D&M
D&M Holdings Inc.
Quality Assurance Division
2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210-8569 Japan
Tel : +81-44-670-2665 Fax : +81-44-670-2697

Provision of information on the compliance of combinations of radio equipment and software

General Information:

Report Date:	28-Sep-17	Report No.:	DM-Radio17022
Manufacturer:	D&M Holdings Inc.		
Address:	2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210-8569, Japan		
Factory	ANAM ELECTRONICS VIETNAM CO.,LTD		
Address:	Dong Van II Industrial Zone, Duy Tien District Ha Nam Province, Viet Nam		
Model Tested:	DSB50BT		
Appliance Type	Bluetooth Speaker		
Brand Name:	DENON		
Country of Origin:	Vietnam		

Radio Specification:

Type	Frequency Range	Max.RF Power(Limit)	Test result of RF Power
Bluetooth	2402~2480 MHz	10dBm	9.8dBm

Technical document: Test Report No. NK-17-R-196

Software version information:
MCU: v1.0 or later
BT: v57_20170905 or later

※There is no change in the performance of Safety, EMC and Radio by version update.

Checked by: Akihiro Yoshida

Approved by:

Jun Sakurai, Director
Quality Assurance Dep.
D&M Holdings Inc.

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Test Report for Restriction of Hazardous Substances (RoHS)
EU Directive 2011/65/EU

General Information:

Report Date:	28-Sep-17	Report No.:	DM-RoHS17022
Manufacturer:	D&M Holdings Inc.		
Address:	2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210-8569, Japan		
Factory	ANAM ELECTRONICS VIETNAM CO.,LTD		
Address:	Dong Van II Industrial Zone, Duy Tien District Ha Nam Province, Viet Nam		
Model Tested:	DSB50BT		
Appliance Type	Bluetooth Speaker		
Brand Name:	DENON		
Country of Origin:	Vietnam		
Harmonised Standards:	EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances		

Test Results: For more detail, refer to the attached parts list.

Date Reported:	28-Sep-17		
Substance	Limit (%)	Containing substances	Judgment
Lead	0.1	Yes*1	Pass
Mercury	0.1	ND*2	Pass
Cadmium	0.01	ND*2	Pass
Hexavalent chromium	0.1	ND*2	Pass
Polybrominated biphenyls (PBB)	0.1	ND*2	Pass
Polybrominated diphenyl ethers (PBDE)	0.1	ND*2	Pass

*1: These are included to only those parts defined as exemption in ANNEX Ⅲ.
*2: ND = Not Detected

Checked by: Akihiro Yoshida

Approved by: Jun Sakurai

Jun Sakurai, Director
Quality Assurance Dep.
D&M Holdings Inc.

DENON

D&M Holdings Inc.
2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210-8569 Japan
Phone: +81-44-670-2665 Fax: +81-44-670-2697

DM-CE17022

EU Declaration of Conformity

We, D&M Holdings Inc., declare under our sole responsibility that the product;

Brand name: **DENON**

Product: **Bluetooth Speaker**

Model: **DSB50BT**

following the provisions of EC/EU directives and EC regulation as follows;

RE: ***2014/53/EU***
LV: ***2014/35/EU***
EMC: ***2014/30/EU***
RoHS: ***2011/65/EU***

to which this declaration relates is in conformity with the following standards for

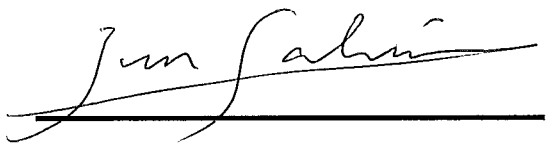
* Standards applied

Safety: ***EN60065:2014***
EMC: ***EN55032:2015 (Class:B)***
EN55020:2007+A11:2011
EN55024:2010
EN61000-3-2:2014
EN61000-3-3:2013
EN301489-1 V2.1.1
EN301489-9 V2.1.1
EN301489-17 V3.1.1
Radio: ***EN300328 V2.1.1***
Health: ***EN62479:2010***
RoHS: ***EN50581:2012***

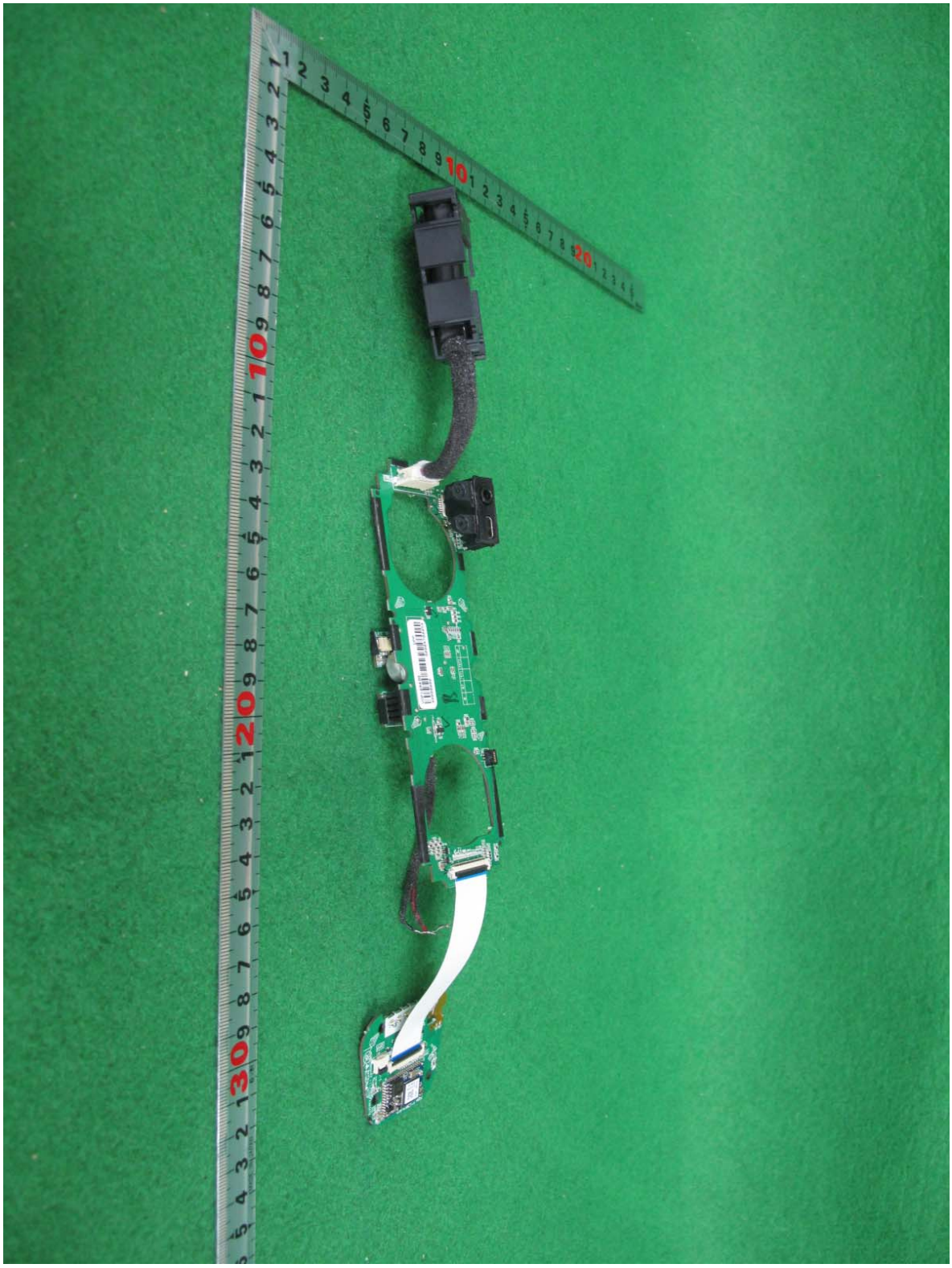
CE Mark first affixed in 2017

Manufacturer: D&M Holdings Inc.
Address : 2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210-8569 Japan

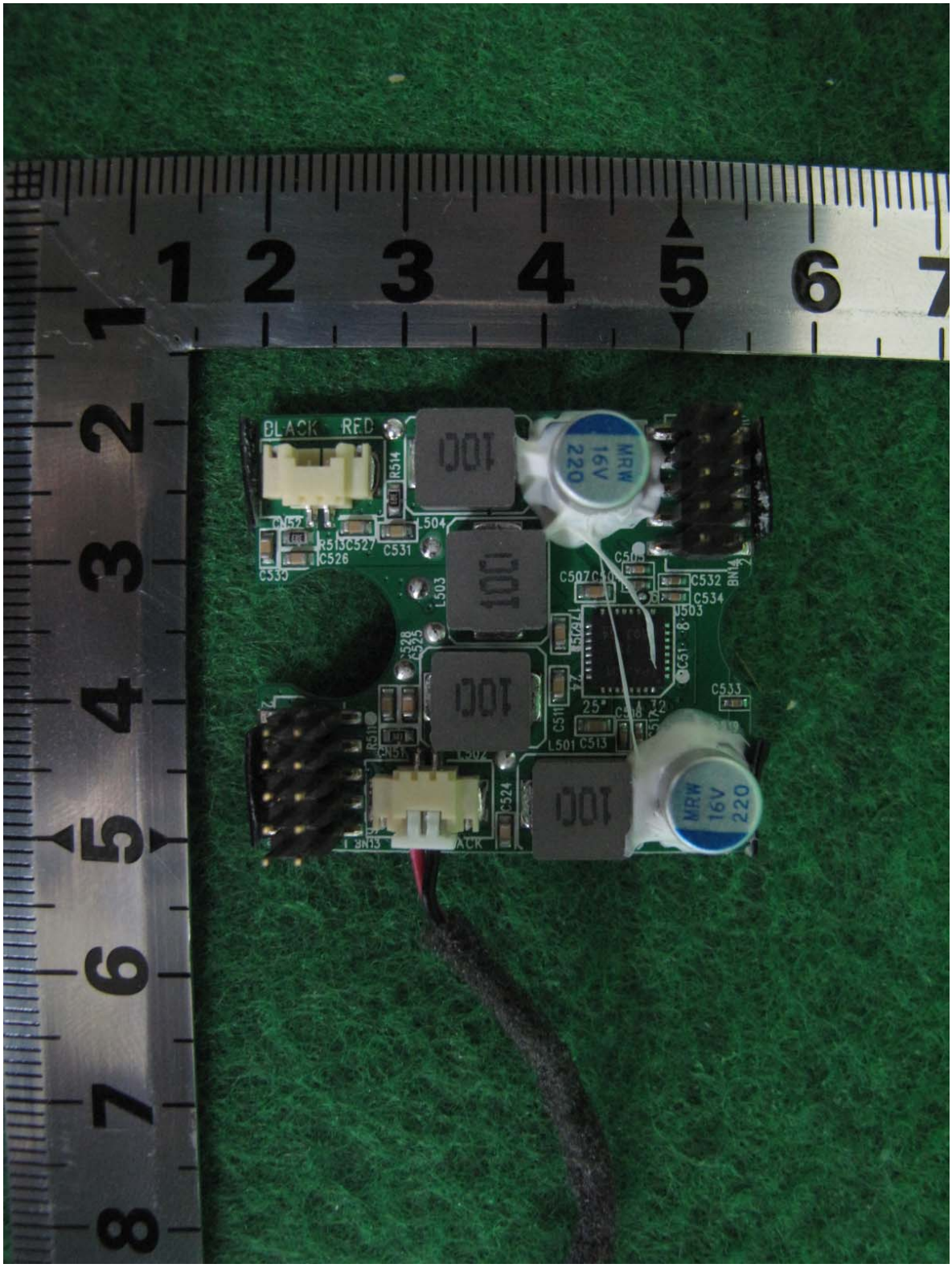
Responsible: Jun Sakurai
Director, Quality Assurance Dep.
Date: 28-September-2017



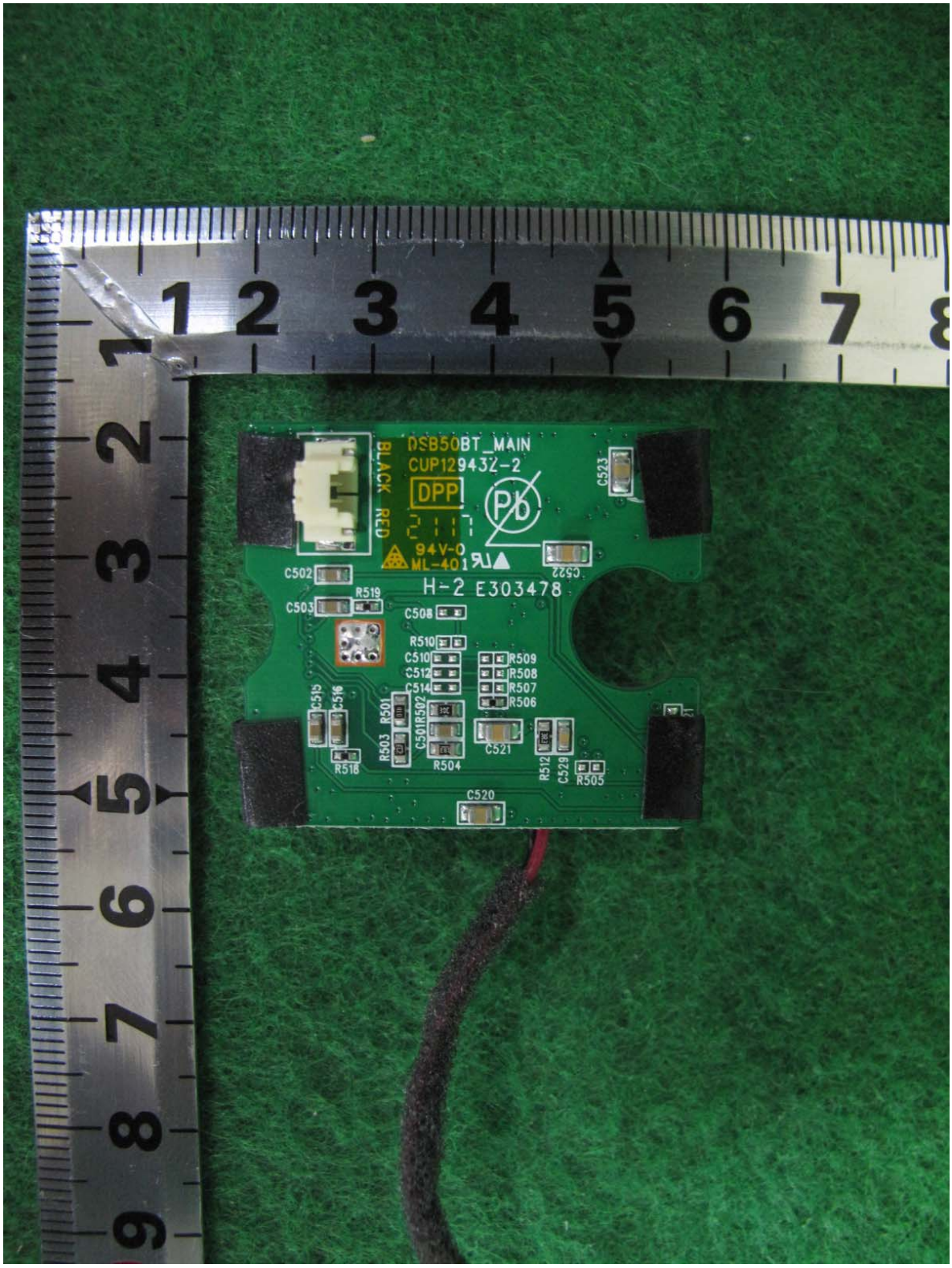
Mainboard with battery



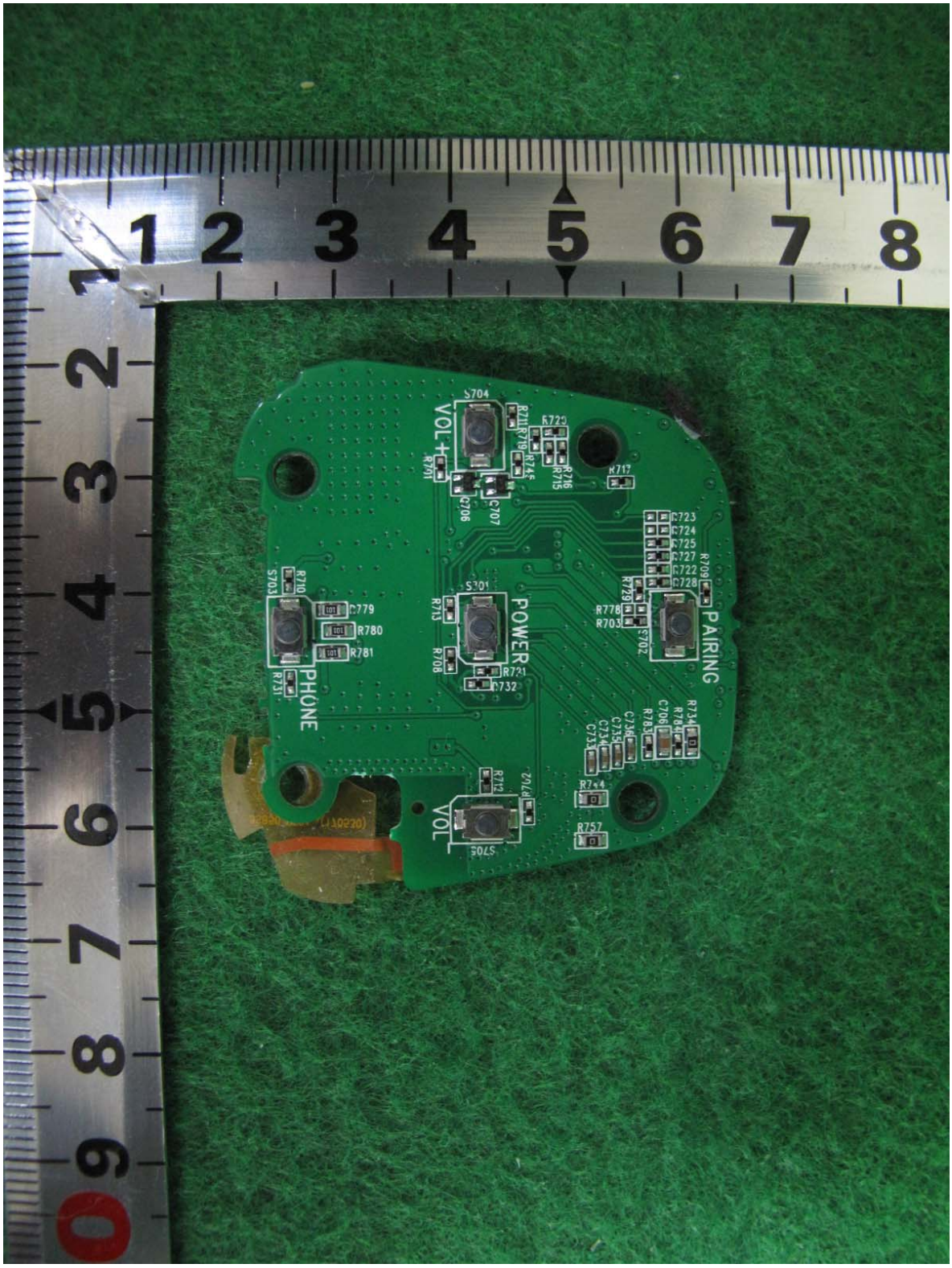
Rear View of Power board



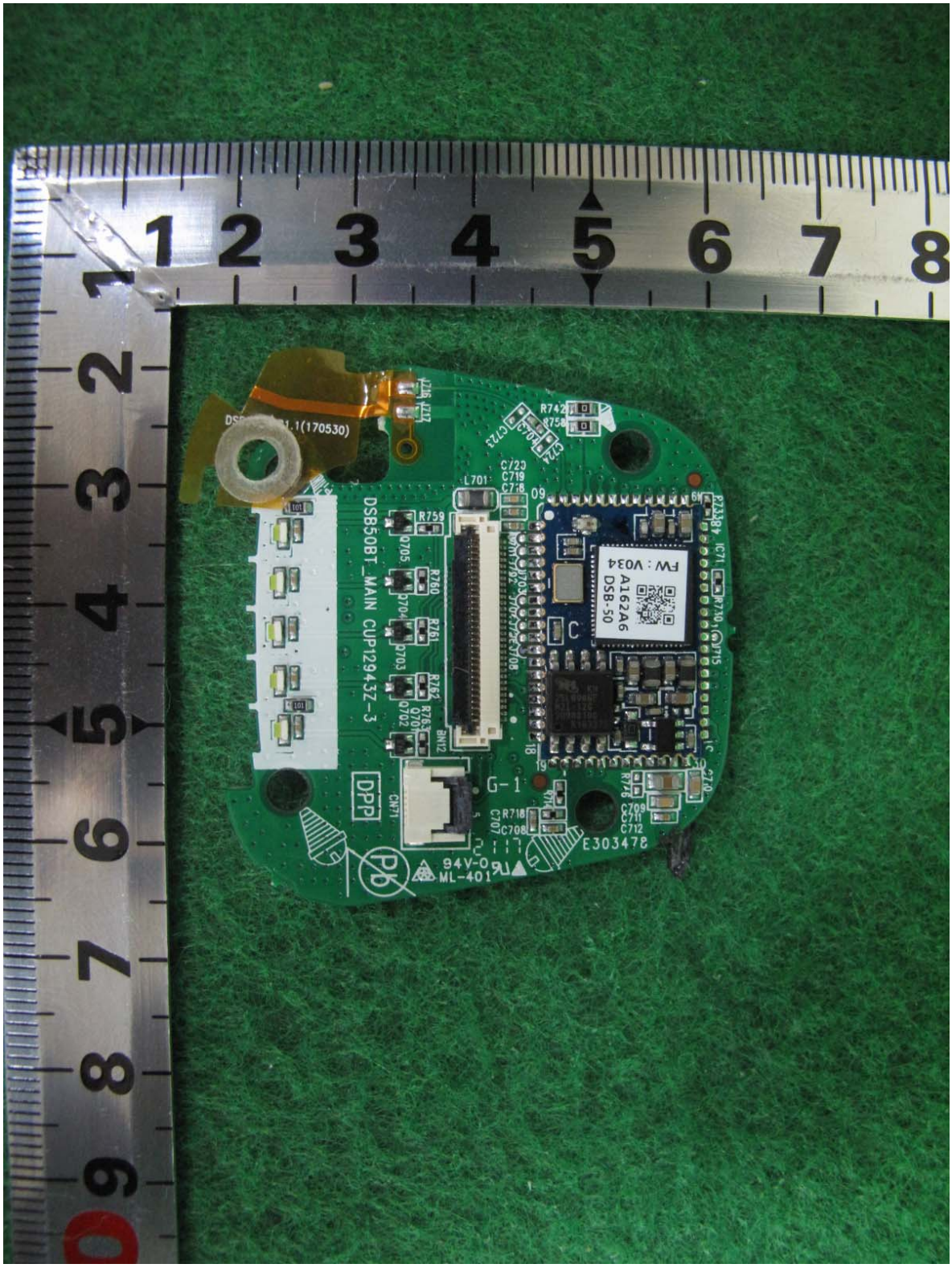
Front View of Power board



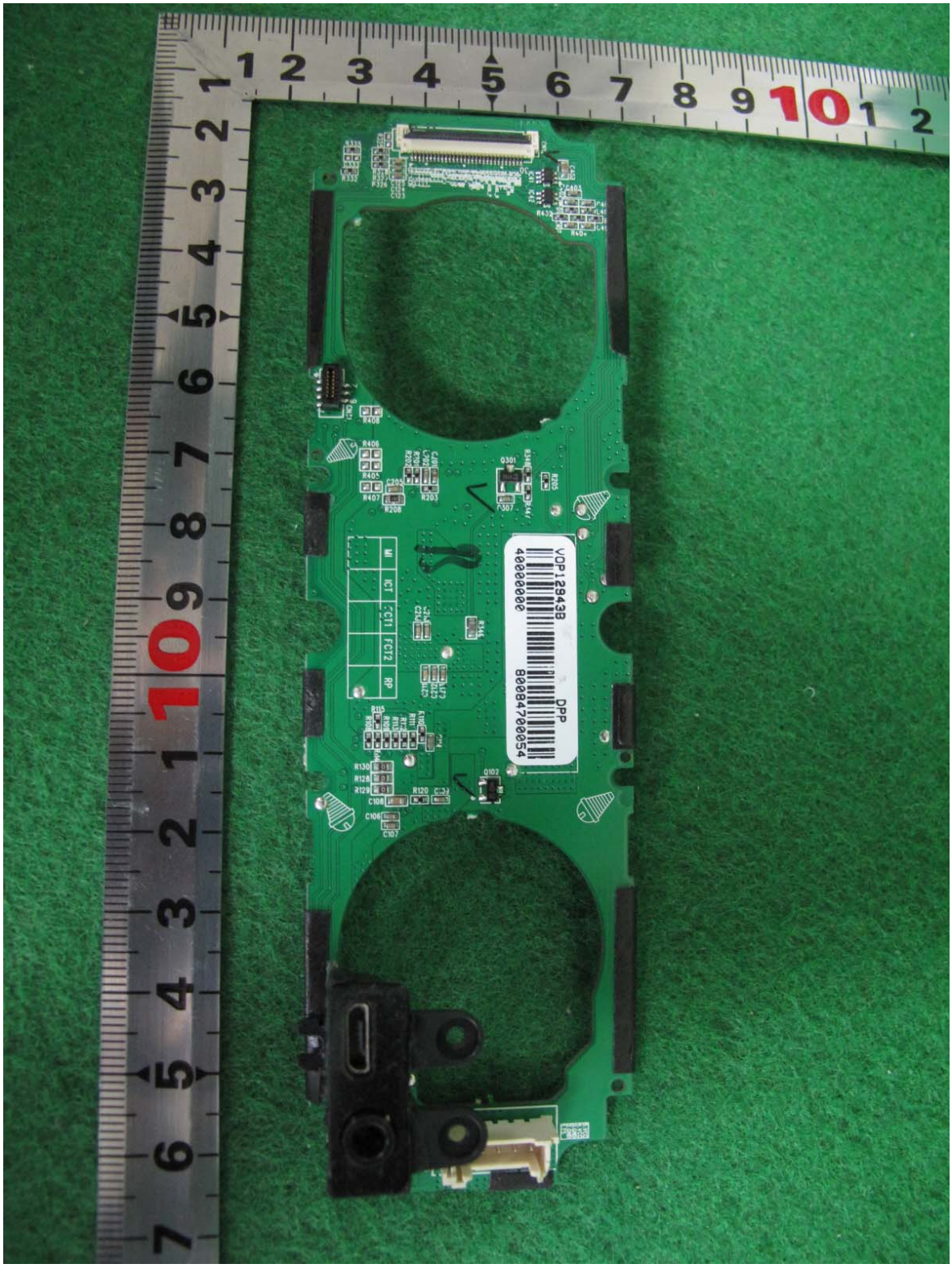
Rear View of RF Board



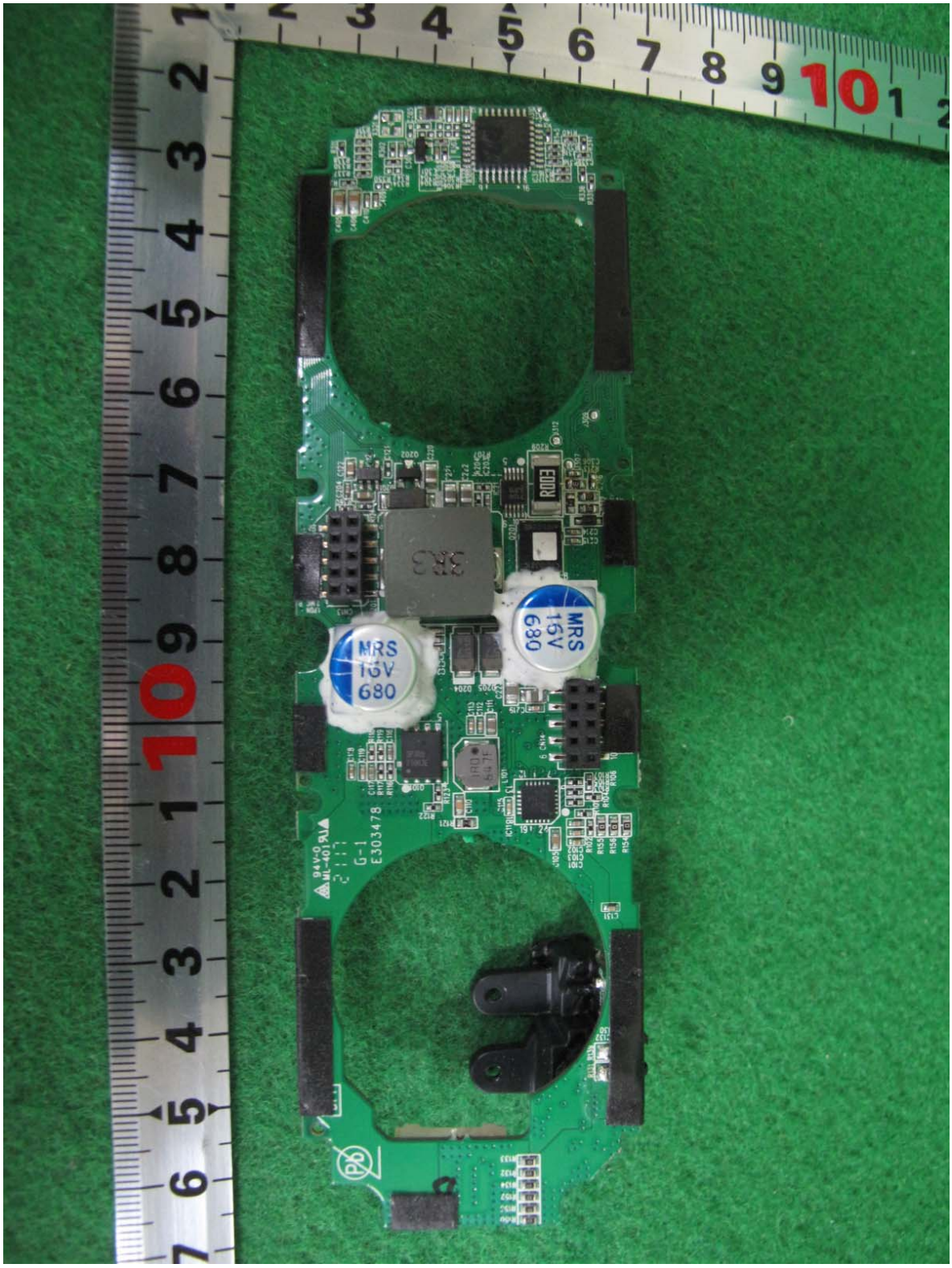
Front View of RF Board



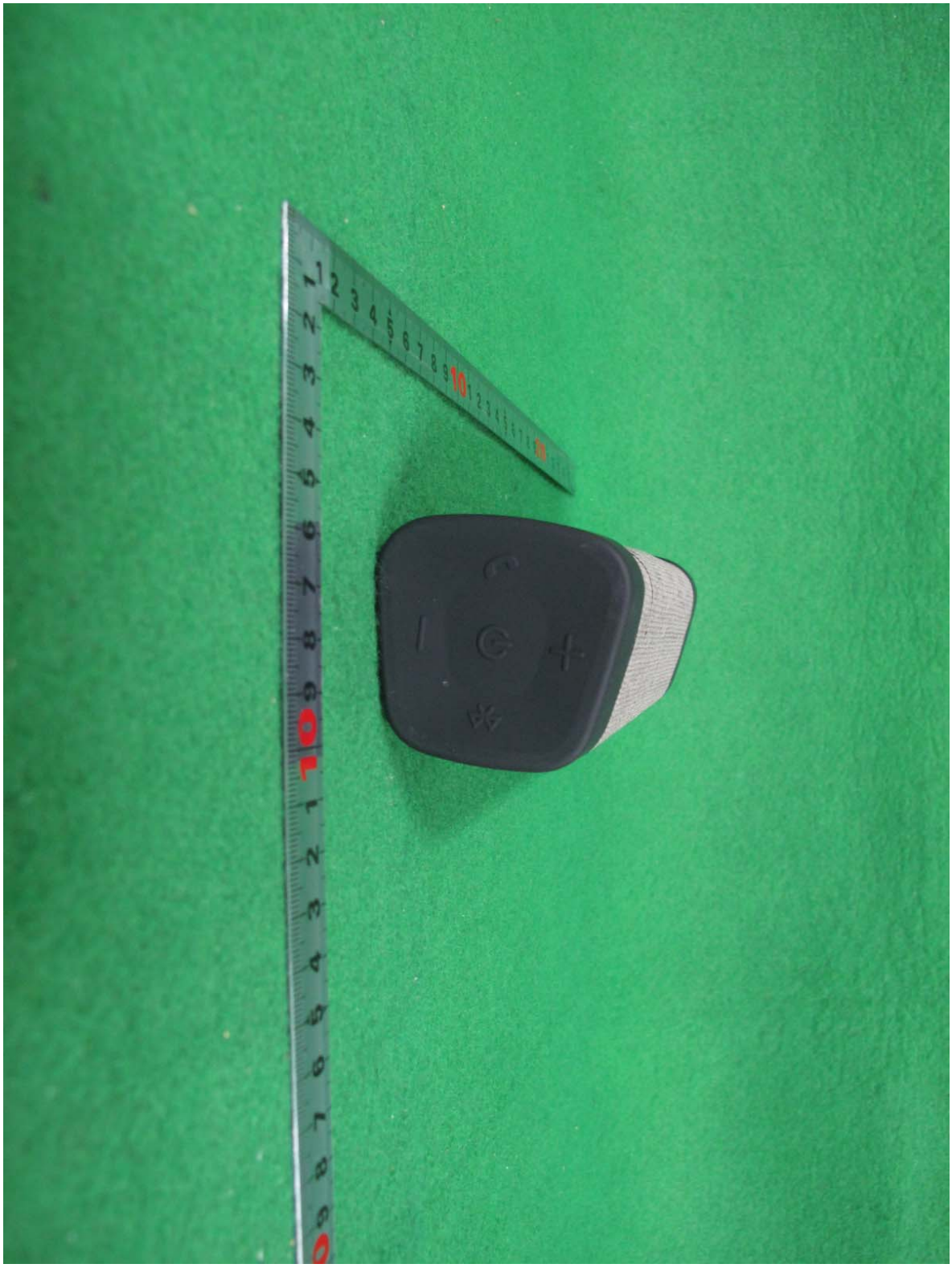
Rear View of Mainboard



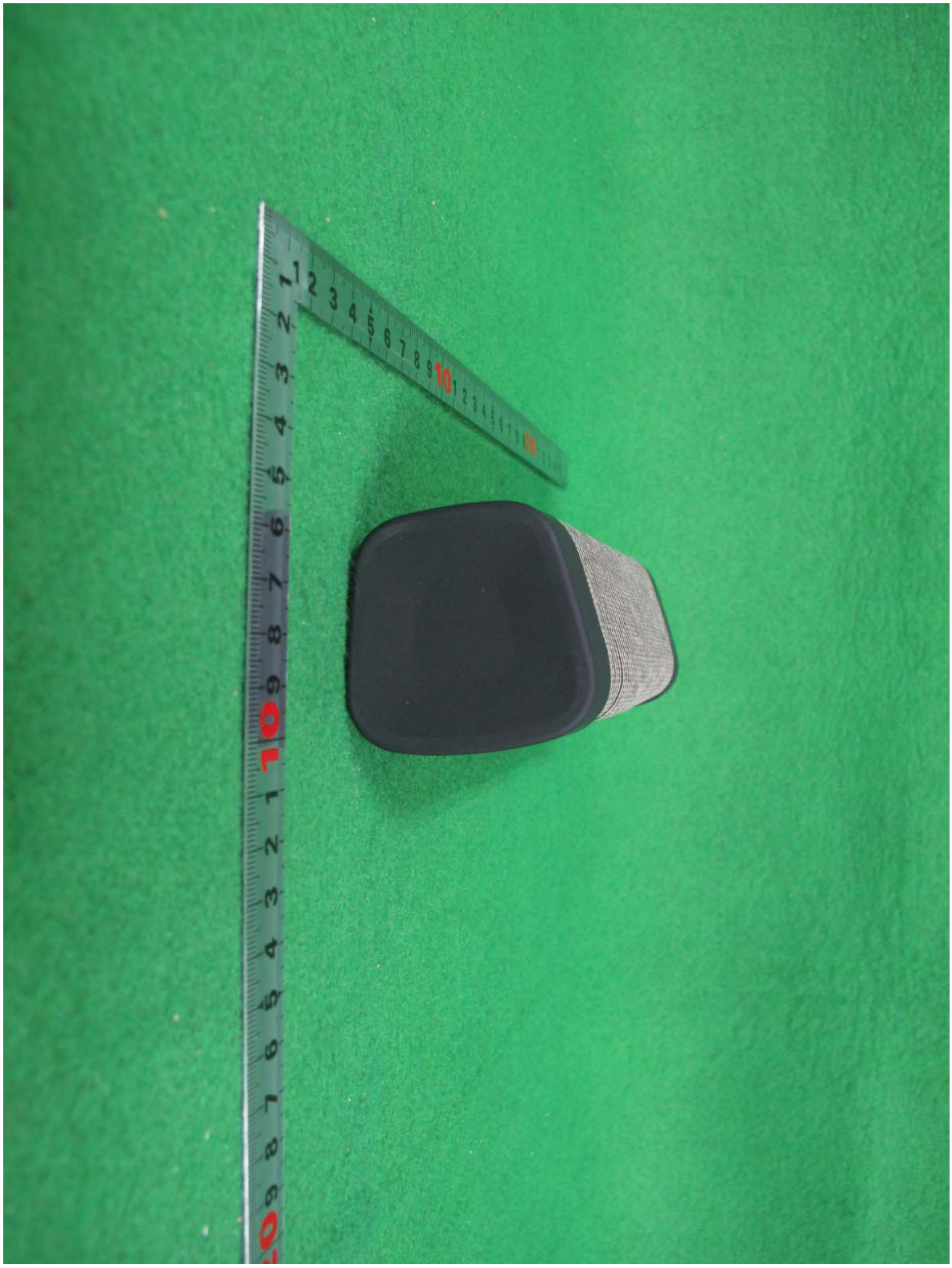
Front View of Mainboard



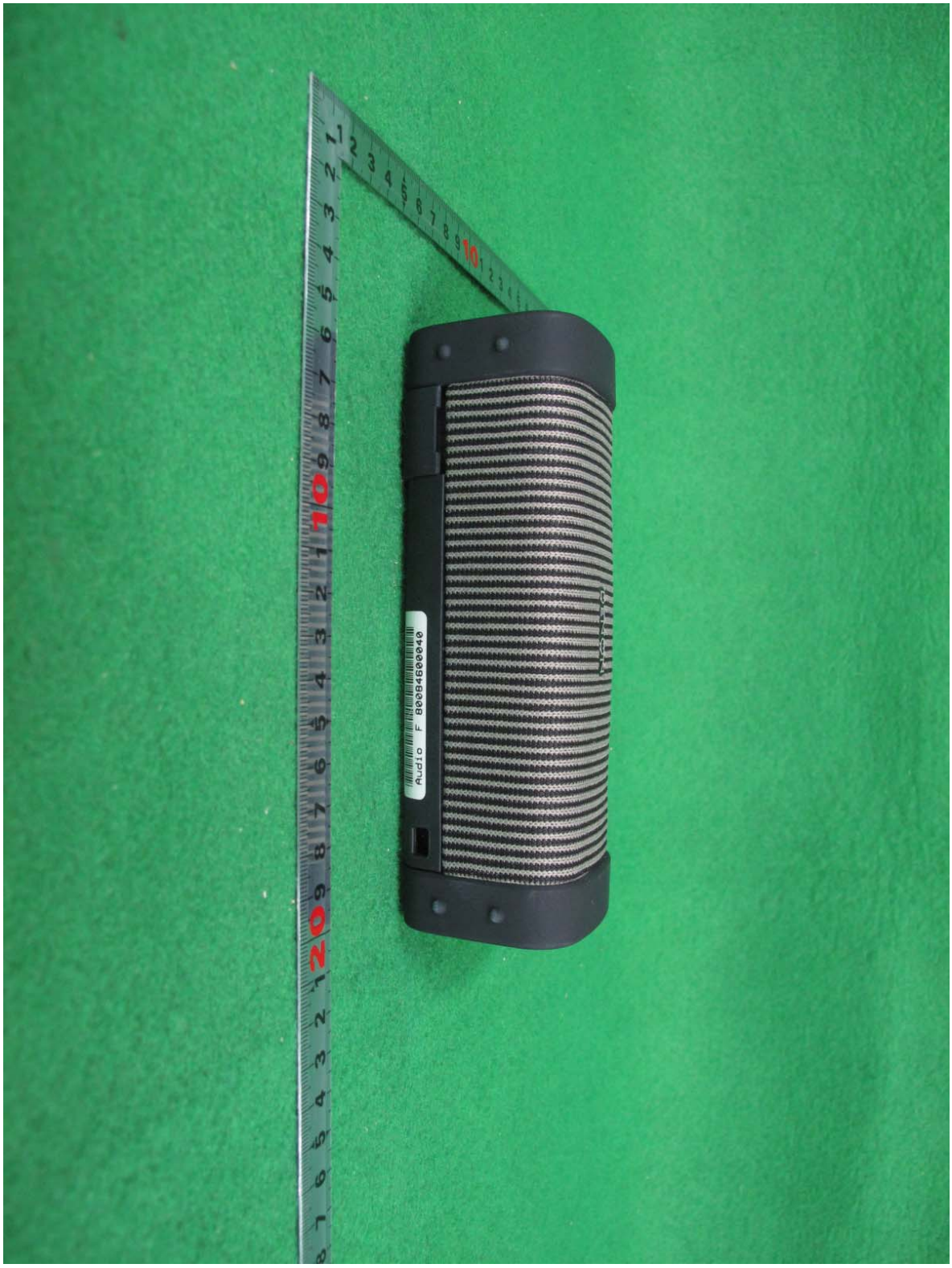
Right View of EUT



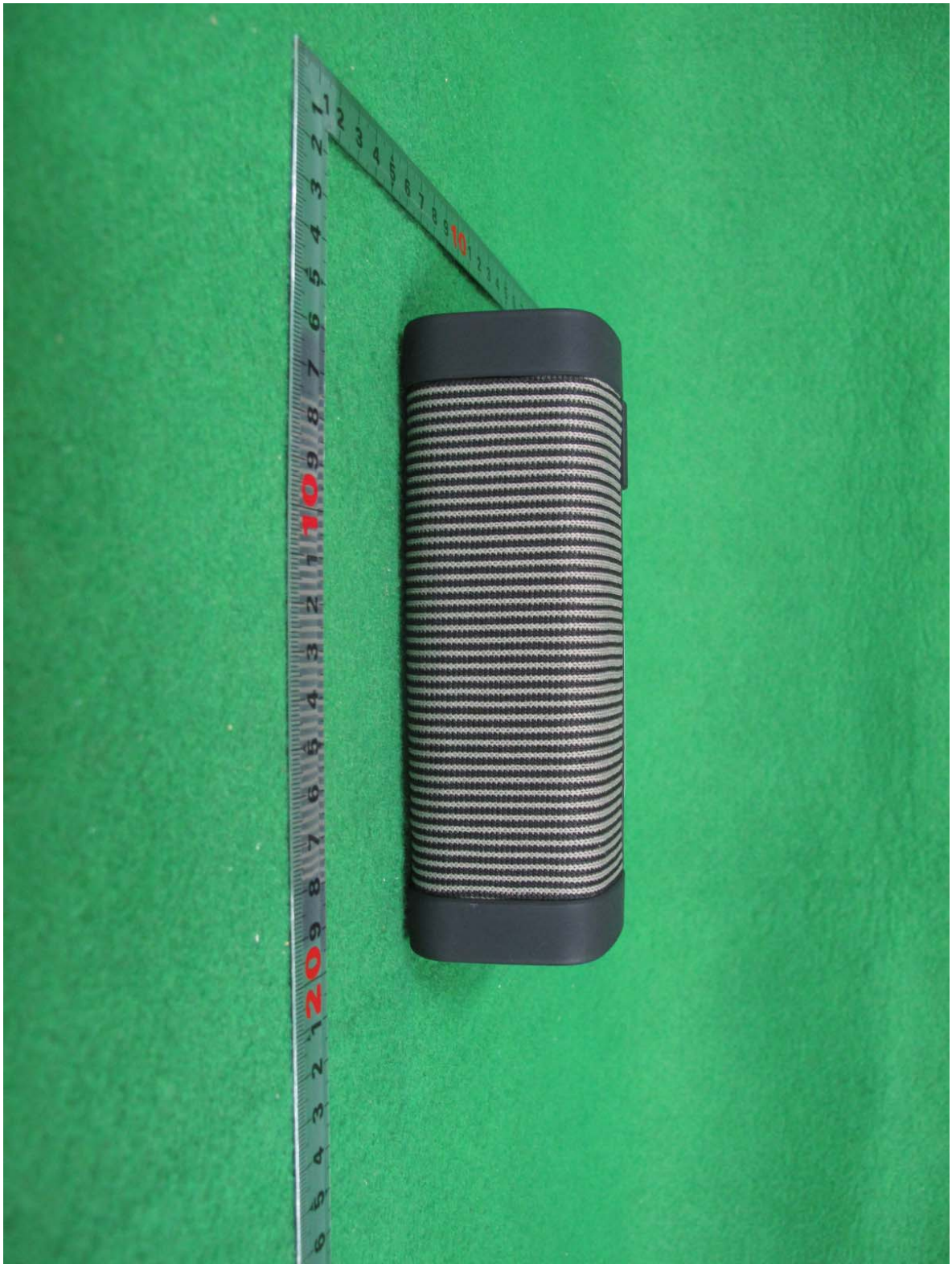
Left View of EUT



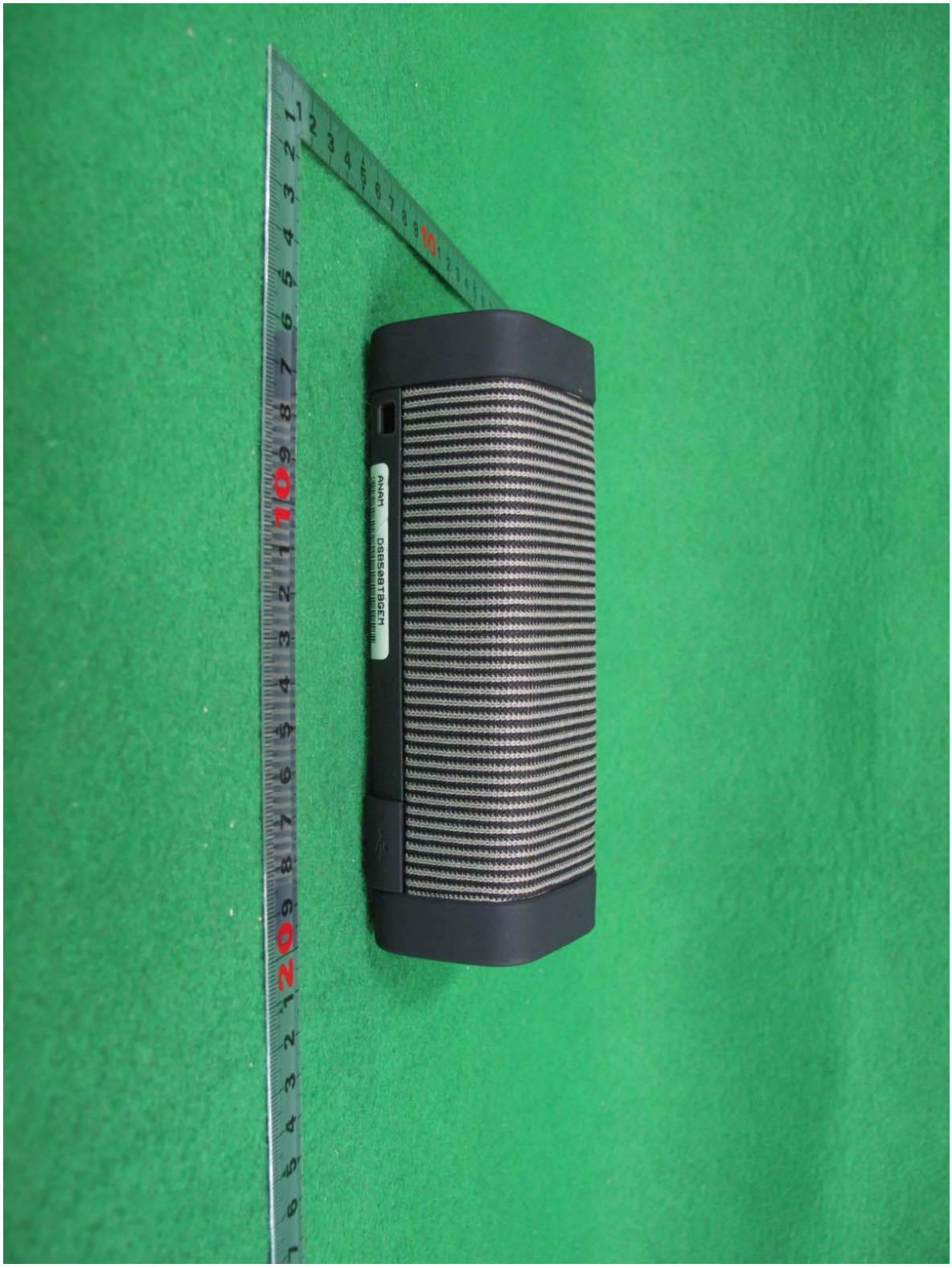
Bottom View of EUT



Top View of EUT



Rear View of EUT

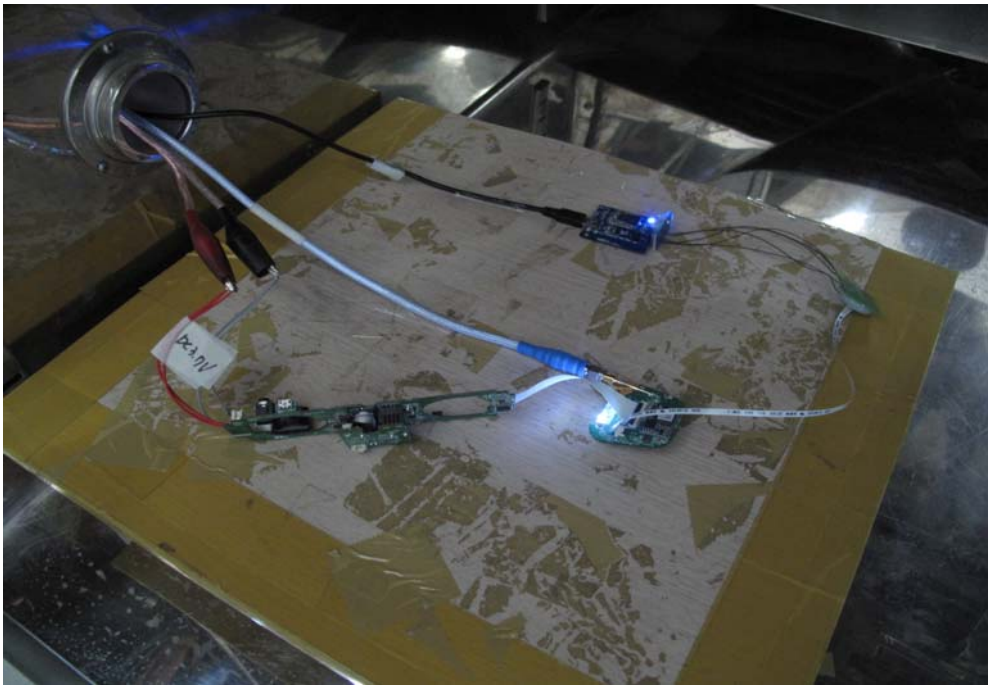


Appendix B Photographs of EUT

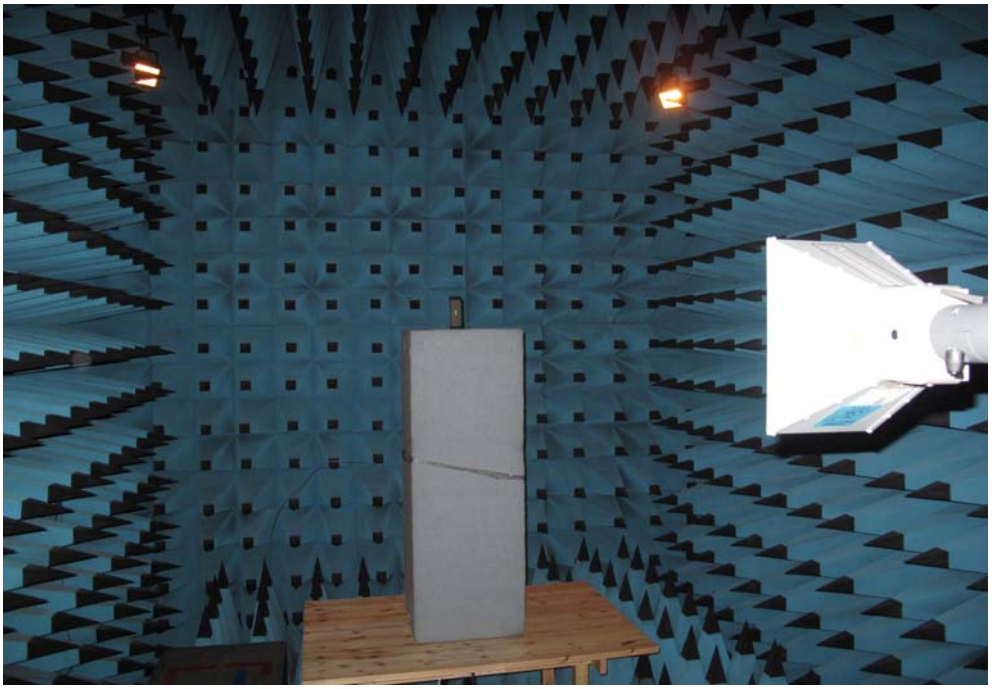
Front View of EUT

Appendix A Photographs of Test Set-up

Conducted Test Picture



Radiated Test Picture



Notes

1. ** Pmin + 6dB. Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.*
2. ***These levels are levels of signal generator and results of being corrected by cable loss and antenna assembly gain (3.37dBi).*
   Blocking signal Power (dBm) = Specified level (dBm) in Limit table below
   + Correctioin factor (dB)
   = Specified level (dBm) in Limit table below + 10.63dB
   Correction factor (dB) = Cable loss (dB) + Ant assembly gain (dBi)
   = 7.26dB + 3.37dBi
   = 10.63dB
3. ****Minimum performance criterion specified in clause 4.3.2.11.3 in EN300328.*
4. *This testing was performed in GFSK modulation of LE mode.*

Limit : ETSI EN 300 328 Sub clause 4.3.2.11.4

Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
Pmin + 6dB	2380 2503.5	-57	CW
Pmin + 6dB	2300 2583.5	-47	CW
NOTE 1: Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

7.7 Receiver Blocking

Test Method : ETSI EN 300 328 Sub clause 5.4.11

Result:

Lowest channel

Categorization	Wanted signal mean power from companion device (dBm)*	Blocking signal Frequency (MHz)	Blocking signal Power (dBm)**	PER (%)	PER Limit (%)***
Receiver category 2	-78.22	2380 2503.5	-46.37	4.60 4.61	10
	-78.22	2300 2583.5	-36.37	4.60 4.98	10

Highest channel

Categorization	Wanted signal mean power from companion device (dBm)*	Blocking signal Frequency (MHz)	Blocking signal Power (dBm)**	PER (%)	PER Limit (%)***
Receiver category 2	-82.22	2380 2503.5	-46.37	5.59 6.04	10
	-82.22	2300 2583.5	-36.37	5.69 8.67	10

7.6.2 Radiated Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.10

Result:

RX mode

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Rx mode	270.33	H	RMS	-61.2	-57.0	4.2
	303.09	H	RMS	-62.2	-57.0	5.2
	319.48	H	RMS	-63.2	-57.0	6.2
	368.66	H	RMS	-60.7	-57.0	3.7
	625.02	V	RMS	-60.3	-57.0	3.3
	810.98	H	RMS	-58.2	-57.0	1.2
	1523.40	V	PK	-53.9	-47.0	6.9
	1663.20	V	PK	-54.7	-47.0	7.7
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

Notes

*1. *Pol. H = Horizontal V = Vertical*

*2. **Det PK = Peak Detector RMS = RMS Detector*

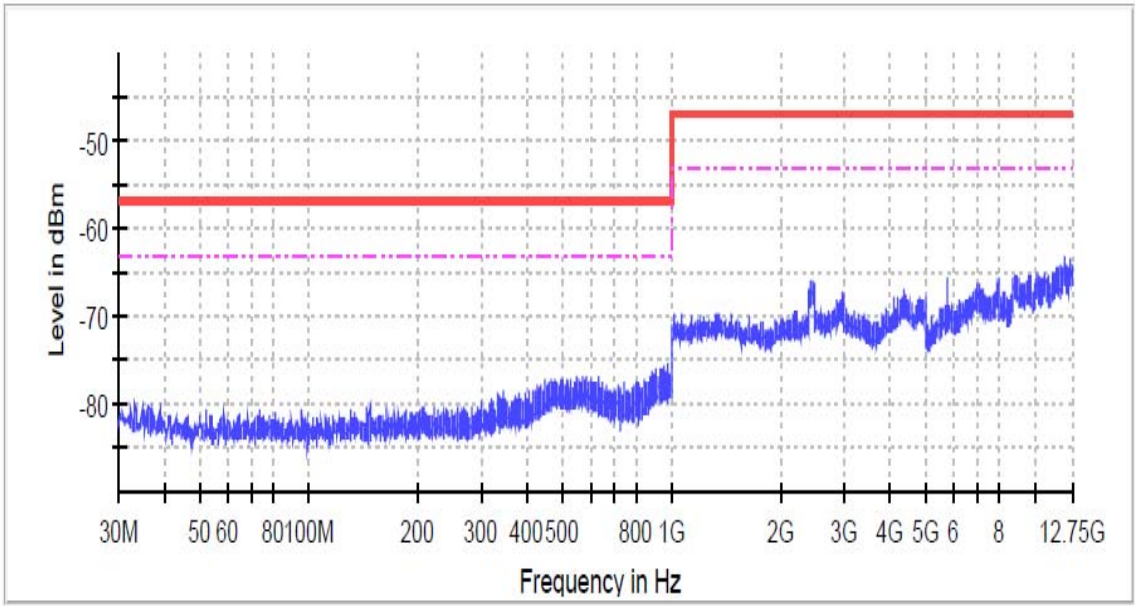
3. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

Limit : ETSI EN 300 328 Sub clause 4.3.2.10.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

7.6.1.1 Test data

Rx mode



7.6. Receiver spurious emissions

7.6.1 Conducted Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.10

Result:

DUT Frequency (MHz)	Frequency (MHz)	Level	Limit (dBm)	Magin (dB)
Rx mode	-	Not detected*	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB			

Notes

1. **Any emssions don't fall within the 6dB range below the applicable limit during testing for pre-scan as specified in 5.4.10.2.1.2.*

Limit : ETSI EN 300 328 Sub clause 4.3.2.10.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

Notes

*1. *Pol. H = Horizontal V = Vertical*

*2. **Det PK = Peak Detector RMS = RMS Detector*

3. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

Limit : ETSI EN 300 328 Sub clause 4.3.2.9.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

Highest Channel (2480 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Highest channel (2480)	270.32	H	PK	-62.1	-36.0	26.1
	368.65	H	PK	-61.7	-36.0	25.7
	466.99	H	PK	-62.3	-36.0	26.3
	625.10	V	PK	-60.6	-54.0	6.6
	750.10	H	PK	-60.3	-54.0	6.3
	811.09	H	PK	-60.2	-54.0	6.2
	2323.73	H	PK	-50.0	-30.0	20.0
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

7.5.2 Radiated Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.9

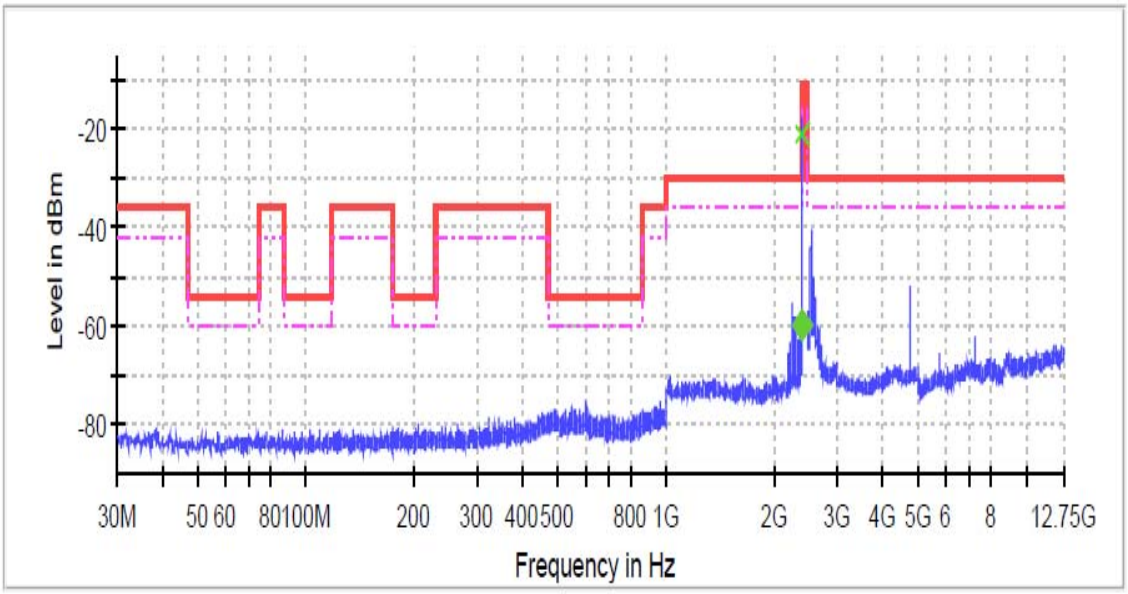
Result:

Lowest Channel (2402 MHz)

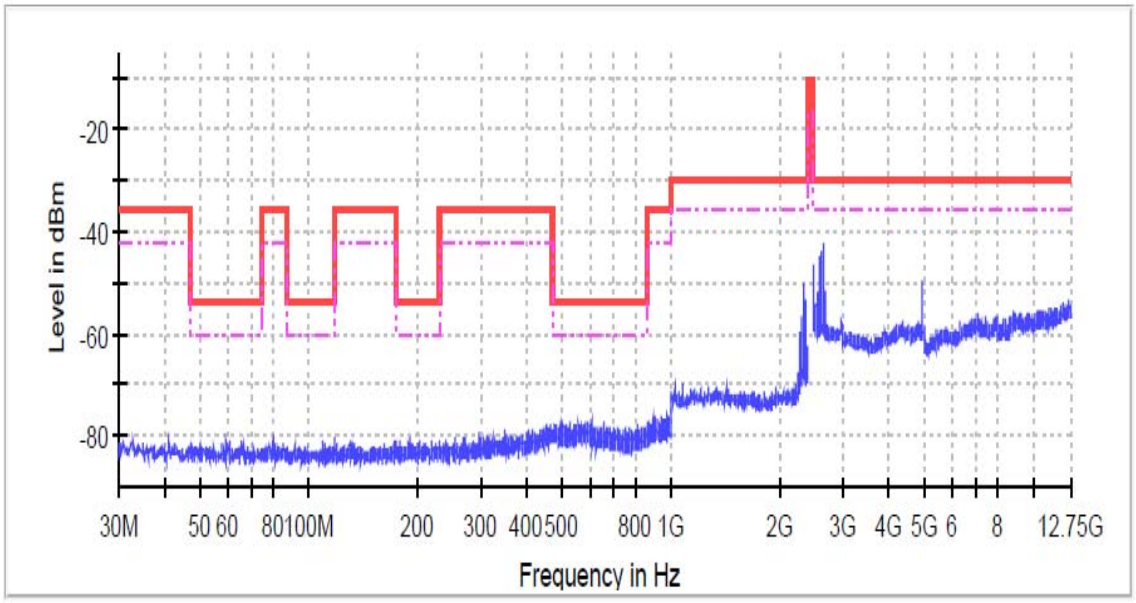
Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Lowest channel (2402)	368.65	H	PK	-61.8	-36.0	25.8
	454.74	H	PK	-62.9	-36.0	26.9
	466.99	H	PK	-62.6	-36.0	26.6
	624.97	V	PK	-60.7	-54.0	6.7
	750.10	H	PK	-61.0	-54.0	7.0
	811.09	H	PK	-60.1	-54.0	6.1
	1670.69	H	PK	-49.7	-30.0	19.7
	2558.24	H	PK	-46.0	-30.0	16.0
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

7.5.1.1 Test data

Lowest Channel (2402 MHz)



Highest Channel (2480 MHz)



7.5. Transmitter unwanted emissions in the spurious domain

7.5.1 Conducted Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.9

Result:

DUT Frequency (MHz)	Frequency (MHz)	Level	Limit (dBm)	Magin (dB)
2402	-	Not detected*	-	-
2480	-	Not detected*	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB			

Notes

1. **Any emssions don't fall within the 6dB range below the applicable limit during testing for pre-scan as specified in 5.4.9.2.1.2.*

Limit : ETSI EN 300 328 Sub clause 4.3.2.9.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

7.4. Transmitter unwanted emissions in the out-of-band domain

Test Method : ETSI EN 300 328 Sub clause 5.4.8

Result:

Lowest Channel

Test Conditions	Transmitter unwanted emissions in the out-of-band domain (e.i.r.p) (dBm/MHz)			
	2400 MHz - 2BW to 2400 MHz - BW	2400 MHz - BW to 2400 MHz	2483.5 MHz to 2483.5 MHz + BW	2483.5 MHz + BW to 2483.5 + 2BW
Normal 25 ℃, 3.7 Vdc	-55.5	-54.6	-60.6	-60.4
Limit	-20.00	-10.00	-10.00	-20.00
Measurement Uncertainty	±2.0 dB			

Highest Channel

Test Conditions	Transmitter unwanted emissions in the out-of-band domain (e.i.r.p) (dBm/MHz)			
	2400 MHz - 2BW to 2400 MHz - BW	2400 MHz - BW to 2400 MHz	2483.5 MHz to 2483.5 MHz + BW	2483.5 MHz + BW to 2483.5 + 2BW
Normal 25 ℃, 3.7 Vdc	-60.9	-61.0	-59.5	-56.2
Limit	-20.00	-10.00	-10.00	-20.00
Measurement Uncertainty	±2.0 dB			

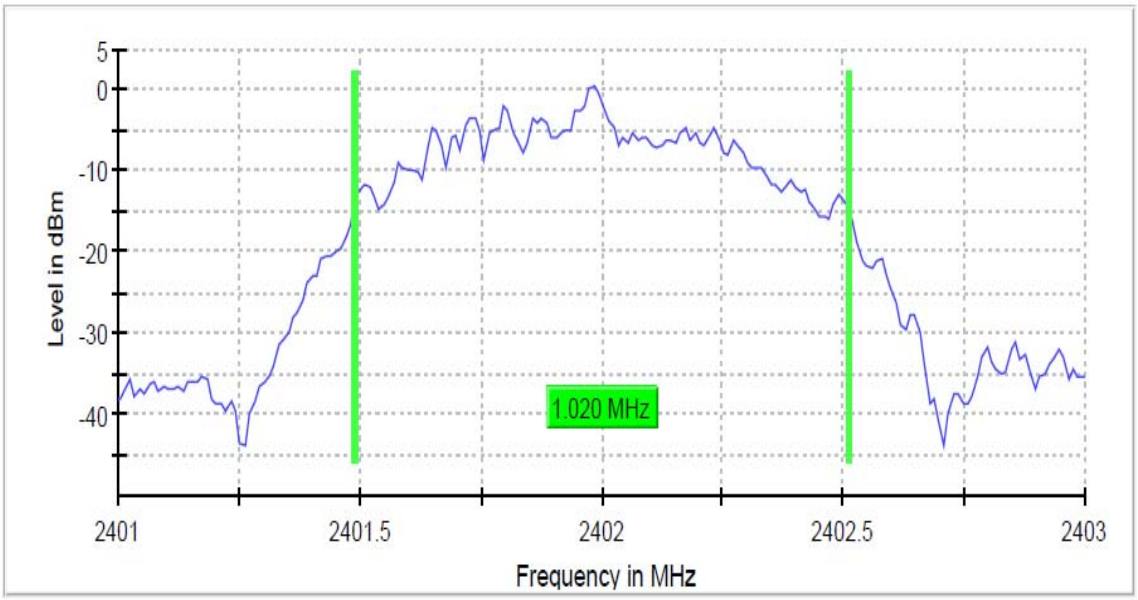
Notes
Antenna Peak Gain = 3.37 dBi

Limit : ETSI EN 300 328 Sub clause 4.3.2.8.3

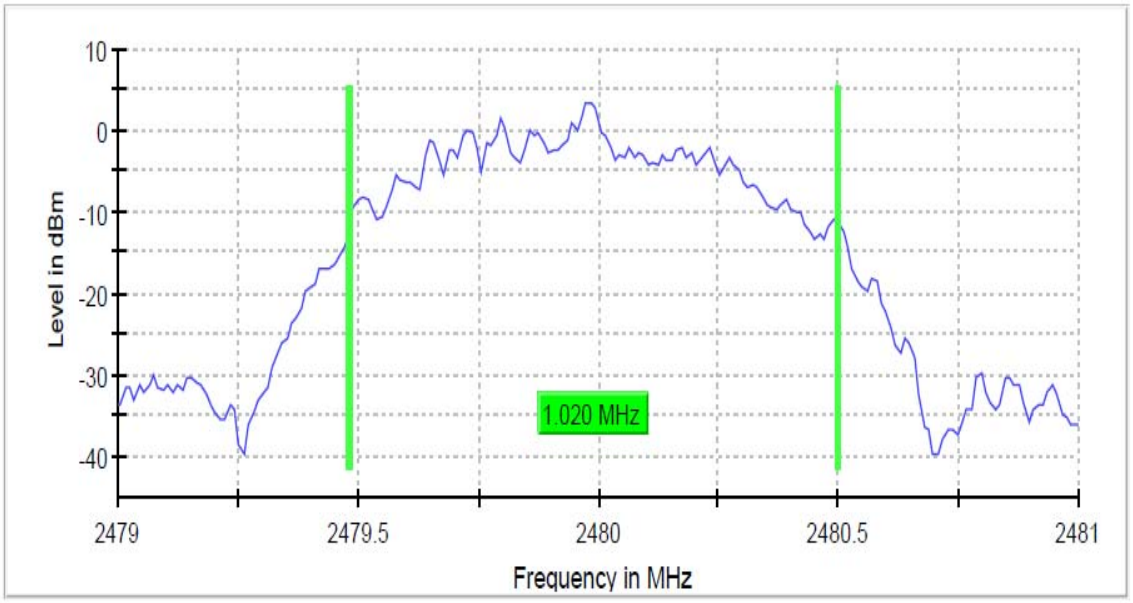
Frequency Range	Limit
2400 MHz - BW to 2400 MHz, 2483.5 MHz to 2483.5 + BW	-10 dBm/MHz e.i.r.p
2400 MHz - 2BW to 2400 MHz – BW, 2483.5 MHz + BW to 2483.5 MHz + 2BW	-20 dBm/MHz e.i.r.p

7.3.1 Test Data

Lowest Channel (2402 MHz)



Highest Channel (2480 MHz)



7.3 Occupied Channel Bandwidth

Test Method : ETSI EN 300 328 Sub clause 5.4.7

Result:

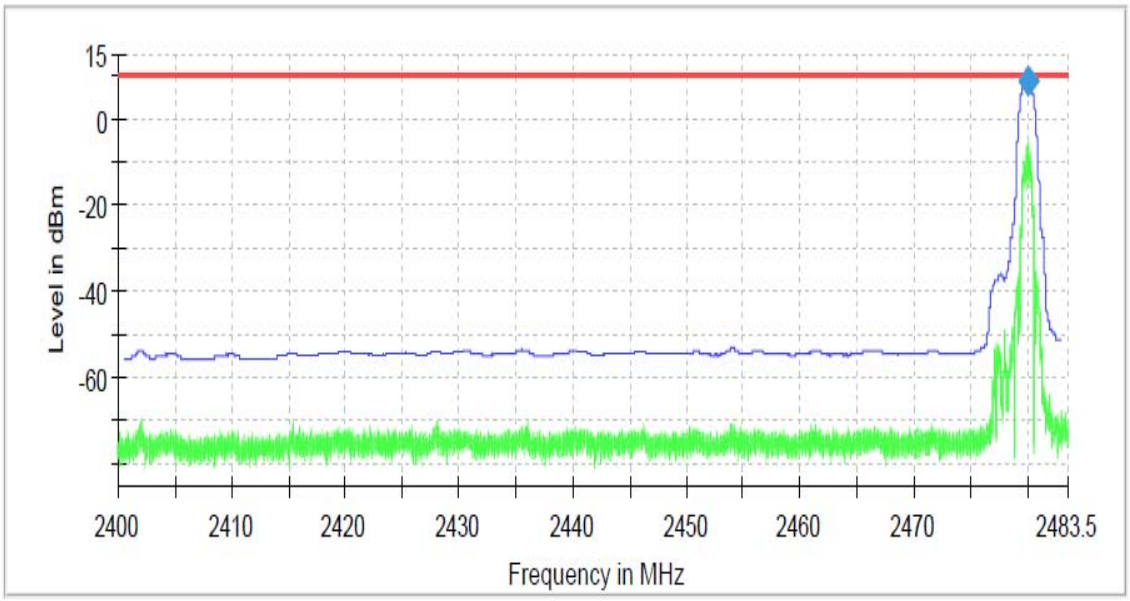
Test Conditions	Frequency range (MHz)	
	Lowest	Highest
Normal 25 ℃, 3.7 Vdc	2401.49	2480.50
Measurement Uncertainty	± 0.23 MHz	

Test Conditions	Occupied channel bandwidth (MHz)	
	Lowest	Highest
Normal 25 ℃, 3.7 Vdc	1.02	1.02
Measurement Uncertainty	± 0.23 MHz	

Limits :

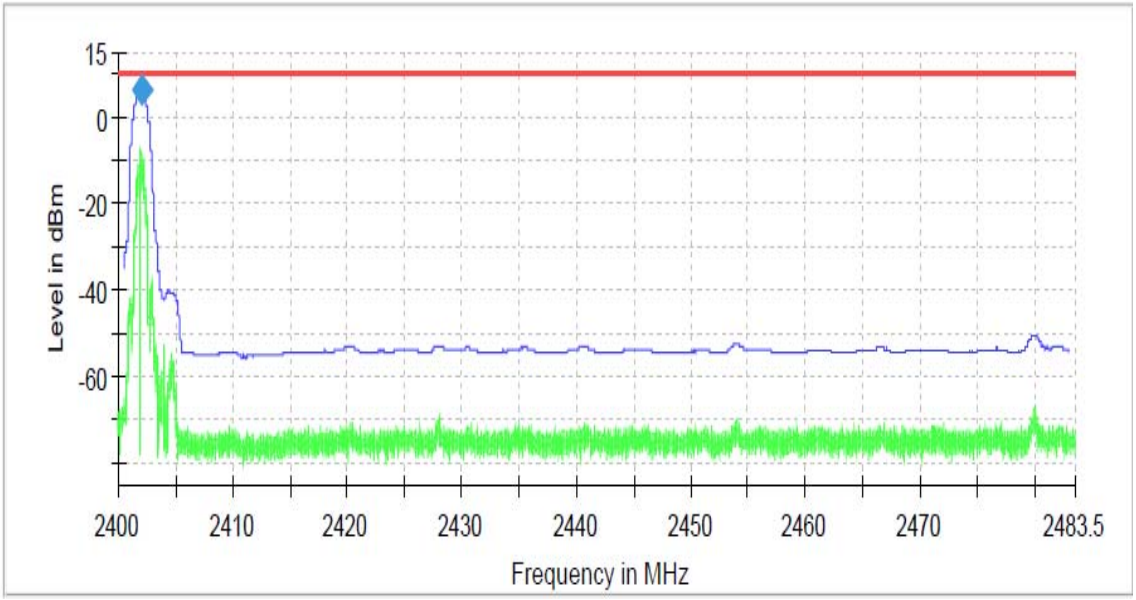
ETSI EN 300 328 Sub clause 4.3.2.7.3	2400 to 2483.5 MHz

Highest Channel (2480 MHz)

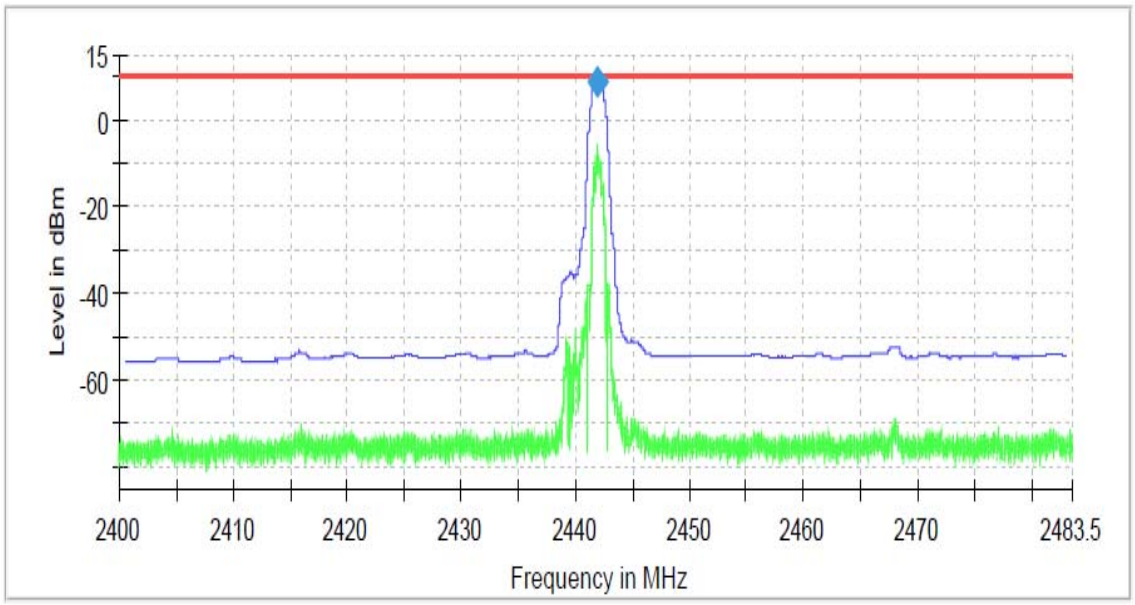


7.2.1 Test data

Lowest Channel (2402 MHz)



Middle Channel (2442 MHz)



7.2 Power Spectral Density

Test Method : ETSI EN 300 328 Sub clause 5.4.3

Result:

Test Conditions	Power spectral density (e.i.r.p) (dBm/MHz)		
	2402 MHz	**2442 MHz**	**2480 MHz**
Normal 25 ℃, 3.7 Vdc	6.0	8.8	9.0
Measurement Uncertainty	± 0.4 dB		

Notes

There are two options for this testing as specified in 5.4.3.2.1 in EN300328 v2.1.1

- Option 1 was used for PSD measurement.

Limits :

ETSI EN 300 328 Sub clause 4.3.2.3.3	10 dBm/MHz

7. Other Types of Wide Band Modulation Test Items

7.1 RF Output Power

Test Method : ETSI EN 300 328 Sub clause 5.4.2

Result:

Test Conditions	RF Output Power (e.i.r.p.) (dBm)		
	2402 MHz	2442 MHz	2480 MHz
Normal 25 ℃, 3.7 Vdc	6.0	8.8	9.0
Extreme -10 ℃, 3.33 Vdc	5.3	8.2	8.3
Extreme -10 ℃, 4.07 Vdc	5.0	8.2	8.3
Extreme 50 ℃, 3.33 Vdc	5.5	8.3	8.5
Extreme 50 ℃, 4.07 Vdc	5.5	8.2	8.5
Measurement Uncertainty	± 0.4 dB		

Notes
Antenna Peak Gain = 3.37 dBi
RF Output Power (e.i.r.p.) = RF output power (dBm) + Antenna Gain (dBi)

Limits :

ETSI EN 300 328 Sub clause 4.3.2.2.3	20 dBm

Limit : ETSI EN 300 328 Sub clause 4.3.1.12.4

Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
Pmin + 6dB	2380 2503.5	-57	CW
Pmin + 6dB	2300 2583.5	-47	CW
NOTE 1: Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

6.8. Receiver Blocking

Test Method : ETSI EN 300 328 Sub clause 5.4.11

Result:

Normal operation

Categorization	Wanted signal mean power from companion device (dBm)*	Blocking signal Frequency (MHz)	Blocking signal Power (dBm)**	PER (%)	PER Limit (%)***
Receiver category 2	-83.22	2380 2503.5	-46.37	1.039 0.547	10
	-83.22	2300 2583.5	-36.37	0.843 6.586	10

Notes

1. ** Pmin + 6dB. Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.*
2. ***These levels are levels of signal generator and results of being corrected by cable loss and antenna assembly gain (3.37dBi).*
   Blocking signal Power (dBm) = Specified level (dBm) in Limit table below
   + Correctioin factor (dB)
   = Specified level (dBm) in Limit table below + 10.63dB
   Correction factor (dB) = Cable loss (dB) + Ant assembly gain (dBi)
   = 7.26dB + 3.37dBi
   = 10.63dB
3. ****Minimum performance criterion specified in clause 4.3.1.12.3.*

6.7.2 Radiated Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.10

Result:

Rx mode

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Rx mode	270.38	H	RMS	-60.7	-57.0	3.7
	368.64	H	RMS	-61.0	-57.0	4.0
	532.03	H	RMS	-61.7	-57.0	4.7
	624.99	V	RMS	-59.5	-57.0	2.5
	795.75	V	RMS	-59.9	-57.0	2.9
	811.00	H	RMS	-58.1	-57.0	1.1
	1665.20	V	RMS	-70.0	-47.0	23.0
	1679.00	V	RMS	-70.9	-47.0	23.9
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

Notes

*1. *Pol. H = Horizontal V = Vertical*

*2. **Det PK = Peak Detector RMS = RMS Detector*

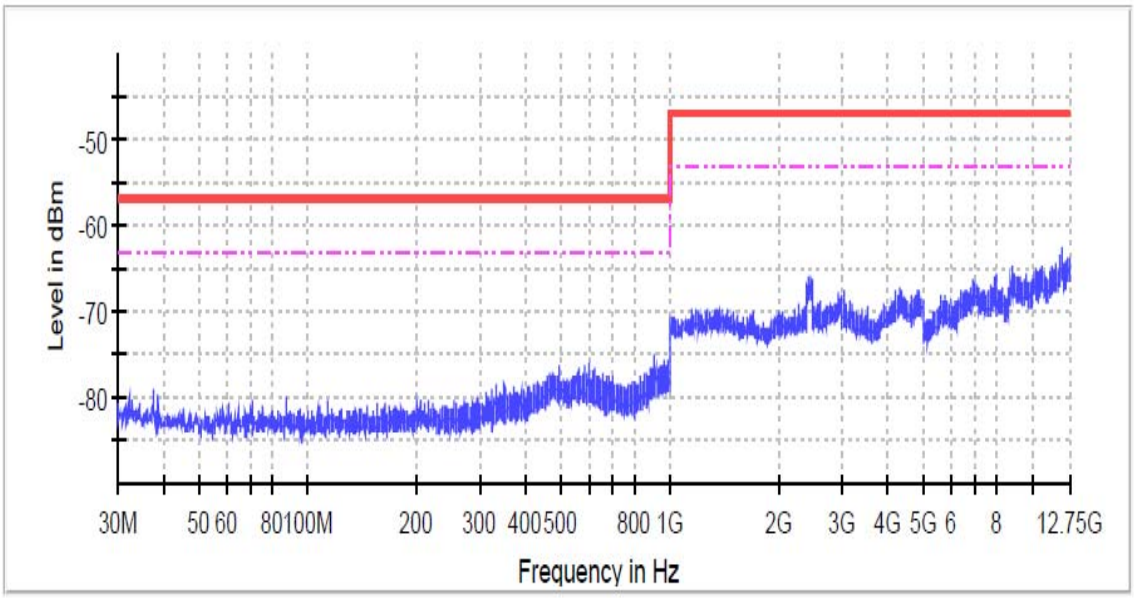
3. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

Limit : ETSI EN 300 328 Sub clause 4.3.1.11.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

6.7.1.1 Test Data

Rx mode



6.7. Receiver spurious emissions

6.7.1 Conducted Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.10

Result:

Rx mode

DUT Frequency (MHz)	Frequency (MHz)	Level	Limit (dBm)	Magin (dB)
Rx mode	-	Not detected*	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB			

Notes

1. **Any emssions don't fall within the 6dB range below the applicable limit during testing for pre-scan as specified in 5.4.10.2.1.2.*

Limit : ETSI EN 300 328 Sub clause 4.3.1.11.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

Notes

*1. *Pol. H = Horizontal V = Vertical*

*2. **Det PK = Peak Detector RMS = RMS Detector*

3. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

Limit : ETSI EN 300 328 Sub clause 4.3.1.10.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

8DPSK Lowest Channel (2402 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Lowest channel (2402)	162.77	V	PK	-67.1	-36.0	31.1
	170.77	H	PK	-67.2	-36.0	31.2
	264.01	H	PK	-64.1	-36.0	28.1
	272.02	H	PK	-64.5	-36.0	28.5
	280.02	H	PK	-66.9	-36.0	30.9
	300.02	H	PK	-61.8	-36.0	25.8
	2557.98	H	PK	-46.9	-30.0	16.9
	1761.39	H	PK	-53.0	-30.0	23.0
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

8DPSK Highest Channel (2480 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Highest channel (2480)	170.77	H	PK	-68.2	-36.0	32.2
	264.01	H	PK	-65.1	-36.0	29.1
	268.01	H	PK	-67.3	-36.0	31.3
	272.02	H	PK	-65.8	-36.0	29.8
	291.90	H	PK	-67.1	-36.0	31.1
	300.02	H	PK	-63.6	-36.0	27.6
	1684.32	H	PK	-50.1	-30.0	20.1
	2609.43	H	PK	-51.4	-30.0	21.4
	7439.60	H	PK	-44.8	-30.0	14.8
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

π/4 DQPSK Lowest Channel (2402 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Lowest channel (2402)	163.01	H	PK	-67.6	-36.0	31.6
	170.77	H	PK	-67.8	-36.0	31.8
	264.01	H	PK	-65.4	-36.0	29.4
	271.89	H	PK	-64.0	-36.0	28.0
	280.02	H	PK	-67.0	-36.0	31.0
	300.02	H	PK	-63.2	-36.0	27.2
	2557.66	H	PK	-48.0	-30.0	18.0
	2658.76	H	PK	-47.8	-30.0	17.8
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

π/4 DQPSK Highest Channel (2480 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Highest channel (2480)	170.77	H	PK	-67.9	-36.0	31.9
	264.01	H	PK	-65.6	-36.0	29.6
	268.01	H	PK	-66.1	-36.0	30.1
	271.89	H	PK	-62.9	-36.0	26.9
	280.02	H	PK	-66.4	-36.0	30.4
	300.02	H	PK	-61.7	-36.0	25.7
	2324.08	H	PK	-50.0	-30.0	20.0
	7440.40	V	PK	-42.9	-30.0	12.9
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

6.6.2 Radiated Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.9

Result:

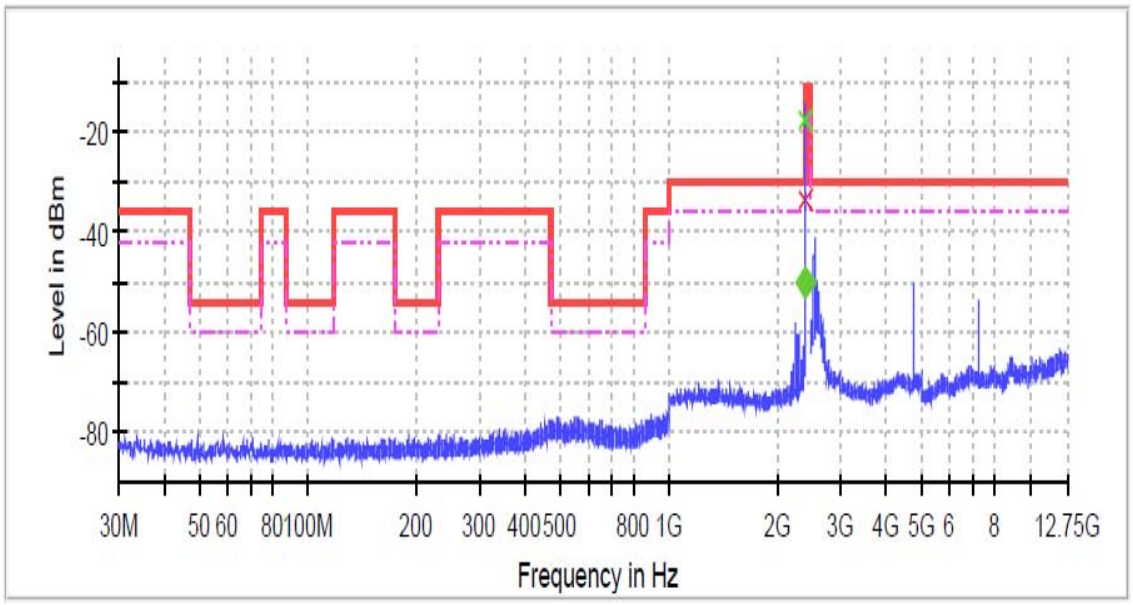
GFSK Lowest Channel (2402 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Lowest channel (2402)	160.01	V	PK	-67.8	-36.0	31.8
	264.01	H	PK	-66.3	-36.0	30.3
	272.02	H	PK	-66.3	-36.0	30.3
	280.02	H	PK	-67.3	-36.0	31.3
	292.02	H	PK	-66.5	-36.0	30.5
	300.02	H	PK	-59.7	-36.0	23.7
	2557.85	H	PK	-44.9	-30.0	14.9
	7206.00	V	PK	-42.1	-30.0	12.1
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

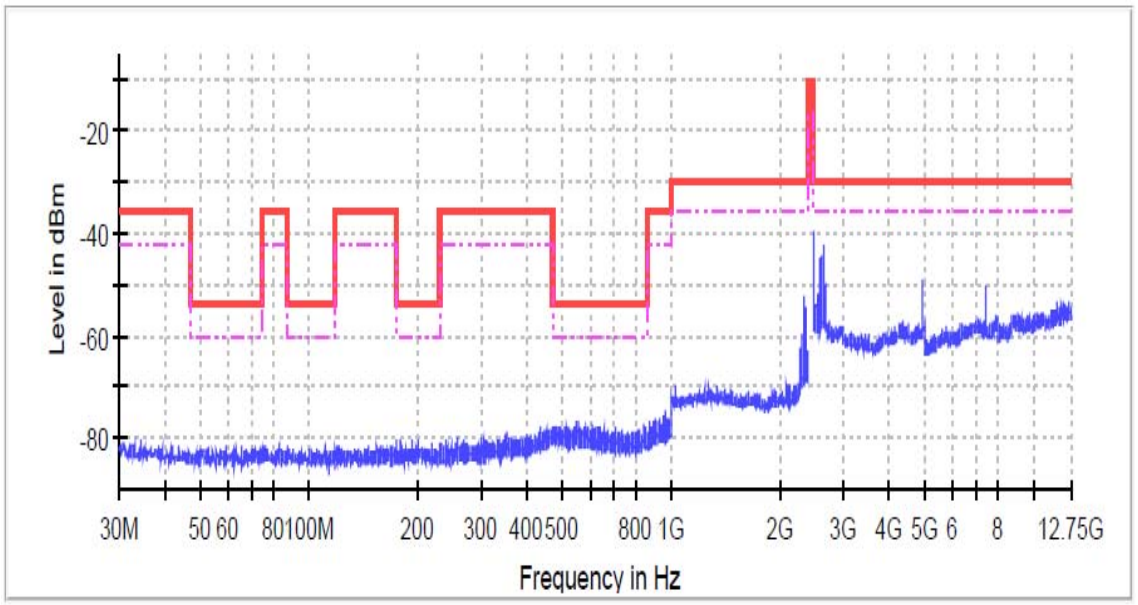
GFSK Highest Channel (2480 MHz)

Channel (MHz)	Frequency (MHz)	*Pol. (H/V)	**Det (PK/RMS)	Maximum power (dBm)	Limit (dBm)	Margin (dB)
Highest channel (2480)	170.53	H	PK	-67.8	-36.0	31.8
	256.01	H	PK	-66.6	-36.0	30.6
	264.01	H	PK	-66.0	-36.0	30.0
	272.02	H	PK	-65.4	-36.0	29.4
	280.02	H	PK	-66.8	-36.0	30.8
	292.02	H	PK	-66.8	-36.0	30.8
	300.02	H	PK	-60.6	-36.0	24.6
	2610.07	H	PK	-49.4	-30.0	19.4
	7439.60	V	PK	-38.0	-30.0	8.0
Measurement Uncertainty : ± 3.8 dB at < 300 MHz, ± 3.9 dB at > 300 MHz						

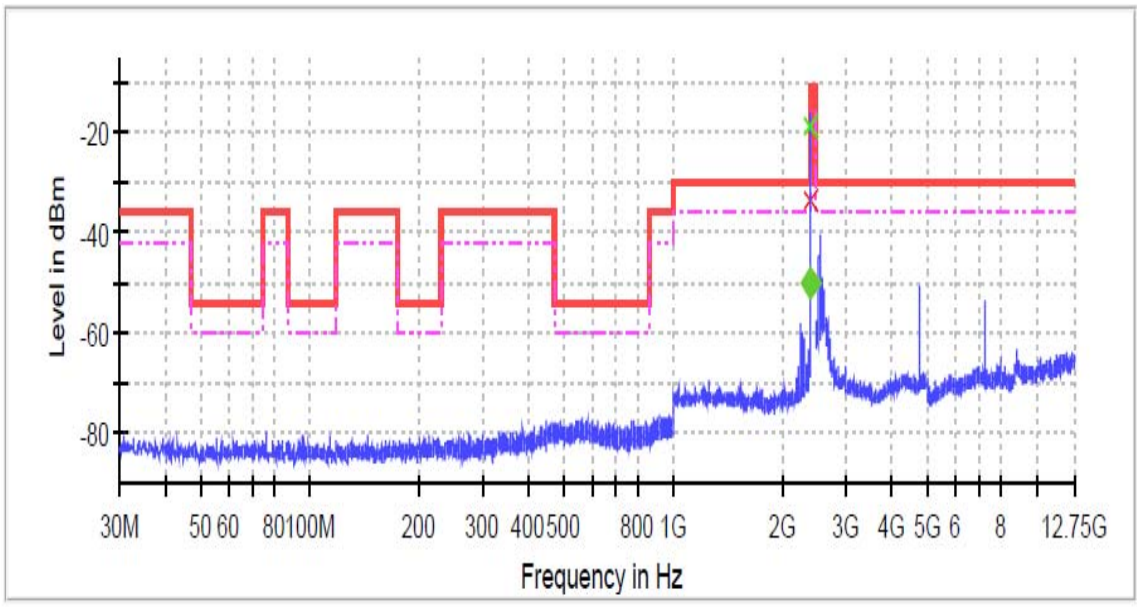
8DPSK Lowest Channel



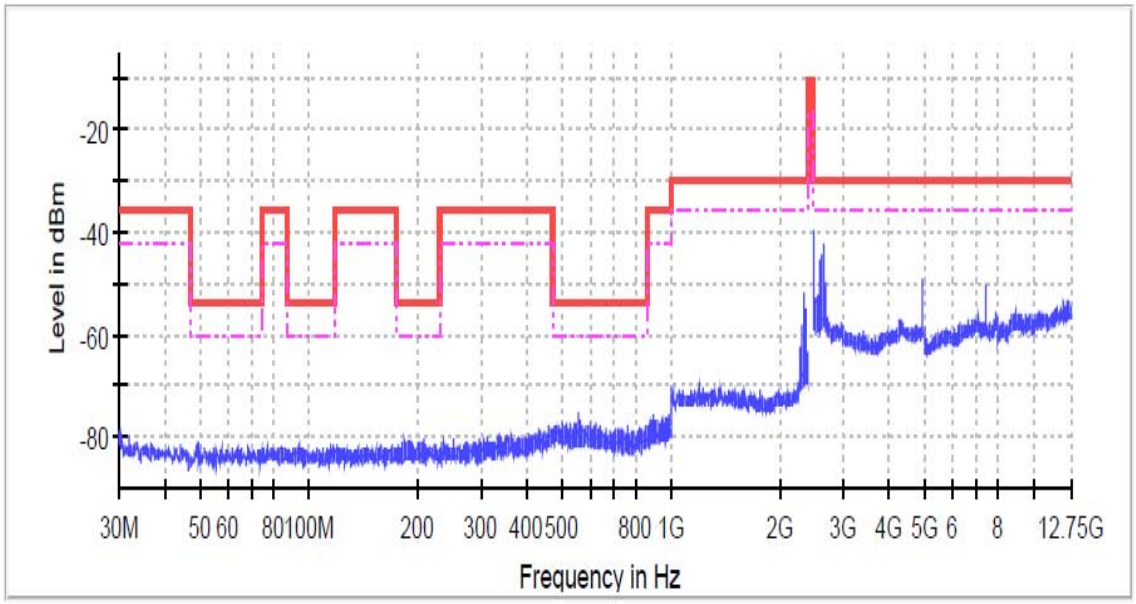
8DPSK Highest Channel



π/4 DQPSK Lowest Channel

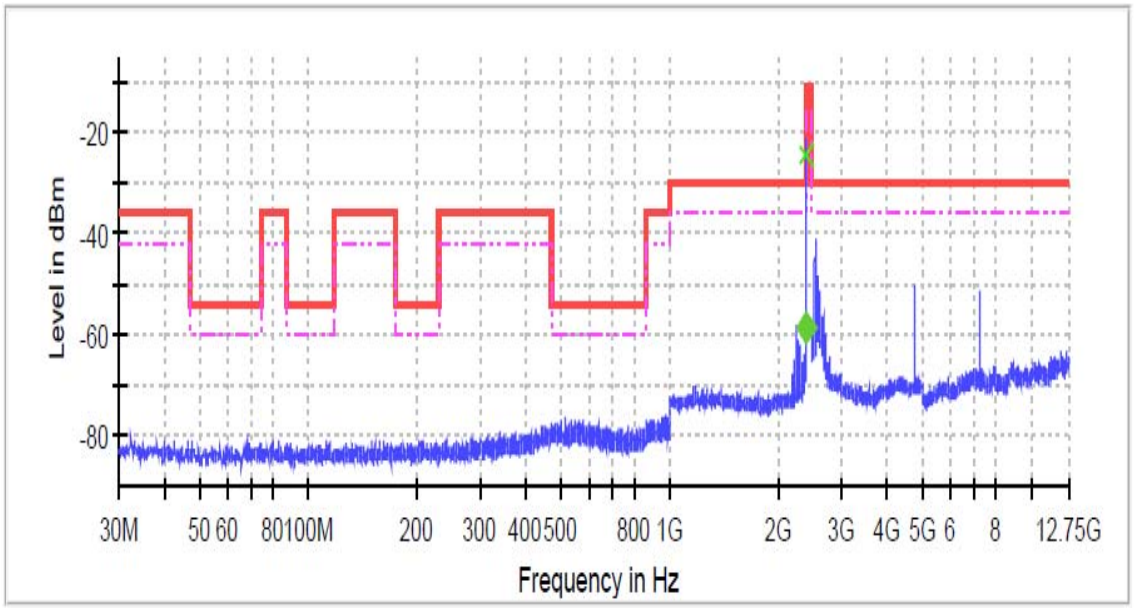


π/4 DQPSK Highest Channel

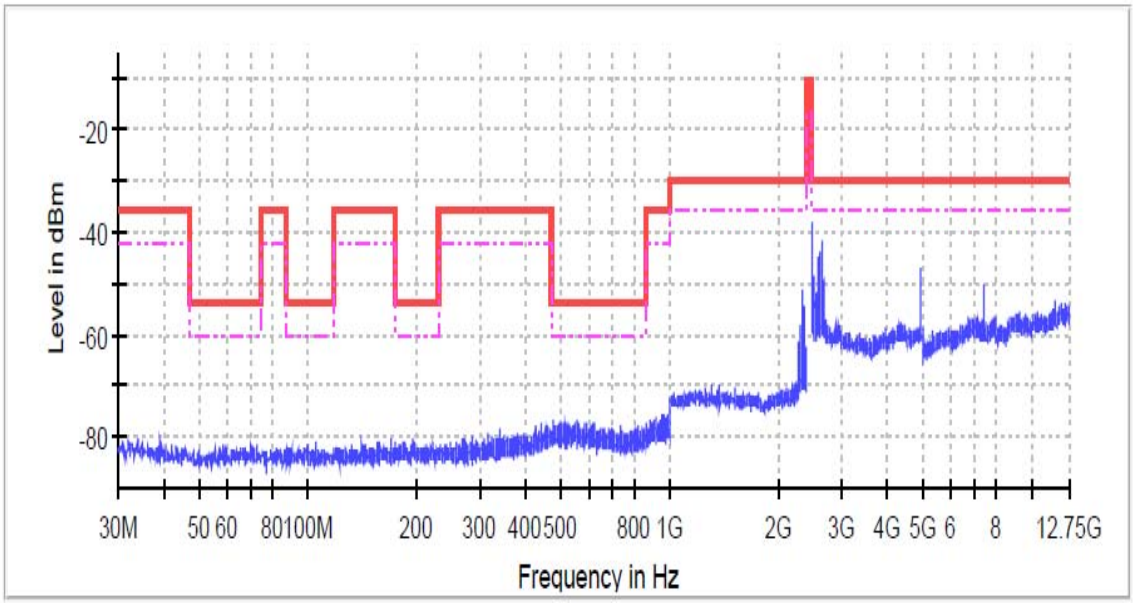


6.6.1.1 Test Data

GFSK Lowest Channel



GFSK Highest Channel



Limit : ETSI EN 300 328 Sub clause 4.3.1.10.3

Frequency Range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

6.6 Transmitter unwanted emissions in the spurious domain

6.6.1 Conducted Emissions

Test Method : ETSI EN 300 328 Sub clause 5.4.9

Result:

GFSK modulation

DUT Frequency (MHz)	Frequency (MHz)	Level	Detector	Limit (dBm)	Magin (dB)
2402	-	Not detected*	-	-	-
2480	-	Not detected*	-	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB				

π/4 DQPSK modulation

DUT Frequency (MHz)	Frequency (MHz)	Level	Detector	Limit (dBm)	Magin (dB)
2402	-	Not detected*	-	-	-
2480	-	Not detected*	-	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB				

8DPSK modulation

DUT Frequency (MHz)	Frequency (MHz)	Level	Detector	Limit (dBm)	Magin (dB)
2402	-	Not detected*	-	-	-
2480	-	Not detected*	-	-	-
Measurement Uncertainty	+2.37 dB/-2.82 dB				

Notes

1. **Any emssions don't fall within the 6dB range below the applicable limit during testing for pre-scan as specified in 5.4.9.2.1.2.*

8DPSK modulation

Test Conditions	Transmitter unwanted emissions in the out-of-band domain (e.i.r.p) (dBm/MHz)			
	2400 MHz - 2BW to 2400 MHz - BW	**2400 MHz - BW to 2400 MHz**	**2483.5 MHz to 2483.5 MHz + BW**	**2483.5 MHz + BW to 2483.5 + 2BW**
Normal 25 ℃, 3.7 Vdc	-53.0	-39.9	-58.8	-58.0
Limit	-20.0	-10.0	-10.0	-20.0
Measurement Uncertainty	± 2.0 dB			

Notes
Antenna Peak Gain = 3.37 dBi

Limit : ETSI EN 300 328 Sub clause 4.3.1.9.3

Frequency Range	Limit
2400 MHz - BW to 2400 MHz, 2483.5 MHz to 2483.5 + BW	-10 dBm/MHz e.i.r.p
2400 MHz - 2BW to 2400 MHz – BW, 2483.5 MHz + BW to 2483.5 MHz + 2BW	-20 dBm/MHz e.i.r.p

6.5 Transmitter unwanted emissions in the out-of-band domain

Test Method : ETSI EN 300 328 Sub clause 5.4.8

Result:

GFSK modulation

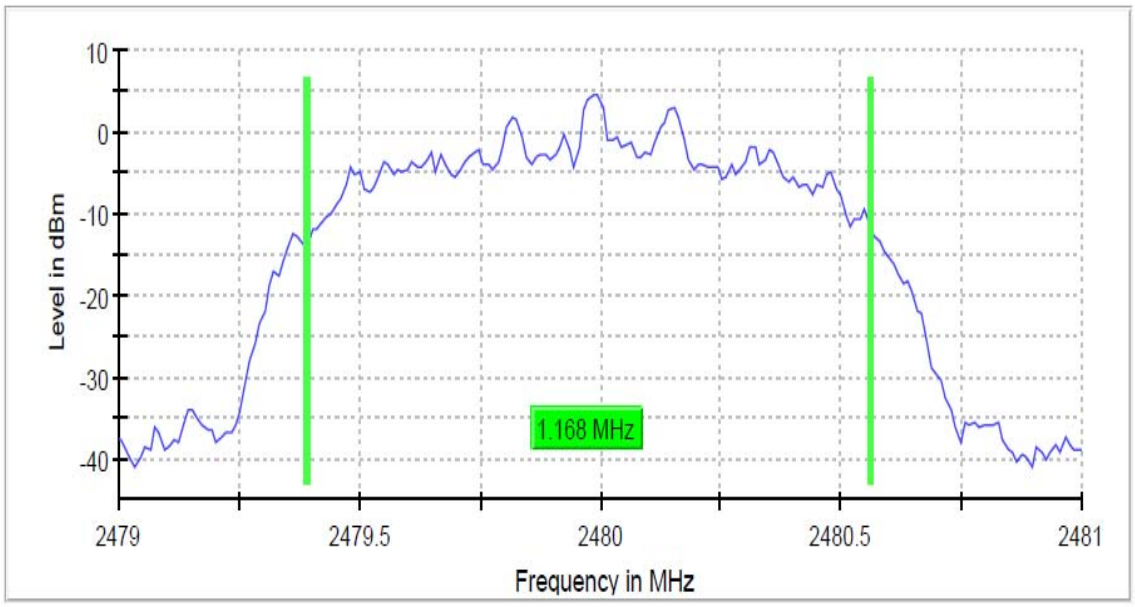
Test Conditions	Transmitter unwanted emissions in the out-of-band domain (e.i.r.p) (dBm/MHz)			
	2400 MHz - 2BW to 2400 MHz - BW	2400 MHz - BW to 2400 MHz	2483.5 MHz to 2483.5 MHz + BW	2483.5 MHz + BW to 2483.5 + 2BW
Normal 25 ℃, 3.7 Vdc	-59.6	-59.3	-59.5	-59.8
Limit	-20.0	-10.0	-10.0	-20.0
Measurement Uncertainty	± 2.0 dB			

π/4 DQPSK modulation

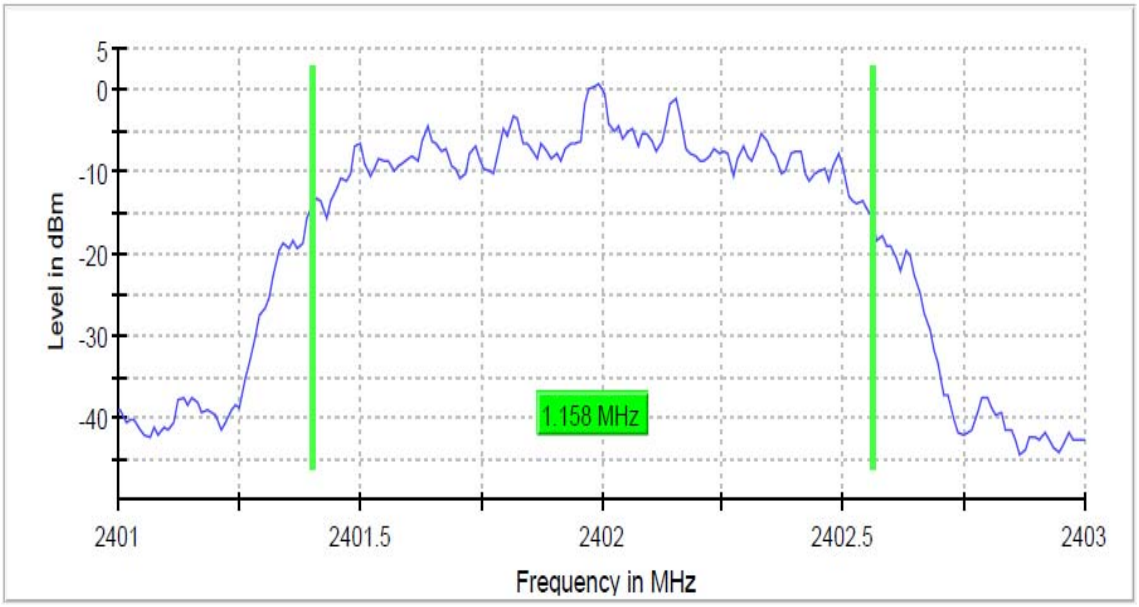
Test Conditions	Transmitter unwanted emissions in the out-of-band domain (e.i.r.p) (dBm/MHz)			
	2400 MHz - 2BW to 2400 MHz - BW	2400 MHz - BW to 2400 MHz	2483.5 MHz to 2483.5 MHz + BW	2483.5 MHz + BW to 2483.5 + 2BW
Normal 25 ℃, 3.7 Vdc	-52.9	-39.9	-59.0	-58.0
Limit	-20.0	-10.0	-10.0	-20.0
Measurement Uncertainty	± 2.0 dB			

8DPSK Lowest Channel (2402 MHz)

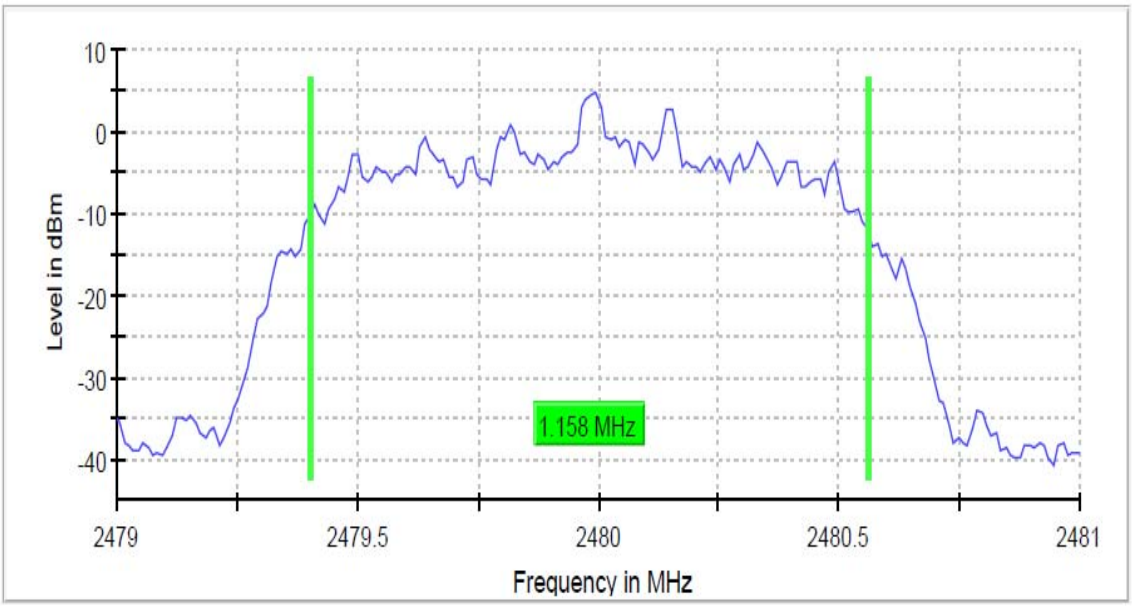
8DPSK Highest Channel (2480 MHz)



π/4 DQPSK Lowest Channel (2402 MHz)

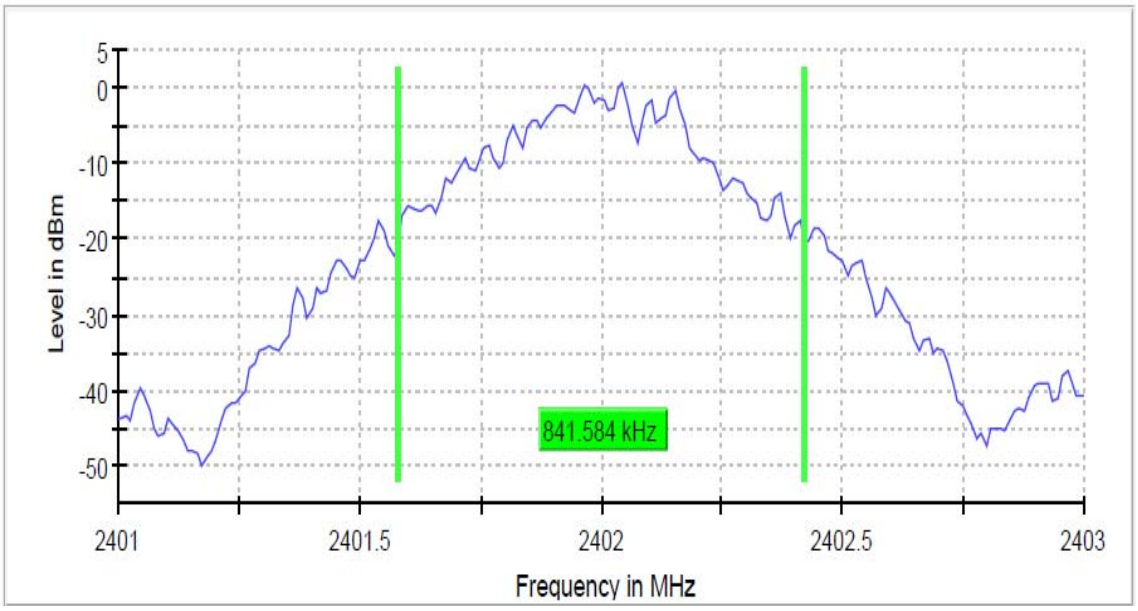


π/4 DQPSK Highest Channel (2480 MHz)

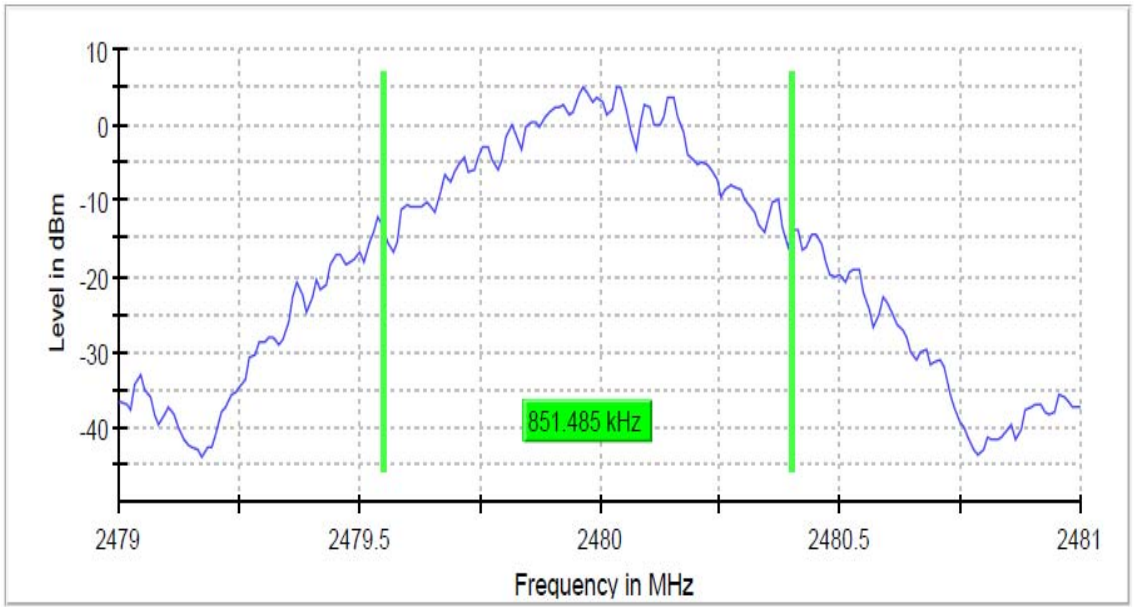


6.4.1 Test Data

GFSK Lowest Channel (2402 MHz)



GFSK Highest Channel (2480 MHz)



6.4. Occupied Channel Bandwidth

Test Method : ETSI EN 300 328 Sub clause 5.4.7

Result:

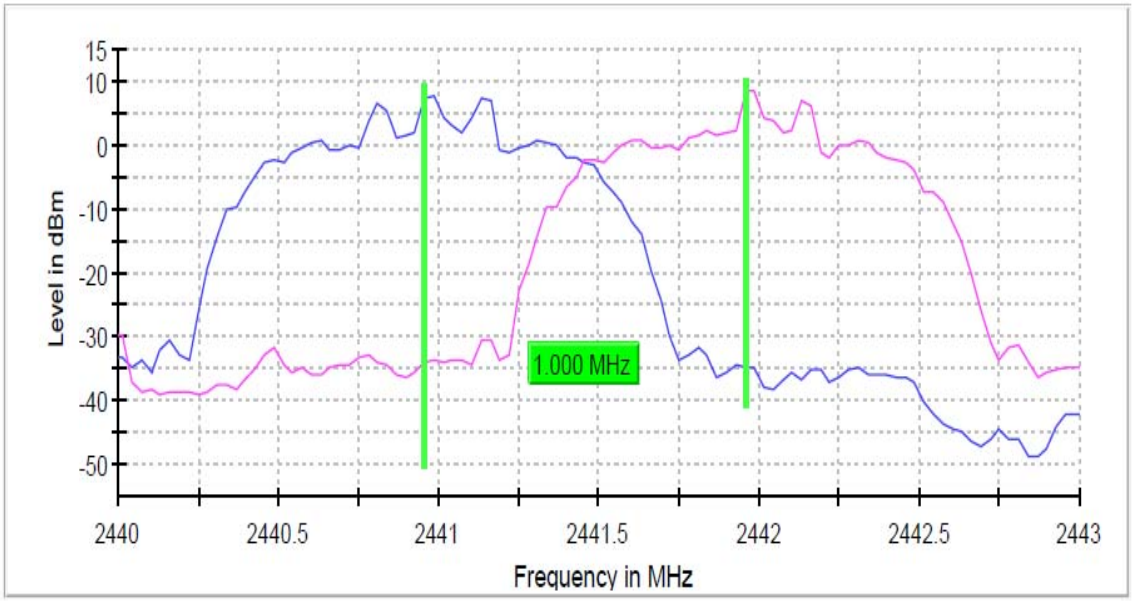
Modulation	Frequency range (MHz)	
	Lowest	Highest
GPSK	2401.579	2480.401
π/4 DQPSK	2401.401	2480.559
8DPSK	2401.401	2480.559
Measurement Uncertainty	± 0.23 MHz	

Modulation	Occupied channel bandwidth (MHz)	
	Lowest	Highest
GPSK	0.842	0.851
π/4 DQPSK	1.158	1.158
8DPSK	1.158	1.168
Measurement Uncertainty	± 0.23 MHz	

Limits :

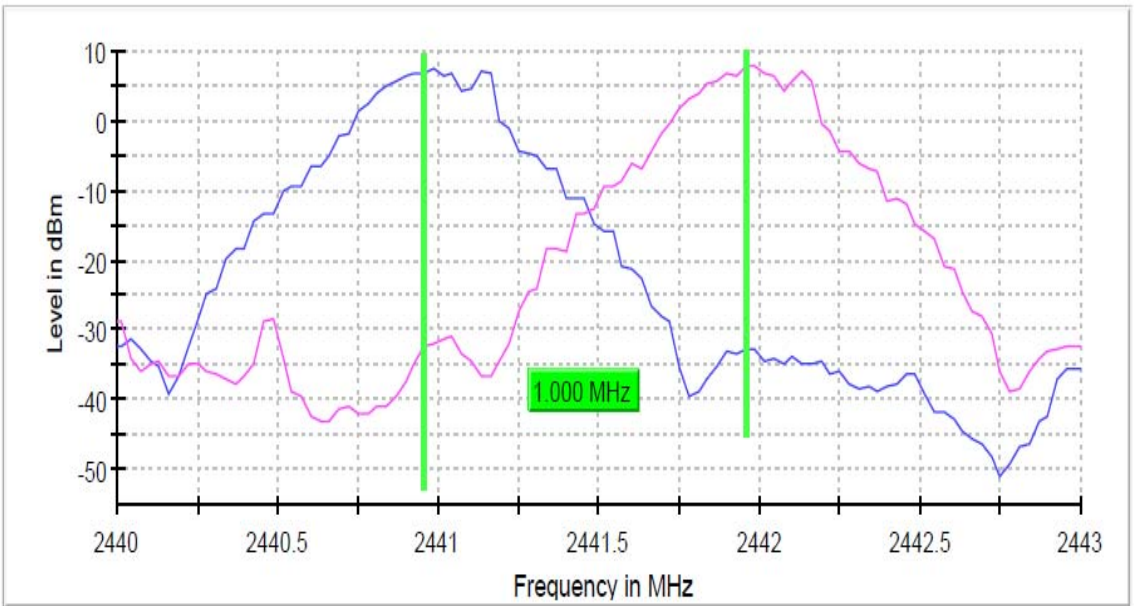
ETSI EN 300 328 Sub clause 4.3.1.8.3	2400 to 2483.5 MHz

8DPSK modulation

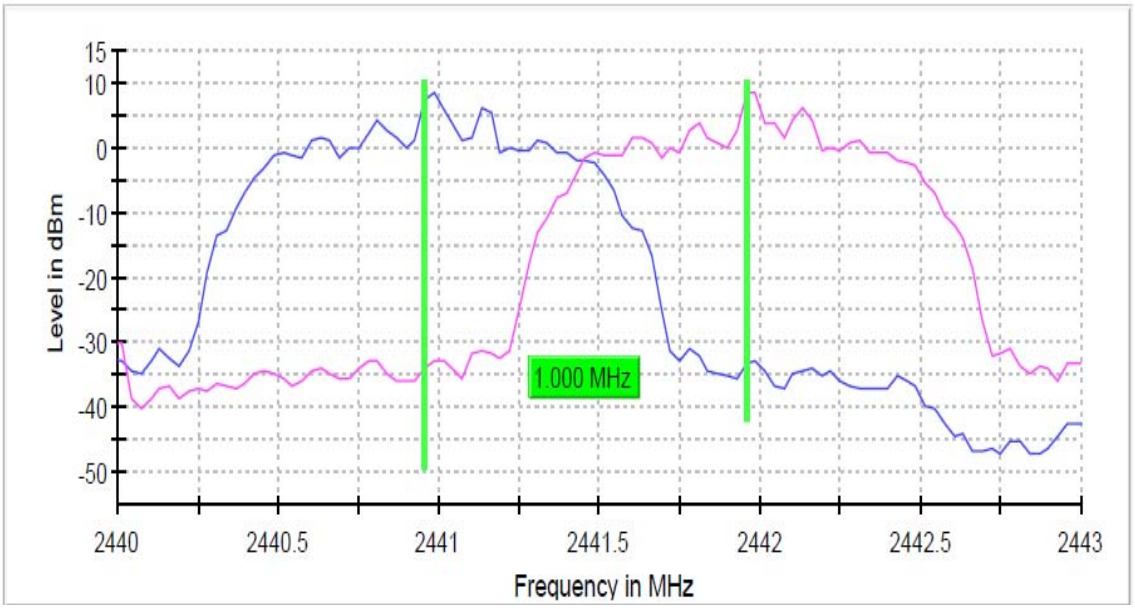


6.3.1 Test Data

GFSK modulation



π/4 DQPSK modulation



6.3. Hopping Frequency Separation

Test Method : ETSI EN 300 328 Sub clause 5.4.5

Result:

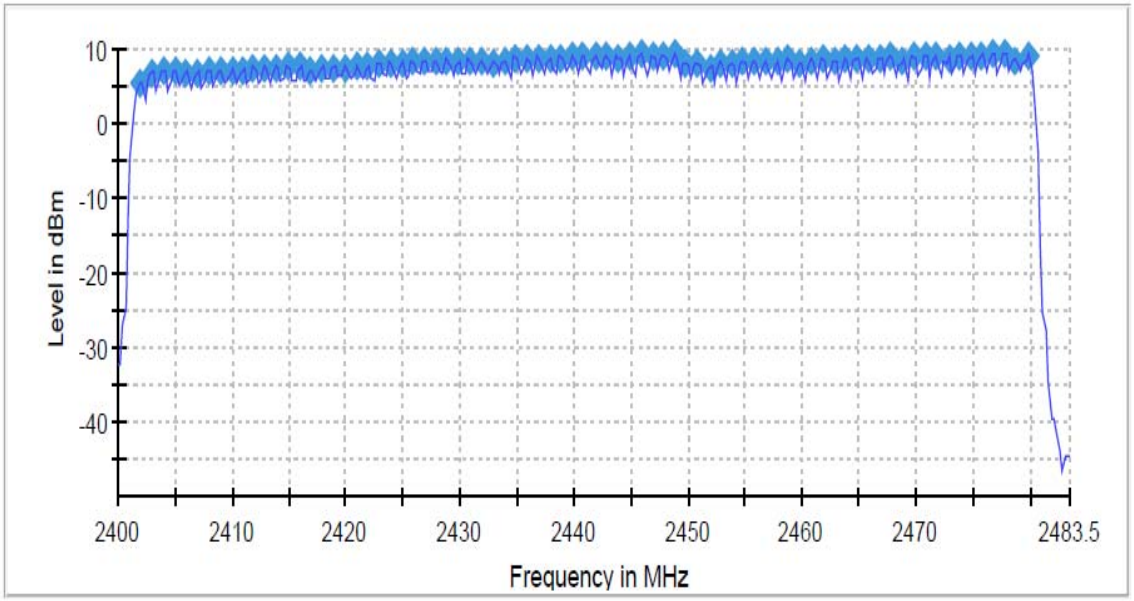
Modulation	Channel Separation (MHz)
GFSK	1.000
π/4 DQPSK	1.000
8DPSK	1.000

Notes
This Equipment is Adaptive frequency hopping systems.
There are two options for this testing as specified in 5.4.5.2.1 in EN300328 v2.1.1.
- Option 1 was used for these measurements to identify the centre of the power envelope for the two adjacent signals exactly.

Limits :

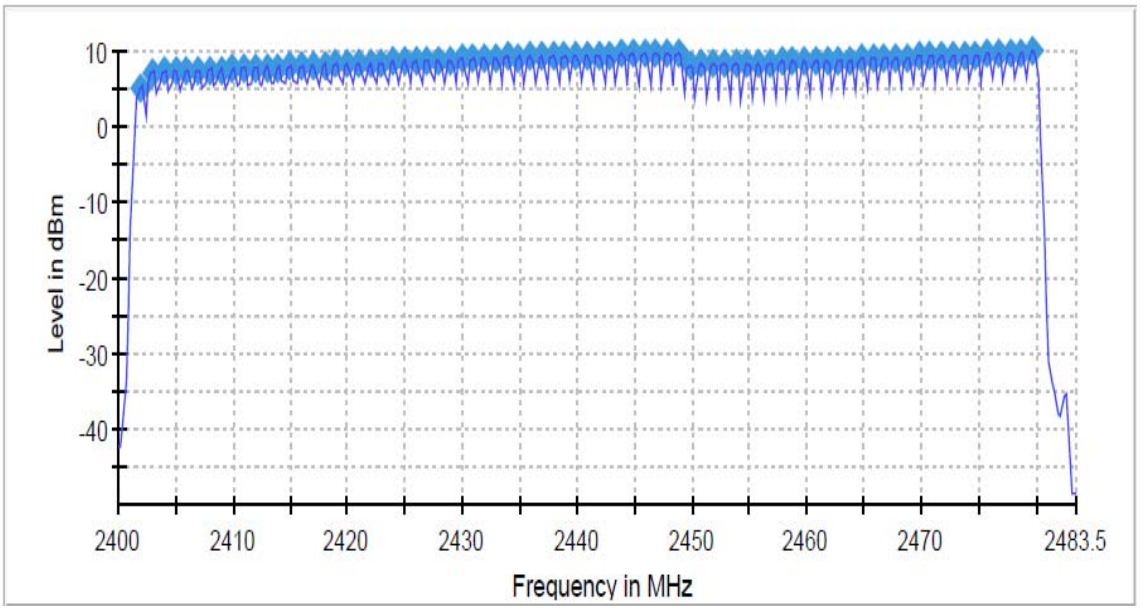
ETSI EN 300 328 Sub clause 4.3.1.5.3	≥ 100 kHz

8DPSK modulation

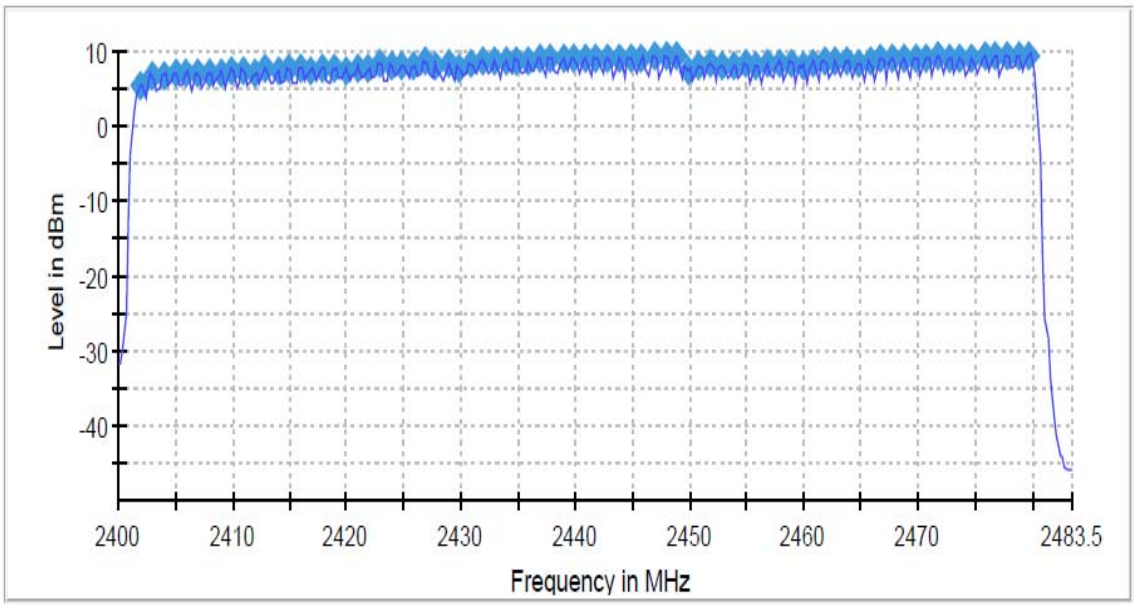


6.2.4 Test Data

GFSK modulation



π/4 DQPSK modulation



Notes

*1. * Limit : One dwell time = 2.894 ms (GFSK), 2.900 ms (π/4 DQPSK),*
2.900 ms (8DPSK)
Frequency Occupation comply with Option 1 limit as specified below.

*2. ** Limit : 70% of 2400 ~ 2483.5 MHz = 58.45 MHz*

3. This Equipment is Adaptive frequency hopping systems.

Limits :

ETSI EN 300 328 Sub clause 4.3.1.4.3.2	The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used. In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options: Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use. Option 2: The occupation probability for each frequency shall be between ((1 / U) × 25 %) and 77 % where U is the number of hopping frequencies in use. The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater. Adaptive Frequency Hopping systems shall be capable of operating over a minimum of 70 % of 2400 ~ 2483.5 MHz

6.2 Accumulated Transmit time, Frequency Occupation & Hopping Sequence

Test Method : ETSI EN 300 328 Sub clause 5.4.4

Result:

6.2.1 Accumulated Transmit time

Modulation	Frequency (MHz)	Maximum Accumulated Dwell Time (ms)	Limit (ms)
GFSK	2402	266.493	≤ 400
	2480	225.413	
π/4 DQPSK	2402	251.747	
	2480	279.133	
8DPSK	2402	257.013	
	2480	207.507	

6.2.2 Frequency Occupation

Modulation	Frequency (MHz)	Minimum Accumulated Dwell Time (ms)	*Limit (ms)
GFSK	2402	2.932	≥ One dwell time
	2480	5.865	
π/4 DQPSK	2402	9.408	
	2480	8.859	
8DPSK	2402	5.896	
	2480	8.859	

6.2.3 Hopping Sequence

Modulation	Frequency Band (MHz)	Number of Hopping Frequency		-20dB Points Occupied Bandwidth	
		Result Data (N)	Limit (N)	Result Data (MHz)	**Limit (MHz)
GFSK	2400~2483.5	79	≥ 15	79.027	≥ 58.45
π/4 DQPSK	2400~2483.5	79	≥ 15	79.524	≥ 58.45
8DPSK	2400~2483.5	79	≥ 15	79.524	≥ 58.45

8DPSK modulation

Test Conditions	RF Output Power (e.i.r.p.) (dBm)
Normal 25 ℃, 3.7 Vdc	8.5
Extreme -10 ℃, 3.33 Vdc	9.1
Extreme -10 ℃, 4.07 Vdc	9.1
Extreme 50 ℃, 3.33 Vdc	8.5
Extreme 50 ℃, 4.07 Vdc	8.5
Measurement Uncertainty	± 0.4 dB

Notes
Antenna Peak Gain = 3.37 dBi
RF Output Power (e.i.r.p.) : RF output power (dBm) + Antenna Gain (dBi)

Limits :

ETSI EN 300 328 Sub clause 4.3.1.2.3	20 dBm

6. Frequency Hopping Equipment Test Items

6.1 RF Output Power

Test Method: ETSI EN 300 328 Sub clause 5.4.2

Result:

GFSK modulation

Test Conditions	RF Output Power (e.i.r.p.) (dBm)
Normal 25 ℃, 3.7 Vdc	9.7
Extreme -10 ℃, 3.33 Vdc	9.8
Extreme -10 ℃, 4.07 Vdc	9.8
Extreme 50 ℃, 3.33 Vdc	9.1
Extreme 50 ℃, 4.07 Vdc	9.0
Measurement Uncertainty	± 0.4 dB

π/4 DQPSK modulation

Test Conditions	RF Output Power (e.i.r.p.) (dBm)
Normal 25 ℃, 3.7 Vdc	8.8
Extreme -10 ℃, 3.33 Vdc	9.3
Extreme -10 ℃, 4.07 Vdc	9.0
Extreme 50 ℃, 3.33 Vdc	8.4
Extreme 50 ℃, 4.07 Vdc	8.4
Measurement Uncertainty	± 0.4 dB

Wide band modulations other than FHSS (ETSI EN 300 328)

Test Result	C	NC	NT	NA	Remarks
RF Output Power	■				
Power Spectral Density	■				
Duty Cycle, Tx-Sequence, Tx-gap				■	Only for non-adaptive equipment
Accumulated Transmit time, Frequency Occupation & Hopping Sequence				■	Only for FHSS equipment
Hopping Frequency Separation				■	Only for FHSS equipment
Medium Utilisation				■	Only for non-adaptive equipment
Adaptivity				■	RF Output power less than 10 dBm e.i.r.p.
Occupied Channel Bandwidth	■				
Transmitter unwanted emissions in the OOB domain	■				
Transmitter unwanted emissions in the spurious domain	■				
Receiver spurious emissions	■				
Receiver Blocking	■				
Geo-location capability				■	Only for equipment with geo-location capability

Note) C : Compliant
NC : Non- Compliant
NT : Not Tested
NA : Not Applicable

5. Test method

All test were performed in accordance with the procedures documented in ETSI EN 300 328 v2.1.1 (2016-11). The average power of this product is less than 20 mW therefore, it comply with the EN 62479:2010 and EN 62311: 2008 without testing.

4. List of Measurements

FHSS modulation (ETSI EN 300 328)

Test Result	C	NC	NT	NA	Remarks
RF Output Power	■				
Power Spectral Density				■	Only for equipment using wide band modulations other than FHSS
Duty Cycle, Tx-Sequence, Tx-gap				■	Only for non-adaptive equipment
Accumulated Transmit time, Frequency Occupation & Hopping Sequence	■				
Hopping Frequency Separation	■				
Medium Utilisation				■	Only for non-adaptive equipment
Adaptivity				■	RF Output power less than 10 dBm e.i.r.p.
Occupied Channel Bandwidth	■				
Transmitter unwanted emissions in the OOB domain	■				
Transmitter unwanted emissions in the spurious domain	■				
Receiver spurious emissions	■				
Receiver Blocking	■				
Geo-location capability				■	Only for equipment with geo-location capability

Note) C : Compliant
NC : Non- Compliant
NT : Not Tested
NA : Not Applicable

3.5. Test Equipment

Instruments	Manufacturer	Model	Serial number	Calibration Date	Calibration Interval
Spectrum Analyzer	R & S	FSW43	100732	Apr.11, 2017	1 Year
Spectrum Analyzer	R & S	FSW43	104084	Apr.04, 2017	1 Year
Signal Generator	R & S	SMB100A	175861	Jul.14, 2017	1 Year
Vector Signal Generator	R & S	SMBV100A	257152	Oct.07, 2016	1 Year
Trilog-Broadband antenna	Schwarzbeck	VULB9163	946	May.18, 2017	2 Year
Horn antenna	Schwarzbeck	BBHA9120D	01615	May.18, 2017	2 Year
Signal Conditioning Unit	R & S	SCU-03	100358	Apr.11, 2017	1 Year
Signal Conditioning Unit	R & S	SCU-18F	180025	Apr.03. 2017	1 Year
Temp./Humi. Chamber	Kun Poong	FX1077B	20011223	Oct.07, 2016	1 Year
10 dB Attenuator	WEINSCHEL	56-10	58765	Oct. 09, 2016	1 Year
10 dB Attenuator	PASTERNACK	PE7395-10	1441-1	Jul. 13, 2017	1 Year
Power Diveider	WEINSCHEL	1580-1	SB530	Oct.09, 2016	1 Year
11dB Step Attenuator	H.P	8494B	3308A32753	Jan. 09, 2017	1 Year
WIDEBAND RADIO COMMUNICATION TESTER	R & S	CMW500	145181	Apr. 11, 2017	1 Year
UNIVERSAL RADIO COMMUNICATION TESTER	R & S	CMU200	106332	Jan. 09, 2017	1 Year
Position Controller	Inn-co	CO2000	1480406/L	N/A	N/A
Turn Table	Inn-co	DS1200S	N/A	N/A	N/A
Antenna Mast	Inn-co	MA4000	N/A	N/A	N/A
Anechoic Chamber	Seo-Young	N/A	N/A	N/A	N/A
Open Switch And Control Platform	R & S	OSP-120	100081	N/A	N/A
Open Switch And Control Platform	R & S	OSP-120	100857	Apr. 11, 2017	1 Year
WiFi Filter Bank	R & S	U083	N/A	N/A	N/A

3. General Test Conditions

3.1. Location

Nemko Korea Co.,Ltd
159, Osan-ro, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 16885, Republic of Korea.
Phone : 82-31-330-1700 Fax : 82-31-322-2332

3.2. Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	(24 ~ 26)℃	(15 ~ 35)℃
Relative humidity	(36 ~ 45) %	(20 ~ 75) %

3.3. Test Frequency

Channel	Frequency (MHz)	
	BDR/EDR	LE
Low	2402	2402
Middle	2441	2442
High	2480	2480

3.4. Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
Laptop Computer	HP	G62-355TU	CNF0489WDT
AC/DC Adapter	HP	PPP009D	WBGSV0ACXZH162

2.4. Additional Information Related to Testing

- For BDR/EDR mode, Tests have been performed GFSK, π /4DQPSK and 8DPSK modulation with DH5 packet.
- For LE mode, Tests have been performed GFSK modulation with 37 packet length.
- The Laptop was used to control the EUT to transmit the wanted TX channel and modulation by the program (CSR Bluetest 3) which manufacturer supported.
- The cable and attenuator loss from 30MHz to 12.75GHz was reflected in spectrum analyzer with correction factor for all conducted testing.
- The EUT supports the Adaptive Frequency Hopping systems.

Type of Adaptivity function	■ Adaptive Frequency Hopping using LBT based DAA
	☐ Adaptive Frequency Hopping using other forms of DAA (non-LBT based)
	☐ Short Control Signaling Transmissions

- The EUT was programmed with the following output power setting that was used during testing:

Test frequency	2402 MHz	2441 MHz	2480 MHz
BDR (GFSK)	Ext. 255, Int. 22		
EDR (π/4 DQPSK / 8DPSK)	Ext. 255, Int. 50		
Test frequency	2402 MHz	2442 MHz	2480 MHz
LE(GFSK)	Default		

- Receiver category

Categorization	C	NA	Remarks
Receiver category 1		■	
Receiver category 2	■		Adaptive equipment with a maximum RF Output power of 10 dBm e.i.r.p..
Receiver category 3		■	
Note) C : Compliant NA : Not Applicable			

2. Equipment Under Test (EUT)

2.1. Identification of EUT

Category	BT SPEAKER			
Model Name	DSB50BT			
Brand Name	DENON			
Frequency of Operation	2402 MHz ~ 2480 MHz			
Modulation Technique	Frequency Hopping Spread Spectrum(FHSS)			Wideband modulation
Modulation type:	BDR	EDR	EDR	LE
	GFSK	π/4 DQPSK	8DPSK	GFSK
Power output (EIRP)	9.8 dBm	9.3 dBm	9.1 dBm	9.0 dBm
Channels	79 ch			40 ch
Antenna Gain (peak)	3.37 dBi			
Antenna Setup	1TX / 1RX			
Temperature Range:	-10 ℃ ~ +50 ℃			
Voltage	3.7 Vdc (±10%)			
Size (W x H x D)	About 5.7 mm x 16.0 mm x 5.5 mm			
Weight	About 394 g			
Remarks	-			

2.2. Description of change

- No Comment

2.3. Modifications

- No Comment

1. Client Information

1.1. Applicant

Company Name:	ANAM ELECTRONICS CO., LTD.
Company Address:	27, Digital-ro 27ga-gil, Guro-gu, Seoul, Korea
Phone:	+82-2-6424-4881
Contact Name:	Byeong-Seob, Lee

1.2. Manufacturer

Company Name:	D&M HOLDINGS INC.
Company Address:	D&M Building, 2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa-ken, 210-8569, JAPAN

1.3. Factory

Company Name:	Anam Electronics Vietnam Co.,Ltd.
Company Address:	Dong Van II Industrial Zone, Duy Tien District, Ha Nam Province, Vietnam

1.4. Other Information

- No Comment

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	September.12,2017	Initial issue	

Test Report

Test Report	
Project Reference No.	NK-17-R-196
Product	BT SPEAKER
Brand Name	DENON
Model	DSB50BT
Tested according to	ETSI EN 300 328 V2.1.1 ETSI EN 62479

Tested in period	August 01, 2017 ~ September 09, 2017
Issued date	September 12, 2017
Name and address of the Test House	Nemko 159, Osan-ro, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 16885, Republic of Korea. Phone : 82-31-330-1700 Fax : 82-31-322-2332
Tested by	Seungyong Shin Sep 12. 2017 *September 12, 2017*
Verified by	Deokha Ryu Sep 12 2017 Deokha Ryu *September 12, 2017*

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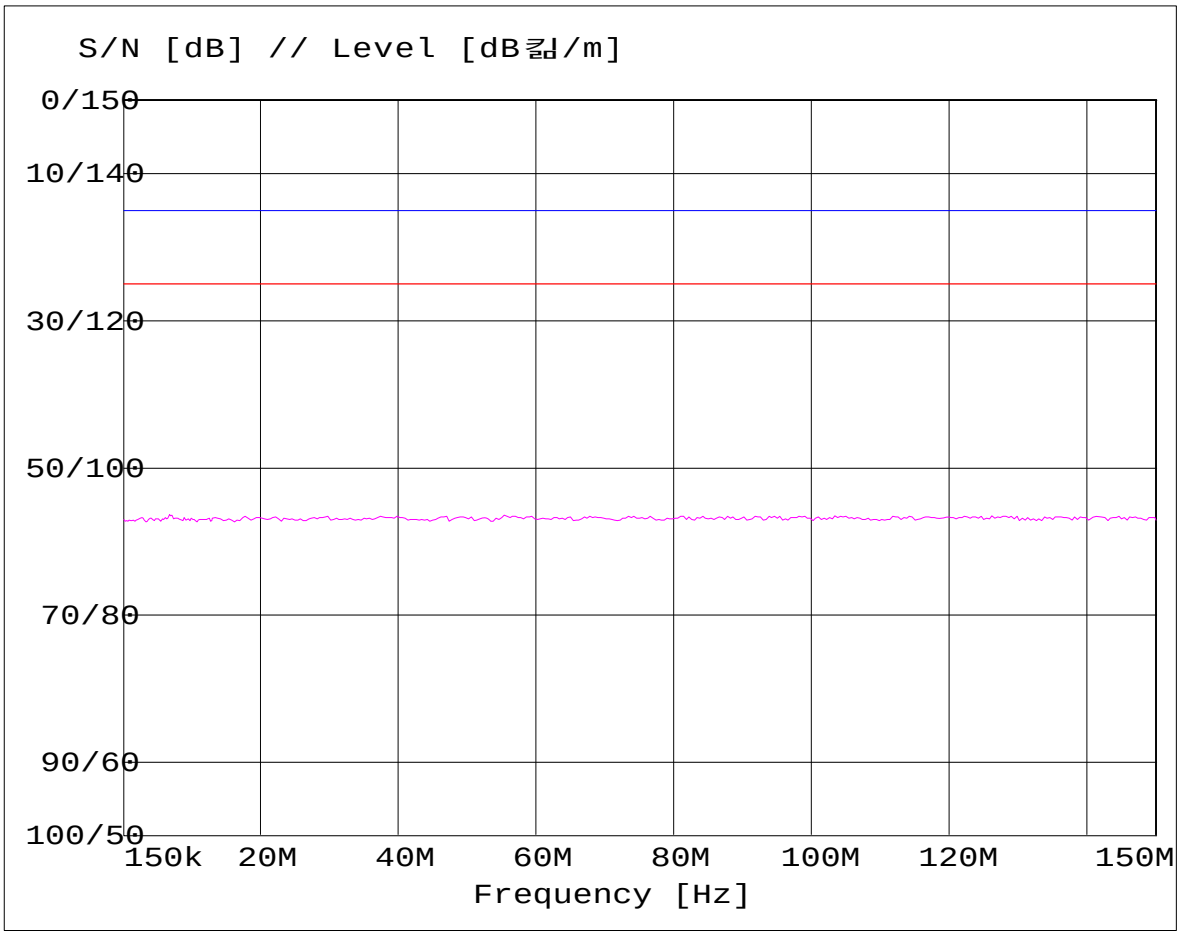
This report apply only to the sample(s) tested. It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the Competent Authorities in Europe for any modifications made to the product which results in non-compliance to the relevant regulation.

Test: Immunity Radiated Fields S3 <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker R
Operating Mode:	AUX	S/N:	57.5 dB
Frequency:	-	AF Level:	62.3 mW

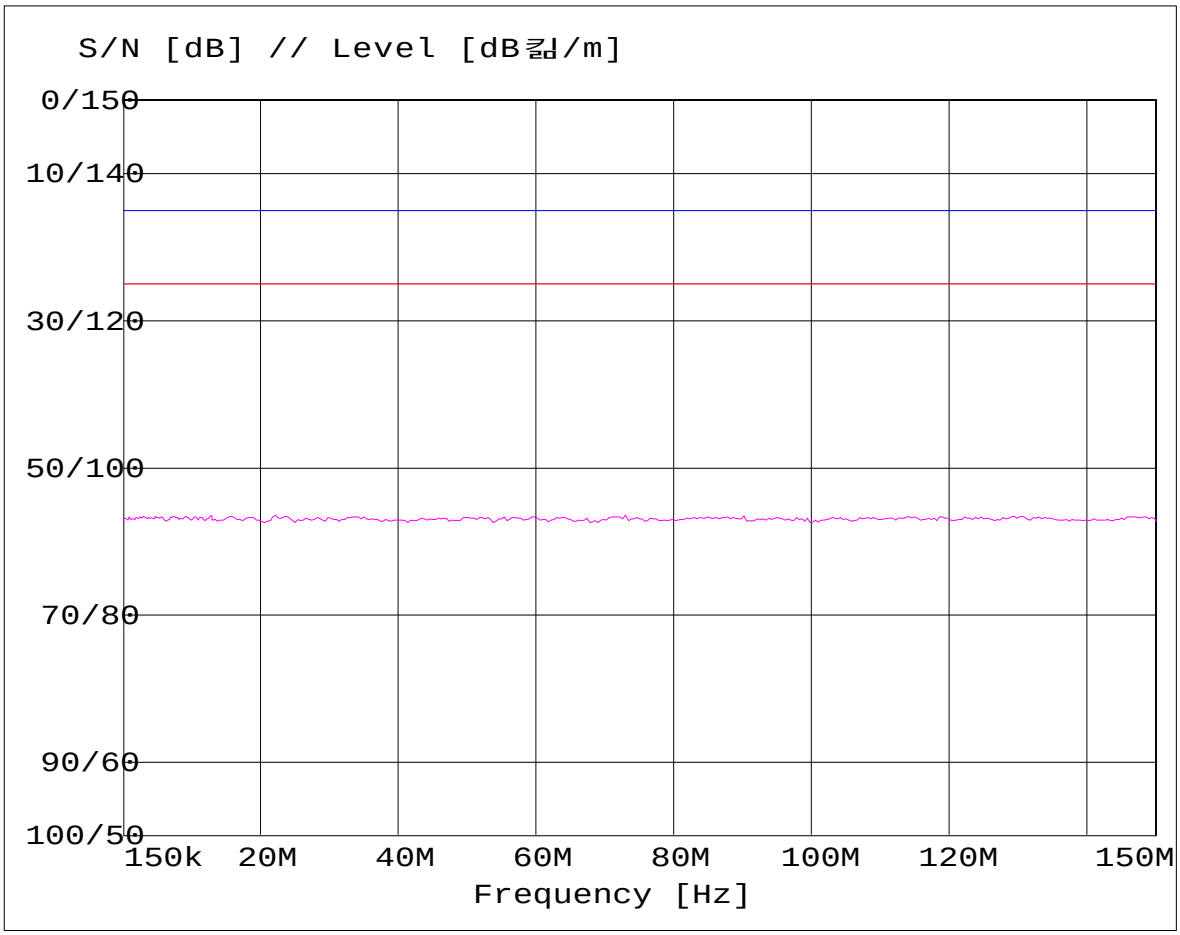
Interf. Signal: Scan, 280817-00043-002, 8/28/2017, 6:42:10PM K2 = 1.6 dB



Test: Immunity Radiated Fields S3 <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker L
Operating Mode:	AUX	S/N:	57.0 dB
Frequency:	-	AF Level:	62.2 mW

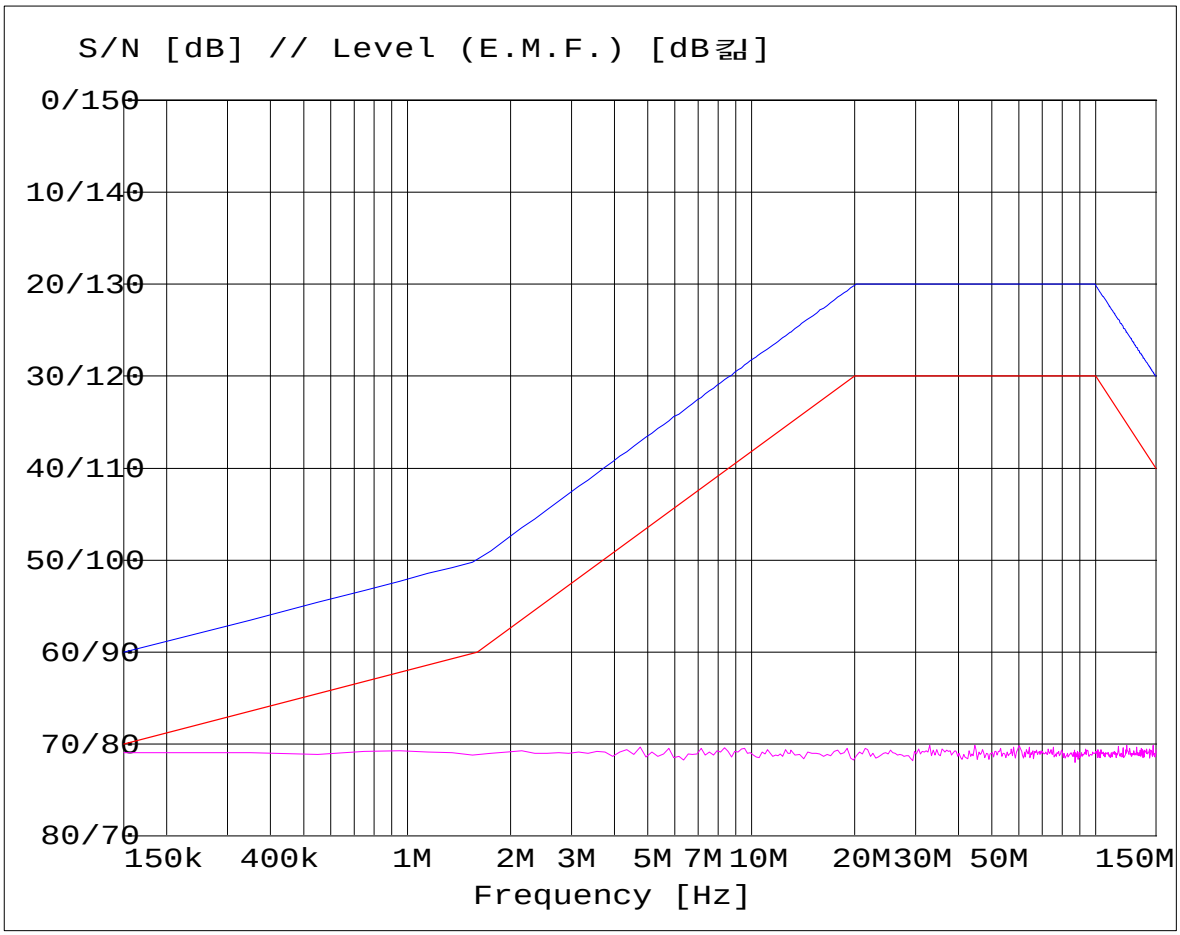
Interf. Signal: Scan, 280817-00043-001, 8/28/2017, 6:22:05PM K2 = 1.6 dB



Test: Immunity Conducted Voltages S2a <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker R
Operating Mode:	AUX	S/N:	71.3 dB
Frequency:	-	AF Level:	52.6 mW

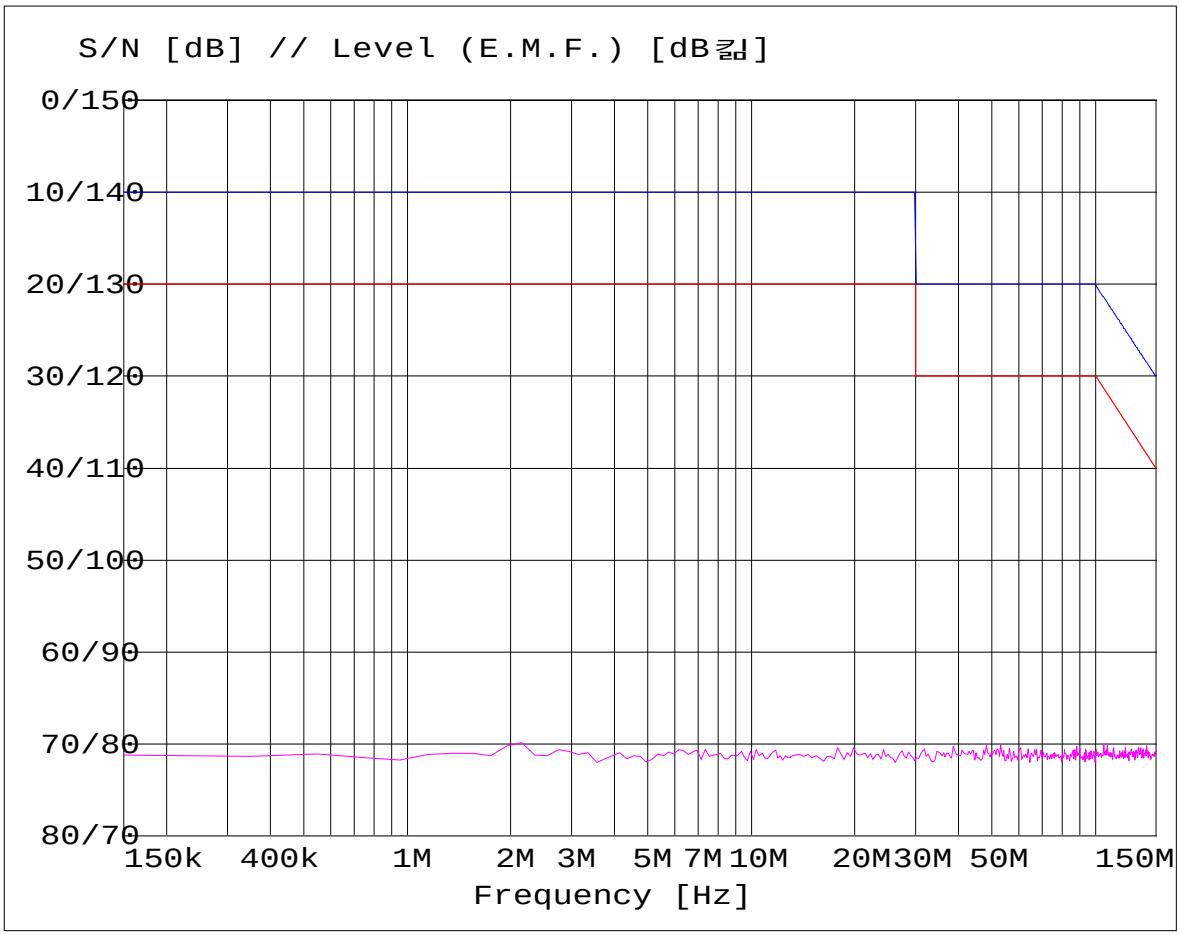
Interf. Signal: AUX, 280817-00032-001, 8/28/2017, 4:34:12PM



Test: Immunity Conducted Voltages S2a <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker R
Operating Mode:	AUX	S/N:	71.4 dB
Frequency:	-	AF Level:	54.4 mW

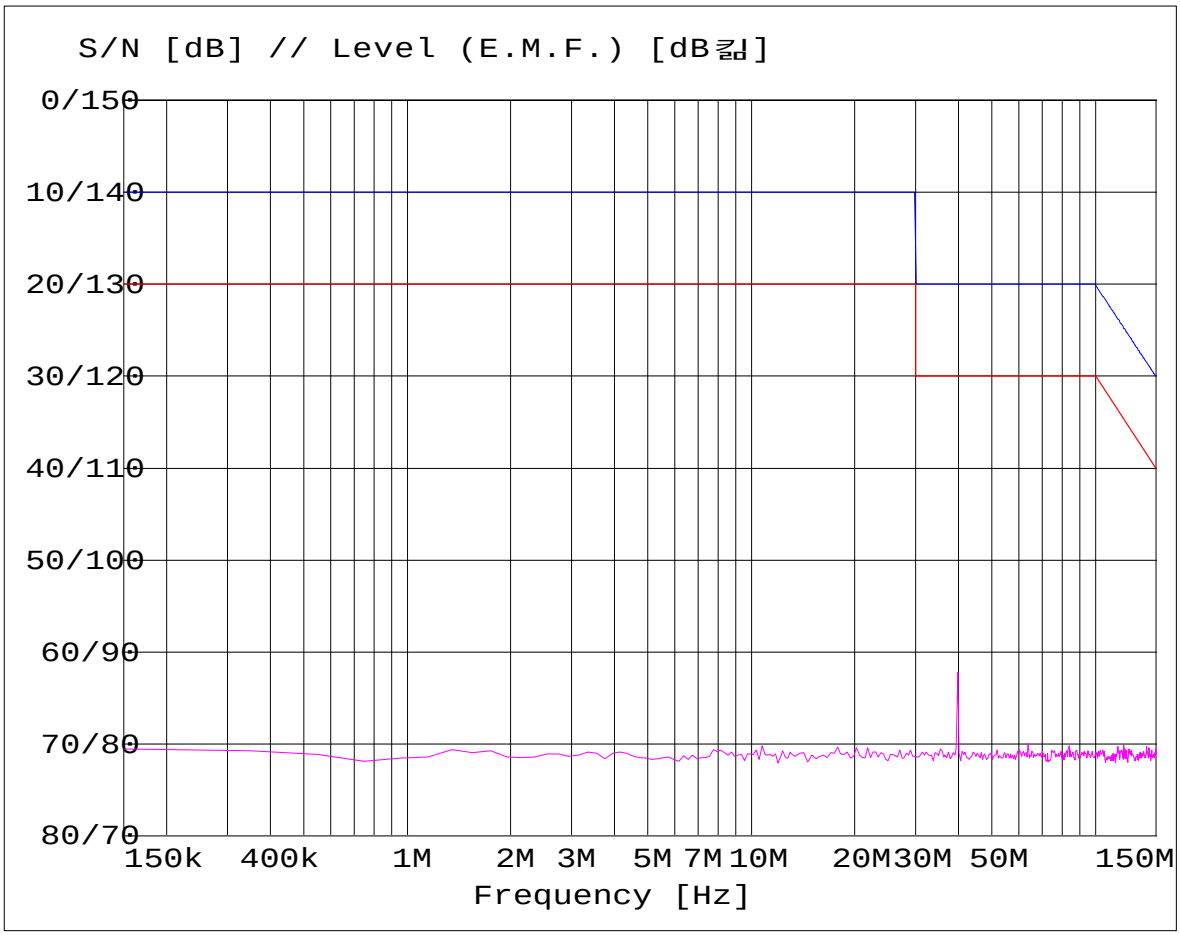
Interf. Signal: Speaker R, 280817-00030-001, 8/28/2017, 4:20:47PM



Test: Immunity Conducted Voltages S2a <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker L
Operating Mode:	AUX	S/N:	71.5 dB
Frequency:	-	AF Level:	55.3 mW

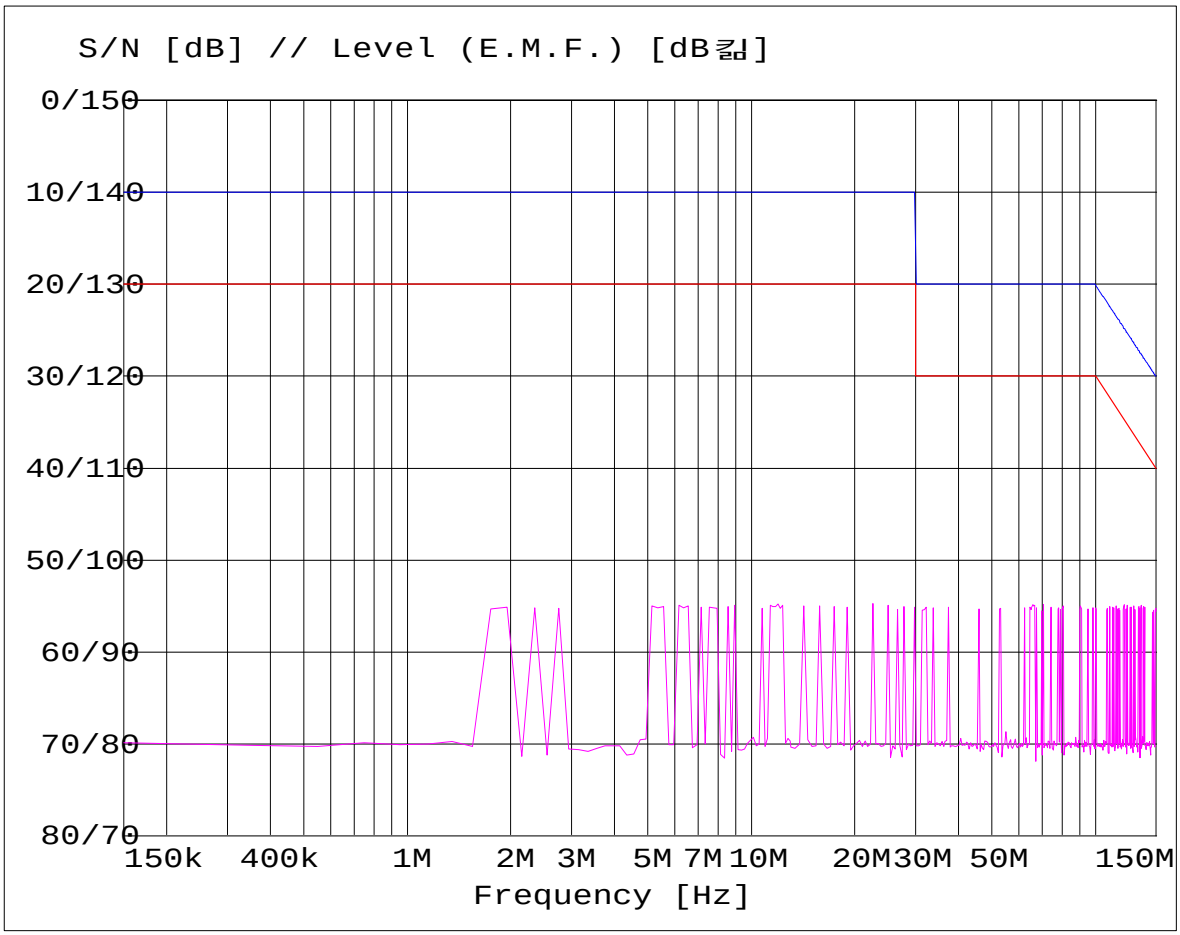
Interf. Signal: Speaker L, 280817-00031-001, 8/28/2017, 4:26:17PM



Test: Immunity Conducted Voltages S2a <DSB50BT>

Test Mode:	Amplifier -	Monitor:	Speaker R
Operating Mode:	AUX	S/N:	54.8 dB
Frequency:	-	AF Level:	49.4 mW

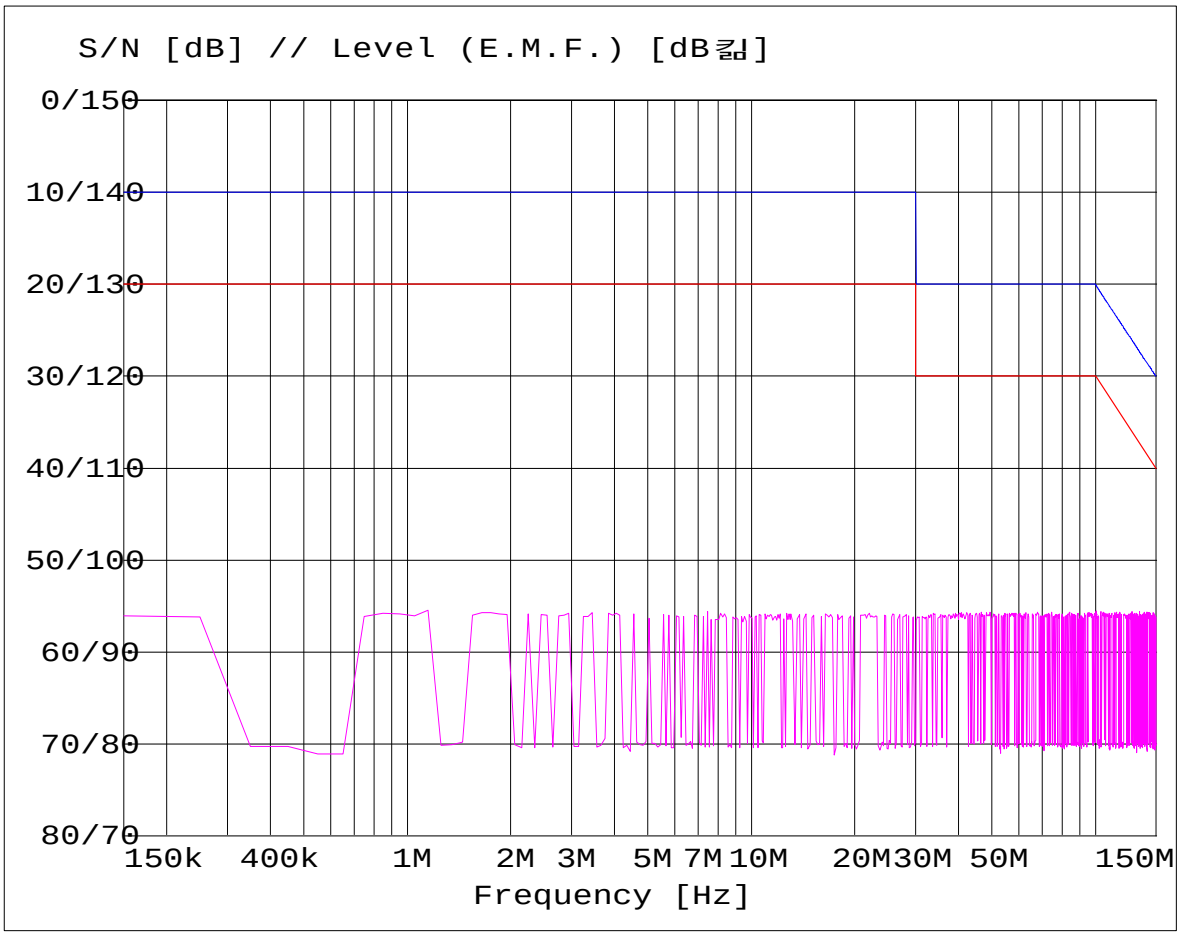
Interf. Signal: Mains, 280817-00029-001, 8/28/2017, 4:15:21PM



Test: Immunity Conducted Voltages S2a <DSB50BT>

Test Mode: Amplifier - Monitor: Speaker L
Operating Mode: AUX S/N: 56.6 dB
Frequency: - AF Level: 52.6 mW

Interf. Signal: Mains, 280817-00028-001, 8/28/2017, 4:02:18PM



7. Test instrumentation

Equipment and Type	Manufacturer	Serial NO.
POWER METER(NRVD)	Rohde & Schwarz	102321
RF System Panel(TS-RSP)	Rohde & Schwarz	100439
Power Sensor(URV-Z4)	Rohde & Schwarz	100243
POWER SENSOR(URV5-Z4)	Rohde & Schwarz	100116
Signal Generator(SMG)	Rohde & Schwarz	835793/023
Signal Generator(SMG)	Rohde & Schwarz	835793/024
Audio Analyzer(UPA)	Rohde & Schwarz	836798/010
Bandpass filter(0.5-3kHz)(BP)	Erika Fiedler	6229
Isolation Transformer(TS-TT.3)	Volrio Star	94/109738
RC Net Work(8,300ohm/RCo)	Erika Fiedler	
Mains Filter(MSF)	Erika Fiedler	
Coupling Unit(A,M,L,SR)	Erika Fiedler	
Matching Net Work(MN)	Erika Fiedler	
Mains Filter(M)	Erika Fiedler	
Loudspeaker Filter(BS)	Erika Fiedler	
RC Net Work(RCi,RCo)	Erika Fiedler	
RF Power AMP(1347F/325LA)	ENI	
USB Stick	Transcend	
SD Memory	SanDisk	
iPhone 4S	Apple	

6. Immunity to ambient electromagnetic fields (S3)

6.1 Test criteria and test procedure

Operating environment;
Temperature : 24 ℃
Relative Humidity : 42 %

The EUT was placed on a non-metallic support by 0.1m above the lower conductor in the center of the stripline.
The wanted signal was fed to all input terminals respectively .The unwanted signal is fed to a matching network of the stripline.
The ground connection of the mains filter(M) was directly connected to the jacky.
All unused input/output connections on the EUT were terminated and shielded with the proper resistance.
The power supply to the mains of the EUT was attached to the mains filter(M).
Ferrite rings for this test was required on all test cables inside the shielded room.

The measurement are performed with TS9980 T80-K1 V2.22

6.2 Measurement uncertainty

Radiated fields : ± 2dB

6.3 Test result immunity from radiated fields.

The equipment does comply with the requirements.

For the measurement data, see annex B.

5. Immunity to RF voltages(S2a)

5.1 Test criteria and test procedure

Operating environment;
Temperature : 24 ℃
Relative Humidity : 42 %

The EUT was placed 0.1m above a metallic ground plane of dimensions 2 x1m. The wanted signal was fed to all input terminals respectively and the unwanted signal was fed to mains input, audio output and input terminals respectively.

The criterion concerning acceptable sound interference is a wanted to unwanted audio signal ratio of ≥40dB at a wanted signal level of 50mW.

The audio output power was measured with a 0.5 - 3kHz band-pass filter.
The audio analyzer was applied without a weighting filter.
The ground connection of the input matching network(Rci), output matching network(Rco), and mains filter(MSF) were directly connected to the metal table.
The mains filter(MSF) was connected to ground while the other matching networks are only connected to ground when they are being used as injection ports.

The measurement are performed with TS9980 T80-K1 V2.22

5.2 Measurement uncertainty

Immunity to conducted voltage : ± 2dB.

5.3 Test result immunity to conducted voltage.

The equipment does comply with the requirements.

For the measurement data, see annex A.

3. TEST SPECIFICATIONS

3.1 Standards

EN55020(2007) & +A11(2011)
Sound and television broadcast receivers and associated equipment
- Immunity characteristics - Limits and methods of measurement

3.2 Additions,deviations and exclusions from standards

No additions,deviations or exclusions have been made from standard.

3.3 Purpose of the test

Purpose of test: To determine whether the equipment under test fulfils the EMC immunity requirements of the standard stated in section 3.1

4. TEST SUMMARY

The results in this report apply only to sample tested:

	Passed	Note
(S1)Input immunity to RF voltages	N.A.	*)
(S2a)Immunity to RF voltages	Yes	
(S2b)Immunity to RF voltages(in common mode)	N.A.	*)
(S3)Immunity to ambient electromagnetic fields	Yes	
(S4)Screening effectiveness	N.A.	*)

Note : * N.A. = Not Applicable

The equipment does comply with the requirements

Measurement data see annex A and B.

1. CLIENT INFORMATION

The EUT has been test by request of:

* Company : D&M Holdings Inc.
D&M Building, 2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa-ken, 210-8569, JAPAN

2. EQUIPMENT UNDER TEST(EUT)

2.1 Identification of the EUT

*Equipment : Bluetooth Speaker

*Model No. : DSB50BT

*Brand Name : DENON

*Serial No. : N/A

*Manufacturer : D&M Holding Inc.
D&M Building, 2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa-ken, 210-8569, JAPAN

*Power Rating : INPUT 5V, 2.1A

*In/Out terminal : AUX, CHARGE

*Tuner Section : N/A

2.2 Additional information about the EUT

The EUT consists of the following subsystems/modules/parts; none
The tests have been performed on the EUT provided with the following modifications; none

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6.2 Measurement uncertainty
6.3 Test result

7. Test instrumentation **7**

Annex-Measurement Data;
Annex A : Immunity to RF voltage **8**
Annex B : Immunity to ambient electromagnetic fields **13**

ANAM ELECTRONICS CO.,LTD.
27, Digital-ro 27ga-gil, Guro-gu, Seoul, Korea
TEL. : 82-2-6424-4894

EMS TEST REPORT

Reference No. 54121708B

Immunity to electromagnetic disturbances

Equipment Under Test

Equipment : Bluetooth Speaker

Type/model : DSB50BT

Brand Name : DENON

Manufacturer : D&M Holdings Inc.

Total Page of this report : 14(including this page)

SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report the equipment does comply with the requirements according to EN55020(2007)&+A11(2011). The test results in this report apply only to the sample tested.

Report Issued : August 29, 2017

EUT Received : August 28, 2017

Tested by :

H. K. Jung / Assistant Engineer

Approved by :

B. S. Lee / Researching Engineer

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Appendix B Photographs of EUT

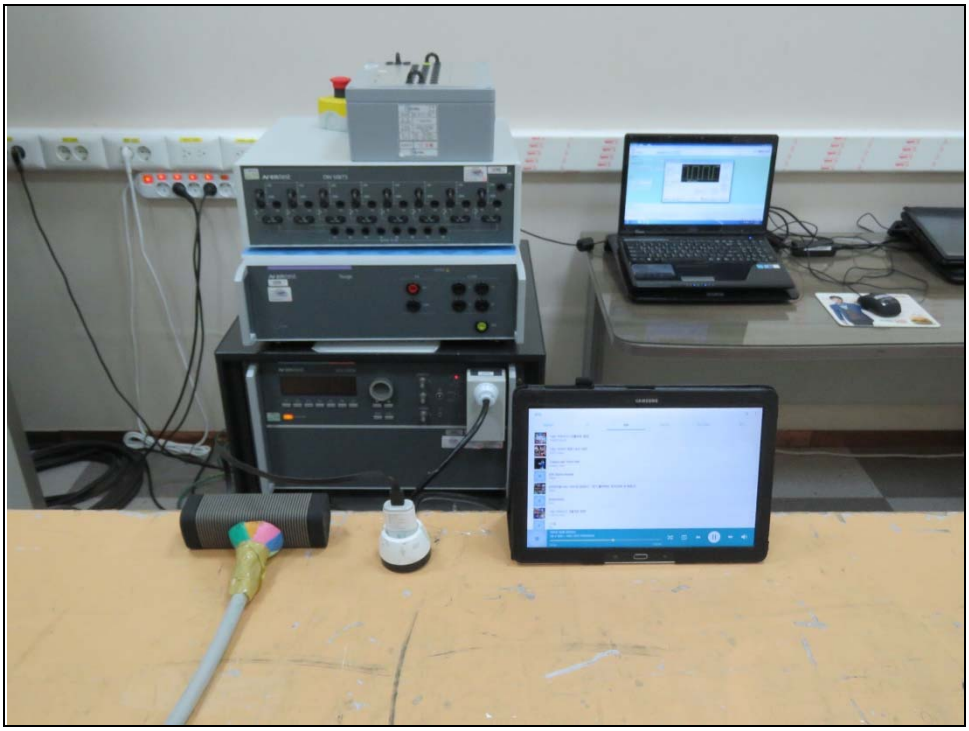
1. Front View of EUT

2. Rear View of EUT

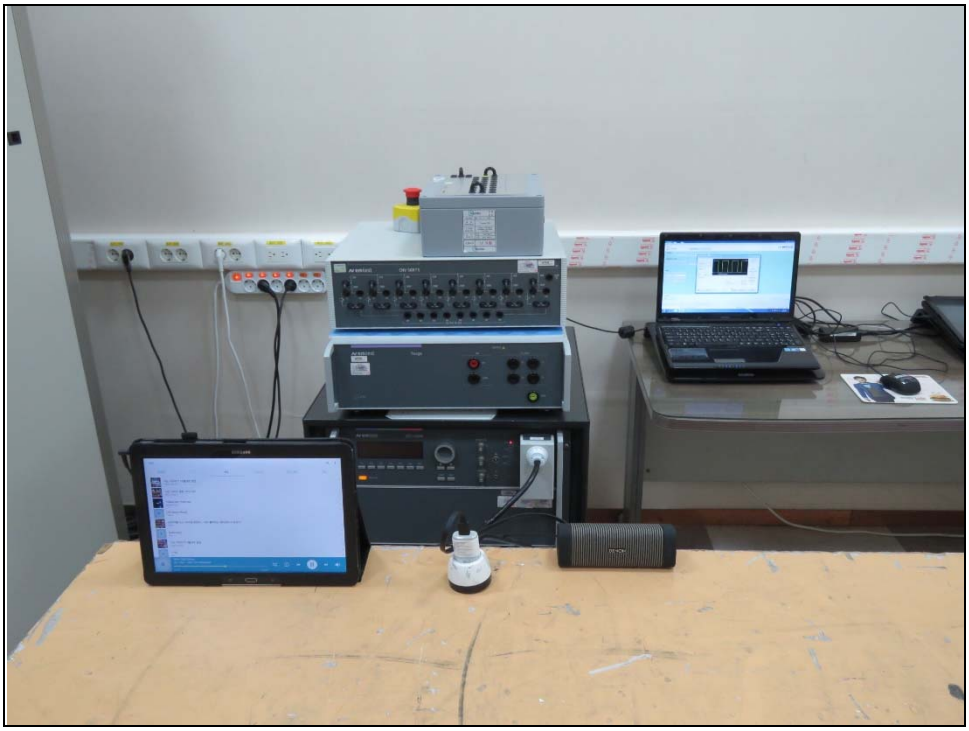
9. Fluctuating Harmonics & Flicker

8. Voltage dips and Interruptions

▶**BT mode**

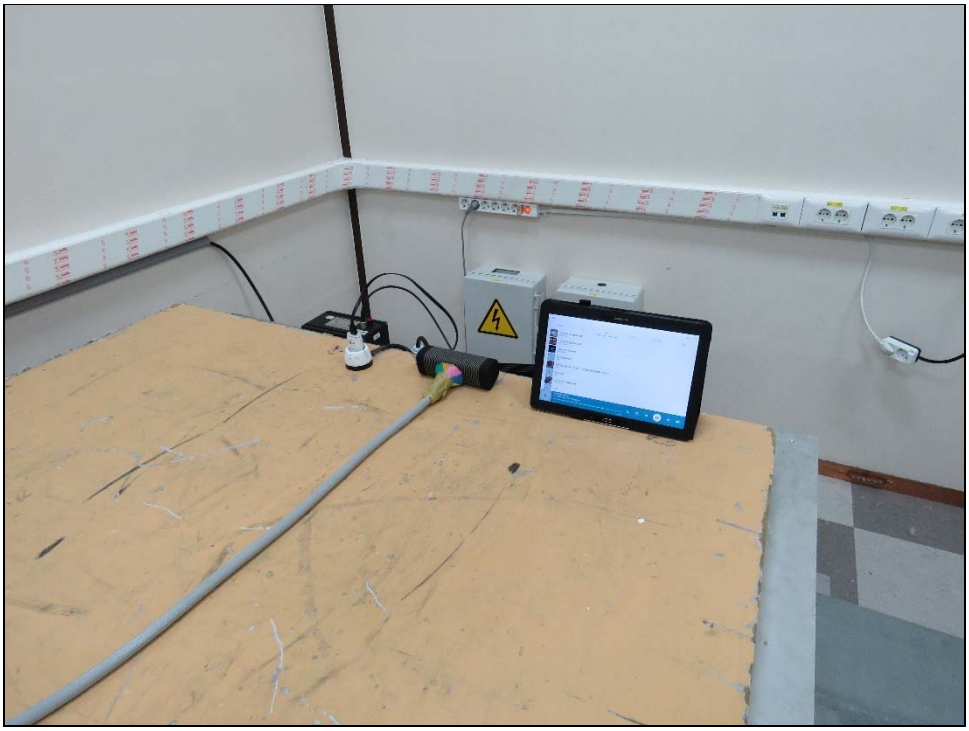


▶**AUX mode**

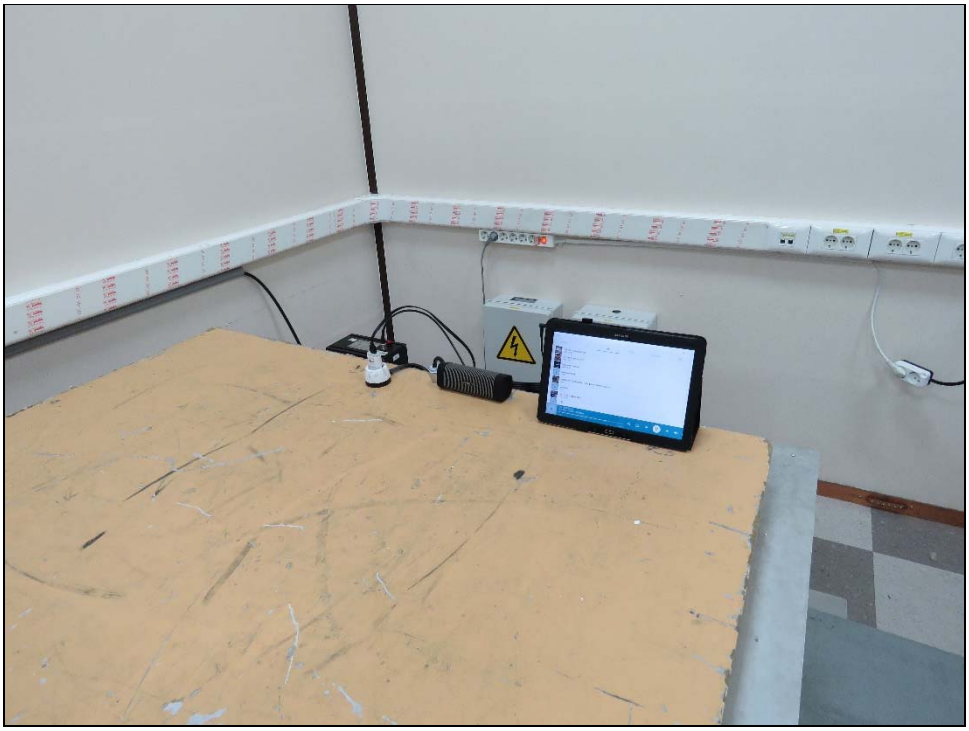


7. Continuous conducted disturbances

▶**BT mode**

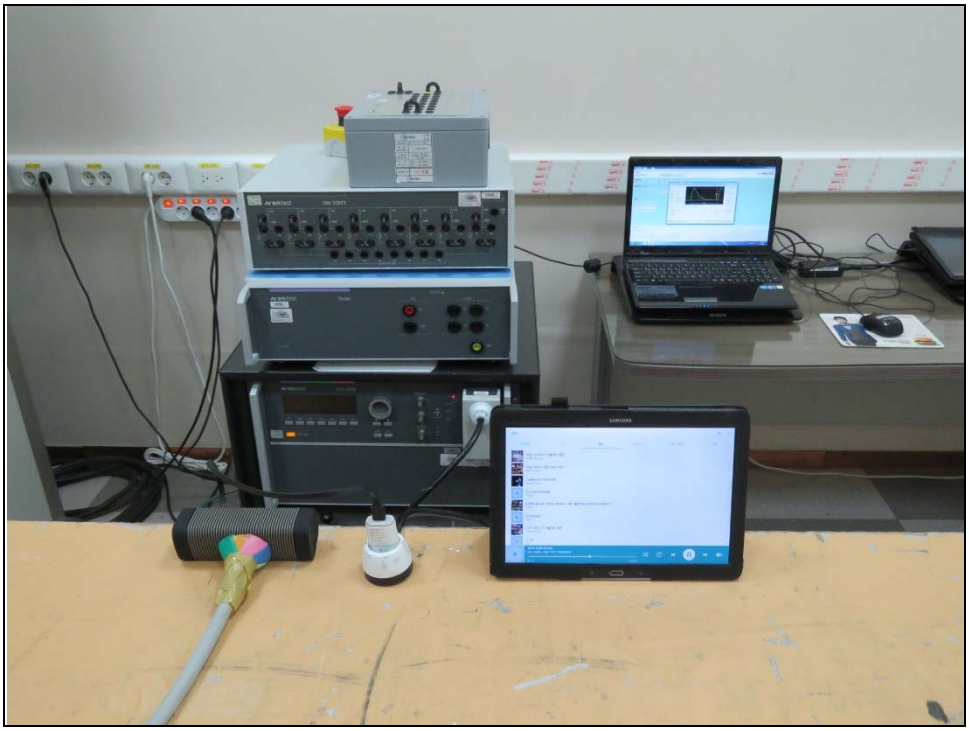


▶**AUX mode**

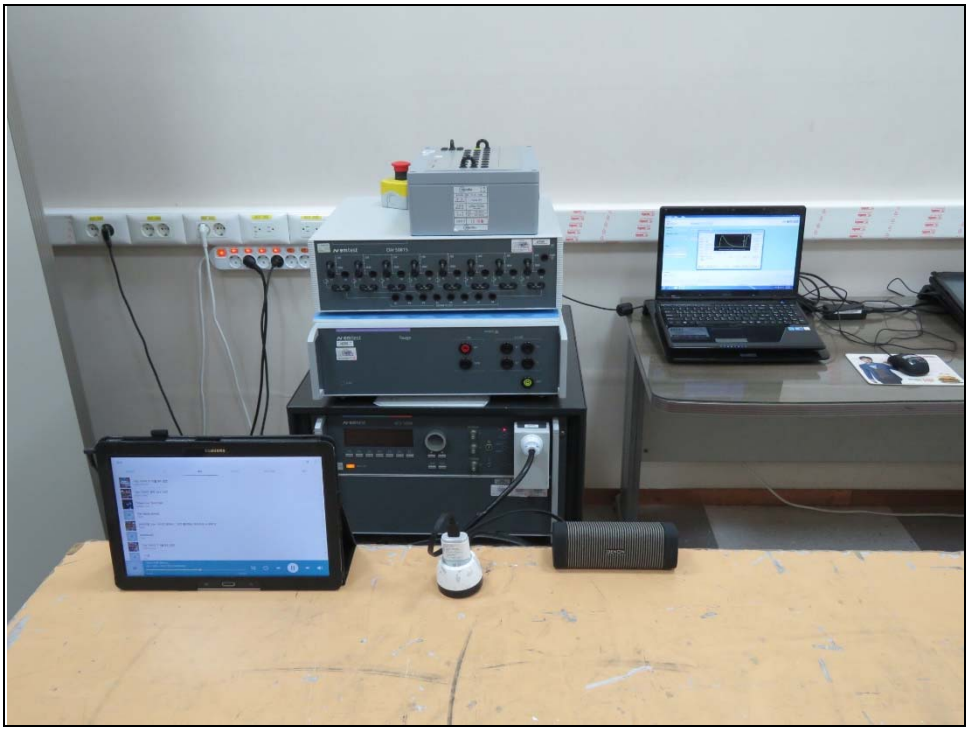


6. Surges

▶**BT mode**

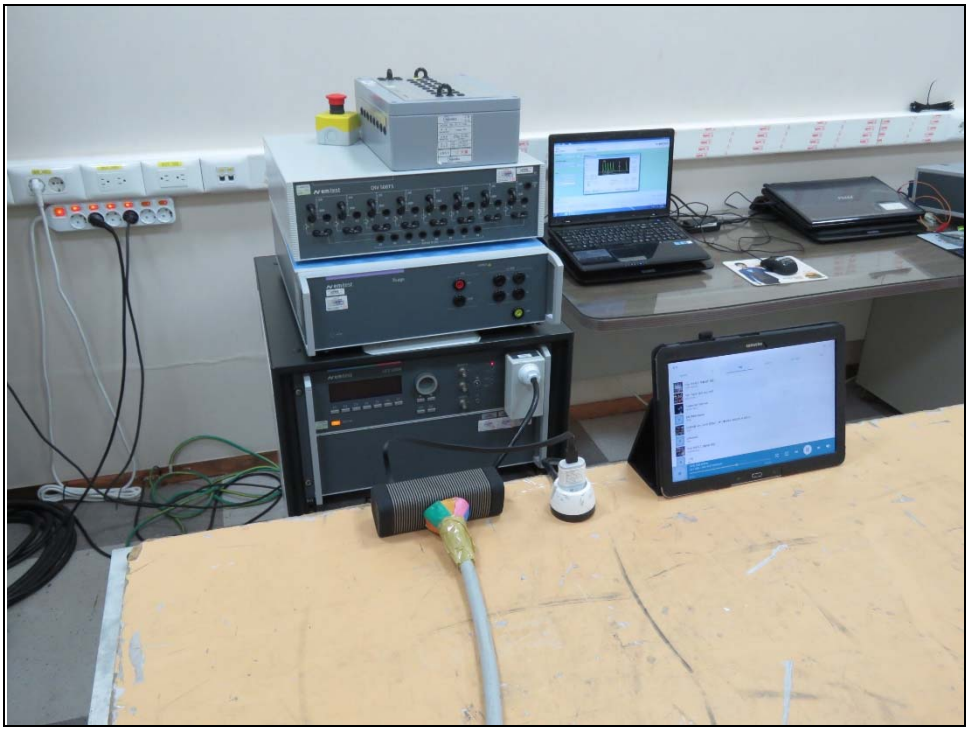


▶**AUX mode**

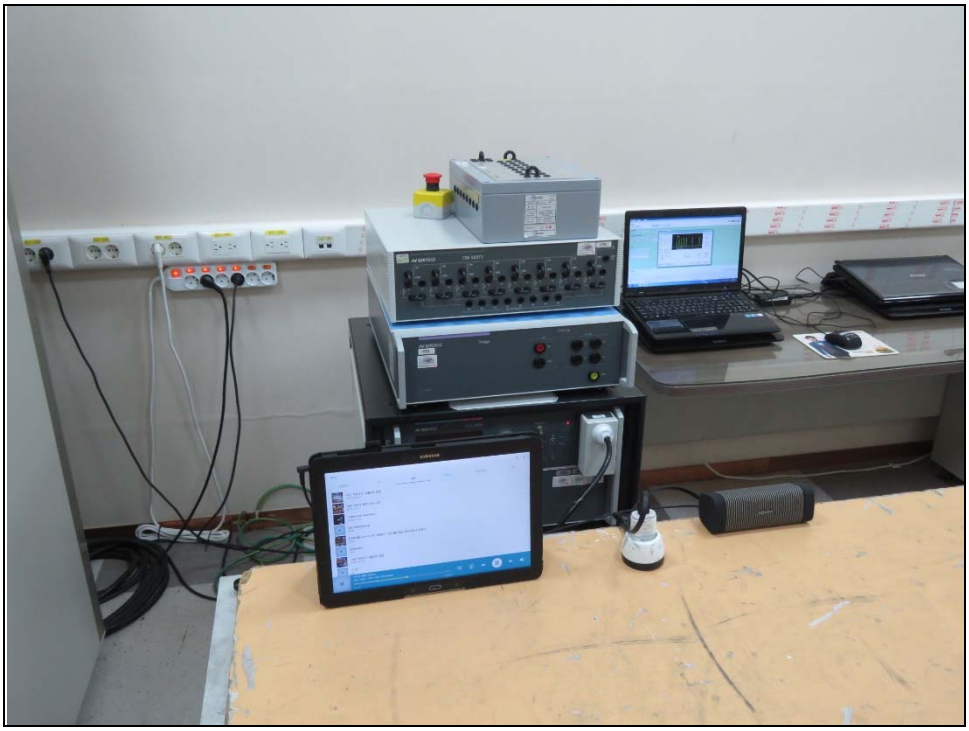


5. Electrical fast transients (EFT)

▶**BT mode**

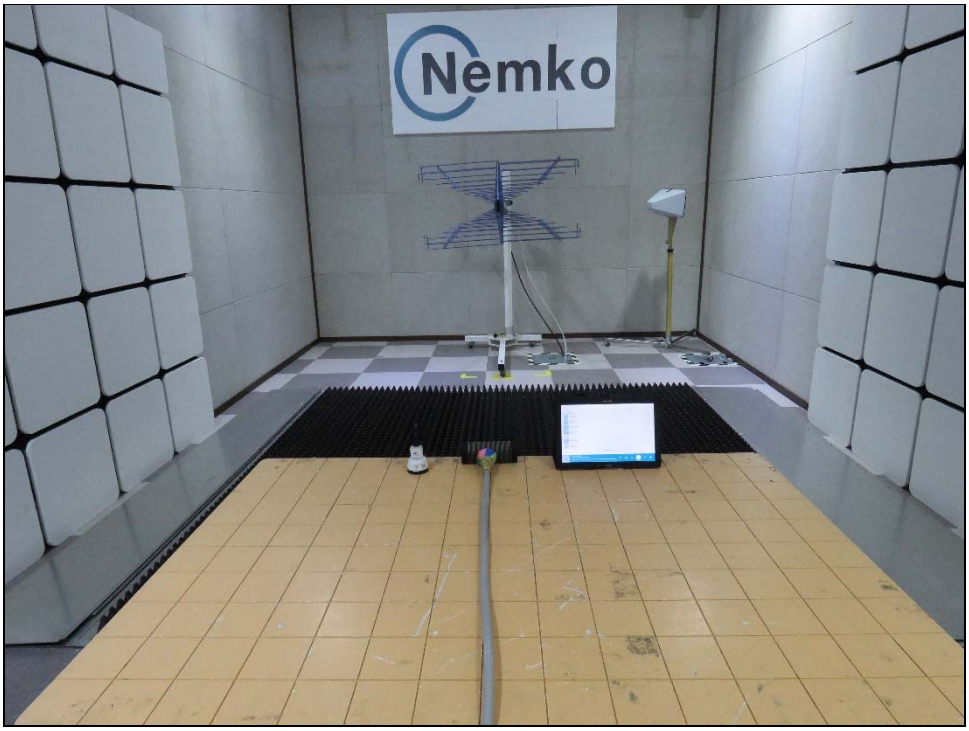


▶**AUX mode**

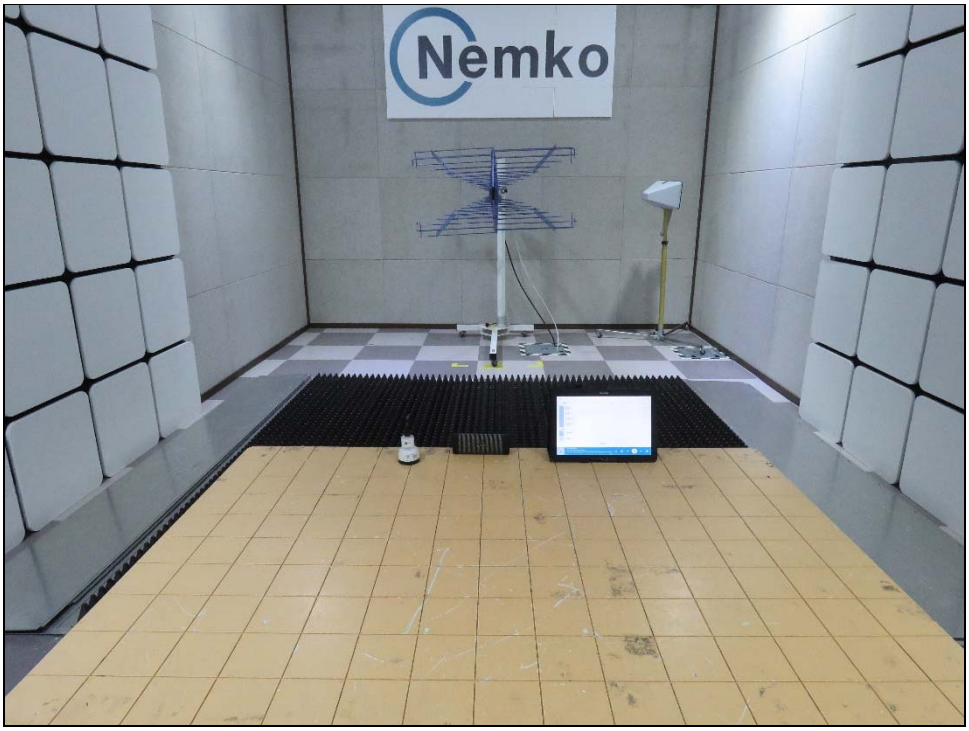


4. Continuous radio frequency disturbances

▶**BT mode**

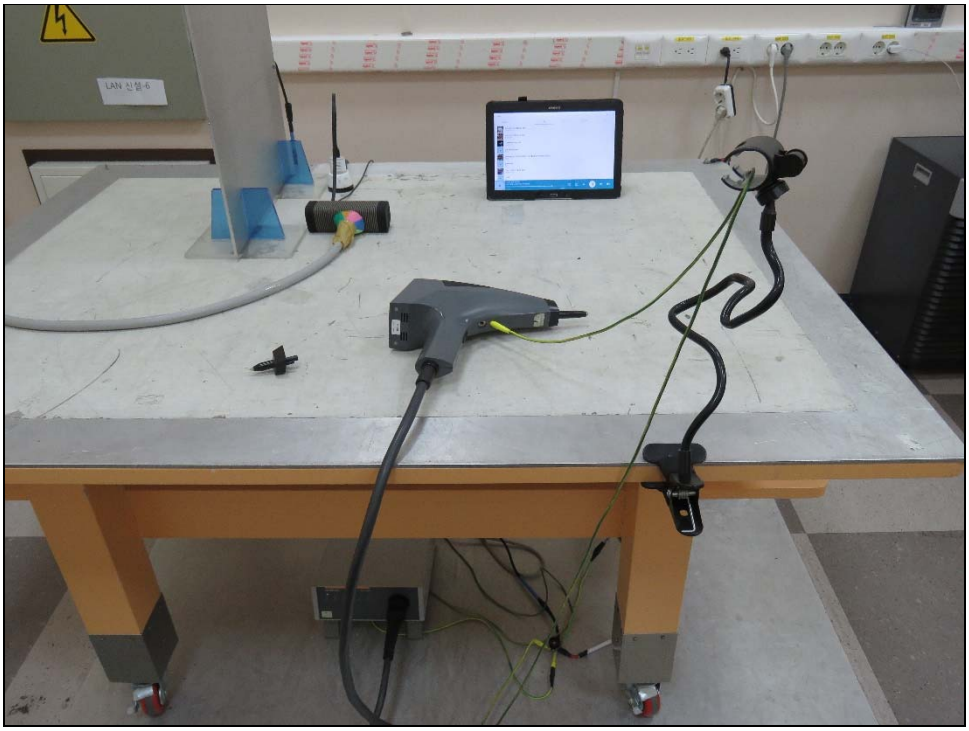


▶**AUX mode**



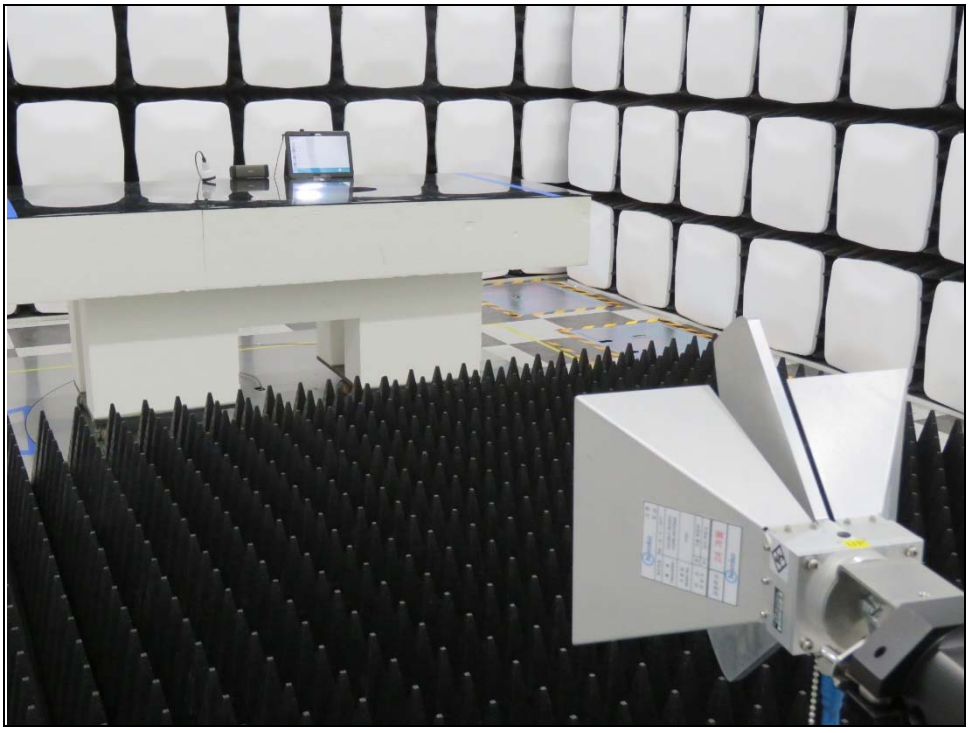
3. Electrostatic discharges (ESD)

▶**BT mode**

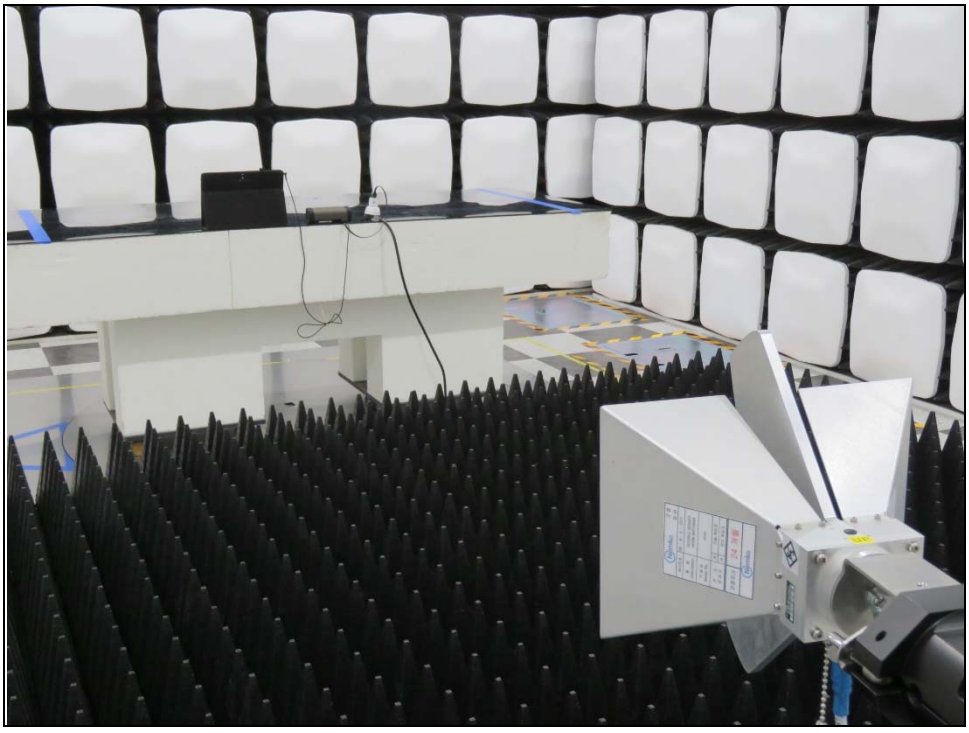


▶**AUX mode**

▶ **AUX mode**



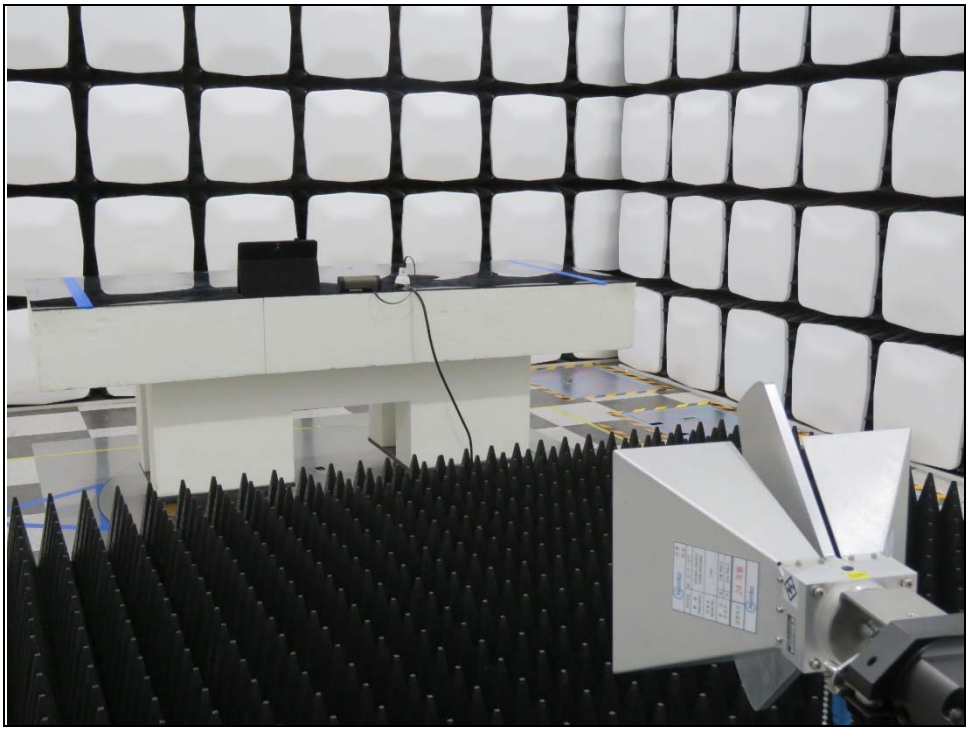
[Above 1 ㎓, Front]



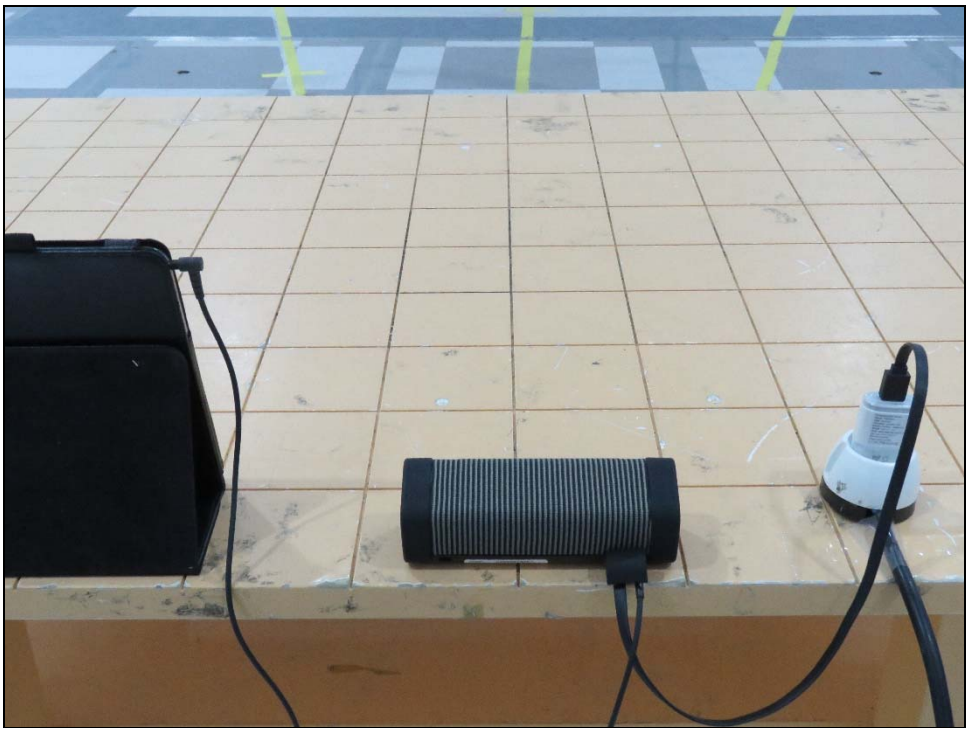
[Above 1 ㎓, Rear]

▶ **BT mode**

[Above 1 ㎓, Front]



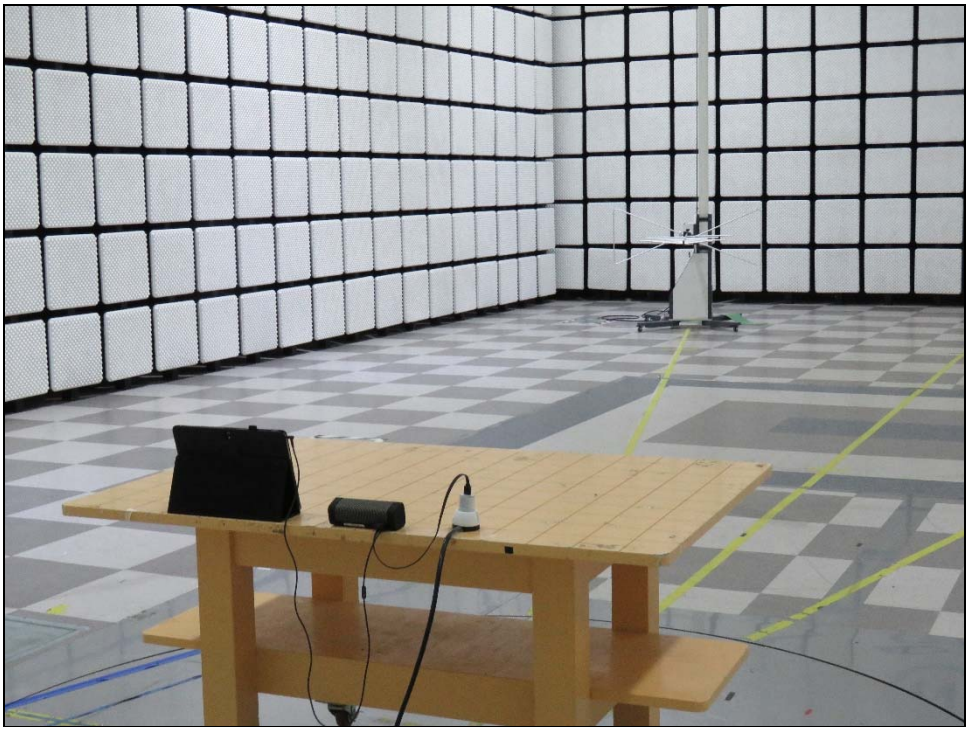
[Above 1 ㎓, Rear]



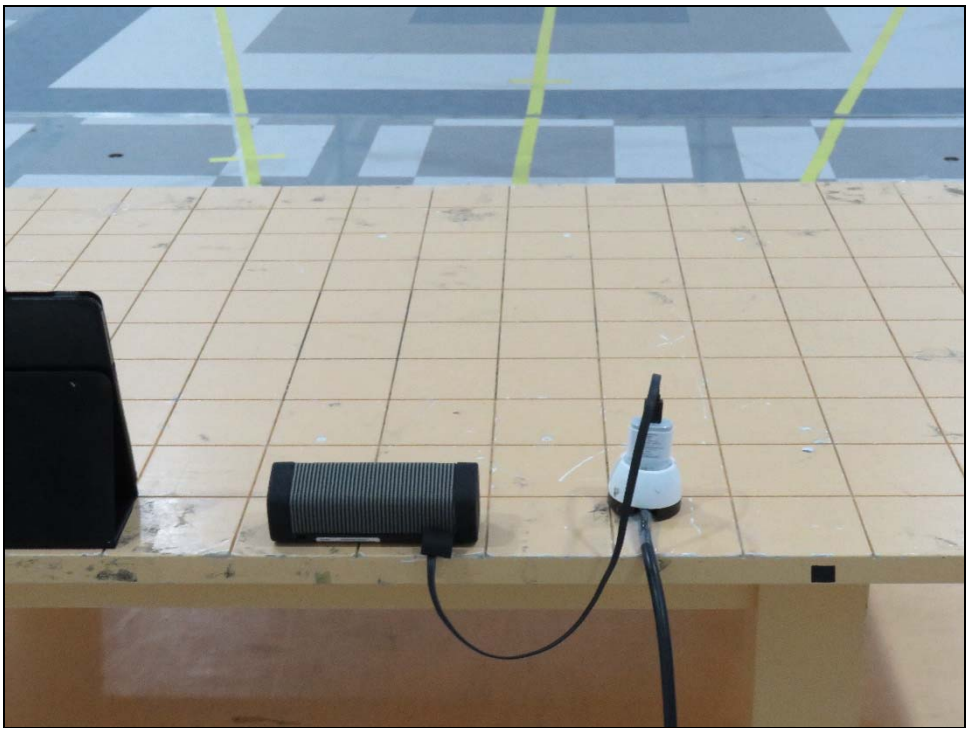
[Below 1 ㎓, Port]

▶AUX mode

[Below 1 ㎓, Front]



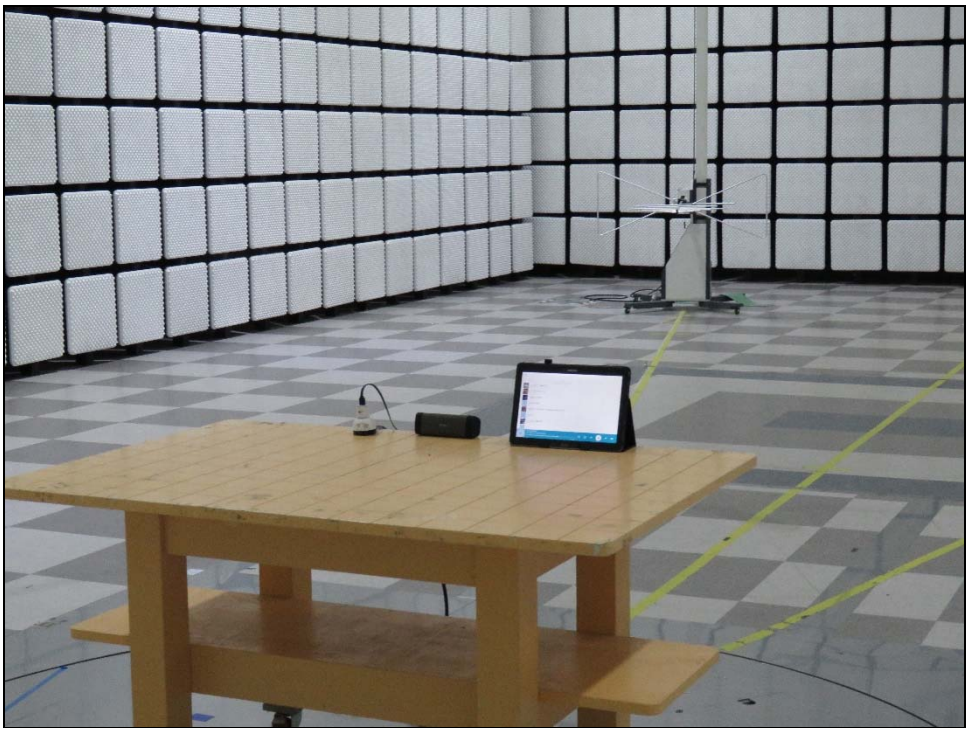
[Below 1 ㎓, Rear]



[Below 1 ㎓, Port]

2. Radiated emissions

▶ **BT mode**

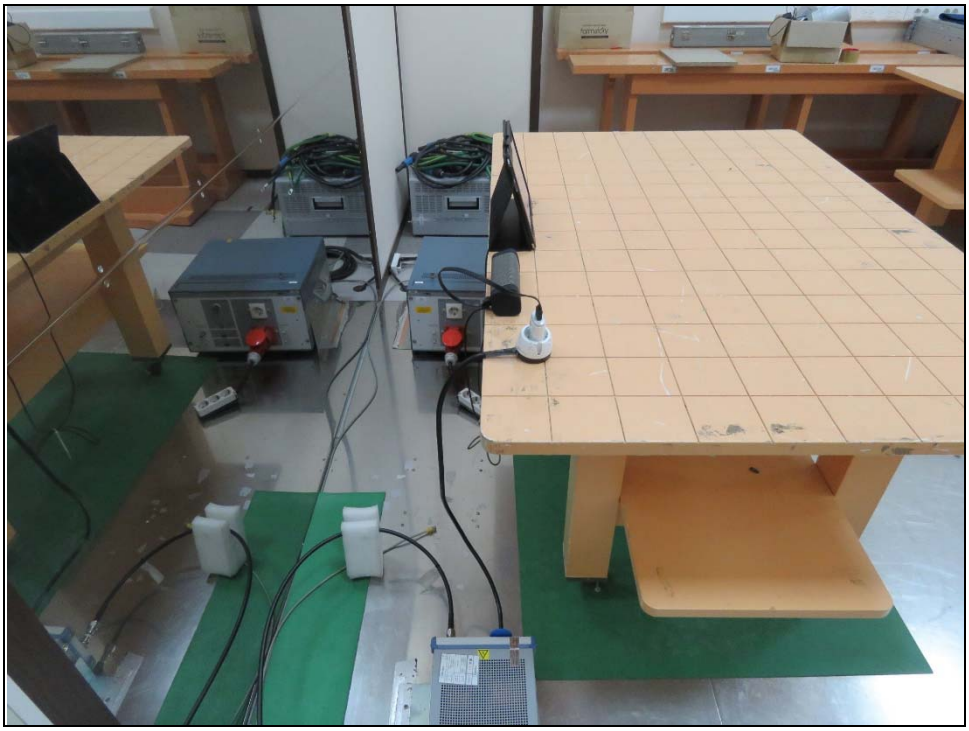


[Below 1 ㎓, Front]

[Below 1 ㎓, Rear]

▶ **AUX mode**

[Front]



[Side]

Appendix A Photographs of Test

1. Conducted emissions from the AC mains power ports

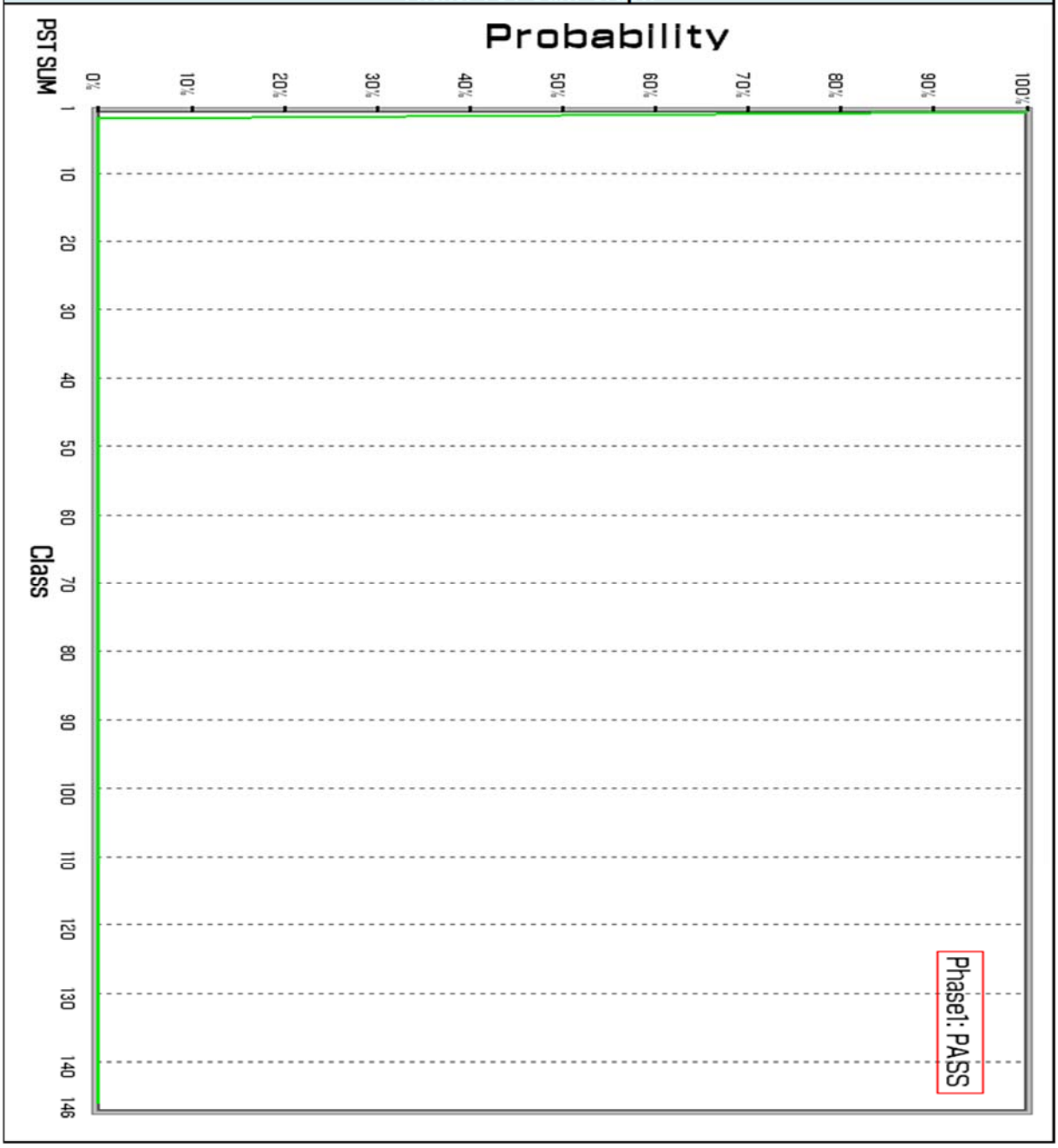
▶ **BT mode**

[Front]

[Side]

Appendixes

05th August 2017 - 11:44:06	Ph:1 Page 3/3	IECSoft v2_5a
IEC61000-3-3:2013 Ed.3.0 Flickermeter		
Instrument Details		
Instrument Model	PPA5511	
Instrument Serial	162-04585	
Instrument Firmware	2.149	
Equipment Under Test		
Brand	N/A	
Model	N/A	
Serial	N/A	
Flicker PST Sum Graph		



Tested by : Doseung Shin

05th August 2017 - 11:44:06	Ph:1 Page 2/3	IECSoft v2_5a

IEC61000-3-3:2013 Ed.3.0 Flickermeter

Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04585
Instrument Firmware	2.149

Equipment Under Test

Brand	N/A
Model	N/A
Serial	N/A

Flicker Test Results

PST no.	Status	DC (%)	Dmax (%)	Tmax (s)	PST	PST Lim	PLT	PLT Lim
1	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
2	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
3	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
4	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
5	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
6	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
7	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
8	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
9	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
10	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
11	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	N/A
12	Phase1: PASS	0.011	0.0572	0	0.082	1.00	0.082	0.65

Tested by : Doseung Shin

Flicker Probability, Value Presentation

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IEC61000-3-3:2013 Ed.3.0
Flickermeter

Instrument Details		
Instrument Model	PPA5511	
Serial Number	162-04585	
Firmware Version	2.149	
N4L Calibration Date	03rd February 2016	
Instrument Version	Standard	
Source Details		
Source Model	N4A06	
Source Serial	91J-11432	
Source Frequency	50.000Hz	
Source Voltage RMS	230.000V	
Source Settling Time		
Test Settings		
Class	Voltage	
Mode	Normal (4%)	
Minimum Current	300mA	
PST	10.00 minutes	
PLT	12 PSTs	
Equipment Under Test		
Brand	N/A	
Model	N/A	
Serial	N/A	
Impedance Network ID	N/A	
Test Conditions		
	User Entered	**Measured**
Rated Voltage	N/A	230.006V
Rated Current	N/A	N/A
Rated Frequency	N/A	49.999Hz
Rated Power	N/A	N/A
D max	0.057% (Limit: 4.0%)	
T max	0.000 s (Limit: 0.5 s)	
DC max	0.011% (Limit: 3.3%)	
Additional Test Details		
Operator	Doseung shin	
Lab Name	N/A	
Location	N/A	
Notes	NK-17-E-0599	
Signature		
Results	**Phase1: PASS**	

Tested by : Doseung Shin

16. Flicker

16.1 Test Procedure

EUT was connected to the Power Analyzer system. Measurements were conducted to obtain the desired flicker parameters. The measuring time depends on which parameters are to be measured:

- ◆ 2 hours for Long Time Flicker assessment (Plt)
- ◆ 10 minutes for Short Time Flicker assessment (Pst)
- ◆ (1-10) minutes for dmax, dc and dt assessment (depending on EUT switch-rate)

A pure a.c. mains was supplied to the system from two power supply units. The units supply an a.c. mains, free of harmonics, fluctuations or distortion of any kind. A defined impedance was located between the supply unit and the EUT.

A measurement table and a graphic presentation of the “Worst Case” probability function of Short Time Flicker during this session(if measured) are presented in the report.

For voltage changes caused by manual switching, equipment is deemed to comply without further testing if the maximum r.m.s. input current (including inRush current) evaluated over each 10 ms half-period between zero-crossings does not exceed 20 A, and the supply current after inRush is within a variation band of 1.5 A.

If measurement methods are used, the maximum relative voltage change dmax caused by manual switching. The final test result shall be calculated by deleting the highest and lowest results and take the arithmetical average of the remaining 22 values.

Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
Precision Power Analyzer	Newtons4th Ltd	PPA5511	162-04585	2018.03.09
Impedance Network	Newtons4th Ltd	IMP161	91G-11334	2018.01.20
PROGRAMMABLE AC POWER SOURCE	Newtons4th Ltd	N4A06-M	91J-11432	2017.04.05

16.2 Test Parameters

Port: a.c. mains
Applied Standard: EN 61000-3-3:2013
Measured: dmax, dc, dt, Pst, Plt
Test Engineer: Doseung Shin

16.3 Flicker Probability, Value Presentation

Measurement results can be found in the following page.

Result

Compliant

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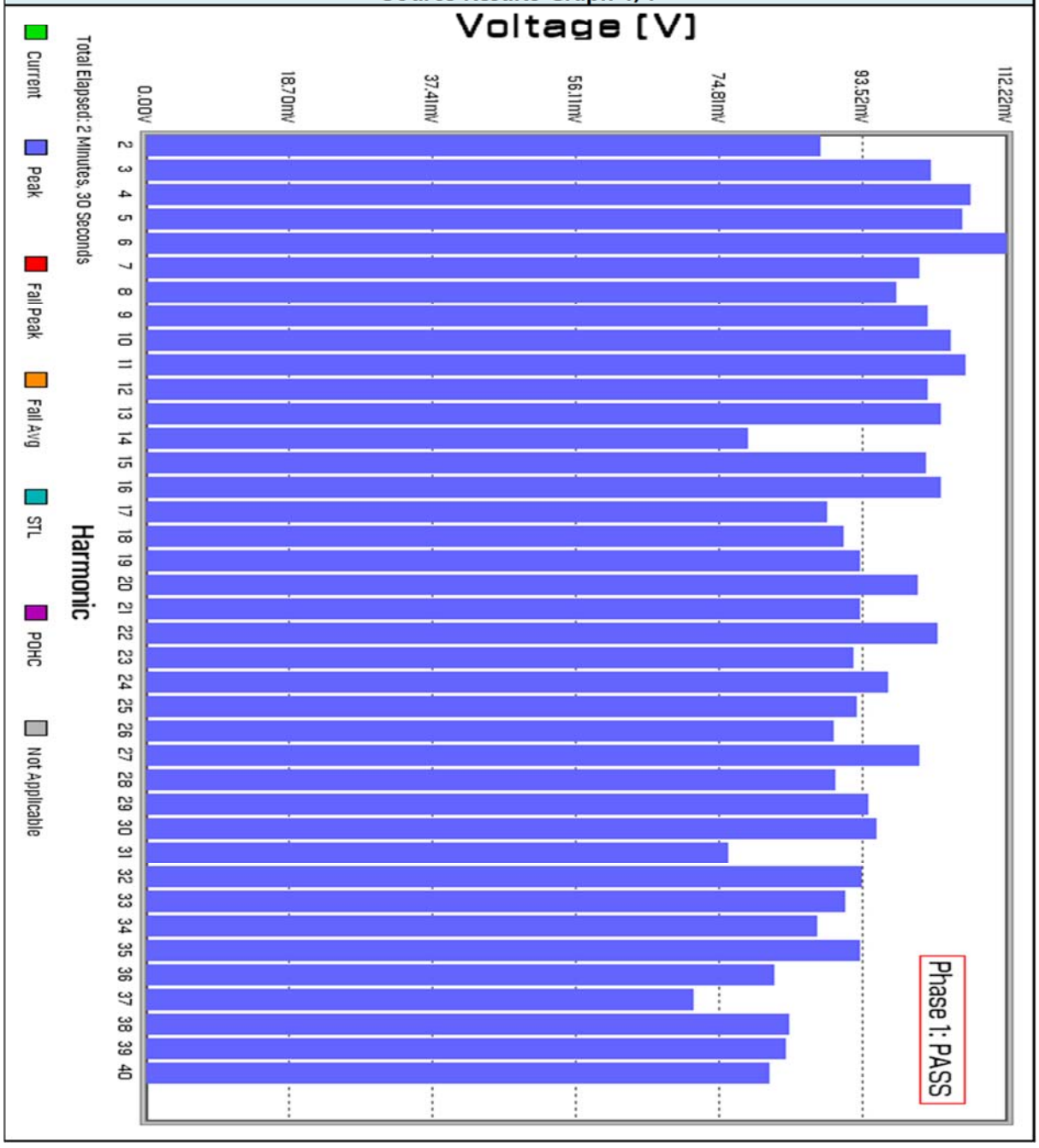
IEC61000-3-2:2014 Fluctuating Harmonics		
Instrument Details		
Instrument Model	PPA5511	
Instrument Serial	162-04585	
Instrument Firmware	2.149	
Equipment Under Test		
Brand	N/A	
Model	N/A	
Serial	N/A	
Source Results Graph 1/1		



Tested by : Doseung Shin

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IEC61000-3-2:2014 Fluctuating Harmonics

Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04585
Instrument Firmware	2.149

Equipment Under Test

Brand	N/A
Model	N/A
Serial	N/A

Source Results 1/1

Harmonic	Status	Peak (V)	Average (V)	Limit (V)
1	PASS	230.04	230.02	No Limit
2	PASS	0.08808	0.06739	0.46023
3	PASS	0.10254	0.08341	2.071
4	PASS	0.10769	0.09478	0.46023
5	PASS	0.10644	0.08492	0.92046
6	PASS	0.11222	0.06872	0.46023
7	PASS	0.10095	0.07813	0.69034
8	PASS	0.09802	0.07141	0.46023
9	PASS	0.10203	0.07327	0.46023
10	PASS	0.10499	0.08107	0.46023
11	PASS	0.10701	0.09145	0.23011
12	PASS	0.10196	0.08238	0.23011
13	PASS	0.1037	0.075	0.23011
14	PASS	0.07855	0.0411	0.23011
15	PASS	0.10188	0.07732	0.23011
16	PASS	0.10368	0.08378	0.23011
17	PASS	0.08881	0.04909	0.23011
18	PASS	0.09097	0.05438	0.23011
19	PASS	0.09317	0.06133	0.23011
20	PASS	0.10082	0.07789	0.23011
21	PASS	0.09324	0.05731	0.23011
22	PASS	0.10323	0.08017	0.23011
23	PASS	0.09226	0.05883	0.23011
24	PASS	0.09681	0.06435	0.23011
25	PASS	0.09287	0.0531	0.23011
26	PASS	0.0898	0.05557	0.23011
27	PASS	0.10091	0.06813	0.23011
28	PASS	0.09001	0.05791	0.23011
29	PASS	0.09426	0.05649	0.23011
30	PASS	0.09535	0.05473	0.23011
31	PASS	0.07592	0.03017	0.23011
32	PASS	0.09335	0.04503	0.23011
33	PASS	0.09134	0.04858	0.23011
34	PASS	0.0876	0.05343	0.23011
35	PASS	0.0932	0.0602	0.23011
36	PASS	0.08207	0.0339	0.23011
37	PASS	0.0715	0.02963	0.23011
38	PASS	0.08406	0.03447	0.23011
39	PASS	0.08349	0.03365	0.23011
40	PASS	0.08145	0.03481	0.23011

Tested by : Doseung Shin

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IEC61000-3-2:2014 Fluctuating Harmonics

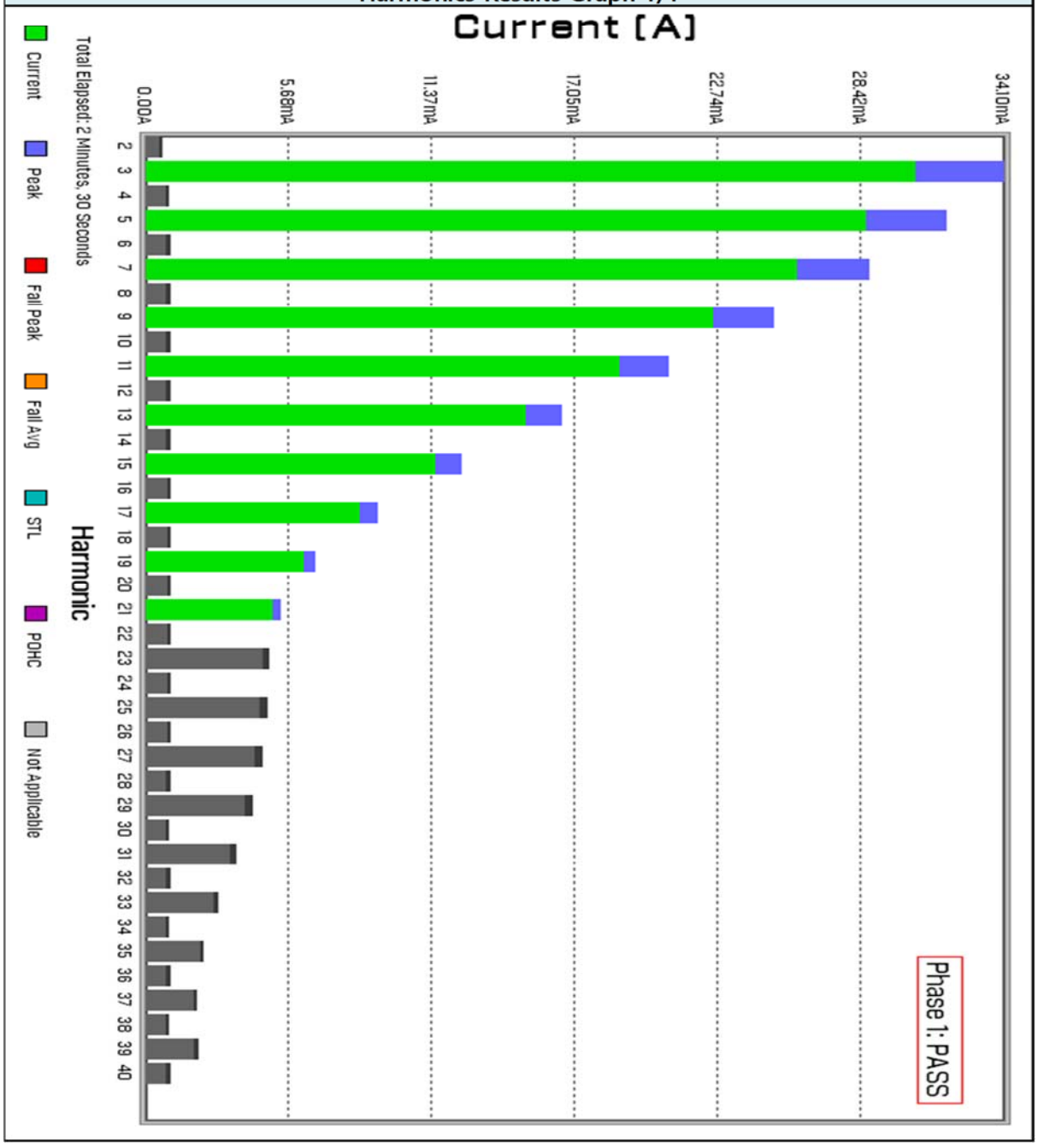
Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04585
Instrument Firmware	2.149

Equipment Under Test

Brand	N/A
Model	N/A
Serial	N/A

Harmonics Results Graph 1/1



Tested by : Doseung Shin

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IEC61000-3-2:2014 Fluctuating Harmonics

Instrument Details

Instrument Model	PPA5511
Instrument Serial	162-04585
Instrument Firmware	2.149

Equipment Under Test

Brand	N/A
Model	N/A
Serial	N/A

Extra Test Information

	Average	Peak	Limit
THC	62.781mA	69.174mA	N/A
POHC	11.561mA	12.331mA	251.375mA
Voltage Crest Factor	1.40981	1.41147	1.40 to 1.42
Current Crest Factor	4.186	5.631	N/A

Harmonics Results 1/1

Harmonic	Status	Avg (A)	Avg L(A)	Avg %ofL	Peak (A)	Peak L(A)	Peak %ofL
1	N/A	0.03185	N/A	N/A	0.03547	N/A	N/A
2	N/A	0.00057	N/A	N/A	0.00072	N/A	N/A
3	N/A	0.03064	N/A	N/A	0.0341	N/A	N/A
4	N/A	0.0008	N/A	N/A	0.00098	N/A	N/A
5	N/A	0.02866	N/A	N/A	0.03187	N/A	N/A
6	N/A	0.00081	N/A	N/A	0.00098	N/A	N/A
7	N/A	0.0259	N/A	N/A	0.02875	N/A	N/A
8	N/A	0.00081	N/A	N/A	0.00099	N/A	N/A
9	N/A	0.02254	N/A	N/A	0.02496	N/A	N/A
10	N/A	0.00084	N/A	N/A	0.00101	N/A	N/A
11	N/A	0.01885	N/A	N/A	0.02081	N/A	N/A
12	N/A	0.00084	N/A	N/A	0.00103	N/A	N/A
13	N/A	0.0151	N/A	N/A	0.01657	N/A	N/A
14	N/A	0.00084	N/A	N/A	0.00103	N/A	N/A
15	N/A	0.01156	N/A	N/A	0.01261	N/A	N/A
16	N/A	0.00086	N/A	N/A	0.00104	N/A	N/A
17	N/A	0.00853	N/A	N/A	0.00922	N/A	N/A
18	N/A	0.00086	N/A	N/A	0.00103	N/A	N/A
19	N/A	0.0063	N/A	N/A	0.00673	N/A	N/A
20	N/A	0.00087	N/A	N/A	0.00104	N/A	N/A
21	N/A	0.00506	N/A	N/A	0.00538	N/A	N/A
22	N/A	0.00087	N/A	N/A	0.00104	N/A	N/A
23	N/A	0.00464	N/A	N/A	0.00496	N/A	N/A
24	N/A	0.00085	N/A	N/A	0.00102	N/A	N/A
25	N/A	0.00454	N/A	N/A	0.00487	N/A	N/A
26	N/A	0.00086	N/A	N/A	0.00101	N/A	N/A
27	N/A	0.00436	N/A	N/A	0.00469	N/A	N/A
28	N/A	0.00085	N/A	N/A	0.00099	N/A	N/A
29	N/A	0.00395	N/A	N/A	0.00425	N/A	N/A
30	N/A	0.00083	N/A	N/A	0.00097	N/A	N/A
31	N/A	0.00337	N/A	N/A	0.00362	N/A	N/A
32	N/A	0.00083	N/A	N/A	0.00099	N/A	N/A
33	N/A	0.00272	N/A	N/A	0.00292	N/A	N/A
34	N/A	0.00081	N/A	N/A	0.00096	N/A	N/A
35	N/A	0.0022	N/A	N/A	0.00234	N/A	N/A
36	N/A	0.00081	N/A	N/A	0.00099	N/A	N/A
37	N/A	0.00193	N/A	N/A	0.00207	N/A	N/A
38	N/A	0.0008	N/A	N/A	0.00097	N/A	N/A
39	N/A	0.00194	N/A	N/A	0.0021	N/A	N/A
40	N/A	0.00079	N/A	N/A	0.00098	N/A	N/A

Tested by : Doseung Shin

Fluctuating Harmonics, Value Presentation

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IEC61000-3-2:2014
Fluctuating Harmonics

Instrument Details	
Instrument Model	PPA5511
Serial Number	162-04585
Firmware Version	2.149
N4L Calibration Date	03rd February 2016
Instrument Version	Standard
Source Details	
Source Model	N4A06
Source Serial	91J-11432
Source Frequency	50.000Hz
Source Voltage RMS	230.000V
Source Settling Time	10.0 s
Test Settings	
Class	Class A
Mode	Measured
Equipment Under Test	
Brand	N/A
Model	N/A
Serial	N/A
Impedance Network ID	N/A

Test Conditions		
	User Entered	Measured
Rated Voltage	N/A	230.111V
Rated Current	N/A	69.860mA
Rated Frequency	N/A	49.999Hz
Rated Power	N/A	7.187W

Additional Test Information	
Measured Power Factor	0.438
Max Current THD	292.613W
Max THC	69.174mW
Max Power	7.991W
Max F.Current	35.467mA
Average F.Current	31.924mA
Minimum Current	3A
Test Duration	2.5 minutes
Additional Test Details	
Operator	Doseung shin
Lab Name	N/A
Location	N/A
Notes	NK-17-E-0599
Signature	

Results	Test - N/A. Rated Power < 75W

Test not applicable
With the exception of lighting equipment section 7 of the IEC61000-3-2:2014 standard declares that no Harmonic current limits are specified for equipment with a rated power of 75W or less.

Tested by : Doseung Shin

15. Fluctuating Harmonics

15.1 Test Procedure

EUT was connected to the Power Analyzer system. Measurements were conducted on all active phases, for harmonics 1st to 40th of the mains frequency (50 ㎐). A pure a.c. mains was supplied to the system from two power supply units. The units supply an a.c. mains, free of harmonics or distortion of any kind. An overview of the harmonic emission is presented as numeric and as graphics.

Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
Precision Power Analyzer	Newtons4th Ltd	PPA5511	162-04585	2018.03.08
Impedance Network	Newtons4th Ltd	IMP161	91G-11334	2018.01.20
PROGRAMMABLE AC POWER SOURCE	Newtons4th Ltd	N4A06-M	91J-11432	2018.04.03

15.2 Test Parameters

Port: a.c. mains
Applied Standard: EN 61000-3-2:2014
Class: A
Test Engineer: Doseung Shin

15.3 Fluctuating Harmonics, Value Presentation

Measurement results can be found in the following pages.

Comment

The following pages inform the harmonic current emissions.

Result

Compliant

14.3 Test Log

[Testing in accordance with EN 55024]

Voltage Dip/Int. %U_T	Duration Period of the rated frequency	Phase (˚)	Count	Result (Pass/Fail)
30 %	25 period	0	3 T	Pass Note 1)
> 95 %	0.5 period	0	3 T	Pass Note 1)
> 95 %	250 period	0	3 T	Pass Note 2)

[Testing in accordance with EN 301 489-1, EN 301 489-17]

Voltage Dip/Int. %U_T	Duration Period of the rated frequency	Phase (˚)	Count	Result (Pass/Fail)
100 %	0.5 cycle	0	3 T	Pass Note 1)
100 %	1 cycle	0	3 T	Pass Note 1)
30 %	25 cycles	0	3 T	Pass Note 1)
100 %	250 cycles	0	3 T	Pass Note 2)

Comment/Performance

Note 1) No operation errors were detected during and after the dips.

Note 2) During the interruption, the performance of EUT was degraded.
But after the test, the EUT was recovered with intended operation of itself.

Result

Compliant

14. Voltage dips and Interruptions

14.1 Test Procedure

The dips/interruption test is only applicable to a.c. mains power port. The dips/interruptions were applied at zero crossing.

The dips were applied with a 0 % residual voltage and a 70 % residual voltage.

EUT was given a 10 s interval between each dip to recover.

Three-phase dips were applied at each individual voltage with one at a time (phase to neutral and phase to phase).

The interruptions are > 95 % dip-type. EUT was given a 10 s internal between each interruption to recover. Three-phase interruptions were applied at all the three phases simultaneously.

Instrumentation used during this session:

Instruments	Manufacture	Model	Serial number	Due to Calibration
Ultra Compact Simulator	EM TEST	UCS 500 N7	V0952105684	2018.04.03

14.2 Test Parameters

Port: a.c. mains **Test Engineer:** Doseung Shin
Test Standard: EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010
Basic Standard: EN 61000-4-11:2004

▶ EN55024

	Voltage Reduction	Duration	Performance Criteria	Performance Results
Test Level:	30 % (dip)	25 period	C	A
	> 95 % (dip)	0.5 period	B	A
	> 95 % (interruption)	250 period	C	B

▶ EN 301 489-1, EN 301 489-9, EN 301 489-17

	Voltage Reduction	Duration	Performance Criteria	Performance Results
Test Level:	100 % (dip)	0.5 cycle	B	A
	100 % (dip)	1 cycle	B	A
	30 % (dip)	25 cycles	C	A
	100 % (interruption)	250 cycles	C	B

13. Continuous conducted disturbances

13.1 Test Procedure

The tests were performed on a 2 x 2 m ground reference plane. The EUT was located on a 10 cm isolating support. The current was injected to each single port separately.
For a.c. ports, d.c. ports, coaxial lines and 2 wires or 4 wires balanced communication lines a coupling/decoupling network was used to inject. On other multiple signal cables a capacitive coupling clamp (EM Clamp) was used for injection.
Each signal level of 3 V, 80 % AM modulated with a 1 ㎑ sine wave was applied in the frequency range 150 ㎑ to 80 ㎒.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
Continuous Wave Simulator	EM TEST	CWS 500N1	V0952105687	2018.04.03
6 dB Attenuator	EM TEST	ATT6 / 75	1009 - 11	-
CDN	EM TEST	CDN M2/M3N	0110 - 18	2018.01.09

13.2 Test Parameters

Port:	a.c. mains	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010		
Basic Standard:	EN 61000-4-6:2014		
Performance Criteria:	A	**Performance Results :**	A
Frequency Step:	1 %		
Frequency Range:	150 ㎑ to 80 ㎒	**Dwell Time:**	3 s
Test Level:	3 V rms	**Modulation:**	80 % AM, 1 ㎑

13.3 Test Log

Frequency (㎒)	Point	Coupling	Field Strength (rms)	Modulation	Result (Pass/Fail)
150 ㎑ to 80 ㎒	a.c. Main	CDN(M2)	3 V	80 % AM, 1 ㎑	Pass

Comment/Performance

No operation errors were detected during and after the injection.

Result

Compliant

12. Surges

12.1 Test Procedure

The surges generator was connected to earth via a low impedance connection. No presences of an earth/reference plane is necessary.
The surges testing was applied to input a.c. power ports.
For each level and line surges were applied at stepped phase angles with 90º steps for a.c. power ports.
Line to Line surges were applied at ±1 kV for power ports.
The test level for telecommunications ports, intended to be directly connected to the telecommunications network via outdoor cables, shall be 1 kV line to ground as given in EN 61000-4-5 [5], however, in telecommunications centres 0,5 kV line to ground shall be used. The test generator shall provide the 1,2/50 µs pulse as defined in EN 61000-4-5 [5].
The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10 m) shall be 0,5 kV line to ground. The test generator shall provide the 1,2/50 µs pulse as defined in EN 61000-4-5 [5].
The surges were applied with 1 min or faster intervals.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
Ultra Compact Simulator	EM TEST	UCS 500 N7	V0952105684	2018.04.03

12.2 Test Parameters

Port: a.c. mains **Test Engineer:** Doseung Shin
Applied Standard : EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010
Basic Standard: EN 61000-4-5:2014
Performance Criteria: B (a.c. power) **Performance Results :** A
Test Data Line(s) to Line(s)

12.3 Test Log

Line	Voltage	Coupling	Phase	Inject (count)	Result (Pass/Fail)
L1-L2	±0.5 ㎸, ±1 ㎸	CDN	0º, 90º, 180º, 270º	5	Pass
L2-L1	±0.5 ㎸, ±1 ㎸	CDN	0º, 90º, 180º, 270º	5	Pass

Comment/Performance

No operation errors were detected during and after the surges.

Result

Compliant

11. Electrical fast transients (EFT)

11.1 Test Procedure

The minimum area of the ground reference plane is 1 m x 1 m, and connected to earth via a low impedance connection.

The EFT/Burst generator was located on the ground reference plane.

The EUT was located 0,1 m above the ground reference plane and the length of the signal or power lines between the EUT and the coupling device shall be as short as possible in the range 0,5 m to 3,0 m.

The minimum distance between the EUT and all other conductive structures, except the ground reference plane is more than 0,5 m.

The test voltage was applied simultaneously between each of the power supply conductors and the protective earth at the power supply.

Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
Ultra Compact Simulator	EM TEST	UCS 500 N7	V0952105684	2018.04.03

11.2 Test Parameters

Port:	a.c. mains	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010, EN 55020:2007+A11:2011		
Basic Standard:	EN 61000-4-4:2012		
Performance Criteria:	B	**Performance Results :**	B
Duration:	120 s		
Test Data	**Tr/Td** 5/50 ns	**Fburst** 5 ㎑	**Trep** 300 ms

11.3 Test Log

[Testing in accordance with EN 55020, EN 55024, EN 301 489-1, EN 301 489-9, EN 301 489-17]

Line	Voltage	Coupling	Inject Time (s)	Result (Pass/Fail)
L1	±1 kV	CDN	120	Pass Note 1)
L2	±1 kV	CDN	120	Pass Note 1)
L1-L2	±1 kV	CDN	120	Pass Note 1)

Comment/Performance

Note 1) During the Burst, the performance of EUT was degraded.

But after the test, the EUT was recovered with intended operation of itself.

Result

Compliant

10.3 Test Log

Frequency Range (㎒)	Position (Angle)	Polarity (H/V)	Field Strength (V/m)	Modulation	Result (Pass/Fail)
900	Front	H	3	Duty Cycle 1/8, 217 ㎐ repetition frequency	Pass
900	Rear	H	3		Pass
900	Right	H	3		Pass
900	Left	H	3		Pass
900	Front	V	3		Pass
900	Rear	V	3		Pass
900	Right	V	3		Pass
900	Left	V	3		Pass

Comment/Performance

No operation errors were detected during and after the exposures.

Result

Compliant

10. RF e.m. field keyed carrier : S5

10.1 Test Procedure

The tests were performed at 3 m distance in an anechoic chamber.
For floor-standing equipment, the EUT was mounted a non-conducting support 0.05 m to 0.15 m above the supporting plane. For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.
The EUT was exposed to the field from different angles, normally 0º, 90º, 180º, 270º and at both horizontal and vertical polarization (antenna height 1.55 m)
A signal level of 3 V/m with duty cycle 1/8, 217 ㎐ repetition frequency was applied in the frequency range 900 ㎒. During the test the 1 ㎑ unwanted noise level comes from the speaker was detected using microphone and selected level meter.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
POWER METER	ROHDE & SCHWARZ	NRP	102491	2018.04.03
SIGNAL GENERATOR	ROHDE & SCHWARZ	SMB 100A	103440	2018.04.03
Power Amplifier	BONN Elektronik	BLMA 1060-100/50D	107808B	-
Power Amplifier	BONN Elektronik	BLWA 0810-160/100D	107808A	-
TRIPOD MOBILE	ROHDE & SCHWARZ	HL046Z1	100112	-
EMS- ANTENNA	ROHDE & SCHWARZ	HL046	100054	-
AUTO POLARISATION SWITCH	ROHDE & SCHWARZ	-	N/A	-
AVG POWER SENSOR	ROHDE & SCHWARZ	NRP-Z91	100966	2018.04.03
AVG POWER SENSOR	ROHDE & SCHWARZ	NRP-Z91	100965	2018.04.03

10.2 Test Parameters

Port:	Enclosure	**Test Engineer:**	Doseung Shin
Applied Standard:	EN 55020:2007+A11:2011		
Basic Standard:	EN 61000-4-3:2006+A1:2008+A2:2010		
Performance Criteria:	A	**Performance Results :**	A
Test Level:	3 V/m	**Dwell Time:**	3 s
Frequency Step:	1 %	**Modulation:**	Duty Cycle 1/8, 217 ㎐ repetition frequency
Frequency Range:	900 ㎒		

9.3 Test Log

Frequency Range	Position	Polarity (H or V)	Field Strength (V/m)	Modulation	Result (Pass/Fail)
80 ㎒ to 6 ㎓	Front	H	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Rear	H	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Right	H	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Left	H	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Front	V	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Rear	V	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Right	V	3	80 % AM (1 ㎑)	Pass
80 ㎒ to 6 ㎓	Left	V	3	80 % AM (1 ㎑)	Pass

Comment/Performance

No operation errors were detected during and after the exposures.

Result

Compliant

9. Continuous radio frequency disturbances

9.1 Test Procedure

The tests were performed at 3 m distance in an anechoic chamber.
For floor-standing equipment, the EUT was mounted a non-conducting support 0.05 m to 0.15 m above the supporting plane. For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.
The EUT was exposed to the field from different angles, normally 0º, 90º, 180º, 270º and at both horizontal and vertical polarization (antenna height 1.55 m)
A signal level of 3 V/m, 80 % AM modulated with a 1 ㎑ sine wave was applied in the frequency range 80 ㎒ to 6 000 ㎒.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
POWER METER	Rohde & Schwarz	NRP	102491	2018.04.03
SIGNAL GENERATOR	Rohde & Schwarz	SMB 100A	103440	2018.04.03
Power Amplifier	BONN Elektronik	BLMA 1060-100/50D	107808B	-
Power Amplifier	BONN Elektronik	BLWA 0810-160/100D	107808A	-
TRIPOD MOBILE	Rohde & Schwarz	HL046Z1	100112	-
EMS- ANTENNA	ROHDE & SCHWARZ	HL046	100054	-
Stacked Double Log - per Antenna	SCHWARZBECK	STLP 9149	9149-064	-
AUTO POLARISATION SWITCH	Rohde & Schwarz	-	N/A	-
AVG POWER SENSOR	Rohde & Schwarz	NRP-Z91	100966	2018.04.03
AVG POWER SENSOR	Rohde & Schwarz	NRP-Z91	100965	2018.04.03

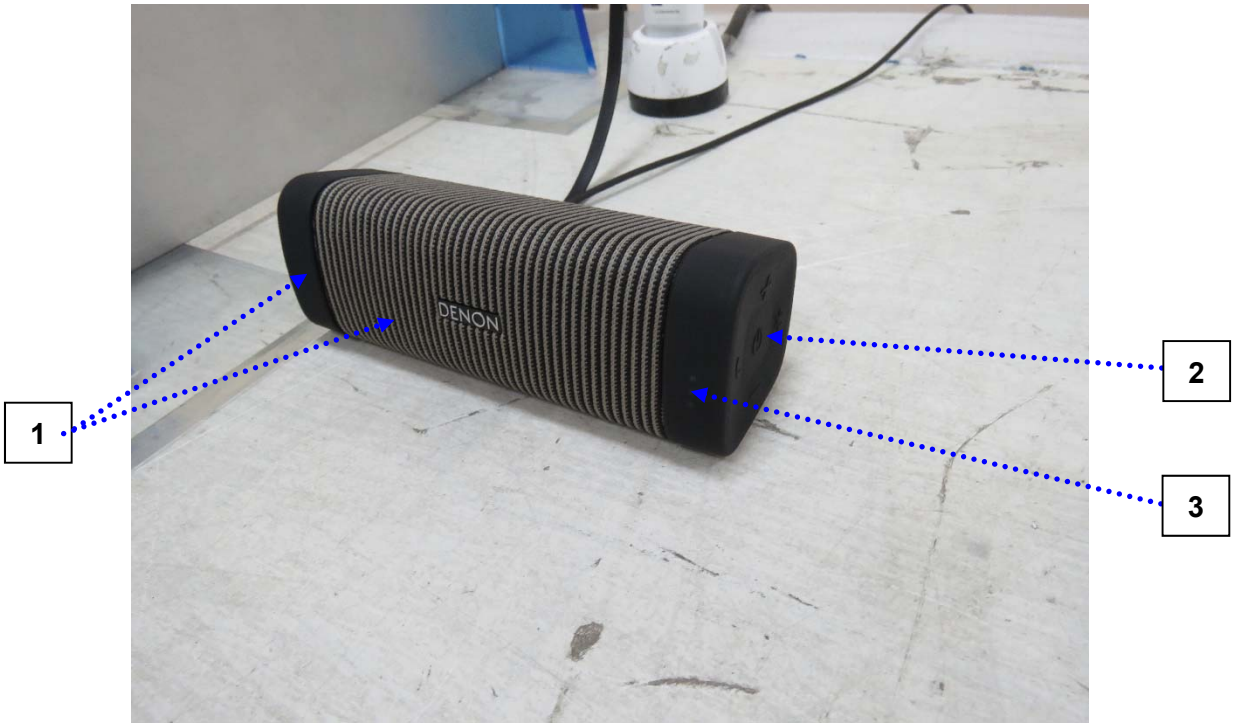
9.2 Test Parameters

Port:	Enclosure	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010		
Basic Standard:	EN 61000-4-3:2006/A1:2008/A2:2010		
Performance Criteria:	A	**Performance Results :**	A
Dwell Time:	3 s		
Frequency Step:	1 %	**Modulation:**	80 % AM, 1 ㎑
Frequency Range:	80 ㎒ to 6 000 ㎒	**Test Level:**	3 V/m

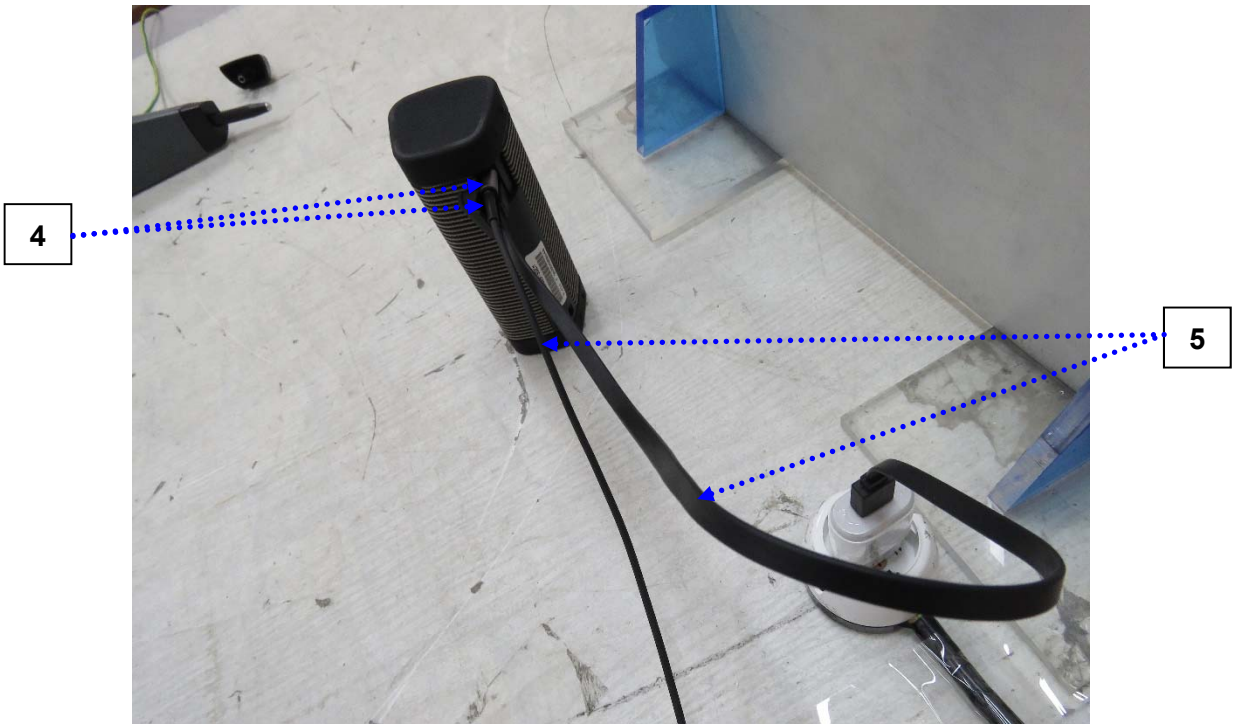
8.4 Discharges Points

Air discharge

Contact discharge



[Front]



[Rear]

8.3 Test Log

▶ **BT mode, AUX mode**

Point		Voltage	Coupling	Result (Pass/Fail)
-	HCP, VCP	±4 ㎸	Contact Discharge	Pass
1	Enclosure (Non-Conductive surface)	±2 ㎸, ±4 ㎸, ±8 ㎸	Air Discharge	Pass
2	Button	±2 ㎸, ±4 ㎸, ±8 ㎸	Air Discharge	Pass
3	LED	±2 ㎸, ±4 ㎸, ±8 ㎸	Air Discharge	Pass
4	Port	±2 ㎸, ±4 ㎸, ±8 ㎸	Air Discharge	Pass
5	Cable	±2 ㎸, ±4 ㎸, ±8 ㎸	Air Discharge	Pass

Comment/Performance

No operation errors were detected during and after the discharges.

Result

Compliant

8. Electrostatic discharges (ESD)

8.1 Test Procedure

A ground reference plane was located on the floor, and connected to earth via a low impedance connection. The return cable of the ESD generator was connected to the reference plane.
In case of a floor standing equipment, EUT was placed on the reference plane on 0.1 m of insulating support.
In case of table-top equipment, EUT was placed on a wooden table 0.8 m above the reference plane.
A horizontal coupling plane (HCP) of 1.6 m x 0.8 m was placed on the table, and connected to the reference plane via a cable with a 470 ㏀ resistor located in each end (0.5 mm insulating support between EUT and HCP).
In both cases a vertical coupling plane (VCP) of 0.5 m x 0.5 m was located 0.1 m from each sides of the EUT. The VCP was connected to the reference plane in the same matter as the HCP. The test was done by applying contact and air discharges to the EUT itself, and contact discharges to the HCP and VCP. When applying the discharges to the HCP, the tip of the generator was located at the front edge of each HCP opposite the center point of the EUT, at 0.1m distance. When applying the discharges to the VCP the tip of the generator was located at the middle edge of the VCP. The VCP was located 0.1 m from each side of the EUT. Contact discharges up to ±4 ㎸ were applied to various points of the EUT at conductive surfaces, and to the HCP/VCP. Air discharges up to ±2 ㎸, ±4 ㎸, ±8 ㎸ were applied to various points of the EUT at non-conductive surfaces.
Ungrounded equipment, or ungrounded part(s) of equipment, cannot discharge itself similarly to class I mains-supplied equipment. If the charge is not removed before the next ESD pulse is applied, it is possible that the EUT or part(s) of the EUT be stressed up to twice the intended test voltage. Therefore, double-insulated equipment could be charged at an unrealistically high charge, by accumulating several ESD discharges on the capacitance of the class II insulation, and then discharge at the breakdown voltage of the insulation with a much higher energy.
In the case of the ungrounded metallic parts shall be tested following 7.2.4 in EN 61000-4-2:2009 and the cable with the bleeder resistors shall be connected to the GRP close to the EUT.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
ESD SIMULATOR	EM TEST	ESD 30N	V0952105682	2018.04.03

8.2 Test Parameters

Port:	Enclosure	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55024:2010, EN 55020:2007+A11:2011		
Basic Standard:	EN 61000-4-2:2009		
Performance Criteria:	B	**Performance Results :**	A
Test Level	Air Discharge:	±2 ㎸, ±4 ㎸, ±8 ㎸	
	Contact Discharge:	±4 ㎸	

Test 2 / 2

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1436.666667	33.42	---	70.00	36.58	15000.0	1000.000	100.1	H
1436.666667	---	20.30	50.00	29.70	15000.0	1000.000	100.1	H
1723.833333	---	21.64	50.00	28.36	15000.0	1000.000	100.1	H
1723.833333	36.09	---	70.00	33.91	15000.0	1000.000	100.1	H
2262.666667	36.38	---	70.00	33.62	15000.0	1000.000	100.1	H
2262.666667	---	23.12	50.00	26.88	15000.0	1000.000	100.1	H
2698.500000	---	25.45	50.00	24.55	15000.0	1000.000	100.1	H
2698.500000	39.10	---	70.00	30.90	15000.0	1000.000	100.1	H
3199.500000	---	27.94	54.00	26.06	15000.0	1000.000	100.1	H
3199.500000	41.79	---	74.00	32.21	15000.0	1000.000	100.1	H
4678.333333	---	32.25	54.00	21.75	15000.0	1000.000	100.1	V
4678.333333	46.15	---	74.00	27.85	15000.0	1000.000	100.1	V
5807.666667	---	32.84	54.00	21.16	15000.0	1000.000	100.1	H
5807.666667	46.96	---	74.00	27.04	15000.0	1000.000	100.1	H

(continuation of the "Final_Result" table from column 14 ...)

Frequency (MHz)	Azimuth (deg)	Corr. (dB)	Comment
1436.666667	180.0	-17.3	
1436.666667	180.0	-17.3	
1723.833333	45.0	-15.7	
1723.833333	45.0	-15.7	
2262.666667	225.0	-13.4	
2262.666667	225.0	-13.4	
2698.500000	225.0	-10.9	
2698.500000	225.0	-10.9	
3199.500000	90.0	-8.0	
3199.500000	90.0	-8.0	
4678.333333	315.0	-3.4	
4678.333333	315.0	-3.4	
5807.666667	90.0	-1.6	
5807.666667	90.0	-1.6	

24/8/2017

Tested by: Doseung Shin

[AUX mode]

Test 1 / 2

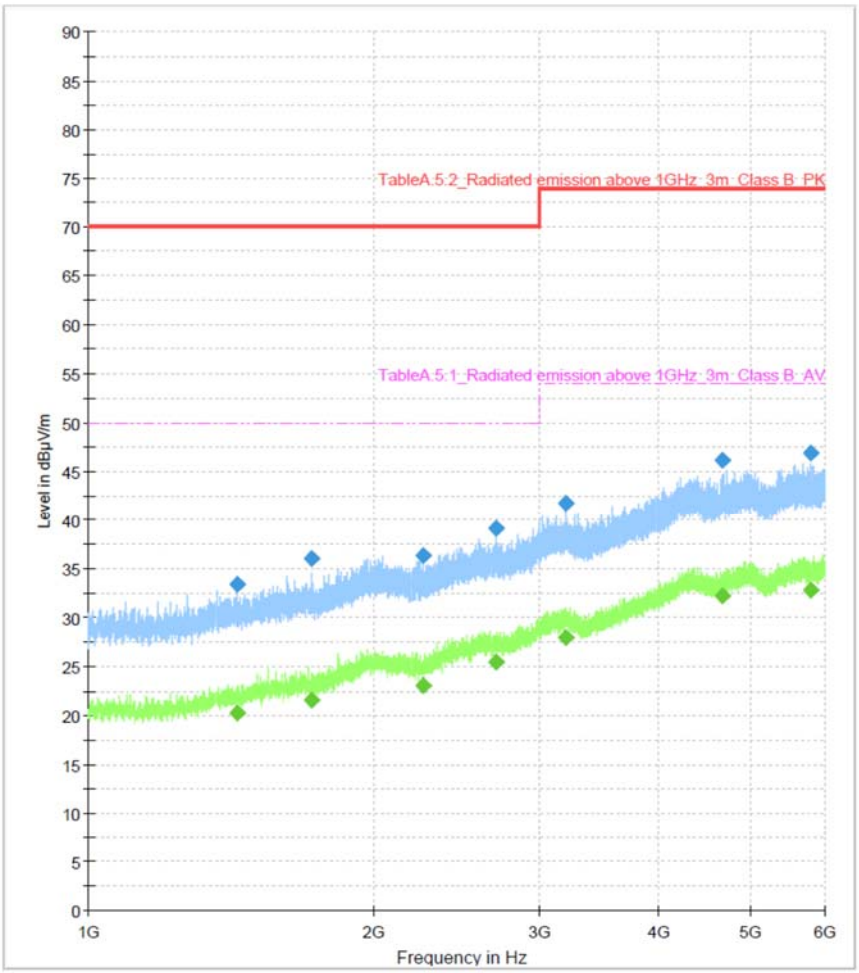
Test Report

Common Information

Test Description:	Radiated Emission(NK-17-E-0599)
Test Site:	Nemko 3m Chamber
Test Standard:	EN 55032
Environment Conditions:	a.c. 230 V, 50 Hz
Operator Name:	Doseung Shin
	Charging & AUX mode

Full Spectrum

Full Spectrum



24/8/2017

Test 2 / 2

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1100.000000	33.80	---	70.00	36.20	15000.0	1000.000	100.1	H
1100.000000	---	19.21	50.00	30.79	15000.0	1000.000	100.1	H
1459.333333	37.11	---	70.00	32.89	15000.0	1000.000	100.1	H
1459.333333	---	20.54	50.00	29.46	15000.0	1000.000	100.1	H
1540.166667	---	20.78	50.00	29.22	15000.0	1000.000	100.1	H
1540.166667	35.40	---	70.00	34.60	15000.0	1000.000	100.1	H
2220.166667	38.16	---	70.00	31.84	15000.0	1000.000	100.1	H
2220.166667	---	23.15	50.00	26.85	15000.0	1000.000	100.1	H
2595.833333	40.64	---	70.00	29.36	15000.0	1000.000	100.1	V
2595.833333	---	25.19	50.00	24.81	15000.0	1000.000	100.1	V
3202.000000	---	27.96	54.00	26.04	15000.0	1000.000	100.1	V
3202.000000	41.53	---	74.00	32.47	15000.0	1000.000	100.1	V
4914.000000	46.71	---	74.00	27.29	15000.0	1000.000	100.1	H
4914.000000	---	32.88	54.00	21.12	15000.0	1000.000	100.1	H
5461.166667	46.50	---	74.00	27.50	15000.0	1000.000	100.1	V
5461.166667	---	32.63	54.00	21.37	15000.0	1000.000	100.1	V

(continuation of the "Final_Result" table from column 14 ...)

Frequency (MHz)	Azimuth (deg)	Corr. (dB)	Comment
1100.000000	120.0	-19.0	
1100.000000	120.0	-19.0	
1459.333333	240.0	-17.2	
1459.333333	240.0	-17.2	
1540.166667	30.0	-16.5	
1540.166667	30.0	-16.5	
2220.166667	30.0	-13.6	
2220.166667	30.0	-13.6	
2595.833333	120.0	-11.2	
2595.833333	120.0	-11.2	
3202.000000	300.0	-8.0	
3202.000000	300.0	-8.0	
4914.000000	90.0	-2.6	
4914.000000	90.0	-2.6	
5461.166667	150.0	-2.2	
5461.166667	150.0	-2.2	

24/8/2017

Tested by: Doseung Shin

7.5 Test Data (Above 1 ㎓)

[BT mode]

Test 1 / 2

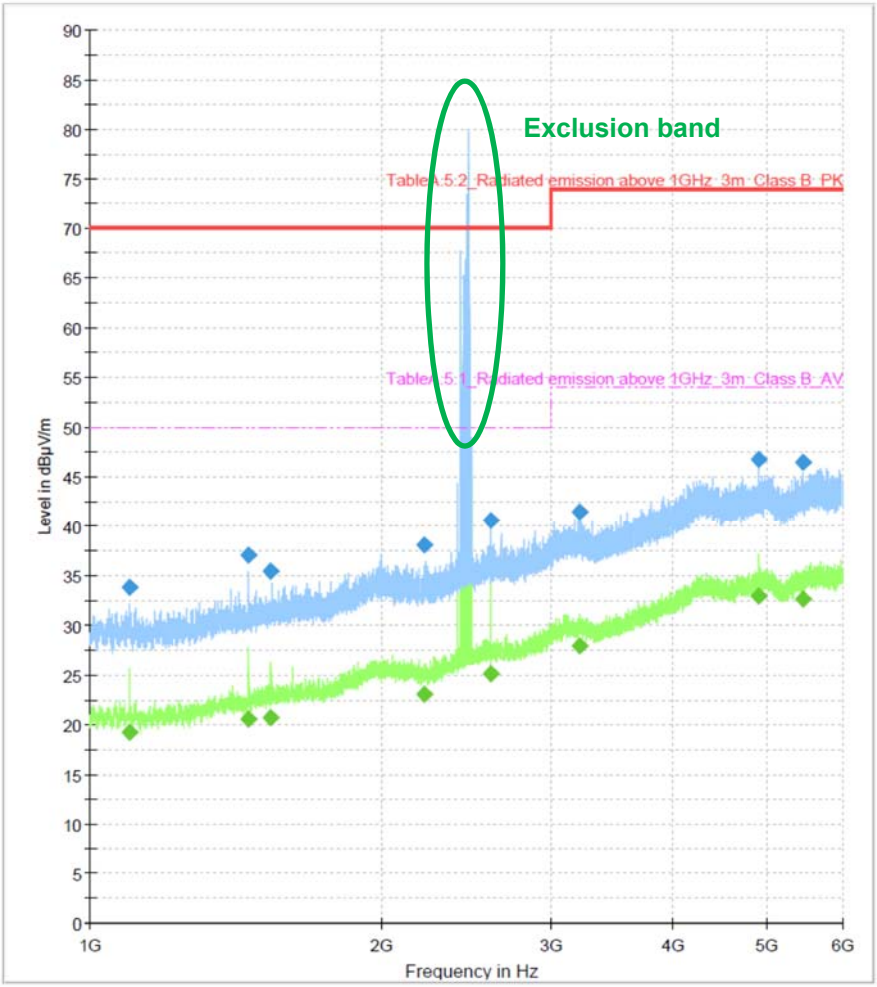
Test Report

Common Information

Test Description:	Radiated Emission(NK-17-E-0599)
Test Site:	Nemko 3m Chamber
Test Standard:	EN 55032, EN 301 489-1
Environment Conditions:	a.c. 230 V, 50 Hz
Operator Name:	Doseung Shin
	Charging & BT mode

Full Spectrum

Full Spectrum



24/8/2017

EMI Auto Test(1) 2 / 2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
67.960347	18.80	30.00	11.20	15000.0	120.000	230.0	V	116.0	-24.6
92.354153	25.97	30.00	4.03	15000.0	120.000	170.0	V	159.0	-23.6
92.818393	26.45	30.00	3.55	15000.0	120.000	170.0	V	148.0	-23.5
92.943947	26.32	30.00	3.68	15000.0	120.000	170.0	V	148.0	-23.4
93.595187	26.52	30.00	3.48	15000.0	120.000	170.0	V	148.0	-23.2
96.175960	25.88	30.00	4.12	15000.0	120.000	270.0	V	125.0	-22.7
113.299953	21.68	30.00	8.32	15000.0	120.000	170.0	V	28.0	-22.8
166.637127	20.15	30.00	9.85	15000.0	120.000	130.0	V	54.0	-24.4
466.339107	22.76	37.00	14.24	15000.0	120.000	400.0	V	49.0	-12.8
909.781713	24.74	37.00	12.26	15000.0	120.000	298.0	V	0.0	-4.2

8/23/2017

Tested by: Doseung Shin

[AUX mode]

EMI Auto Test(1) 1 / 2

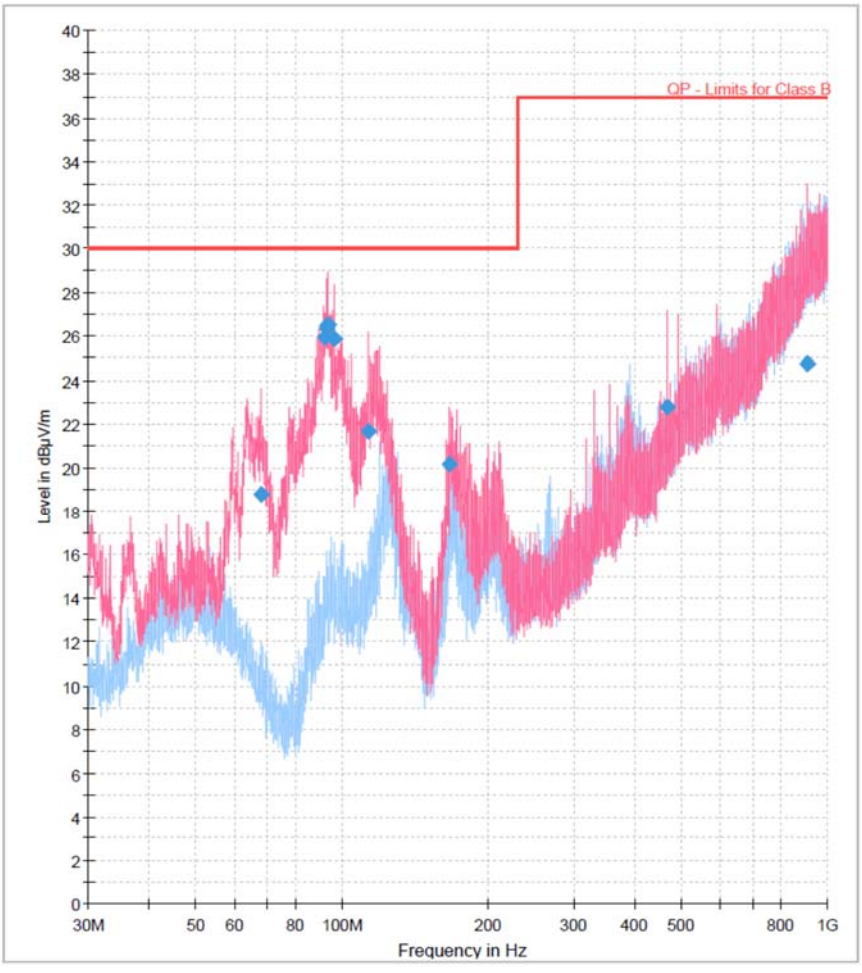
Test Report

Common Information

Test Description :	Radiated Emission(NK-17-E-0599)
Test Site :	Nemko 10 m Chamber
Test Standard :	EN 55032
Environment Conditions :	a.c. 230 V, 50 Hz
Operator Name :	Doseung Shin
	Charging & AUX mode

Full Spectrum

Full Spectrum



8/23/2017

EMI Auto Test(1) 2 / 2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.678800	14.91	30.00	15.09	15000.0	120.000	100.0	V	310.0	-24.4
55.355780	18.62	30.00	11.38	15000.0	120.000	130.0	V	15.0	-21.4
82.608633	18.26	30.00	11.74	15000.0	120.000	198.0	V	297.0	-26.5
107.490307	20.21	30.00	9.79	15000.0	120.000	130.0	V	172.0	-22.3
110.344447	23.08	30.00	6.92	15000.0	120.000	130.0	V	193.0	-22.5
112.309987	21.27	30.00	8.73	15000.0	120.000	170.0	V	57.0	-22.7
459.690967	16.27	37.00	20.73	15000.0	120.000	215.0	H	336.0	-13.2

8/22/2017

Tested by: Doseung Shin

7.4 Test Data (Below 1 ㎓)

[BT mode]

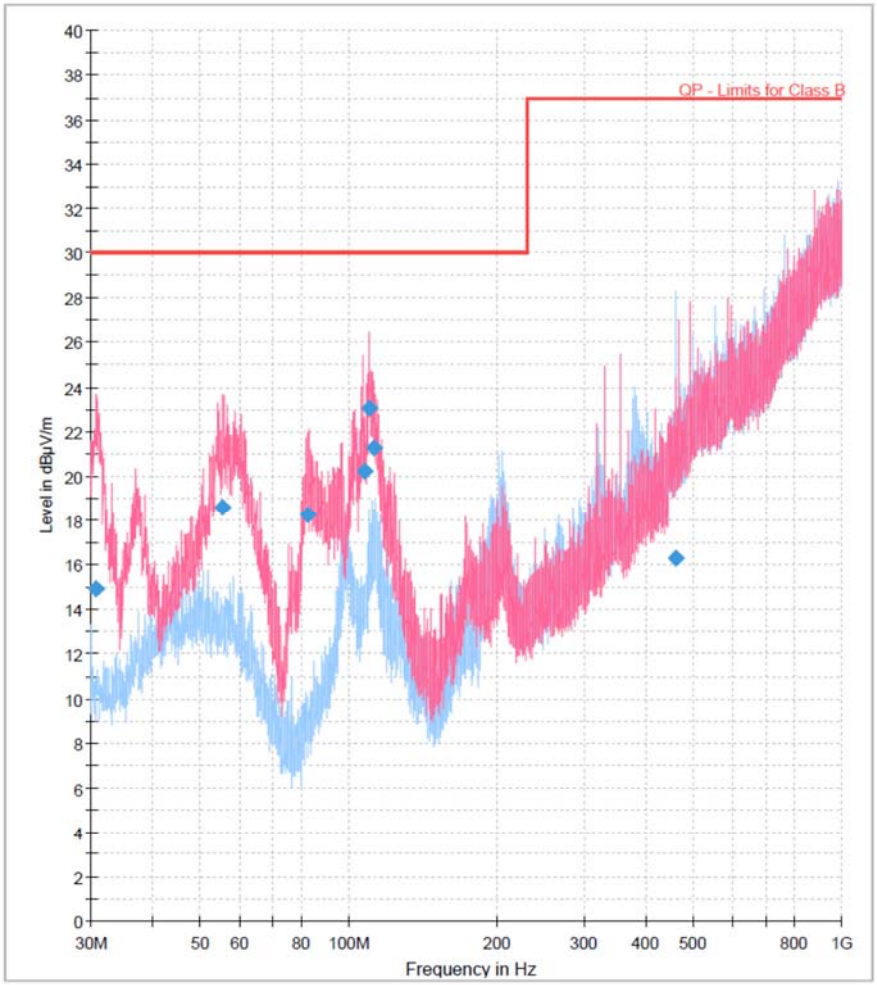
EMI Auto Test(1) 1 / 2

Test Report

Common Information

Test Description :	Radiated Emission(NK-17-E-0599)
Test Site :	Nemko 10 m Chamber
Test Standard :	EN 55032, EN 301 489-1
Environment Conditions :	a.c. 230 V, 50 Hz
Operator Name :	Doseung Shin
	Charging & BT mode

Full Spectrum



8/22/2017

7.2 Measurement Uncertainty

- Below 1 ㎓

U = 2 x 2.53 = 5.06 ㏈
U = 5.1 ㏈ (CL is 95 %, *k* = 2)

- Above 1 ㎓

U = 2 x 2.51 = 5.02 ㏈
U = 5.0 ㏈ (CL is 95 %, *k* = 2)

7.3 Test Parameters

Port:	Enclosure	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55032:2015 (Class B)		
Test Distance:	10 m, 3 m	**Frequency Range:**	30 ㎒ to 1 000 ㎒ 1 ㎓ to 6 ㎓
Measurement Time:	15 s	**IF Bandwidth:**	120 ㎑, 1 ㎒

7. Radiated emissions

7.1 Test Procedure

The EUT was placed on a wooden table 0.8 m above the ground plane, at the edge of the turntable.
Cables connected to EUT were fixed to cause maximum emission.
A maximum emitting point for each frequency was found by turning EUT 0 to 360 degrees,
adjust between the antenna height 1 m to 4 m for below 1 ㎓ and 1.3 m for above 1 ㎓.
These measurements were done at a semi anechoic chamber at 10 m distance with a quasi-peak detector for 30 ㎒ to 1 000 ㎒ and a full anechoic chamber 3 m distance with a peak, CISPR average detector for 1 ㎓ to 6 ㎓.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial or Firmware (No./Ver.)	Due to Calibration
EMI TEST RECEIVER	Rohde & Schwarz	ESW8	100994	2018.04.03
EMI TEST RECEIVER	Rohde & Schwarz	ESU 40	100202	2018.04.04
Software	Rohde & Schwarz	EMC32	Version 10.10.01	-
TRILOG Broadband Test Antenna	SCHWARZBECK	VULB 9163	9163-01027	2019.05.16
ATTENUATOR	FAIRVIEW	SA3N5W-06	N/A	2018.04.03
CONTROLLER	innco systems GmbH	CO2000-G	CO2000/562/ 23890210/L	-
OPEN SWITCH AND CONTROL UNIT	Rohde & Schwarz	OSP-120	100015	-
ANTENNA MAST (LEFT)	innco systems GmbH	MA4000-EP	N/A	-
Turn Table	innco systems GmbH	DT3000-3T	N/A	-
Signal Conditioning Unit	Rohde & Schwarz	SCU 01	10030	2018.04.03
Double Ridged Broadband Horn Antenna	SCHWARZBECK	HF907	102585	2019.05.16
Signal Conditioning Unit	ROHDE & SCHWARZ	SCU 18	10065	2018.05.29
WiFi Filter Bank	Rohde & Schwarz	U082	N/A	-
TILT ANTENNA MAST	innco systems GmbH	MA4640-XP-EP	N/A	-
CONTROLLER	innco systems GmbH	CO3000	CO3000/937/38330 516/L	-
Turntable	innco systems GmbH	DT2000-2t	N/A	-

EMI Auto Test(1) 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.593994	40.9	15000.0	9.000	On	L1	9.8	15.1	56.0	
2.131294	41.0	15000.0	9.000	On	L1	9.8	15.0	56.0	
3.694688	44.9	15000.0	9.000	On	L1	9.9	11.1	56.0	
4.011844	42.7	15000.0	9.000	On	L1	9.9	13.3	56.0	
9.119925	44.8	15000.0	9.000	On	L1	10.0	15.2	60.0	
12.097462	46.8	15000.0	9.000	On	N	10.1	13.2	60.0	
12.537750	43.7	15000.0	9.000	On	N	10.1	16.3	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.593994	30.5	15000.0	9.000	On	L1	9.8	15.5	46.0	
2.131294	30.2	15000.0	9.000	On	L1	9.8	15.8	46.0	
3.694688	34.9	15000.0	9.000	On	L1	9.9	11.1	46.0	
4.011844	32.6	15000.0	9.000	On	L1	9.9	13.4	46.0	
9.119925	33.7	15000.0	9.000	On	L1	10.0	16.3	50.0	
12.097462	31.8	15000.0	9.000	On	N	10.1	18.2	50.0	
12.537750	29.6	15000.0	9.000	On	N	10.1	20.4	50.0	

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Tested by: Doseung Shin

▶ **AUX mode**

EMI Auto Test(1) 1 / 2

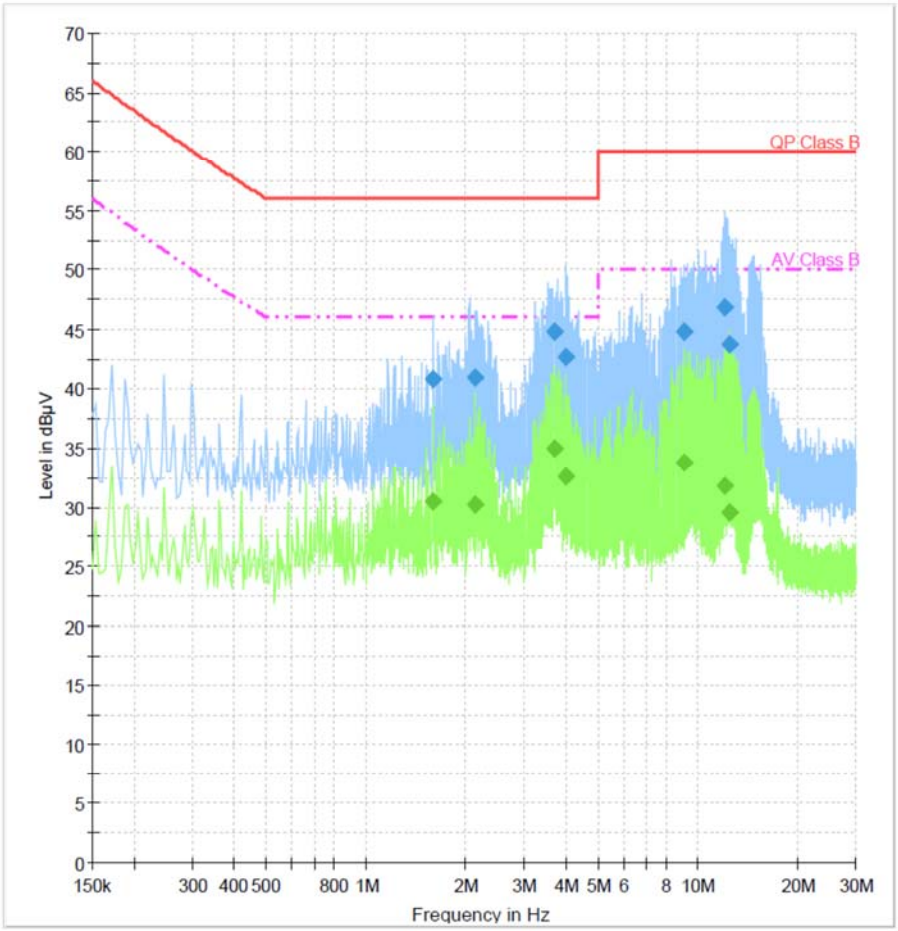
Test Report

Common Information

Test Description:	Nemko Korea(NK-17-E-0599)
Test Site:	Conducted emission
Test Standard:	EN 55032
Environment Conditions:	a.c. 230 V, 50 Hz
Operator Name:	Doseung,Shin
	Charging & AUX mode

1.EMI Auto Test_2-Line Voltage LISN

1.EMI Auto Test_2-Line Voltage LISN



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EMI Auto Test(1) 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.836525	38.5	15000.0	9.000	On	L1	9.8	17.5	56.0	
3.679762	42.8	15000.0	9.000	On	L1	9.9	13.2	56.0	
3.720806	42.6	15000.0	9.000	On	L1	9.9	13.4	56.0	
6.220744	37.5	15000.0	9.000	On	L1	10.0	22.5	60.0	
9.325144	39.5	15000.0	9.000	On	L1	10.0	20.5	60.0	
12.026569	40.3	15000.0	9.000	On	L1	10.1	19.7	60.0	
14.783962	39.0	15000.0	9.000	On	N	10.2	21.0	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.836525	28.5	15000.0	9.000	On	L1	9.8	17.5	46.0	
3.679762	33.2	15000.0	9.000	On	L1	9.9	12.8	46.0	
3.720806	32.8	15000.0	9.000	On	L1	9.9	13.2	46.0	
6.220744	26.0	15000.0	9.000	On	L1	10.0	24.0	50.0	
9.325144	29.3	15000.0	9.000	On	L1	10.0	20.7	50.0	
12.026569	28.6	15000.0	9.000	On	L1	10.1	21.4	50.0	
14.783962	26.1	15000.0	9.000	On	N	10.2	23.9	50.0	

8/28/2017 6:13:19

Tested by: Doseung Shin

6.4 Test Data

▶ **BT mode**

EMI Auto Test(1) 1 / 2

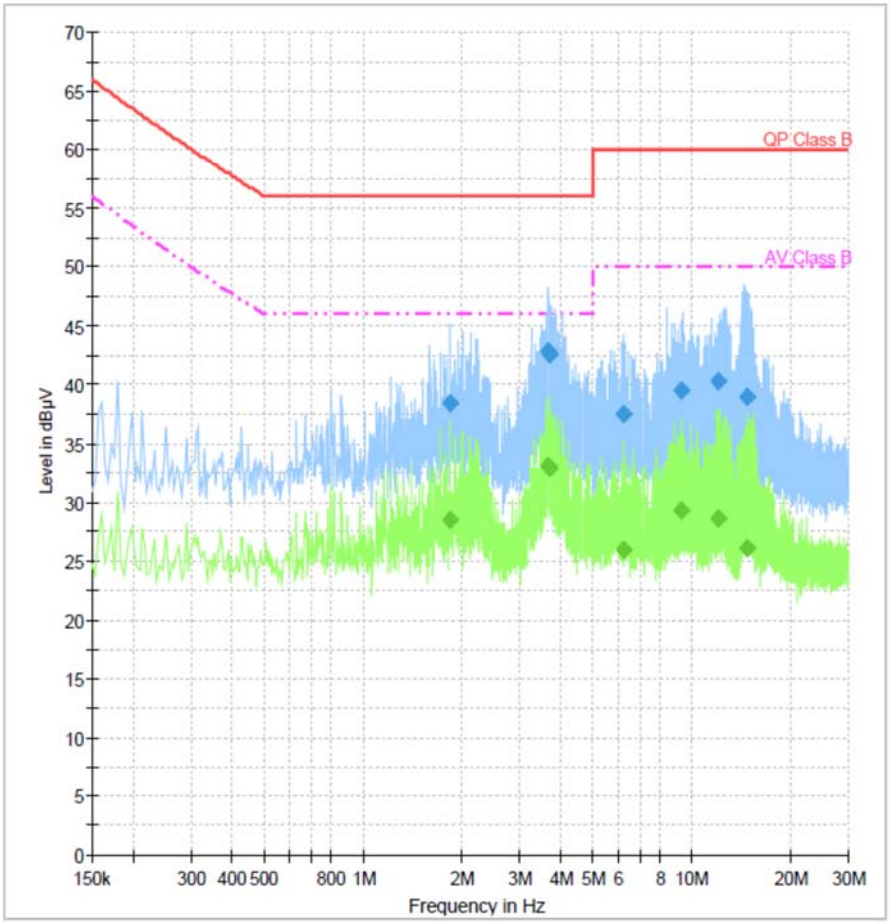
Test Report

Common Information

Test Description:	Nemko Korea(NK-17-E-0599)
Test Site:	Conducted emission
Test Standard:	EN 55032, EN 301 489-1
Environment Conditions:	a.c. 230 V, 50 Hz
Operator Name:	Doseung,Shin
	Charging & BT mode

1.EMI Auto Test_2-Line Voltage LISN

1.EMI Auto Test_2-Line Voltage LISN



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6. Conducted emissions from the AC mains power ports

6.1 Test Procedure

The measurements were performed in a shielded enclosure. EUT was connected to an Artificial Mains Network(AMN). EUT was placed on a wooden table 0.8 m above the grounded floor and at least 0.4 m from the reference ground plane(wall), EUT was placed at least 0.8 m from, and connected via a 1 m mains cable, to the AMN.
The measurements on the terminals for mains connection were conducted between neutral and ground, and between phase and ground, in the frequency range 150 ㎑ to 30 ㎒.
A peak detector scan was conducted over the defined frequency range on all phases. A comparison of the results obtained from the different phases was then conducted to find the most emitting phase for each frequency. This “Worst Case” scan with quasi-peak detector & CISPR average detector was presented detector.
Instrumentation used during this session:

Instruments	Manufacturer	Model	Serial number	Due to Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101041	2018.04.03
Software	Rohde & Schwarz	EMC32	Version 8.53.0	-
TWO-LINE V-NETWORK	Rohde & Schwarz	ENV216	101156	2018.04.04

6.2 Measurement Uncertainty

U = 2 x 1.30 = 2.60 ㏈
U = 2.6 ㏈ (CL is 95 %, k = 2)

6.3 Test Parameters

Port:	a.c. mains	**Test Engineer:**	Doseung Shin
Applied Standard :	EN 301 489-1 V2.1.1:2017, EN 301 489-9 V2.1.1:2017, EN 301 489-17 V3.1.1:2017, EN 55032:2015 (Class B)		
Frequency Range:	**Frequency Step:**	**IF Bandwidth:**	**Measurement Time:**
150 ㎑ to 30 ㎒	4 ㎑	9 ㎑	15 s

●**EN 55024:2010**:

Information technology equipment Immunity characteristics Limits and methods of measurement

Phenomena	Basic Standards	Result
Electrostatic discharges (ESD)	EN 61000-4-2:2009	Pass
Continuous radio frequency disturbances	EN 61000-4-3:2006/A1:2008/A2:2010	Pass
Electrical fast transients (EFT)	EN 61000-4-4:2012	Pass
Surges	EN 61000-4-5:2014	Pass
Continuous conducted disturbances	EN 61000-4-6:2014	Pass
Power-frequency magnetic fields	EN 61000-4-8:2010	N/A
Voltage dips and interruptions	EN 61000-4-11:2004	Pass

● **EN 55020:2007+A11:2011:**

Electromagnetic immunity of broadcast receivers and associated equipment

Phenomena	Basic Standards	Result
Input immunity to RF voltages (S1)	EN 55020:2007+A11:2011	N/A
Immunity to RF voltages (S2a)	EN 55020:2007+A11:2011	N/A
Immunity to RF voltages (in common mode) (S2b)	EN 55020:2007+A11:2011	N/A
Immunity from radiated fields (S3)	EN 55020:2007+A11:2011	N/A
Screening effectiveness (S4)	EN 55020:2007+A11:2011	N/A
Immunity to ambient electromagnetic fields (S6)	EN 55020:2007+A11:2011	N/A
Electrostatic Discharge	EN 61000-4-2:2009	Pass
RF e.m. field keyed carrier (S5)	EN 61000-4-3:2006+A1:2008+A2:2010	Pass
Electric Fast Transients/Burst	EN 61000-4-4:2012	Pass

●**EN 61000-3-2:2014** :

Electromagnetic compatibility(EMC)-Pt.3: Limits-S.2: Limits for harmonic-current emissions (equipment input current up to and including 16A)

Phenomena	Basic Standards	Result
Steady State Harmonics	EN 61000-3-2:2014	N/A
Fluctuating Harmonics	EN 61000-3-2:2014	Pass

●**EN 61000-3-3:2013**:

Electromagnetic compatibility(EMC)-Pt.3: Limits-S.3: Limits for voltage fluctuations and flicker in low voltage supply systems for equipment with rated current up to and including 16A.

Phenomena	Basic Standards	Result
Flicker	EN 61000-3-3:2013	Pass
Voltage Fluctuations	EN 61000-3-3:2013	N/A

5.2 Deviations and Evaluations

●No recorded deviations to the applied standards.

●No general evaluations made.

5. Standards, Deviations and Results

5.1 Applied Test Standards

The following standards have been applied:

●EN 301 489-1 V2.1.1:2017

Electromagnetic compatibility (EMC)
standard for radio equipment and services;
Part 1: Common technical requirements;
Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

●EN 301 489-9 V2.1.1:2017

ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 9: Specific conditions for wireless microphones,
similar Radio Frequency (RF) audio link equipment,
cordless audio and in-ear monitoring devices;
Harmonised Standard covering the essential requirements
of article 3.1(b) of Directive 2014/53/EU

●EN 301 489-17 V3.1.1:2017

Electromagnetic compatibility (EMC)
standard for radio equipment and services;
Part 17: Specific conditions for Broadband Data Transmission Systems;
Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

Phenomena	Basic Standards	Result	Reference clause in the present document
Conducted emission (AC mains input/output port)	EN 55032:2012/AC:2013	Pass	Clause 8.4
Telecommunication ports	EN 55032:2012/AC:2013	N/A	Clause 8.7
Radiated emission (Below 1 ㎓)	EN 55032:2012/AC:2013	Pass	Clause 8.2
Radiated emission (Above 1 ㎓)	EN 55032:2012/AC:2013	Pass	Clause 8.2
Harmonic current emissions	EN 61000-3-2:2014	Pass	Clause 8.5
Voltage fluctuations and flicker	EN 61000-3-3:2013	Pass	Clause 8.6
Electrostatic discharge	EN 61000-4-2:2009	Pass	Clause 9.3
RF electromagnetic field	EN 61000-4-3:2006/A1:2008/A2:2010	Pass	Clause 9.2
Fast transients common mode	EN 61000-4-4:2012	Pass	Clause 9.4
Surge	EN 61000-4-5:2014	Pass	Clause 9.8
RF common mode	EN 61000-4-6:2014	Pass	Clause 9.5
Voltage dips and interruptions	EN 61000-4-11:2004	Pass	Clause 9.7

●EN 55032:2015 (Class B) :

Electromagnetic compatibility of Multimedia equipment Emission requirements

Phenomena	Basic Standards	Result
Conducted emissions from the AC mains power ports	EN 55032:2015	Pass
Asymmetric mode conducted emissions	EN 55032:2015	N/A
Conducted differential voltage emissions	EN 55032:2015	N/A
Radiated emissions (Below 1 ㎓)	EN 55032:2015	Pass
Radiated emissions (Above 1 ㎓)	EN 55032:2015	Pass

4.4 Measurement Uncertainty

The result of measurements of emissions from EUT shall reference the measurement instrumentation uncertainty considerations contained in CISPR 16-4-2 and UKAS Lab 34.

4.5 Final Decision

The equipment under test complies to all requirements of the applied test standards

② Evaluation of picture quality

In the evaluation of picture interference the wanted test signal produces a standard picture (in the case of video tape equipment on the screen of the test-tv-set) and the unwanted signal produces a degradation of the picture. The degradation may be in a number of forms, such as a superposed pattern, disturbance of synchronization, geometrical distortion, loss of picture contrast, of colour, etc. The criterion of compliance with the requirement is just perceptible degradation by observation of the picture. The screen shall be observed under normal viewing conditions (brightness 15 lx to 20 lx), at a viewing distance of six times the height of the screen. The picture quality can also be evaluated by using objective measurement methods; one such method is described in Annex K. In the case of video tape equipment the test criteria relate to the picture, assessed on a test-tv-set, which is connected to the video output terminal of the equipment.

●Criteria B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

4.3.5 Compliance criteria for EN 55024

4.3.5.1 General Performance criteria

●Criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

●Criteria B

After the test, the equipment shall continue to operate as intended without operate intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

●Criteria C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer’s instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

- **Performance criteria for continuous phenomena applied to transmitters (CT)**
  The performance criteria A shall apply.
  Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

- **Performance criteria for transient phenomena applied to transmitters (TT)**
  The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.
  Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

- **Performance criteria for continuous phenomena applied to receivers (CR)**
  The performance criteria A shall apply.
  Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

- **Performance criteria for transient phenomena applied to receivers (TR)**
  The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration for which performance criteria C shall apply.
  Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

4.3.4 Compliance criteria for EN 55020

●Criteria A

The equipment shall continue to operate as intended during the test.
No change of actual operating state (for example change of channel) is allowed as a result of the application of the test.
Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of ① and/or ② are fulfilled.

① Evaluation of audio quality

Unless otherwise specified in this standard, the criterion of compliance with the requirement is a wanted to unwanted audio signal ratio of ≥40 dB at a wanted audio signal level of 50 mW, or at another audio signal level specified by the manufacturer. If the S/N ratio is less than 43 dB, the performance criterion for audio assessment is the actual S/N ratio minus 3 dB. In this case, at the beginning of the audio quality evaluation the actual S/N ratio is measured and noted in the test report as reference value. For AM sound receivers the criterion is ≥26 dB at 50 mW. For AM and FM car radios and for broadcast receiver cards for computers the criterion is ≥26 dB at 500 mW.

4.3.2.4 Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.4 shall apply.

4.3.3 Compliance criteria for EN 301 489-17

- **General performance criteria**

  The performance criteria are :

  - performance criteria A for immunity tests with phenomena of a continuous nature ;
  - performance criteria B for immunity tests with phenomena of a transient nature ;
  - performance criteria C for immunity tests with power interruptions exceeding a certain time.

  The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance table

Criteria	During test	After test
A	Shall operate as intended (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 3) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 2) Shall be no unintentional transmissions.	Functions shall be self-recoverable Shall operate as intended after recovering. Shall be no degradation of performance (see note 3) Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more)	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3)

Note 1) Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 2) Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 3) No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

During and after the tests the audio output shall be monitored and assessed. During the test, the SINAD of the audio output shall not result in levels below the relevant category limit specified in table 2. After the test, the SINAD shall recover to that level recorded before the test or at least to levels not below the relevant category limit specified in table 2.

Table 2: Continuous phenomena, minimum performance criteria

Equipment category	Minimum performance criterion	Intended use
Category 1	30 dB SINAD	Professional applications
Category 2	20 dB SINAD	Domestic entertainment
Category 3	6 dB SINAD	General consumer

Where the EUT is a transmitter only, and a stand-by mode of operation is provided, the tests shall be repeated with the EUT in stand-by mode of operation to ensure that unintentional transmission does not occur. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.3.2.2 Performance criterion for Transient phenomena applied to Transmitters (TT) and Receivers (TR)

The following performance criteria for transient phenomena apply for transmitters (TT) and receivers or receiver parts of simplex or duplex transceivers (TR) permitting the establishment of a continuous communications link:

- before the test it shall be verified that the EUT, when coupled through the test equipment and not subjected to EMC stress is capable of producing a SINAD figure of at least 3 dB above the category limit specified in table 2.
- at the conclusion of each exposure in the test sequence the EUT shall operate with no user noticeable loss of the communications link;
- at the conclusion of the total test comprising of a series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communications link shall have been maintained during the test.

After the tests the audio output shall be monitored and assessed. After the test the SINAD shall recover to that level recorded before the test or at least to levels not below the relevant category limit specified in table 2.

Where the EUT is a transmitter only, and a stand-by mode of operation is provided, the tests shall be repeated with the EUT in stand-by mode of operation to ensure that unintentional transmission does not occur. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.3.2.3 Performance criteria for equipment which does not provide a continuous communication link

For immunity tests with continuous phenomena, equipment not permitting the establishment of a continuous communications link and ancillary equipment intended to be tested on a stand alone basis shall meet the following performance criteria

- performance criteria A for category 1 equipment
- performance criteria C for categories 2 and 3 equipment,

as specified in table 1.

For immunity tests with transient phenomena, equipment not permitting the establishment of a continuous communications link and ancillary equipment intended to be tested on a stand alone basis shall meet the performance criteria B as given in table 1, except for immunity tests with voltage dips and interruptions (see EN 301 489-1 [1], clause 9.7), where it is explicitly stated that the communications link need not be maintained in which case performance criteria C from table 1 shall apply.

4.3.2 Compliance criteria for EN 301 489-9

The equipment shall meet the minimum performance criteria as specified in clauses 4.3.2.1 and 4.3.2.2, as appropriate.

- **General performance criteria**

The equipment shall meet the performance criteria specified in table 1, as detailed in the special performance criteria in clauses 4.3.2.1 or 4.3.2.2, as appropriate

Table 1: General performance criteria

During test	After test	Criteria
Operate as intended; Degradation of performance (see note 1); No loss of function.	Operate as intended; No degradation of performance (see note 2); No loss of function.	A
Loss of function (one or more).	Operate as intended; No degradation of performance (see note 2); Functions self-recoverable.	B
Loss of function (one or more).	Operate as intended; No degradation of performance (see note 2); Functions recoverable by the operator.	C
NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the permissible degradation of performance is not specified by the manufacturer, then this may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible degradation of performance is not specified by the manufacturer, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.		

4.3.2.1 Performance criteria for equipment which provides a continuous communication link

The establishment of the communications link at the start of the test, the maintenance of the communications link and the assessment of the recovered signal information, e.g. an audio signal, shall be used as the performance criteria to ensure that the essential functions of the transmitter and/or receiver are evaluated during and after the test. The equipment shall meet the minimum performance criteria as specified for the appropriate category of equipment in clauses 4.3.2.1.1 and 4.3.2.2

4.3.2.1.1 Performance criterion for Continuous phenomena applied to Transmitters (CT) and Receivers (CR)

The following performance criteria for continuous phenomena apply for transmitters (CT) and receivers or receiver parts of simplex or duplex transceivers (CR) permitting the establishment of a continuous communications link:

- before the test it shall be verified that the EUT, when coupled through the test equipment and not subjected to EMC stress is capable of producing a SINAD figure of at least 3 dB above the category limit specified in table 2;
- during each individual exposure in the test sequence it shall be verified, by appropriate means supplied by the manufacturer, that the communications link is maintained;
- at the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communications link shall have been maintained during the test.

4. Evaluation Of Performance

4.1 Functions Monitored During Immunity Tests

In order to verify acceptable performance by the EUT during the applied tests, the following functions were monitored:

●**No interruptions of communication link, maintenance of function**

4.2 Function Tested After Immunity Tests

The following function tests were conducted to verify correct performance by the EUT before and after each test:

●**Performance of EUT according to the manufacturer specifications**

4.3 Performance Criteria

4.3.1Compliance criteria for EN 301 489-1

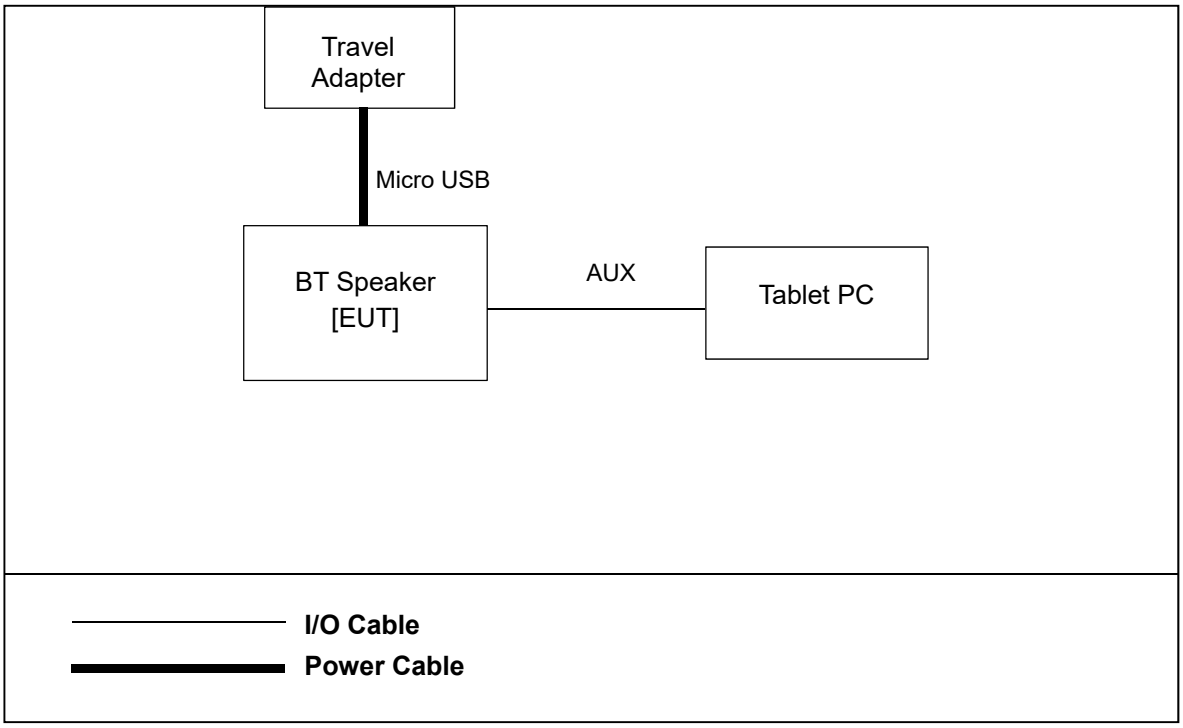
- **Performance criteria for continuous phenomena applied to transmitters and receivers ;**
  During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.
  If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

- **Performance criteria for transient phenomena applied to transmitters and receivers ;**
  After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.
  During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation or stored data is allowed.
  If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

- **Performance criteria for equipment which does not provide a continuous communication link ;**
  The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 4.3.1

- **Performance criteria for ancillary equipment tested on a stand alone basis ;**
  The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 4.3.1

[AUX mode]


Travel Adapter
Micro USB
BT Speaker [EUT]
AUX
Tablet PC
I/O Cable
Power Cable

3.5 EUT & Support Equipment

Equipment	Manufacturer	Model	Serial Number
BT SPEAKER (EUT)	D&M HOLDINGS INC.	DSB50BT	N/A
Dual Microphone Supply	Bruel&Kjaer	5935	2564717
AC/DC Adapter	FRIWO	FW75550/12	Q02867
Probe Microhpone	Bruel&Kjaer	4182	2539089
UPV AUDIO ANALYZER	ROHDE&SCHWARZ	UPV	100684
Tablet PC	Samsung Electro-Mechanics Co.,Ltd.	SM-P900	N/A
Travel Adapter	Welhai Sunlin Electronics Co.,Ltd.	MCS-01KR	N/A

3.6 Connection Cable

[BT mode]

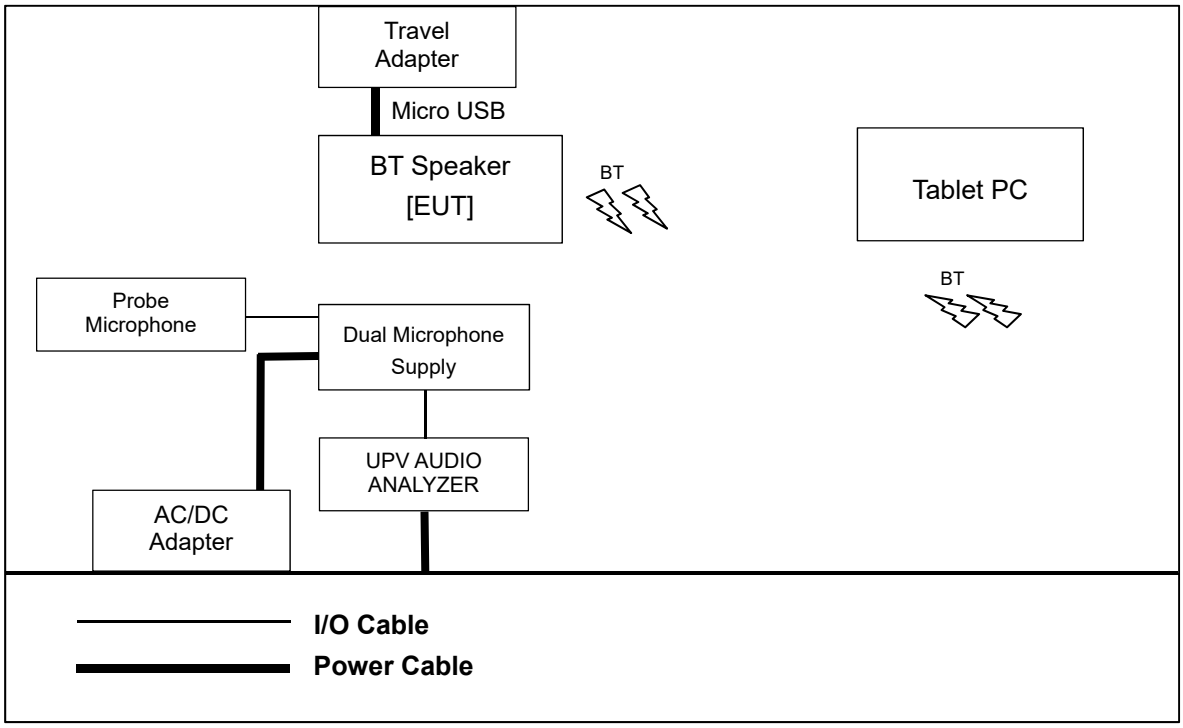
Connection of EUT	Connection Terminal	Cable Data
Micro USB	Travel Adapter	0.45 m length, Shielded

[AUX mode]

Connection of EUT	Connection Terminal	Cable Data
Micro USB	Travel Adapter	0.45 m length, Shielded
AUX	Tablet PC	1.50 m length, Shielded

3.7 Test Set-up Drawing

[BT mode]



3. General Test Conditions

3.1 Location

Nemko Korea Co., Ltd.
155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF
Phone : + 82 31 330 1700 Fax : + 82 31 322 2332

3.2 Operating Environment

All tests and measurements were performed in a shielded enclosure or a controlled environment suitable for the tests conducted. The climatic conditions in the test area are automatically controlled and recorded continuously.

Parameters	Recording during test		Accepted deviation	
	ESD Test	Others Test	ESD Test	Others Test
Ambient temperature	(25.9 ± 2.5) ℃		(25.0 ± 10.0) ℃	
Relative humidity	(47.0 ± 2.0) % R.H.	(49.5 ± 5.5) % R.H.	(45.0 ± 15.0) % R.H.	(75.0 or less) % R.H.
Atmospheric pressure	(99.6 ± 0.5) kPa		(96.0 ± 10.0) kPa	

3.3 Operating During Test

Test Item	Test Mode
Emission	BT mode(1 ㎑ Audio Playback), AUX mode(1 ㎑ Audio Playback)
Immunity	BT mode(1 ㎑ Audio Playback), AUX mode(1 ㎑ Audio Playback), Idle mode

3.4 Test Equipment

●The test equipment used in testing are calibrated on a regular basis. For most of the testing equipment accredited calibration is conducted once a year. For certain equipment the calibration interval is longer. Between the calibrations all test equipment are controlled and verified on a regular basis. The test equipments used are defined in each test section of this report.

2. Equipment Under Test (EUT)

2.1 Identification of EUT

EUT Type:	BT SPEAKER
Model Name:	DSB50BT
Trade mark:	DENON
Serial Number:	N/A
I/O Port:	Micro USB (1 EA), AUX (1 EA)
Rating :	d.c. 5 V, 2.1 A
Tested Voltage & Power Frequency :	a.c. 230 V, 50 ㎐ (Host unit : Travel Adapter)
Remote :	-

2.2 Variants Covered By This Report

Model Name	Technical Deviations From Reference Model
N/A	N/A

2.3 Modifications

- No modifications.

2.4 Additional Information Related To Testing

- No comments.

2.5 Picture Documentation

- Pictures can be found in Appendix B.

1. Client Information

1.1 Applicant

Company Name:	ANAM ELECTRONICS CO., LTD.
Company Address:	27, Digital-ro 27ga-gil, Guro-gu, Seoul, Korea
Phone/Fax:	+ 82 2 6424 4881
Contact Name:	Mr. Byeongseob, Lee

1.2 Manufacturer

Company Name:	D&M HOLDINGS INC.
Company Address:	D&M Building, 2-1 Nisshin-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa-ken, 210-8569, JAPAN

1.3 Other Information

●No Comment

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EMC Test Report

EMC Test Report	
Project Reference No.	NK-17-E-0599
Product	BT SPEAKER
Trade Mark	DENON
Model	DSB50BT
Tested according to	EN 301 489-1 V2.1.1:2017
	EN 301 489-9 V2.1.1:2017
	EN 301 489-17 V3.1.1:2017
	EN 55032:2015 (Class B)
	EN 55024:2010
	EN 55020:2007+A11:2011 (EN 61000-4-2) (EN 61000-4-3) (EN 61000-4-4)
	EN 61000-3-2:2014
	EN 61000-3-3:2013

Date of receipt of test item	July 25, 2017	
Tested in period	July 17, 2017 to August 28, 2017	
Issued date	September 06, 2017	
Name and address of the Test House	Nemko 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF Phone : + 82 31 330 1700 Fax : + 82 31 322 2332	
Tested by		Sep. 06. 2017
	Doseung Shin	*date*
Verified by		Sep. 06. 2017
	Chang Soo Choi	*date*

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This report apply only to the sample(s) tested. It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the Competent Authorities in Europe for any modifications made to the product which results in non-compliance to the relevant regulation.

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
	The test is not carried out if the— - ; PRINTED BOARD does not carry any potential ignition source ..... base material of PRINTED BOARDS, on ..... which the available power at a connection exceeds 15 VA operating at a voltage exceeding 50 V and equal or less than 400 V (peak) a.c. or d.c. under normal operating conditions, is of flammability category V-1 or better according enclosure meeting the flammability category V-0 according to AS/NZS 60695.11.10, or made of metal, having openings only for connecting wires which fill the openings completely; or – base material of PRINTED BOARDS, on which the available power at a connection exceeds 15 VA operating at a voltage exceeding 400 V (peak) a.c. or d.c. under normal operating conditions, and base material of PRINTED BOARDS supporting spark gaps which provides protection against overvoltages, is of flammability category V-0 according to AS/NZS 60695.11.10 or the PRINTED BOARDS are contained in a metal enclosure, having openings only for connecting wires which fill the openings completely. *Compliance shall be determined using the smallest thickness of the material*.		**N/A**
	NOTE – Available power is the maximum power which can be drawn from the supplying circuit through a resistive load whose value is chosen to maximize the power for more than 2 min when the circuit supplied is disconnected.		**N/A**
20.201.3	**For open circuit voltages greater than 4 kV** POTENTIAL IGNITION SOURCES with open circuit voltages exceeding 4 kV (peak) a.c. or d.c. under normal operating conditions shall be contained in a FIRE ENCLOSURE which shall comply with flammability category V-1 or better according to AS/NZS 60695.11.10	< 4 kV	**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
	NOTE 2 – If other parts do not withstand the glow-wire test due to ignition of the tissue paper and if this indicates that burning or glowing particles can fall onto an external surface underneath the apparatus, the apparatus is considered to have failed to meet the requirements of Clause 21.201 without the need for consequential testing		**N/A**
	NOTE 3 – Parts likely to be impinged upon by the flame are considered to be those within the envelope of a vertical cylinder having a radius of 10 mm and a height equal to the height of the flame, positioned above the point of the material supporting, in contact with, or in close proximity to, connections.		**N/A**
20.201.2.4	**Testing of printed boards** The base material of PRINTED BOARDS shall be subject to the needle-flame test of Clause 21.201.2.3. The flame shall be applied to the edge of the board where the heatsink effect is lowest when the board is positioned as in normal use. The flame shall not be applied to an edge consisting of broken perforations, unless the edge is less than 3 mm from a POTENTIAL IGNITION SOURCE	PCB rated min. V-1.	**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
	first paragraph: If possible, the flame shall be applied at least 10 mm from a corner. *Replace* the second paragraph with: The duration of application of the test flame shall be 30 ±1 s		
	9.3 Number of specimens *Replace* with: The test shall be made on one specimen. If the specimen does not withstand the test, the test may be repeated on two further specimens, both of which shall then withstand the test		
	11 Evaluation of test results *Replace* with: The duration of burning (t_b) shall not exceed 30 s. However, for printed circuit boards, it shall not exceed 15 s		
	The needle-flame test shall not be carried out on parts of material classified as V-0 or V-1 according to AS/NZS 60695.11.10 provided that the sample tested was not thicker than the relevant part.		—
20.201.2.3	**Testing by needle-flame test** If parts, other than enclosures, do not withstand the glow wire tests of 20.201.2.2, by failure to extinguish within 30 s after the removal of the glow wire tip, the needle-flame test detailed in 20.201.2.2 shall be made on all parts of non-metallic material which are within a distance of 50 mm or which are likely to be impinged upon by flame during the tests of 20.201.2.2. Parts shielded by a separate barrier that meets the needle-flame test shall not be tested.		**N/A**
	NOTE 1 – If the enclosure does not withstand the glow-wire test the appliance is considered to have failed to meet the requirements of Clause 21.201 without the need for consequential testing.		**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
20.201.2.1	**Testing of non-metallic parts** Part of non-metallic material shall be subject to the glow-wire test of AS/NZS 60695.2.11 which shall be carried out at 550°C. Parts for which the glow-wire test cannot be carried out, such as those made of soft or foamy material, shall meet the requirements specified in ISO 9772 for category FH-3 material. The glow-wire test shall not be carried out on parts of material classified at least FH-3 according to ISO 9772 provided that the sample tested was not thicker than the relevant part		**N/A**
20.201.2.2	**Testing of insulated parts** Part of insulating material supporting POTENTIAL IGNITION SOURCES shall be subject to the glow-wire test of AS/NZS 60695.2.11 which shall be carried out at 750°C. The test shall be also carried out on other parts of insulating material which are within a distance of 3 mm of the connection . NOTE – Contacts in components such as switch contacts are considered to be connections.		**N/A**
	For parts which withstand the glow-wire test but produce a flame, other parts above the connection within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm shall be subjected to the needle-flame test. However, parts shielded by a barrier which meets the needle-flame test need not be tested		**N/A**
	The needle-flame test shall be made in accordance with AS/NZS 60695.11.5 with the following modifications:		**N/A**
	Clause of AS/NZS 60695.11.5 / **Change** **9 Test Procedure** **9.2 Application of needle-flame**: *Replace* the second sentence of the first paragraph with: The specimen shall be arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1. Add to the end of the		**—**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
20.2.3	Addition After Clause 20.2.3, add the following variation: **20.201 Resistance to fire—Alternative tests**	Evaluated in table 21 above no alternative tests used.	**N/A**
20.201.1	**General** Parts of non-metallic material shall be resistant to ignition and the spread of fire. This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames originating from inside the apparatus, or the following: a) Components that are contained in an. enclosure having a flammability category of V-0 according to AS/NZS 60695.11.10 and having openings only for the connecting wires filling the openings completely, and for ventilation not exceeding 1 mm in width regardless of length b) The following parts which would contribute negligible fuel to a fire: – small mechanical parts, the mass of which does not exceed 4 g, such as mounting parts, gears, cams, belts and bearings; – small electrical components, such as capacitors with a volume not exceeding 1750 mm3, integrated circuits, transistors and optocoupler packages, if these components are mounted on material of flammability category V-1 or better according to AS/NZS 60695.11.10		**N/A**
	NOTE – In considering how to minimize propagation of fire and what 'small parts' are account should be taken of the cumulative effect of small parts adjacent to each other for the possible effect of propagating fire from one part to another.		**N/A**
	Compliance shall be checked by the tests of 20.201.2.1, 20.201.2.2. and 20.201.2.3 *For the base material of PRINTED BOARDS, compliance shall be checked by the test of 20.201.2.4.*		**N/A**
	The tests shall be carried out on parts of non-metallic material which have been removed from the apparatus. When the glow-wire test is carried out, they are placed in the same orientation as they would be in normal use. These tests are not carried out on internal wiring.		**N/A**
20.201.2	**Tests**		**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
	IMPORTANT INFORMATION If a television is not positioned in a sufficiently stable location, it can be potentially hazardous due to falling. Many injuries, particularly to children, can be avoided by taking simple precautions such as: • Using cabinets or stands recommended by the manufacturer of the television. • Only using furniture that can safely support the television. • Ensuring the television is not overhanging the edge of the supporting furniture. • Not placing the television on tall furniture (for example, cupboards or bookcases) without anchoring both the furniture and the television to a suitable support. • Not standing the television on cloth or other materials placed between the television and supporting furniture. • Educating children about the dangers of climbing on furniture to reach the television or its controls.		N/A
	Such information should also be provided as a label on the apparatus		N/A
19.201.2	**Restraining device**	The restraining device is not provided with the equipment.	N/A
19.201.2.1	Television receivers should be provided with a restraining device such as a fixing point to facilitate restraining the television from toppling forward.		N/A
19.201.2.2	Where a restraining device is provided in accordance with 19.201.2.1 information shall be provided in the instructions for installation or use, to ensure correct and safe installation. Such information should also be provided as a label on the television receiver.		N/A
	. Any such restraining device shall be capable of withstanding a pull of 100 N in all directions without damage		N/A
19.201.3	**Glass slide test‡** Television receivers and display devices that may be used for television purposes, with a mass of 18 kg or more, are placed on a clean, dry, glass covered horizontal surface such that only the supporting feet are in contact with the glass. The glass-covered surface is then tilted in the most unfavourable direction through an angle of 10°. During the tests, the equipment shall not slide.		N/A
20	**RESISTANCE TO FIRE**		N/A

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
14.10.201.4.7	*Crush test* Hand-held remote control devices are to be supported by a fixed rigid supporting surface in a position likely to produce the most adverse results as long as the position can be self-supported. A crushing force of 330 N ± 5 N is applied to the exposed top and back surfaces of remote control devices placed in a stable condition on a flat surface measuring approximately 100 mm by 250 mm for a period of 10 s.	No coin/button cell or R1 batteries.	**N/A**
14.10.201.5	*Compliance criteria* Compliance is checked by applying a force of 30 N ± 1 N for 10 s to the battery compartment door/cover by a rigid test finger according to test probe 11 of IEC 61032:1997 at the most unfavourable place and in the most unfavourable direction. The force shall be applied in one direction at a time.	No coin/button cell or R1 batteries.	**N/A**
	The battery compartment door/cover shall remain functional, and— – the battery shall not become accessible; or		**N/A**
	– it shall not be possible to remove the battery from the product with the test hook of Figure 4 using a force of approximately 20 N.		**N/A**
19	**STABILITY AND MECHANICAL HAZARDS**		**N/A**
19.6	*Addition* *Add* the following after Clause 19.6		—
19.201	**Additional stability requirements for television receivers** Television receivers and display devices that may be used for television purposes, with a mass of 7 kg or more, shall have additional stability requirements.	No television receivers and display devices.	**N/A**
	Compliance is checked by inspection and by the tests of 19.201.2.2 and 19.201.3 as applicable.		**N/A**
	Apparatus designed only for fixing to a wall, ceiling or equipment rack are not required to be subjected to these additional requirements if the marking of 5.4.1 f) is provided on or with the apparatus		**N/A**
19.201.1	**Warning notice** Television receivers and display devices that may be used for television purposes, shall be provided with information in the instructions for installation or use, containing the following information or similar:		**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
14.10.201.4.2	*Test sequence* One sample shall be subjected to the applicable tests of 14.10.201.4.3 to 14.10.201.4.7. If applicable, the test in 14.10.201.4.3 shall be conducted first.	No coin/button cell or R1 batteries.	**N/A**
14.10.201.4.3	*Stress relief test* If the battery compartment utilizes moulded or formed thermoplastic materials, the sample consisting of the complete equipment, or of the complete enclosure together with any supporting framework, is tested according to the stress relief test of Clause 12.1.5 or the mould stress relief test of IEC 60695-10-3. During the test, the battery may be removed.	No coin/button cell or R1 batteries.	**N/A**
14.10.201.4.4	*Battery replacement test* For equipment with a battery compartment door/cover, the battery compartment shall be opened and closed and the battery removed and replaced 10 times to simulate normal replacement according to the manufacturer's instructions.	No coin/button cell or R1 batteries.	**N/A**
	If the battery compartment door/cover is secured by one or more screws, the screws are loosened and then tightened applying a continuous linear torque according to Table 20 Column II, using a suitable screwdriver, spanner or key. The screws are to be completely removed and reinserted each time.		**N/A**
14.10.201.4.6	*Impact test* The battery compartment door/cover shall be subjected to three impacts in a direction perpendicular to the battery compartment door/cover according to the 50 mm steel ball impact test method of Clause 12.1.3 and Figure 8 with a force of: – 0.5 J (102 mm ± 10 mm height) for glasses for watching, for example, 3 dimensional television; or	No coin/button cell or R1 batteries.	**N/A**
	– 2 J (408 mm ± 10 mm height) for all other doors/covers. Alternatively horizontal impacts may be simulated on vertical or sloping surfaces by mounting the sample at 90° to its normal position and applying the vertical impact test instead of the pendulum test		**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
14.10.201.2	*Safety warnings* Equipment containing one or more coin/button cell/R1 batteries shall have safety warnings in the instructions accompanying the equipment . The safety warnings are not required where these batteries are not intended to be replaced or are only accessible after damaging the equipment. The safety warnings shall be as follows: – CAUTION: Do not ingest battery, Chemical Burn Hazard [or equivalent wording]. – [The remote control supplied with] this product contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death. – Keep new and used batteries away from children . – If the battery compartment does not close securely, stop using the product and keep it away from children. – If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.	No coin/button cell or R1 batteries.	**N/A**
14.10.201.3	*Construction* Equipment containing one or more coin/button cell/R1 batteries and having a battery compartment door/cover shall be designed to reduce the possibility of children removing the battery by one of the following methods: – a tool, such as a screwdriver or coin, required to open the battery compartment; or	No coin/button cell or R1 batteries.	**N/A**
	– the battery compartment door/cover requires the application of a minimum of two independent and simultaneous movements to open by hand.		**N/A**
14.10.201.4	*Tests*		**N/A**
14.10.201.4.1	*General* Equipment containing one or more coin/button cell/R1 batteries shall be subject to the requirements of 14.10.201.1 to 14.10.201.4 followed by the compliance criteria of 14.10.201.5.	No coin/button cell or R1 batteries.	**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
	Special national conditions (if any)		
14	**COMPONENTS**		**N/A**
14.10.5	Addition After Clause 14.10.5, add new Clause 14.10.201 as follows:		**N/A**
14.10.201	Products containing coin/button cell batteries and batteries designated R1	No coin/button cell or R1 batteries.	**N/A**
14.10.201.1	*General* These requirements apply to equipment, including remote controls, that— -are likely to be accessible to children; and - include coin/button cell batteries with a diameter of 32 mm or less and batteries designated R1	No coin/button cell or R1 batteries.	**N/A**
	NOTE 1 Coin/button cell batteries are devices that are small, single cell batteries having a diameter greater than their height. NOTE 2 Batteries are specified in IEC 60086-2		**N/A**
	These requirements do not apply to- - .....Professional equipment NOTE 3 Professional equipment is equipment sold through special sales channels. Equipment sold through normal electronics stores is considered not to be professional equipment. - ..... equipment for locations where it is unlikely that children will be present; or - .....equipment containing batteries that are soldered in place		**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict
15.1.1	Addition After the second paragraph, *add* the following: Plugs for the connection of apparatus to mains-powered socket-outlets shall comply with AS/NZS 3112 or AS/NZS 3123. Apparatus with a plug portion, suitable for insertion into a 10 A 3-pin flat pin socket-outlet complying with AS/NZS 3112, shall comply with the requirements of AS/NZS 3112 for equipment with integral pins for insertion into socket-outlets.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
Table 15	Variation In the second and third rows of the first column replace '6' with '7.5'.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
16	**EXTERNAL FLEXIBLE CORDS**		**N/A**
Table 18	Variation In the second and third rows of the first column replace '6' with '7.5'.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
16.3	Addition In item (b), add the following: A flexible cord complying with AS/NZS 3191 need not undergo this test.		**N/A**
20	**RESISTANCE TO FIRE**		**P**
20	Variation Delete the following paragraph: '*The requirements are considered to be fulfilled if the apparatus complies with the requirements of 20.1 and 20.2'* and *replace* with *'The requirements are considered to be fulfilled if the apparatus complies with the requirements of 20.1 and 20.2. Alternatively the requirements are considered to be fulfilled if the apparatus complies with the requirements of Clause 20.201.*'		—
Table 21	In the third and fourth columns *delete* 'HB75' and 'No requirement' and *replace* both with 'V-1'.	Comply	**P**
Annex B	Addition After the Annex title *add* the following: For Australia only, this Annex is replaced by the requirements of the Telecommunications Labelling Notice issued under the Telecommunications Act 1997. NOTE – The *Telecommunications Act 1997* is administered by the Australian Communications and Media Authority.	No TNV circuit	**N/A**

ATTACHMENT 7			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60065
(AUSTRALIA/NEW ZEALAND) NATIONAL DIFFERENCES
(AUDIO, VIDEO AND SIMILAR ELECTRONIC APPARATUS—SAFETY REQUIREMENTS)

Differences according to ..... :	AS/NZS 60065:2012 + A1:2015
Attachment Form No. ..... :	AU_NZ_ND_IEC60065K
Attachment Originator..... :	JAS-ANZ
Master Attachment ..... :	2017-06

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	National Differences		
Appendix ZZ	Variations between this Standard and IEC 60065, Ed.7.2 (2011)		
7	**HEATING UNDER NORMAL OPERATING CONDITIONS**		**N/A**
Table 3	Addition In Table 3, Item c) *add* '[201])' in both columns against 'Thermoplastic materials'	No alternative method used.	**N/A**
	Add new footnote 201 as follows: [201)] As an alternative to the method described in footnote f) the following variation may be used where there is any doubt about the suitability of the material: The ball-pressure test described in AS/NZS 60695.10.2 may be carried out		**N/A**
	To assess compliance under normal operating conditions, the test shall be made in a heating cabinet at a temperature of 40°C ±2°C plus the maximum temperature rise determined under normal operating conditions but, it shall be at least – for external parts ..... 75°C ±2°C		**N/A**
	– for materials supporting parts CONDUCTIVELY CONNECTED TO THE MAINS ..... 125°C ±2°C		**N/A**
7.2	Addition After the second paragraph, *add* the following: The alternative method described in footnote 201 of Table 3 may be used.	No alternative method used.	**N/A**
15	**TERMINALS**		**N/A**

ATTACHMENT 6				
Clause	Requirement + Test		Result - Remark	Verdict
Applicable to multiway adaptor				
34	Multiway adaptor with 3-pin socket-outlets or combination of 3-pin and 2-pin socket-outlets	a) The socket contacts of the adaptor shall only accept 13A 3-pin mains plug complying with SS 145 and/or 2.5A 2-pin mains plug complying with EN 50075. b) The shutters screening the current-carrying socket contacts shall not be opened by the insertion of any corresponding **SINGLE** pin of the plug into any current-carrying socket aperture. c) A barrier or other acceptable means shall be provided on the engagement surface of the 2.5A 2-pin socket-outlet of the adaptor to PREVENT entry of any types of 2-pin mains plugs except those complying with EN 50075. **(note: shutters cannot be regarded as barriers**) d) Adaptor incorporates with switch would require additional test to sub-clauses 13.11, 17.1.3 and 18.1.3 of SS 145: Part 2: 1997.	No multiway adaptor	**N/A**
Applicable to plasma/LCD display monitor				
35	Plasma/LCD display monitor with TV tuner	Plasma/LCD display monitor tested to IEC 60950 would require additional test to clauses 9 (related to antenna only), 10.1, 10.2, 10.3 and 12.5 of IEC 60065.	No Plasma/LCD display monitor	**N/A**

ATTACHMENT 6			
Clause	Requirement + Test	Result - Remark	Verdict
Applicable to portable/wall socket-outlet and portable cable reel			
19	Portable/wall socket-outlet and portable cable reel	a) If residual current device (RCD) is incorporated, its tripping current must be less than 30mA and operating time must be less than 0.1 second and testing to sub-clauses 9.9.2.1, 9.9.2.2, 9.9.2.3 and 9.16 of SS 97: Part 1: 2000 are required. b) The shutters screening the current-carrying socket contacts shall not be opened by the insertion of any corresponding **SINGLE** pin of the plug into any current-carrying socket aperture.	No portable/wall socket-outlet and portable cable reel	**N/A**
Applicable to roaster			
20	Roaster	A metal ring (Appendix U) must be provided to prevent the roaster from falling off in case the glass bowl shattered.	No roaster	**N/A**
Applicable to Residual Current Circuit Breaker (RCCB)			
31	RCCB	Registration of RCCB is limited to 30 mA sensitivity and the operating time must be less than 0.1 second. Electronic RCCB will not be accepted for registration.	No residual current circuit breaker.	**N/A**
Applicable to electric instantaneous and storage water heater			
32	Instantaneous electric water heater and mains pressure electric storage water heater	Heating elements used must not be of the "bare-element" type.	No electric instantaneous and storage water heater	**N/A**
33	Water heater incorporated with residual current device(RCD)	Testing to sub-clauses 9.9.2.1, 9.9.2.2, 9.9.2.3 and 9.16 of SS 97: Part 1: 2000 are required.		**N/A**

ATTACHMENT 6				
Clause	Requirement + Test		Result - Remark	Verdict
Applicable to AC adaptor				
13	3-pin AC adaptor (Appendix V)	Test report showing that the 3-pin complied with sub-clauses 12.1 & 12.3 of SS 246 must be submitted.	No AC adaptor	**N/A**
14	2-pin AC adaptor (Appendix V)	The 2-pin (Appendix T) shall comply with EN 50075.		**N/A**
15	Detachable power supply cord set not supplied by Registered Supplier	Registered Supplier who is not supplying the detachable power supply cord set together with the AC Adaptor must provide written instruction to its customer on the type of approved detachable power cord set to use.		**N/A**
Applicable to computer products				
16	CD/DVD ROM (used in personal computer)	Test certificate showing that CD/DVD ROM has complied with IEC 825 must be provided.	No CD/DVD ROM.	**N/A**
17	Modem Card (used in personal computer)	Modem card incorporated in the personal computer must be tested at set level (sub-clauses 5.1 & 6 of IEC 60950) or at component level.	No modem card	**N/A**
Applicable to ceiling fan and cycle fan				
18	Ceiling fan and cycle fan	a) These appliances must be tested to sub-clauses 5.7 and 5.8 of SS 360: 1992. b) Installation instruction must mention the 3 expansion bolts for fastening the main suspension, safety cord, expansion bolt with hook for fastening safety cord and mounting plate. (Appendix Q) c) Drawing (Appendix P) to show that the wires within the motor shaft are not stressed must be provided.	No ceiling fan and cycle fan	**N/A**

ATTACHMENT 6				
Clause	Requirement + Test		Result - Remark	Verdict
5	Class I appliances (3-pin mains plug)	All Class I appliances must be fitted with 3-pin mains plugs complied with SS 145/SS 472 that are registered with the Safety Authority.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
6	Class II appliances (mains plug)	a) All Class II appliances must be fitted with 2-pin mains plug (Appendix T) complied with EN 50075. b) Class II appliances that are fitted with 3-pin mains plugs must use plugs that are complied with SS 145 and registered with the Safety Authority.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
7	Appliances rated ≥ 3 kW or connected to fixed wiring	Electric appliance ≥ 3 kW must be connected to fixed wiring. All connection to fixed wiring must be in accordance with Code of Practice CP5.	Not exceed 3 kW.	**N/A**
8	Detachable power cord set (consists of mains plug, mains cord and appliance connector	Detachable power cord set must be listed in the test report critical component list.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
9	Circuit diagrams	Circuit diagrams must be indicated with component's values for products tested to IEC 60065 and IEC 60950.	Comply.	**P**
10	Circuit diagrams of electronic modules in electrical appliances	Circuit diagrams of the electronic modules in the electrical appliances must be provided.	No such module in the apparatus.	**N/A**
11	Controlled goods likely to be treated as toy by children	Controlled goods, having an enclosure, which is shaped and decorated so that it is likely to be treated as a toy by children, shall not be accepted for certification and registration.	Apparatus is not likely to be treated as a toy by children.	**N/A**
No	Items	Requirements	Result - Remark	**Verdict**
Applicable to electric airport				
12	Reboil Switch	No part of the reboil switch is allowed to protrude into the water pot, even if it is located above the maximum water level mark.	No reboil switch	**N/A**

ATTACHMENT 6			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX TO TEST REPORTS
REGULATORY REQUIREMENTS FOR SINGAPORE

Annex Form No. .....: SG_RR_A

Annex Form Originator .....: TÜV SÜD PSB Pte Ltd

Master Annex Form .....: 2008-03

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No	Items	Requirements	Result - Remark	Verdict
The following is the national differences in accordance with safety authority website www.spring.gov.sg/safety, ref. Singapore Consumer Protection (Safety Requirements) – Information Booklet – Chapter 7.				
7 SAFETY AUTHORITY'S REQUIREMENTS **The Safety Authority monitors the safety of the controlled goods sold in Singapore by investigating all complaints, incidents and accidents reported to the authority. Experiences gained are translated into the Safety Authority's Requirements. These requirements are to be fulfilled in addition to the applicable safety standards.**				
No	**Items**	**Requirements**	**Result - Remark**	**Verdict**
Applicable to all products				
1	Test certificate / Test report	Test certificate / Test report more than three (3) years old shall be rejected.	Noted	—
Applicable to all electrical products				
2	All appliances	All appliances must be tested to 230 VAC.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
3	Voltage selector (voltage mis-match test)	Appliance fitted with voltage selector shall be tested as follows: Connect appliance to 230 VAC mains with voltage selector switch to settings not suitable for operation at 230 VAC.	No voltage selector.	**N/A**
4	Tropical condition test	All appliances (with tropical test requirements in applicable Standards) shall comply with the tropical condition test as stated in the relevant IEC Standards.	Comply.	**P**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
	No flash-over or breakdown shall occur during the test. The test voltage source shall be provided with a current sensing (over-current) device which, when activated, gives an indication "unacceptable". When loaded up to and including the tripping current, the voltage source shall still deliver the prescribed voltage.		**N/A**
	NOTE 3 The tripping current should not exceed 100 mA. NOTE 4 Tripping of the current sensing device is regarded as a flash-over or breakdown.		**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict

Annex JA

Addition:

Routine tests for dielectric strength shall be carried out during or after manufacturing of all apparatus.

The insulation of the apparatus shall be checked by the following test.

An a.c. test voltage of substantially sine-wave form, having mains frequency, or a d.c. test voltage or a combination of both with a peak value as specified in Table JA.1 is applied between the supply terminals connected in parallel and

- terminals (refer to 8.4) regarded as accessible, and

- accessible conductive parts respectively,

that may become hazardous live in the event of an insulation fault as a result of incorrect assembly.

NOTE 1 TERMINALS regarded as ACCESSIBLE and ACCESSIBLE conductive parts may be connected together during the electric strength test.

Table JA.1 – Test Voltage

Application of test voltage	Test Voltage V (peak) a.c or d.c.	
	Rated mains voltage ≤ 150	Rated mains voltage > 150
Basic insulation	1 130 (800 r.m.s.)	2 120 (1 500 r.m.s.)
Double insulation or Reinforced insulation	2 120 (1 500 r.m.s.)	3 540 (2 500 r.m.s.)

Before the test voltage is applied, intimate contact shall be made between the apparatus and the connection devices.

Initially it is allowed to apply not more than half of the prescribed test voltage, then it is raised with a steepness not exceeding 1 560 V/ms to the full value which is held for 1 s to 4 s.

NOTE 2 A steepness of 1 560 V/ms corresponds to the steepness of a sine-wave with a MAINS frequency of 60 Hz.

During the test, MAINS switches and functional switches CONDUCTIVELY CONNECTED TO THE MAINS, if any, shall be in the on-position and it shall be ensured by suitable means that the test voltage is effectively connected to the apparatus.

The apparatus is supplied by micro USB (5 Vd.c.) terminal.

N/A

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
16.2	**Replacement:** Replace Table 18 by the following. RATED CURRENT CONSUMPTION of the apparatus [a] A: up to and including 6; Over 6 up to and including 10; Over 10 up to and including 16 Nominal cross-sectional area mm²: 0,75; 1; 1,5 [a] The RATED CURRENT CONSUMPTION includes currents which can be drawn from the socket-outlets providing MAINS power for other apparatus.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Replacement: In the second paragraph, replace “IEC 60950” by “JIS C 6950-1”.		**—**
16.5	**Addition:** Add “or CLASS 0I EQUIPMENT used a plug with an external earth wire” after the words, CLASS I EQUIPMENT.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
16.7	**Replacement:** In item b), replace “IEC 60320-1” by “JIS C 8283-1”.	Not transportable musical instruments and amplifiers.	**N/A**
17.9A	**Addition:** Equipment shall be so constructed that mechanical force is not transmitted to soldering section of appliance coupler when connector is inserted in or pulled out. This requirement is not applied to equipment which appliance coupler is securely fixed, and installation of appliance coupler is not relied solely on soldering.		**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
15.3.6	**Replacement:** In the second paragraph, replace “IEC 60950” by “JIS C 6950-1”.		**—**
15.4.1	**Replacement:** In NOTE 1, replace “IEC 60884-1” by “JIS C 8282-1”.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Replacement: In NOTE 2, replace “IEC 60083 [1]” by “JIS C 8303”		**N/A**
15.4.2	**Replacement:** In NOTE, replace “IEC 60083 [1]” by “JIS C 8303”.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
15.4.3	**Addition:** Add the following NOTE to Table 17. NOTE If mains plug is parallel blade, a pull force as given in “Over 10 A up to and including 16 A, 130/250 V” of Table 17 is applied.		**N/A**
16.1	**Addition:** Add the following to the last of first paragraph. Or mains cords shall be of the sheathed type complying with Appendix 1 of Article 1 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance.. **Replacement:** Replace the second paragraph by the following. Compliance is checked by testing MAINS supply flexible cords in accordance with JIS C 3662 (corresponding to IEC60227) or JIS C 3663 (corresponding to IEC 60245), or Appendix 1 of Article 1 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Addition: Add the following paragraph after the third paragraph. An external earth wire of Class 0I equipment shall be green/yellow, and the length of external earth wire of plug with an external earth wire shall be equal or more than 10 cm from the plug.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
16.2	**Replacement:** Add-the following after the first paragraph. If power supply cord conductors comply with other standards, it shall comply with Japan indoor wiring regulation.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
15.1.2	**Replacement:** Replace of statement “An example of a connector not meeting the requirements of this subclause is the so-called "banana" plug.” by “Use of “banana” plug is considered to be acceptable. “		**—**
15.1.3	**Replacement:** Replace the references, “IEC 60083 [1], IEC 60320, IEC 60884, IEC 60906” by “JIS C 8282 (corresponding to IEC 60884), JIS C 8303 and IEC 60906”.		**N/A**
15.2	**Addition:** Add “and CLASS 0I EQUIPMENT” after the words, “CLASS I EQUIPMENT”	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Addition: Add the following paragraphs after the first paragraph. The external earth wire of plug with an external earth wire shall not be earthed by a clip. Rated voltage of plug with an protective external earth wire shall be less 150 Vac.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
15.3.1	**Replacement:** In the first paragraph, replace “IEC 60998-2-2” by “IEC 60998-2-2 or JIS C 2814-2-2”.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Replacement: In the third paragraph, replace “IEC 60335-1” by “JIS C 9335-1”.		**N/A**
15.3.5	**Replacement:** In the second paragraph, replace “IEC 60950” by “JIS C 6950-1”.		**—**
15.3.5	**Replacement:** Replace Table 15 by the following.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

RATED CURRENT CONSUMPTION of the apparatus [a] A	Nominal cross-sectional area mm²
Up to and including 6	0.75 to 1
Over 6 up to and including 10	1 to 1.5
Over 10 up to and including 16	1.5 to 2.5
[a] The RATED CURRENT CONSUMPTION includes currents which can be drawn from socket-outlets providing MAINS power for other apparatus.	

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
14.7	**Replacement:** Replace “IEC 60950” by “JIS C 6950-1”.	No safety interlocks.	**N/A**
14.9.4	**Replacement:** Replace “IEC 60950” by “JIS C 6950-1”.	No motors.	**N/A**
14.12	**Addition:** Add the following NOTE after 2nd paragraph. NOTE: The example of “not directly connected to the MAINS” is: - A combination of a varistor in series with a gus discharge tube (GDT) complying with appropriate value of the test voltage for dielectric strength and external and internal CREEPAGE DISTANCES.	No surge suppression varistors	**N/A**
15.1.1	Replacement: Replace the first and second paragraph by the following. Plugs and appliance couplers for the connection of the apparatus to the MAINS and socket-outlets and interconnection couplers for providing MAINS power to other apparatus shall comply with below. Plugs and appliance couplers: Appendix 4 of Article 1 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance or relevant IEC standards Socket-outlets and interconnection couplers: Relevant IEC standards These components complied with following criteria and relevant standards are considered to be acceptable. - Plugs and appliance couplers: Appendix 4 of Article 1 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance or JIS C 8282 - Connectors: JIS C 8283-1 or JIS C 8283-2-3 - Appliance couplers: JIS 8283-1 or 8283-2-3 - Socket-outlets for interconnection coupler: JIS C 8283-2-2 - Plug connecots for interconnection coupler: JIS C 8283-2-2 Where the product provided connectors or interconnection couplers with more than 16 A rated voltage, these components shall be compied with Appendix 4 of Article 1 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance or JIS C 8285. In that case, it shall not connect to any connectors specified in the standard sheet other than JIC C 8285.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Class 0I equipment shall not be provided either socket-outlets or interconnection couplers.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
14.5.1.2	**Replacement:** In the first sentence of item a), replace “IEC 60691” by “IEC 60691, JIS C 6691 or Appendix 3 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance and Material”.		**N/A**
	Replacement: After the second sentence of item a), replace “IEC 60691” by “JIS C 6691 or IEC 60691”.		**N/A**
14.5.2.1	**Replacement:** Replace the first and the second sentence as follows: Fuse-links, DIRECTLY CONNECTED TO THE MAINS, used in order to prevent the apparatus from becoming unsafe within the sense of this standard shall comply with - the relevant part of JIS C 6575, unless they have a rated current outside the range specified in that standard. In the latter case, they shall comply with the relevant part of JIS C 6575 as far as applicable, or - Appendix 3 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance and Material.		**N/A**
14.5.2.2	**Addition:** Add the following sentence before last paragraph. For fuses according to Appendix 3 of the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance and Material and also providing the breaking capacity, A or B shall be marked as applicable.		**N/A**
14.5.3	**Replacement:** Replace “IEC 60730-1” by “JIS C 9730-1”.	No PTC`s thermistors.	**N/A**
14.5.4	**Replacement:** Replace “IEC 60127” by “IEC 60127 or JIS C 6575”.		**N/A**
14.6.2	**Replacement:** In item a), replace “IEC 61058-1” by “JIS C 4526-1”.		**N/A**
14.6.3	**Replacement:** In item a), replace “IEC 61058-1” by “JIS C 4526-1”.		**N/A**
14.6.5	**Replacement:** In item a), replace “IEC 61058-1” by “JIS C 4526-1”.		**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
10.3.2	**Addition:** In Table 5, add the following values to the sub-table of NOTE. Operating Voltage *U* (peak) / Test voltage (peak): Curve A / Curve B **142 V** / **1 414 V** / **2 828 V**	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
11.2.1	**Addition:** Add the following after the original NOTE. NOTE 2 Fuses except for the ones according to IEC 60127 shall be tested in consideration of the characteristic.		**N/A**
11.2.6	**Addition:** Add “and CLASS 0I” after the words, CLASS I.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
12.3	**Addition:** In the 3rd paragraph, add the following sentence. The height of fall shall be 500 mm.		**N/A**
14.3	**Replacement:** Replace IEC 61558-1 and IEC 61558-2 by JIS C 61558-1 and JIS C 61558-2.		**N/A**
	Replacement: In NOTE, replace IEC 61558-2-1 [11], IEC 61558-2-4 [12], IEC 61558-2-6 [13] and IEC 61558-2-17 by JIS C 61558-2-1, JIS C 61558-2-4, JIS C 61558-2-6 and JIS C 61558-2-17.		**N/A**
	Addition: In NOTE, add JIS C 61558-2-16: Transformers for switch mode power supplies.		**N/A**
14.3.2	**Addition:** In the 5th paragraph, add JIS C 61558-2-16 in parallel with JIS C 61558-1 and JIS C 61558-2-17.		**N/A**
14.3.3.2	**Addition:** In the second sentence of the first paragraph, add “or JIS C 2107, JIS C 2336 and JIS C 2338” after the reference, IEC 60454.	No such adhesive bonding tape used.	**N/A**
14.5.1.1	**Addition:** In item a), add “JIS C 9730 series or” before the reference, IEC 60730 series.	No thermal cut-out.	**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
	Addition: Add the following paragraph as 2nd paragraph of Condition "d "in Table 3. For materials which are not listed in Table 3, temperature rises in the normal operating conditions are considered satisfactory if these materials comply with item 3 of detailed regulations, 1.(1),b, Appendix 4 in the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance and Material. Permissible temperature rise of "Supply cords and wiring insulation" is applicable only to the materials used in supply cords complying with JIS C 3662 (corresponding to IEC 60227) or JIS C 3663 (corresponding to IEC 60245). Materials used in other wiring shall comply with item 3 of detailed regulations, 1.(1).b, Appendix 4 in the Ministerial Ordinance on stipulating technical requirements for the Electrical Appliance and Material, and also it shall not exceed 100K under fult conditions.	No such materials used.	**N/A**
8.5	**Addition:** In the first paragraph, add "and Class 0I Equipment" after the words, Class I Equipment.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Addition: In the six paragraph (before NOTE 3), add the following to the end of the first sentence. CLASS 0I EQUIPMENT shall be provided with a protective earthing terminal at any point outside the apparatus where easily visible or a protective external earth wire from mains plug.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
8.11	**Addition:** In NOTE 2, c), add "or JIS C 2107, JIS C 2336, JIS C 2338" after the reference, IEC 60454.		**N/A**
9.1.1.1	**Addition:** In the last paragraph, add the following sentence after the first sentence. For CLASS 0I EQUIPMENT, the r.m.s. TOUCH-CURRENT to earth shall not be more than 1.0 mA.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
10.1	**Addition:** Add "CLASS 0I EQUIPMENT and" to the head of the first paragraph.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.2A	**Addition:** For CLASS 0I EQUIPMENT, the following instruction shall be indicated where readily visible on the mains plug or the product: “WARNING: Provide an earthing connection” *Example in Japanese:* 警告 必ず接地接続を行ってください。 Moreover, for CLASS 0I EQUIPMENT, the following instruction shall be indicated where readily visible on the product or written in the operating instructions: “WARNING: Provide an earthing connection before the mains plug is connected to the mains. And, when disconnecting the earthing connection, be sure to disconnect after pulling out the mains plug from the mains.” *Example in Japanese:* 警告 接地接続は必ず、主電源プラグを主電源につなぐ前に行って下さい。また、接地接続を外す場合は、必ず主電源プラグを主電源から切り離してから行って下さい。	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
7.1.5	**Addition:** Add the following paragraph as last paragraph of Condition “b “in Table 3. The enclosure that is covered for internal hetsink is considered to be unlikely accessible if following cinditions are met. - the symbol (IEC 60417-5041) is marked on or adjacent to the heated area of the surface of the enclosure, and - the minimum distance over the surface of the product between this area and any control intended to be operated during use is 150 mm or greater, and - the instruction manual gives information regarding the explanation of the meaning for the symbol (IEC 60417-5041) and the heated area.	Comply.	**P**

ATTACHMENT 5			
Clause	Requirement + Test	Result - Remark	Verdict

JAPAN NATIONAL DIFFERENCES

TEST RESULTS ACCORDING TO ONLINE CB BULLETIN (LAST MODIFICATION DATE OF 2014-11-28)

Differences according..... :	60065 Ed. 7 (2005); am 1, am 2
Corresponding National Standard	J60065 (H26)

No.	Requirement – Test	Result - Remark	Verdict
1.1.3	**Addition:** Add the following as a NOTE after the first sentence. NOTE 1 In Japan, the requirements for regions with moderate apply.	The moderate climates apply.	**P**
2.6.2A	**Addition:** Add this sub-clause. CLASS 0I EQUIPMENT: Equipment which has, as for protection against electric shock, at least using BASIC INSULATION, and providing a means of connecting to the protective earthing conductor in the building wiring those conductive parts that are otherwise capable of assuming HAZARDOUS VOLTAGES if the BASIC INSULATION fails, and using a supply cord without earthing conductor or a plug without earthing pin. Apparatus provided with a cord set having a two-pin type plug with a lead wire for earthing or having three pin - tow pin adaptor is also regarded as Class 0I. NOTE Class 0I equipment may have a part constructed with Double Insulation or Reinforced Insulation.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
3.2	**Addition:** Add the “Class 0I equipment” in the first sentence of this sub-clause.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
	Addition: Add the following after the first sentence of this sub-clause. NOTE Equipment often transported and used should not be Class I equipment nor Class 0I equipment.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
4.3.13	**Replacement:** Replace “250V a.c.” by “the maximum of the variable range”.	No voltage setting devices.	**N/A**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict

	Special national conditions		
1.1.3	Amended the first paragraph: This standard applies to apparatus intended to be used basically at altitudes not exceeding 5 000 m, dry climate at warm temperate zone or tropical climates.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operating at altitude up to 5000 m and tropical climate.	**P**
	The fourth paragraph replaced by following: For apparatus intended to be used in vehicles, ships or aircraft, or at altitude exceeding 5 000m, additional requirements may be necessary. CQC requirement clarification (July, 2012) : The Chinese standard (GB 8898-2011) sets requirements for altitudes up to 5000m.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operating in altitude up to 5000 m.	**N/A**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict
Annex J.6	After the first paragraph, added a paragraph: For apparatus intended to be operated at altitudes between 2 000m and 5 000m, the Minimum CLEARANCES in table J.2 shall multiply with multiplication factor 1.48 in table A.2 of GB/T 16935.1. For apparatus intended to be operated at altitude more than 5 000m, Minimum CLEARANCES shall multiply with corresponding multiplication factor in table A.2 of GB/T 16935.1. CQC requirement clarification (July, 2012) : The Chinese standard (GB 8898-2011) sets requirements for altitudes up to 5000m. Delete note 3 of table J.6. CQC requirement clarification (July, 2012) : Misprint of above reference “table J.6”. The text shall be : “Delete note 3 of J.6”.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operated at altitudes between 2 000 m and 5 000 m. No hazardous voltage inside.	**N/A**
Annex R (normative)	Added annex R: Instructions for the new safety warning labels. R.1 Altitude warning label Meaning of the label: Evaluation for apparatus only based on altitude not exceeding 2000m, therefor it’s the only operating condition applied for the apparatus. There may be some potential safety hazard if the equipment is used at altitude above 2000m. R.2 Climate warning label Meaning of the label: Evaluation for apparatus only based on temperate climate condition, therefor it’s the only operating condition applied for the apparatus. There may be some potential safety hazard if the equipment is used in tropical climate region.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operating at altitude exceeding 2000 m and tropical climate, therefore no need instructions for safety warning labels.	**N/A**
Annex S (informative)	Added annex S: Illustration relative to safety explanation in normative Chinese、Tibetan、Mongolian、Zhuang Language and Uighur.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operating at altitude up to 5000 m and tropical climate, therefore no such illustration relative to safety required.	**N/A**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict
	Amended Table 9 Note 2: For operating voltage values exceeding of table 8, extrapolation is permitted. CQC requirement clarification (July, 2012) : The Chinese standard (GB 8898-2011) sets requirements for altitudes up to 5000m.	Noted	—
13.3.3	After the first paragraph, added a paragraph: The requirements in table 10 apply to apparatus intended to be used at altitude not exceeding 2 000 m. For apparatus intended to be operated at altitudes between 2 000m and 5 000m , Minimum CLEARANCE limits shall multiply with multiplication factor 1.48 in table A.2 of GB/T 16935.1. For apparatus intended to be operated at altitude more than 5 000m , Minimum CLEARANCES limit shall multiply with corresponding multiplication factor in table A.2 of GB/T 16935.1. CQC requirement clarification (July, 2012) : The Chinese standard (GB 8898-2011) sets requirements for altitudes up to 5000m.	The apparatus is supplied by micro USB (5 Vd.c.) terminal. No hazardous voltage inside.	**N/A**
15.1.1	After the first paragraph, added a paragraph: Plugs connected to the MAINS in apparatus shall comply with GB 1002 or GB 1003.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
18	Delete the first paragraph except the first sentence.	No CRT.	**N/A**
18.1	Replaced contents of two dashes in the fourth paragraph: ——for intrinsically protected tubes, including those having integral protective screens, compliance is checked according to GB27701. ——for tubes non-intrinsically protected checked by 18.2.	Noted	**N/A**
18.2	Delete clause 18.2 and renumber the existing clause 18.3 as 18.2.	Noted	**N/A**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict
	Added Note 4: For apparatus intended to be operated at altitudes between 2 000m and 5 000m, the requirements for treatment of the insulating material are under consideration. CQC requirement clarification (July, 2012) : In the following wording "**For apparatus** , temperature …" there is a misprint : Correct text shall be : "For apparatus in tropical climates, temperature …".	Noted	—
11.1	Delete note 2.	Noted	—
11.1	After the ninth paragraph added a paragraph: For apparatus intended to be used in tropical climates, halve the values given above. CQC requirement clarification (July, 2012) : Note 2 is replaced be the text "For apparatus intended to be used in tropical climates, halve the values given above."	The apparatus is supplied by micro USB (5 Vd.c.) terminal, and no hazardous voltage inside.	**N/A**
12.5	Amended the first paragraph : Antenna coaxial sockets to be mounted on the apparatus shall subject to mechanical stress caused in use, and the sockets incorporate with parts or components which isolated HAZARDOUS LIVE parts from ACCESSIBLE parts or protective earth from other terminals. CQC requirement clarification (July, 2012) : The requirement is the same as in the IEC standard, just added "or protective earth". With ref. to the IEC standard the text shall be : "…..which isolate HAZARDOUS LIVE parts from ACCESSIBLE parts **or protective earth** , shall be constructed …… "	No such antenna.	**N/A**
13.3.2	After the first paragraph, added a paragraph: The requirements apply to apparatus intended to be used at altitude not exceeding 2 000 m. For apparatus intended to be operated at altitudes between 2 000m and 5 000m , Minimum CLEARANCE limits shall multiply with multiplication factor 1.48 in table A.2 of GB/T 16935.1. For apparatus intended to be operated at altitude more than 5 000m , Minimum CLEARANCES limit shall multiply with relevant multiplication factor in table A.2 of GB/T 16935.1.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operated at altitudes between 2 000 m and 5 000 m. No hazardous voltage inside.	**N/A**
	Bellow the headings of Table 8 Table 9 and Table 10 ,added : "（Applicable for altitude up to 2000m）".	Noted	—

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict
9.1.1.1	Delete the note 3 and renumber the existing note 4 as 3.	Noted	**N/A**
	After the paragraph of d), added a paragraph: For apparatus intended to be used in tropical climates, the limits should be halved than the values given in a) and b) above. CQC requirement clarification (July, 2012) : The following wording above "…, the limits should be …" is confirmed to be "…., limits shall be …".	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operating in tropical climate. No hazardous voltage inside.	**N/A**
10	Added a paragraph after the second paragraph : The Insulation resistance between CATV antenna coaxial sockets and protective earth of apparatus shall comply with BASIC INSULATION. If it's possible that CLASS II apparatus with CATV antenna coaxial sockets connect with protective earth of another CLASS I apparatus by other terminals, the insulation resistance between them shall comply with BASIC INSULATION as well. Added Note: If CATV antenna separated from the protective earth before connection to the apparatus, there is no requirements of Insulation resistance between them but requirements of 5.4.1i) shall meet. CQC requirement clarification (July, 2012) : 2MΩ insulation resistance is required.	No CDS.	**N/A**
10.1	Delete "on CLASS II apparatus" in the first paragraph. CQC requirement clarification (July, 2012) : The requirement applies also for Cl. I equipment (also with reliable earthed secondary side).	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
10.2	Replaced the fifth to seventh paragraphs by the following: The humidity treatment is carried out in a chamber containing air with a relative humidity of 93%±3 %. For apparatus, temperature of 40℃±2℃ and a relative humidity of 93%±3% shall be subjected. Apparatus intended to be used in non-tropical climates are subjected to a relative humidity of 93%±3%. The temperature in the chamber, at all places where samples located, shall be maintained within 2℃of any convenient value between 20℃ and 30℃, as long as no condensation occur.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, and no hazardous voltage inside.	**N/A**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict
5.1 f)	After the first sentence, Added: ……for Rated MAINS frequency or frequency range shall be 50Hz or covered 50Hz.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
5.4	Replaced the second sentence of the first paragraph： This information shall be given in normative Chinese.	Adequate instruction supplied by Chinese manual with the apparatus.	**P**
5.4.1i)	Added new paragraph i),after the h) paragraph: i) For apparatus incorporating antenna coaxial sockets without separating with CATV network, a warning wording or a similar shall be given in the instructions manual: “The CATV network connecting to this apparatus shall separate from protective earth, otherwise it may cause fire or other hazard.”	No CDS.	**N/A**
7	Note a) of table 3 replaced by : This standard applies to apparatus intended to be used in tropical climates, permissible temperature rises are 10 K less than those specified in the table. For apparatus intended to be used in non-tropical climates the limits in Table 3 are satisfactory. CQC requirement clarification (July, 2012) : The first line of condition a) in the IEC standard is replaced by the text above. The rest of the text for Note a) is as for the IEC standard : “For tropical climates, permissible temperature rises of 10 K less than those specified in this table are required. The values of the temperature rises are based on a maximum ambient temperature of 35 °C for moderate climates and of 45 °C for tropical climates. Where the temperatures are thermostatically limited by a THERMAL CUT-OUT with automatic reset or a PTC THERMISTOR, the measured temperature on the part shall not exceed 35 °C plus the permitted rise of Table 3.”	Considered. The apparatus is intended to be operating in tropical climate. See appended table 7.1.	**P**
7.1	Added Note 3: For apparatus intended to be operated at altitudes between 2 000m and 5 000m, temperature measuring conditions and maximum temperature limits are under consideration.	Noted	**—**

ATTACHMENT 4			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60065 (ED.7)+AMD.1
CHINA NATIONAL DIFFERENCES
AUDIO, VIDEO AND SIMILAR ELECTRONIC APPARATUS – SAFETY REQUIREMENTS

Differences according to ..... :	GB 8898-2011
Attachment Form No. ..... :	CN_ND_IEC60065J
Attachment Originator..... :	CQC
Master Attachment..... :	Date 2012-10

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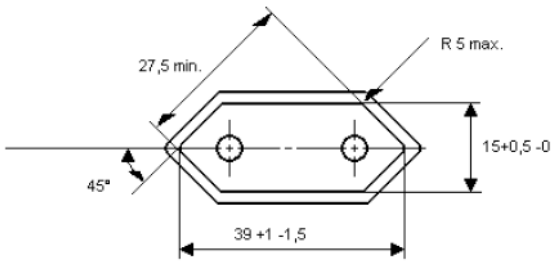
	China National Differences		
5	At the end of the first paragraph ,added following: For apparatus intended to be used at altitude not exceeding 2000m, a warning label containing the following or a similar appropriate wording or a symbol as in annex R(see following) shall fixed to the apparatus at readily visible place. "Only used at altitude not exceeding 2000m." If symbol used only, the explanation of the symbol shall be contained in the instruction manual. For apparatus intended to be used in non-tropical climate regions, a warning label containing the following or a similar appropriate wording or a symbol as in annex R shall fixed to the equipment at readily visible place. "Only used in non-tropical climate regions." If symbol used only, the explanation of the symbol shall be contained in the instruction manual. The statements above shall be given in a language acceptable to the regions where the apparatus is intended to be used.	The apparatus is supplied by micro USB (5 Vd.c.) terminal, but intended to be operated at altitudes of up to 5 000 m and tropical climate, therefore no such wording or symbol with explanation required.	**N/A**
5.1 e)	After the last paragraph, added: …….For single rated voltage, “220 V” or three-phase “380V” shall be marked only. For a rating range, 220 V or three-phase 380V shall be covered. For multiple rated voltages, one of them shall be 220 V or three-phase 380V and which default setting from manufacture shall be 220 V or three-phase 380V as well.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
6.1	**Germany** The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. *Justification*: German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the Council Directive 96/29/Euratom in Germany. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de	No CRT used in the Apparatus.	**N/A**
14.1	**Sweden** The following requirements shall be fulfilled: Switches containing mercury such as thermostats, relays and level controllers are not allowed.	No such switches	N/A

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Cont.	**Subclause 5.3.2 (corrigendum 1)** **Add** after the fourth dash: NOTE In **Finland**, **Norway** and **Sweden**, exclusions are applicable for equipment which is intended for connection to the building installation wiring using screw terminals or other reliable means, and for equipment which is intended for connection to the building installation wiring via an industrial plug and socket -outlet or an appliance coupler, or both, complying with EN 60309 or with a comparable national standard.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
J.2	**Norway** After Table J.1 the following is added: Due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. *Justification:* Based on a use in Norway of an IT power distribution system where the neutral is not provided	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		
5.1	**Italy** The following requirements shall be fulfilled: - The power consumption in Watts (W) shall be indicated on TV receivers and in their instruction for use (Measurement according to IEC 60107-1) NOTE EN 60555-2 has since been replaced by IEC 60107-1:1997. - TV receivers shall be provided with an instruction for use, schematic diagrams and adjustments procedure in Italian language. - Marking for controls and terminals shall be in Italian language. Abbreviation and international symbols are allowed provided that they are explained in the instruction for use. - The ECC manufacturers are bound to issue a conformity declaration according to the above requirements in the instruction manual. The correct statement for conformity to be written in the instruction manual, shall be: Questo apparecchio è fabbricato nella CEE nel rispetto delle disposizioni del D.M. marzo 1992 ed è in particolare conforme alle prescrizioni dell'art. 1 dello stesso D.M. - The first importers of TV receivers manufactured outside EEC are bound to submit the TV receivers for previous conformity certification to the Italian Post Ministry (PP.TT). The TV receivers shall have on the backcover the certification number in the following form: D.M. 26/03/1992 xxxxx/xxxxx/S or T or pT S for stereo T for teletext pT for retrofitable teletext *Justification:* Ministerial Decree of 26 March 1992: National rules for television receivers trade. NOTE The ministerial decree above contains additional, but not safety relevant requirements.	No TV receiver.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Annex B	**Finland, Norway and Sweden** All sub clauses given below are sub clauses of IEC 62151 (ref. corrigenda 1 and 2 to IEC 62151). **Subclause 4.1.1 (corrigendum 2):** **Add** after the first paragraph: NOTE In **Finland**, **Norway** and **Sweden**, CLASS I equipment which is intended for connection to the building installation via a non-industrial plug or a non-industrial appliance coupler, or both and in addition is intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and ACCESSIBLE parts, has a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: " Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan " In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag" **Subclause 4.1.4 (corrigendum 1)** **Add** at the end of the subclause: NOTE In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 4.2.1.2 (corrigendum 1)** **Add** at the end of the subclause: NOTE 3 In **Norway**, for requirements see 5.3.1, note 1. **Subclause 4.2.1.3 (corrigendum 2)** **Add** at the end of the subclause: NOTE In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 4.2.1.4 (corrigendum 1)** **Number** the existing note as NOTE 1 and **add** at the end of the subclause the following NOTE 2: NOTE 2 In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 5.3.1 (corrigendum 1)** **Add** after the first test specifications paragraph: NOTE 1 In **Finland**, **Norway** and **Sweden**, there are additional requirements for the insulation. **Renumber** the existing note as NOTE 2. For additional requirements for the insulation in Finland, Norway and Sweden in NOTE 1 the following text is added between the first and the second paragraph (this text is identical to the corresponding EN 60950-1:2001): NOTE 1 In **Finland**, **Norway** and **Sweden**, if this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in the accordance with the compliance clause below and in addition: • passes the test and inspection criteria of 13.6 with an electric strength test of 10.3 using the test voltage of 1,5 kV multiplied by 1,6, and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV (for performance of the test see N.2.1). It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2. A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in IEC 62151:2000, 6.2.1; • the additional testing shall be performed on all the test specimens as described in EN 132400; • the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400 in the sequence of tests as described in EN 132400.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
15.1.1	**Norway** Mains socket-outlets mounted on Class II apparatus shall comply with the specifications given in CEE Publ. 7 as far as applicable, with the following amendments: § 8 Dimensions a) 2,5 A 250 V two-pole socket-outlets for electronic apparatus shall comply with the enclosed Standard Sheet I. STANDARD SHEET I 2,5 A/250 V SOCKET-OUTLET FOR ELECTRONIC APPLIANCES OF CLASS II  Dimensions in mm Other dimensions according to CEE Publication 7 Standard Sheet I "Portable Single-Way Socket-Outlets". § 24 Mechanical strength a) 2,5 A, 250 V socket-outlets for Class II electronic apparatus are tested as specified in EN 60065:2014, 12.1.3. Also the protecting rim shall be tested. *Justification*: Act of 24 May 1929 relating to supervision of electrical installation (TEA 1929/FEL 1998).	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
15.1.1	**United Kingdom** Apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug shall be fitted with a "standard plug" in accordance with Statutory Instrument 1768: 1994: The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those Regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug. *Justification*: SI 1768: 1994	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
13.3.1	**Norway** **Add** to the second paragraph the following: Due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. *Justification:* Based on a use in Norway of an IT power distribution system where the neutral is not provided	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
15.1.1	**Denmark** To the first paragraph the following is added: In Denmark, supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1. Appliances of Class I provided with socket-outlets with earth contact or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug which assure earth continuity with the socket-outlet in accordance with DS 60884-2-D1. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-1. To the second paragraph the following is added: Socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance with DS 60884-2-D1 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with DS 60884-2-D1 Standard Sheet DKA 1-3a or DKA 1-1c. To the third paragraph the following is added: Mains socket-outlets with earthing contact shall be in compliance with DS 60884-2-D1, Standard sheet DK 1-3a, DK 1-1c, DK 1-1d, DK 1-5a or DK 1-7a *Justification*: Heavy Current Regulations, Section 6c	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
15.1.1	**Ireland** Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, “13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. *Justification*: SI 525: 1997	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2	**Norway and Sweden** **Add** to the end of 5.5.2 (after the compliance statement) the following: The screen of the coaxial cable of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a coaxial cable based television distribution system. It is however accepted to provide the insulation external to the apparatus by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the apparatus is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the MAINS connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)” NOTE In Norway, due to regulation for installations of CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.” Translation to Swedish: ”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”	No CDS.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
5.4	**Denmark, Finland, Norway and Sweden** To the end of the subclause the following is added: CLASS I apparatus which is intended for connection to the building installation wiring via a plug or an appliance coupler, or both and in addition is intended for connection to other apparatus or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network TERMINALS and ACCESSIBLE parts, have a marking stating that the apparatus must be connected to an earthed MAINS socket-outlet. The marking text in the applicable countries shall be as follows: In **Denmark**: "Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord." In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In **Norway**: "Apparatet må tilkoples jordet stikkontakt" In **Sweden**: "Apparaten skall anslutas till jordat uttag"	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Z1.4.3	**Cordless listening devices** In wireless mode: − with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and − respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and − with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above-mentioned programme simulation noise, the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dB(A).	No cordless listening devices.	**N/A**
Z1.5	**Measurement methods** Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval *T* shall be 30 s. NOTE Test method for cordless equipment provided without listening device should be defined.		**N/A**

	ANNEXES		
Annex B	**Replace** the text of Note 1 by the following: In the CENELEC countries listed in IEC 62151, special national conditions apply.	No TNV circuits	**N/A**
Annex N	After the note in N.1, **add** the following: For ROUTINE TEST, reference is made to EN 50514:2008.	Considered.	**P**

ZA	**NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**	—

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		
2.6.1	**Denmark** The following is added: Certain types of Class I apparatus, see 15.1.1, may be provided with a plug not establishing earthing continuity when inserted in Danish socket-outlets *Justification:* Heavy Current Regulations, Section 6c	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
3.Z1	**Denmark** **Add** to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. *Justification:* In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Cont.	For music where the average sound pressure (long term *L*Aeq,T) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song does not exceed the basic limit of 85 dB(A). In this case, *T* becomes the duration of the song. NOTE 4 Classical music typically has an average sound pressure (long term *L*Aeq,T) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dB(A). NOTE 5 For example, if the player is set with the programme simulation noise to 85 dB(A), but the average music level of the song is only 65 dB(A), there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB(A).	No headphones or earphones terminals (built-in speakers only).	**N/A**
Z1.3	The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following: − the symbol of Figure Z1 with a minimum height of 5 mm; and − the following wording, or similar: To prevent possible hearing damage, do not listen at high volume levels for long periods. **Figure Z1 – Warning label (IEC 60417-6044)** Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.	No headphones or earphones terminals (built-in speakers only).	**N/A**
Z1.4	**Requirements for listening devices (headphones, earphones, etc.)**		
Z1.4.1	**Corded passive listening devices with analogue input** With 94 dB(A) sound pressure output $L_{Aeq,T}$, the input voltage of the fixed “programme simulation noise” described in EN 50332-2 shall be ≥ 75 mV. This requirement is applicable in any mode where the headphones can operate including any available setting (for example built-in volume level control, an additional sound feature like equalization, etc.). NOTE The values of 94 dB(A) – 75 mV correspond with 85 dB(A) – 27 mV and 100 dB(A) – 150 mV.	No corded passive listening devices.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Z1.2	**Equipment requirements** No safety provision is required for equipment that complies with the following: − equipment provided as a package (personal music player with its listening device), where the acoustic output *L*Aeq,T is ≤ 85 dB(A) measured while playing the fixed “programme simulation noise” as described in EN 50332-1; and − personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” as described in EN 50332-1. NOTE 1 Wherever the term acoustic output is used in this subclause, the 30 s A-weighted equivalent sound pressure level *L*Aeq,T is meant. See also Z1.5 and Annex ZE. All other equipment shall: a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and NOTE 2 Examples of means include visual or audible signals. Action from the user is always required. NOTE 3 The 20 h listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off. d) have a warning as specified in Z1.3; and e) not exceed the following: 1) equipment provided as a package (player with its listening device), the acoustic output shall be ≤ 100 dB(A) measured while playing the fixed “programme simulation noise” described in EN 50332-1; and 2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” described in EN 50332-1.	No headphones or earphones terminals (built-in speakers only).	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
Z1	**Protection against excessive sound pressure from personal music players**		
Z1.1	**General** This subclause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. Requirements for earphones and headphones intended for use with personal music players are also covered. A personal music player is a portable equipment for personal use, that: − is designed to allow the user to listen to recorded or broadcast sound or video; and − uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and − is body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around while in use. EXAMPLES CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment. A personal music player shall comply with the requirements of this subclause. NOTE 1 Protection against acoustic energy sources from telecom terminal equipment is referenced to ITU-T Recommendation P.360. The requirements in this subclause are valid for music or video mode only. The requirements do not apply to: − professional equipment; NOTE 2 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment. − hearing aid equipment and other devices for assistive listening; − the following types of analogue personal music players: • long distance radio receiver (for example, a multiband radio receiver or a world band radio receiver, an AM radio receiver) and • cassette player/recorder; NOTE 3 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. − player while connected to an external amplifier that does not allow the user to walk around while in use. For equipment clearly designed or intended for use by young children, the limits of EN 71-1 apply.	No headphones or earphones terminals (built-in speakers only).	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
6	**Hazardous radiations**		
6.1	**Replace** the entire subclause by the following: Apparatus including a potential source of ionizing radiation shall be so constructed that personal protection against ionizing radiation is provided under normal operating conditions and under fault conditions. *Compliance is checked by measurement under the following conditions*: *In addition to the normal operating conditions, all controls adjustable from the outside BY HAND, by any object such as a tool or a coin, and those internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.* NOTE 1 Soldered joints and paint lockings are examples of adequate locking. *The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm^2, at any point 10 cm from the outer surface of the apparatus* *Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.* *The dose-rate shall not exceed 1 µSv/h (0,1 mR/h) taking account of the background level.* NOTE 2 These values appear in Council Directive 96/29/Euratom of 13 May 1996. *A picture is considered to be intelligible if the following conditions are met*: *- a scanning amplitude of at least 70 % of the usable screen width;* *- a minimum luminance of 50 cd/m^2 with locked blank raster provided by a test generator;* *- a horizontal resolution corresponding to at least 1,5 MHz in the centre, with a similar vertical degradation;* *- not more than one flashover per 5 min.*	No ionizing radiation.	**N/A**
16	**External flexible cords**		
16.1	**Add** the following note after the first paragraph: NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict
3	**General requirements**		
3.Z1	**Protective devices** To protect against excessive current, short-circuits and earth faults in MAINS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of Clause 11 shall be included as parts of the equipment; b) for components in series or parallel with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for equipment supplied via an industrial mains plug or for PERMANENTLY CONNECTED APPARATUS, to rely on dedicated over current and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for apparatus not supplied via an industrial mains plug or for PERMANENTLY CONNECTED APPARATUS the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.	The apparatus is supplied by micro USB (5 Vd.c.) terminal.	**N/A**
4	**General test conditions**		
4.1.1	**Replace** the text of the note by: NOTE For ROUTINE TEST, reference is made to EN 50514:2008.	Considered.	**P**

ATTACHMENT 3			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60065
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
(AUDIO, VIDEO AND SIMILAR ELECTRONIC APPARATUS – SAFETY REQUIREMENTS)

Differences according to.....: EN 60065:2014

Attachment Form No.....: EU_GD_IEC60065M

Attachment Originator .....: Intertek Semko AB

Master Attachment.....: Date 2016-10

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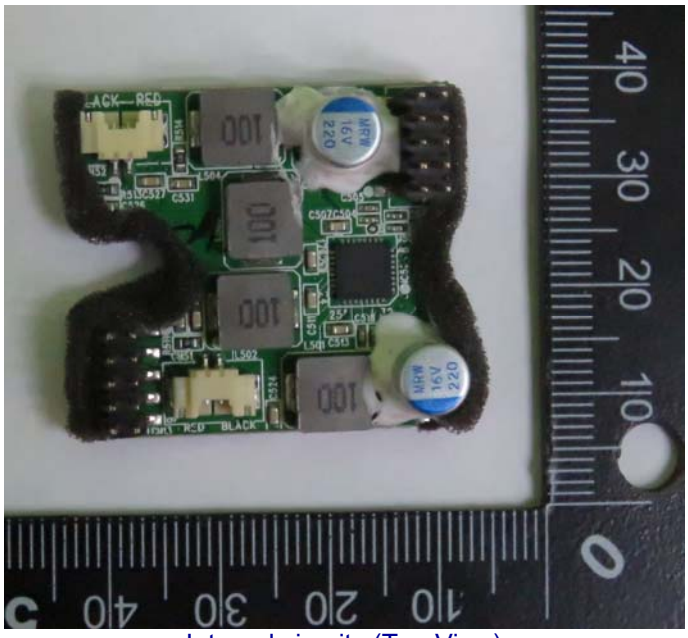
	CENELEC COMMON MODIFICATIONS (EN)		
General	1.1.3 Note 2 5.4 Note 5.5.2 Note 1 and Note 2 13.3.1 Note 4 14.1 Note 1 and Note 2 15.1.1 Note 1 and Note 2 15.2 Note 2 16.1 Note 2 16.2 Note 20 Note J.3 Note 1 and Table J.1 Note 2		**P**
1.2	**Normative references**		
	Add the following: EN 71-1, *Safety of toys – Part 1: Mechanical and physical properties* EN 50332-1, *Sound system equipment: Headphones and earphones associated with personal music players – Maximum sound pressure level measurement methodology – Part 1: General method for "one package equipment"* EN 50332-2, *Sound system equipment: Headphones and earphones associated with personal music players – Maximum sound pressure level measurement methodology – Part 2: Matching of sets with headphones if either or both are offered separately, or are offered as one package equipment but with standardised connectors between the two allowing to combine components of different manufacturers or different design*	Potable Sound System, but no headphones or earphones terminals (built-in speakers only).	**N/A**

ATTACHMENT 2
Photos

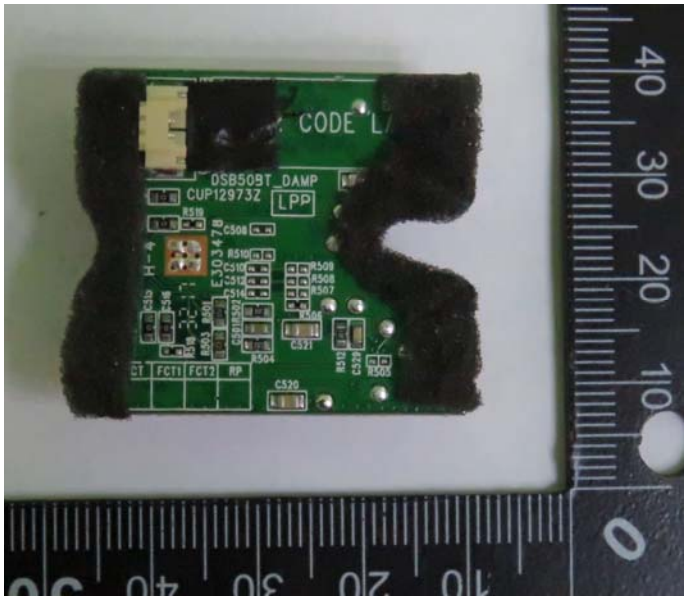
Bluetooth module

Rechargeable battery

ATTACHMENT 2
Photos



Internal circuits (Top View)



Internal circuits (Bottom View)