

Nemko Korea Co., Ltd.

155 & 159, Osan-Ro, Mohyeon-Eup, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF
TEL:+82 31 330-1700 FAX:+82 31 322 2332

FCC and IC EVALUATION REPORT FOR CERTIFICATION

Applicant :**Samsung Electronics Co., Ltd.****129,Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Korea****Attn. : SUNLYEONG HWANG****Dates of Issue : April 1, 2019****Test Report No. : NK-18-R-195****Test Site : Nemko Korea Co., Ltd.****FCC ID
IC****A3LEPOR370
649E-EPOR370****Brand Name****Samsung Electronics Co., Ltd.****Contact Person****Samsung Electronics Co., Ltd.
129,Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Korea
SUNLYEONG HWANG
Telephone No. : 82-31-301-5140**

Applied Standard: FCC 47 CFR Part 15.225 and IC RSS-210 Issue 9
Classification: Part 15 Low Power Communication Device Transmitter (DXX)
EUT Type: Wireless charging dock

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

 APRIL 4, 2019

Tested By : Yonghwan Kim
Engineer

 APRIL 4, 2019

Reviewed By : Seungyong Shin
Technical Manager

TABLE OF CONTENTS

1. Scope	4
2. Introduction (Site Description)	5
2.1 Test facility	5
2.2 Accreditation and listing	6
3. Test Conditions & EUT Information	7
3.1 Operation During Test	7
3.1.1 Table of test power setting	7
3.1.2 Table of test channels	7
3.1.3 Antenna information	7
3.1.4 Additional Information Related to Testing	7
3.1.5 Table of test modes	8
3.2 Support Equipment	8
3.3 Setup Drawing	8
3.4 EUT Information	9
4. Summary of Test Results	10
5. Recommendation / Conclusion	10
6. Antenna Requirements	10
7. Description of Test	12
7.1 Conducted Emissions	12
7.2 Radiated Emissions	13
7.3 20 dB Bandwidth	14
7.4 Frequency tolerance	14
8. Test Data	15
8.1 Conducted Emissions	15
8.2 Radiated Emissions	17
8.3 The field strength of any emission within the band 13.110~14.010 MHz	19

8.4 20 dB Modulated Bandwidth 21

8.5 Frequency tolerance 23

9. Test Equipment 23

10. Accuracy of Measurement 25

1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15 and IC RSS-210 Issue 9.

Responsible Party :	Samsung Electronics Co., Ltd. 129,Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Contact Person :	SUNLYEONG HWANG
Manufacturer :	Samsung Electronics Co., Ltd. 129,Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

- FCC ID: A3LEPOR370
- IC: 649E-EPOR370
- Model: EP-OR370
- HVIN: EP-OR370
- Brand Name: Samsung Electronics Co., Ltd.
- EUT Type: Wireless charging dock
- Classification: Part 15 Low Power Communication Device Transmitter (DXX)
- Applied Standard: FCC 47 CFR Part 15.225 and IC RSS-210 Issue 9
- Test Procedure(s): ANSI C63.10-2013
- Dates of Test: March 15, 2019 ~ March 27, 2019
- Place of Tests: Nemko Korea Co., Ltd.

2. INTRODUCTION

2.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in determining radiated and conducted emissions emanating from **Samsung Electronics Co., Ltd. FCC ID : A3LEPOR370** and **IC : 649E-EPOR370**.

These measurement tests were conducted at **Nemko Korea Co., Ltd. EMC Laboratory**.

The site address 155 & 159, Osan-Ro, Mohyeon-Eup, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 16885, KOREA, REPUBLIC OF.

The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 km (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 km (18miles) south-southeast from central Seoul.

It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.

The detailed description of the measurement facility was found to be in compliance with the requirements of ANSI C63.4-2014 according to §2.948.



Nemko Korea Co., Ltd.
EMC Lab.
155 & 159, Osan-Ro, Mohyeon-Eup,
Cheoin-Gu, Yongin-Si, Gyeonggi-Do
16885 KOREA, REPUBLIC OF
Tel)+82-31-330-1700
Fax)+82-31-322-2332

Fig. 1. The map above shows the Seoul in Korea vicinity area.

The map also shows Nemko Korea Corporation Ltd. EMC Lab. and Incheon Airport.

2.2 Accreditation and listing

Accreditation type		Accreditation number
	CAB Accreditation for DOC	Designation No. KR0026
	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. 155
	Canada IC Registered site	Site No. 2040E
	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
	EMC CBTL	-
	KCC(RRL)Designated Lab.	Registration No. KR0026

3. TEST CONDITIONS & EUT INFORMATION

3.1 Operation During Test

The EUT is the RFID device.

The EUS was set to transmit the wanted TX channel continuously.

The operating voltage of EUT is 5 Vdc.

The worst data were recorded in the report.

3.1.1 Table of test power setting

Frequency (MHz)	Mode	Power setting Level
13.56	RFID	Default

3.1.2 Table of test channels

Frequency band (MHz)	Frequency (MHz)
13.110~14.010	13.56

3.1.3 Antenna information

Frequency band (MHz)	Antenna TX mode	Support CDD	Support MIMO
13.110~14.010	☒ 1TX, ☐ 2TX	☐ Yes, ☒ No	☐ Yes, ☒ No

3.1.4. Additional Information Related to Testing

- No Comment

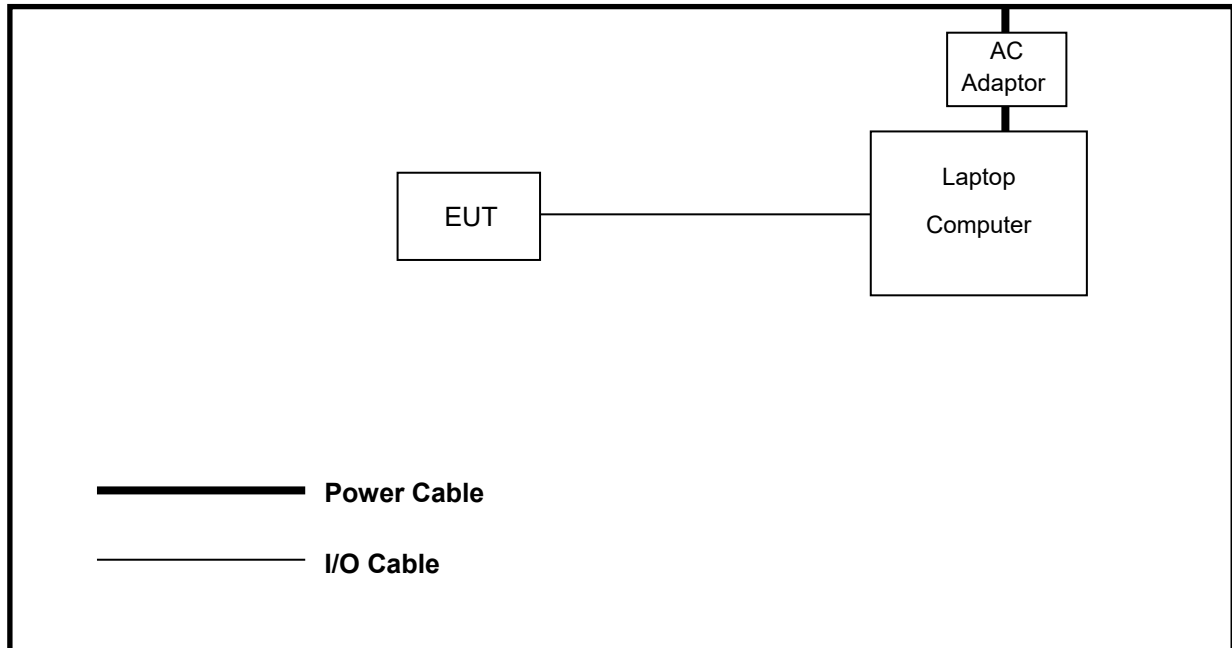
3.1.5 Table of test modes

Test Items	Modulation	Test channel (CH)
Conducted Emissions	ASK	1
Radiated emissions	ASK	1
The field strength of any emission within the band 13.110~14.010 MHz	ASK	1
20 dB bandwidth	ASK	1
Frequency tolerance	ASK	1

3.2 Support Equipment

EUT	Samsung Electronics Co., Ltd. Model : EP-OR370	S/N: N/A
Laptop Computer	HP Model : G62-355TU 1.5 m shielded pin connector cable	FCC DOC S/N : CNF0489WDT
AC/DC Adapter	HP Model : PPP009D 1.5 m unshielded power cable	FCC DOC S/N : WBGSV0ACXZH162

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Samsung Electronics Co., Ltd. Wireless charging dock** FCC ID : **A3LEPOR370** and IC : **649E-EPOR370**.

Specifications:

EUT Type	Wireless charging dock
Model Name	EP-OR370
Brand Name	Samsung Electronics Co., Ltd.
RF Frequency	13.110 MHz ~ 14.010 MHz
Field Strength of Fundamental	0.2 dBuV/m (1.02 uV/m) @ 30m
FCC Classification	Part 15 Low Power Communication Device Transmitter (DXX)
Channel Number	1 ch
Modulation	ASK
Antenna Setup	1TX
Voltage	Operating Voltage : 5 Vdc Test Voltage : 5 Vdc
Temperature Range	-20℃ ~ +55℃
Size (W x H x D)	About 37.0 mm x 25.0 mm x 21.0 mm
Weight	About 20 g
HVIN (Hardware version number)	EP-OR370
FVIN (Firmware Version Identification Number)	OR370.001
Remarks	-

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Test Requirement	FCC Paragraph No.	IC Paragraph No.	Result	Remark
Radiated emissions	15.209	RSS-GEN Issue 4 8.9	Complies	
The field strength of any emission within the band 13.110~14.010 MHz	15.225(a),(b),(c)	RSS-210 Issue 9 Annex B.6	Complies	
20 dB bandwidth	15.215(c)	RSS-210 Issue 9 Annex B.6	Complies	
Frequency tolerance	15.225(e)	RSS-210 Issue 9 Annex B.6	Complies	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Samsung Electronics Co., Ltd. Wireless charging dock FCC ID : A3LEPOR370** and **IC : 649E-EPOR370** is in compliance with FCC 47 CFR Part 15.225 and IC RSS-210 Issue 9.

6. ANTENNA REQUIREMENTS

§15.203 of the FCC Rules part 15 Subpart C

: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the **Samsung Electronics Co., Ltd. Wireless charging dock FCC ID : A3LEPOR370** and **IC : 649E-EPOR370** is **permanently attached** and there are no provisions for connection to an external antenna. It complies with the requirement of §15.203.

7. DESCRIPTION OF TESTS

7.1 Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 meter shielded enclosure. It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6. A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 1.5 m away from the side of wall of the shielded room. Rohde & Schwarz (ESH3-Z5) and (ESH2-Z5) of the 50 ohm/50 μ H Line Impedance Stabilization Network (LISN) are bonded to the shielded room. The EUT is powered from the Rohde & Schwarz LISN (ESH3-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH2-Z5). Power to the LISNs are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ". If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1 meter length. Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 kHz to 30 MHz with 200 msec sweep time. The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30). The detector functions were set to CISPR quasi-peak mode & average mode. The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission. Each EME reported was calibrated using the R&S signal generator.

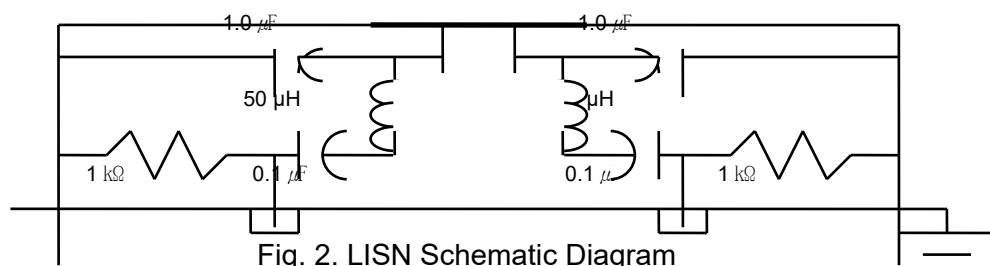


Fig. 2. LISN Schematic Diagram

7.2 Radiated Emissions

The measurement was performed at the test site that is specified in accordance with ANSI C63.10-2013.

The spurious emission was scanned from 9 kHz to 30 MHz using Loop Antenna (Rohde&Schwarz, HFH2-Z2) and 30 to 1000 MHz using Trilog broadband test antenna(Schwarzbeck, VULB 9163).

For emissions testing at below 1GHz, The test equipment was placed on turntable with 0.8 m above ground. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, cable, wire arrangement and mode of operation that has the highest amplitude relative to the limit was selected. Then, the turn table was rotated from 0° to 360° and an antenna mast was moved from 1 m to 4 m height to maximize the suspected highest amplitude signal. The final maximized level was recorded.

At frequencies below 1000 MHz, measurements performed using the CISPR quasi-peak detection. The limit of field strength of any emission within the band 13.110~14.010 MHz is below.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
13.553-13.567	15,848	30
13.410-13.553 13.567-13.710	334	30
13.110-13.410 13.710-14.010	106	30

Radiated Emissions Limits per 47 CFR 15.225(a)(b)(c) and RSS-210 Annex B.6(a)(b)(c)

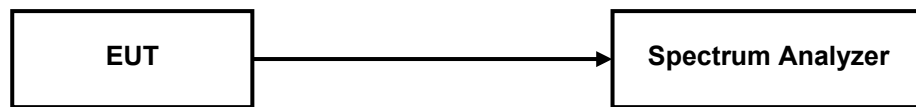
The limit of field strength of any emission outside of the band 13.110~14.010 MHz is below.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88–216	150	3
216–960	200	3
Above 960	500	3

Radiated Emissions Limits per 47 CFR 15.209(a) and RSS-GEN issue 4 8.9

7.3 20 dB Bandwidth

Test Setup



Test Procedure

The EUT is set to the wanted TX channel and connected to the spectrum analyzer.

The spectrum analyzer setting is as follows.

Span = approximately 2 to 5 times the 20 dB bandwidth, centered on TX channel

RBW = 1% to 5% of the OBW

VBW = approximately 3 x RBW

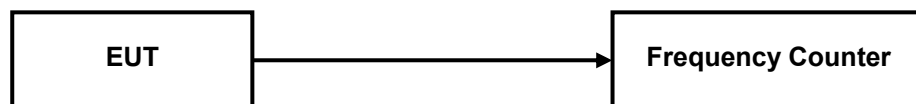
Sweep = auto

Detector function = peak

Trace = max hold

7.4 Frequency tolerance

Test Setup



Test Procedure

The EUT is set to the wanted TX channel and connected to the Frequency Counter.

8. TEST DATA

8.1 Conducted Emissions

FCC §15.207, RSS-GEN Issue 4 8.8

Result

Frequency (MHz)	Level (dB μ V)		*) Factor (dB)	**) Line	Limit (dB μ V)		Margin (dB)	
	Q-Peak	Average			Q-Peak	Average	Q-Peak	Average
0.17	43.5	25.8	10.50	L	65.2	55.2	21.7	29.4
0.21	40.3	33.3	10.60	L	63.4	53.4	23.1	20.1
0.46	41.6	36.2	10.50	L	56.7	46.6	15.1	10.4
3.16	31.8	22.9	10.60	L	56.0	46.0	24.2	23.1
3.37	31.6	21.4	10.70	L	56.0	46.0	24.4	24.6
13.56	38.7	29.9	11.20	L	60.0	50.0	21.3	20.1

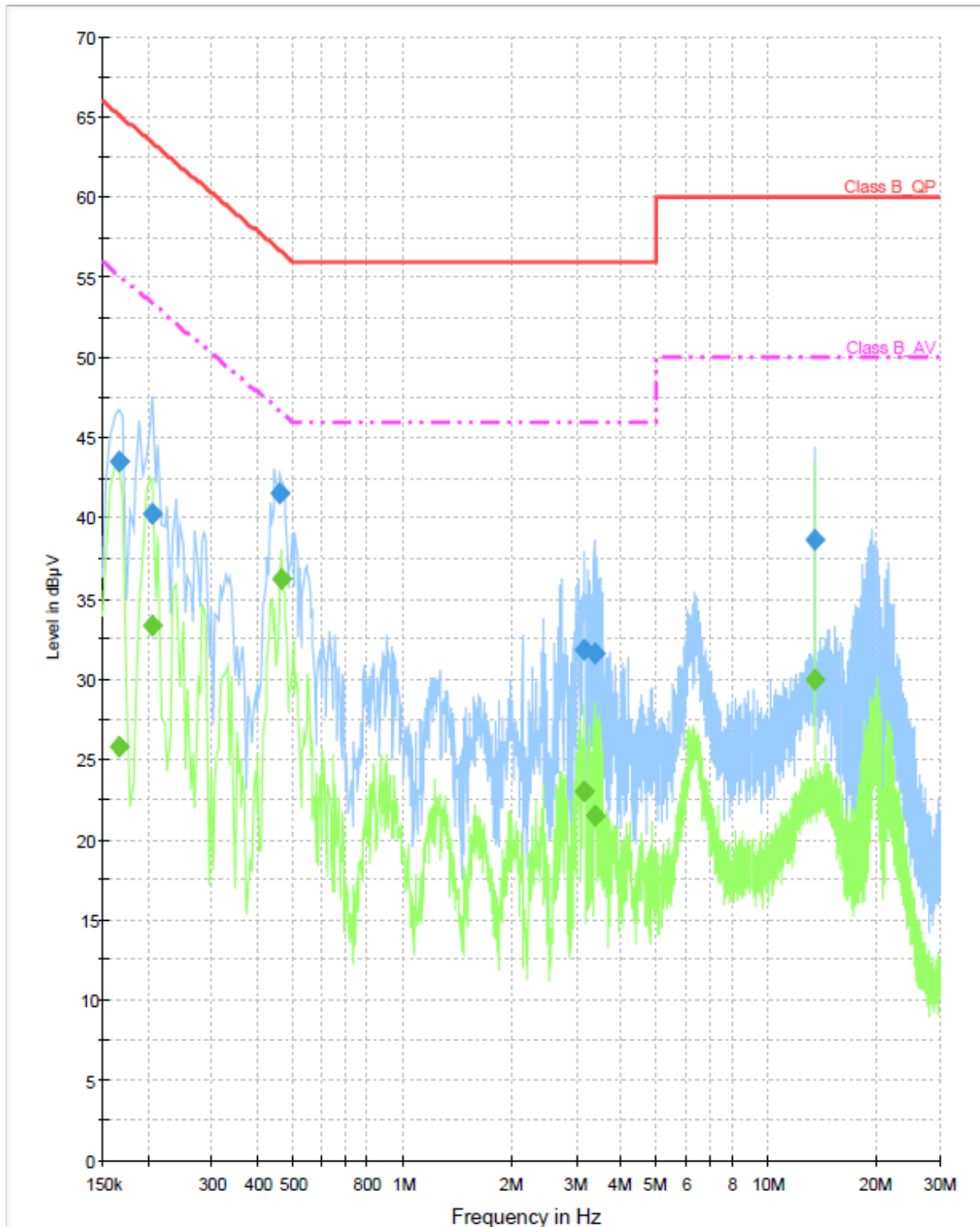
Line Conducted Emissions Tabulated Data

Notes:

1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission are reported. See attached Plots.
3. *) Factor = LISN + Cable Loss
4. **) LINE : L = Line , N = Neutral
5. The limit is on the FCC §15.207(a) and IC RSS-GEN issue4 8.8.

PLOTS OF EMISSIONS

Conducted Emission at the Mains port (Line + Neutral)



TEST DATA

8.2 Radiated Emissions

FCC §15.209, RSS-Gen Issue 4 8.9

Test Mode : Set to wanted TX channel

Frequency	Reading	Pol*	Antenna Heights	Turntable	AF+CL+Amp**	Result	Limit***	Margin
(MHz)	(dBμV/m)	(H/V)	(cm)	Angles (°)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
0.02	81.02	V	100	330	-22.9	58.1	121.5	63.4
1.52	52.83	V	100	210	-23.4	29.4	64.0	34.6
2.04	61.51	V	100	0	-23.4	38.1	69.5	31.4
2.68	58.82	H	100	150	-23.3	35.5	69.5	34.0
40.67	50.37	V	100	251	-23.8	26.6	40.0	13.4
46.11	48.82	V	100	321	-22.9	25.9	40.0	14.1
81.36	49.43	H	400	358	-29.5	19.9	40.0	20.1
184.45	47.99	H	100	308	-26.1	21.9	43.5	21.6
216.94	57.93	V	100	9	-23.6	34.3	46.0	11.7
798.29	36.16	H	100	322	-10.8	25.4	46.0	20.6

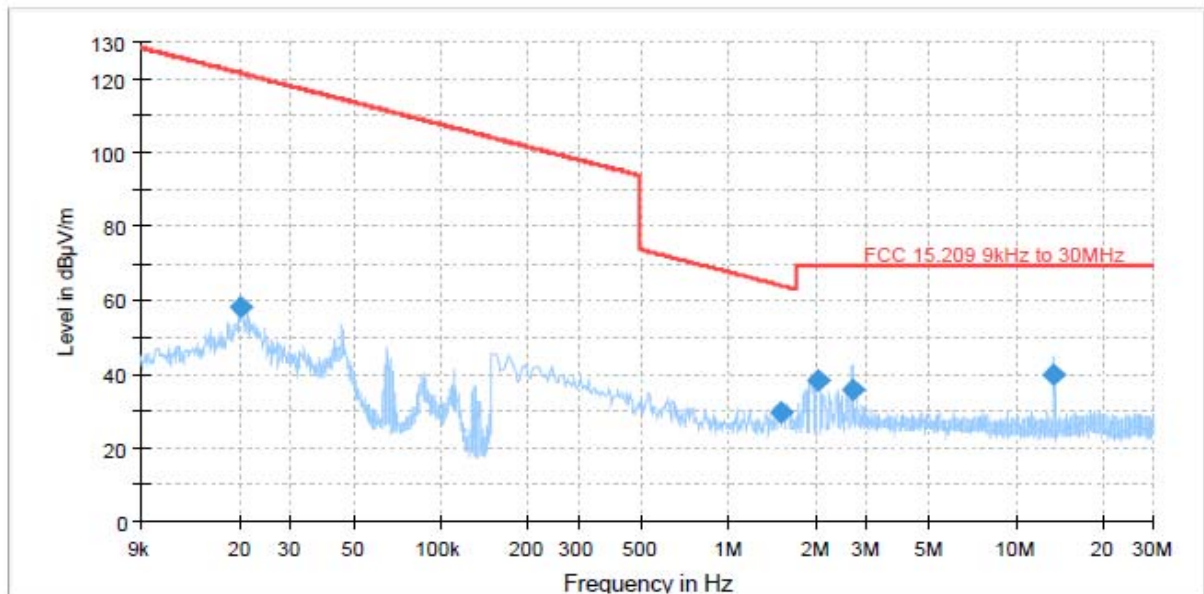
Radiated Measurements at 3meters

Notes:

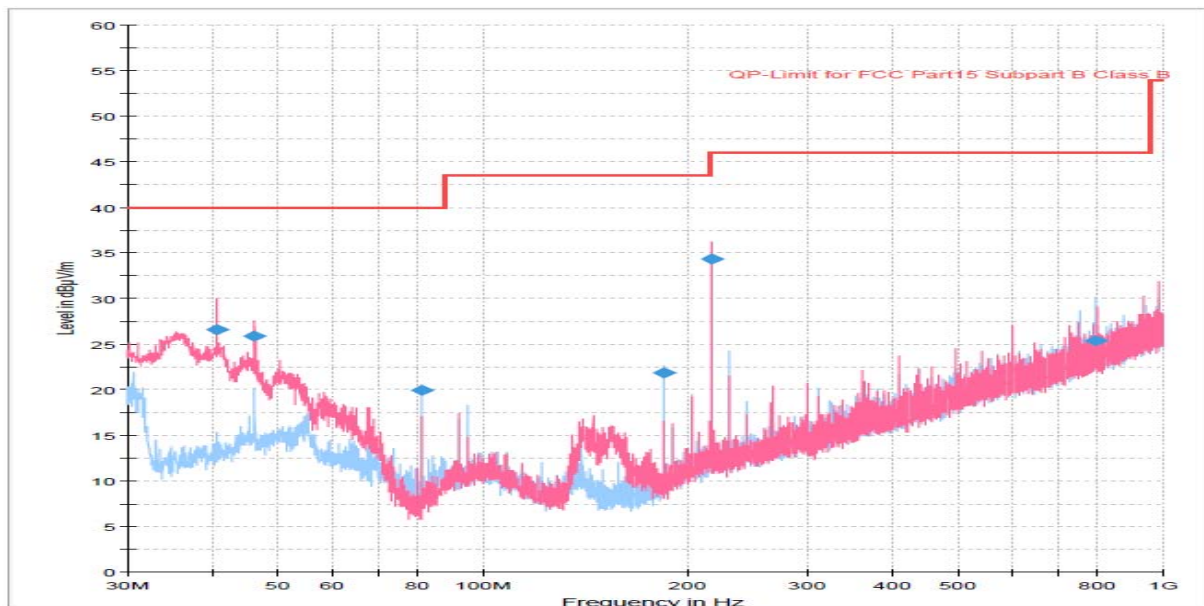
- *Pol. H = Horizontal, V = Vertical
- **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
- ***At frequencies below 30MHz, the limits are extrapolated to 3m measurement distance with correction factor (40 dB/decade) according FCC 15.31(f)(2).
- Measurements using CISPR quasi-peak mode below 1 GHz.
- Measured using RBW = 9 kHz, VBW = 30 kHz below 30 MHz.
- Measured using RBW = 120 kHz, VBW = 300 kHz above 30 MHz.
- 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.
- The limit is on the FCC §15.209 and RSS-Gen Issue4 8.9.

PLOTS OF EMISSIONS

Radiated emission_ 9kHz to 30MHz_13.56MHz



Radiated emission_ 30MHz to 1GHz_13.56MHz



TEST DATA

8.3 The field strength of any emission within the band 13.110~14.010 MHz

FCC §15.225(a)(b)(c), RSS-210 Annex B.6(a)(b)(c)

Test Mode : Set to wanted TX channel

Frequency	Reading	Pol*	Antenna Heights	Turntable	AF+CL+Amp**	Result	Limit***	Margin
(MHz)	(dBμV/m)	(H/V)	(cm)	Angles (°)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
13.56	63.05	V	100	84	-22.9	40.2	123.8	83.7

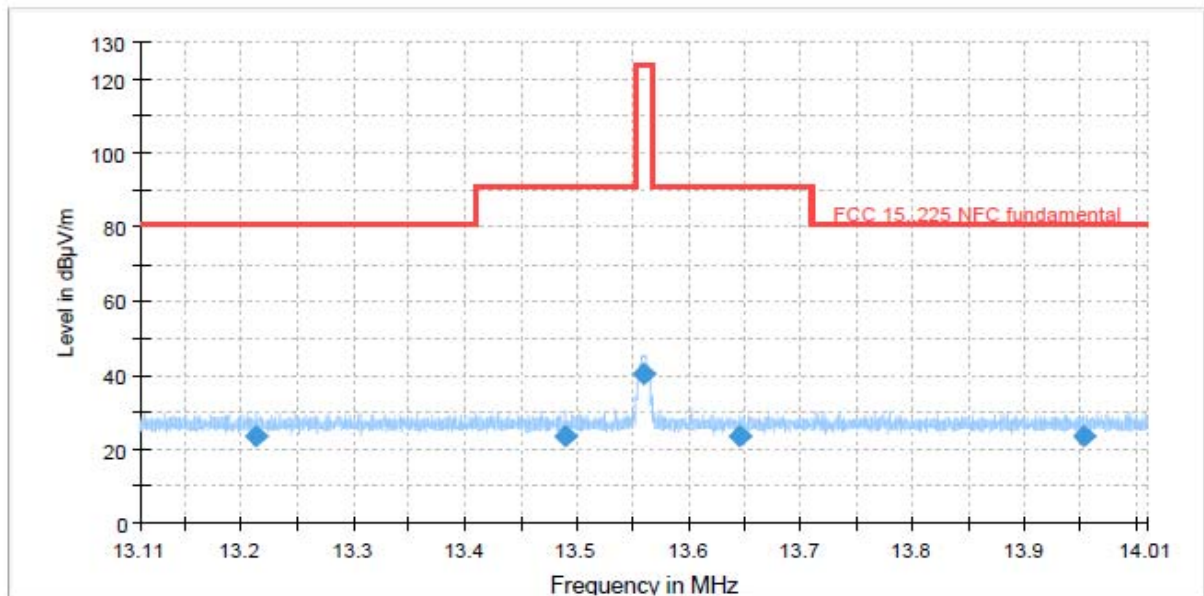
Radiated Measurements at 3meters

Notes:

1. *Pol. H = Horizontal, V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. ***At frequencies below 30MHz, the limits are extrapolated to 3m measurement distance with correction factor (40 dB/decade) according FCC 15.31(f)(2).
4. Measurements using CISPR quasi-peak mode below 1 GHz.
5. Measured using RBW = 9 kHz, VBW = 30 kHz below 30 MHz.
- 6 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.
7. The limit is on the FCC §15.209 and RSS-Gen Issue4 8.9..

PLOTS OF EMISSIONS

The field strength of any emission within the band 13.110~14.010 MHz_13.56MHz



TEST DATA

8.4 20 dB Bandwidth

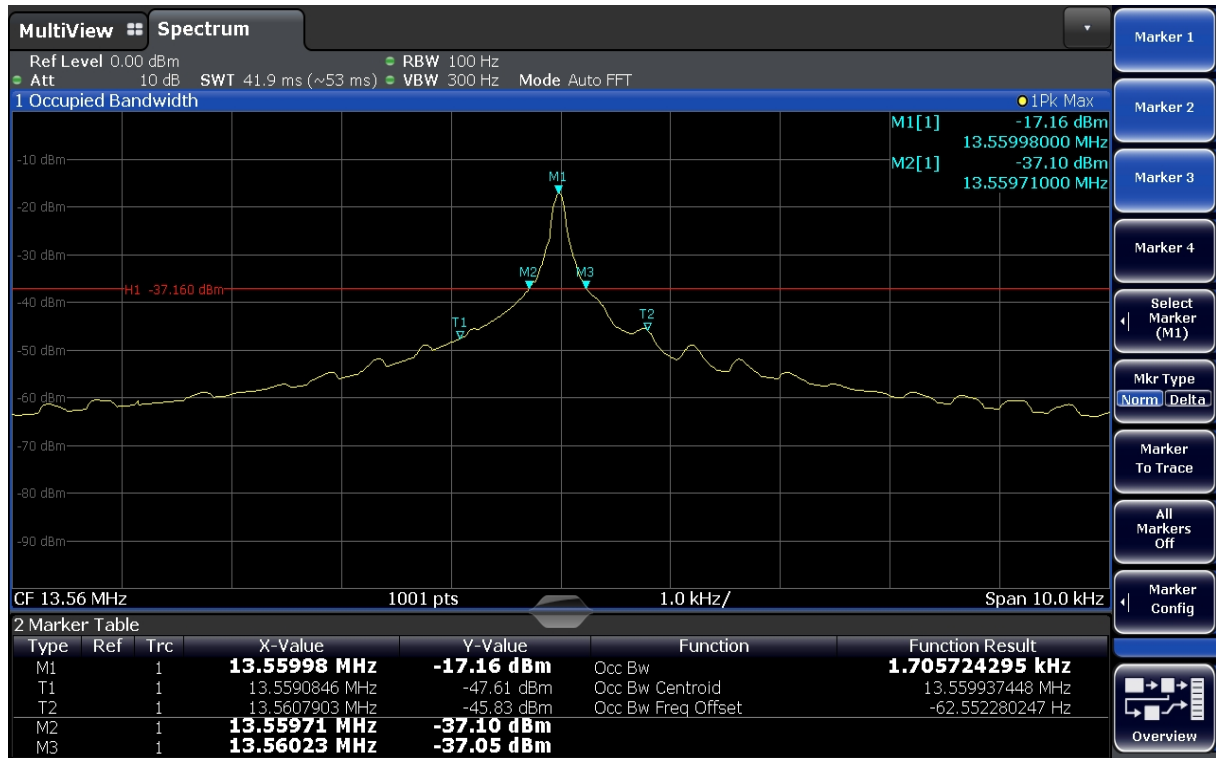
FCC §15.215(c)

Test Mode : Set to wanted TX channel

Frequency	20 dB Bandwidth		Limit	Margin	99% emission Bandwidth
(MHz)	(MHz)		(MHz)	(MHz)	(kHz)
13.56	Lowest Edge	13.55971	13.110	0.450	1.706
	Highest Edge	13.56023	14.010	0.450	

PLOTS OF EMISSIONS

20 dB Bandwidth_13.56MHz



TEST DATA

8.5 Frequency tolerance

FCC §15.225(e) RSS-210 Annex B.6

Test Mode : Set to wanted TX channel

Frequency (MHz)	Temperature (°C)	Voltage (V)	Time (m)	Measured value (Hz)	Tolerance (Hz)	Limit (Hz)	Result
13.56	50	5	0	13559074	926	1356	Pass
			2	13559068	932	1356	Pass
			5	13559071	929	1356	Pass
			10	13559078	922	1356	Pass
	40	5	0	13559175	825	1356	Pass
			2	13559150	850	1356	Pass
			5	13559054	946	1356	Pass
			10	13559058	942	1356	Pass
	30	5	0	13559114	886	1356	Pass
			2	13559478	522	1356	Pass
			5	13559612	388	1356	Pass
			10	13559670	330	1356	Pass
	20	5.75	0	13559045	955	1356	Pass
			2	13559039	961	1356	Pass
			5	13559041	959	1356	Pass
			10	13559040	960	1356	Pass
	20	5	0	13559011	989	1356	Pass
			2	13559031	969	1356	Pass
			5	13559028	972	1356	Pass
			10	13559033	967	1356	Pass
	20	4.25	0	13559050	950	1356	Pass
			2	13559046	954	1356	Pass
			5	13559046	954	1356	Pass
			10	13559039	961	1356	Pass
	10	5	0	13559103	897	1356	Pass
			2	13559118	882	1356	Pass
			5	13559119	881	1356	Pass
			10	13559195	805	1356	Pass
	0	5	0	13559151	849	1356	Pass
			2	13559132	868	1356	Pass
			5	13559125	875	1356	Pass
			10	13559119	881	1356	Pass
	-10	5	0	13559160	840	1356	Pass
			2	13559204	796	1356	Pass
			5	13559190	810	1356	Pass
			10	13559177	823	1356	Pass
	-20	5	0	13559162	838	1356	Pass
			2	13559173	827	1356	Pass
			5	13559176	824	1356	Pass
			10	13559169	831	1356	Pass

9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	May. 24 2018	1 year
2	Test Receiver	R & S	ESCS30	100302	Oct. 11 2018	1 year
3	Attenuator	PASTERNAK	PE7395-10	1441-1	Jul. 07 2018	1 year
4	Attenuator	FAIRVIEW	SA3N5W-06	N/A	Jun. 14 2018	1 year
5	Attenuator	FAIRVIEW	SA3N5W-10	N/A	Apr. 03 2019	1 year
6	*Attenuator	WEINSCHL	56-10	58765	Oct. 12 2018	1 year
7	*Amplifier	R & S	SCU 01	10029	Apr. 02 2019	1 year
8	Amplifier	R & S	SCU18F	180025	Apr. 02 2019	1 year
9	Amplifier	R & S	SCU26D	1984522	Apr. 02 2019	1 year
10	Amplifier	R & S	SCU40	100380	Jul. 16 2018	1 year
11	Pre Amplifier	HP	8449B	3008A00107	Jan. 08 2019	1 year
12	*Spectrum Analyzer	R & S	FSW43	100732	Apr. 02 2019	1 year
13	Spectrum Analyzer	Agilent	E4440A	MY44022567	Oct. 11 2018	1 year
14	Spectrum Analyzer	R & S	FSW43	104084	Apr. 02 2019	1 year
15	*Loop Antenna	R & S	HFH2-Z2	100279	Feb.13 2019	2 year
16	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-474	Jun. 28 2017	2 year
17	Horn Antenna	Q-par Angus	QSH20S20	8179	Aug. 01 2017	2 year
18	Horn Antenna	Q-par Angus	QSH22K20	8180	Aug. 02 2017	2 year
19	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	946	May. 18 2017	2 year
20	LISN	R & S	ESH3-Z5	833874/006	Oct. 12 2018	1 year
21	Position Controller	INNCO	CO2000	12480406/L	N/A	N/A
22	*Controller	INNCO	CO3000	CO3000/937/38330516/L	N/A	N/A
23	Turn Table	INNCO	DS1200S	N/A	N/A	N/A
24	*Turn Table	INNCO	DT2000-2t	N/A	N/A	N/A
25	Antenna Mast	INNCO	MA4000	N/A	N/A	N/A
26	*TILT Antenna Mast	INNCO	MA4640-XP-EP	N/A	N/A	N/A
27	Open Switch And Control Unit	R & S	OSP-120	100081	N/A	N/A
28	*Open Switch And Control Unit	R & S	OSP-120	101766	N/A	N/A
29	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A
30	Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
31	WiFi Filter Bank	R & S	U083	N/A	N/A	N/A
32	*WiFi Filter Bank	R & S	U082	N/A	N/A	N/A

*) Test equipment used during the test

10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
Ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
Ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	Ⓐ: AMN-Receiver Mismatch : + Ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expanded Uncertainty U	Normal ($k = 2$)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	RS	0.34	normal 1	1.00	0.34	1	0.34
Receiver reading	Ri	± 0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	dVsw	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dVpa	± 0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	dVpr	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dVnf	± 0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	AF	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	CL	± 1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	AD	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	AH	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	AP	± 0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	Ai	± 0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	Si	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	DV	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	Dbal	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	DCross	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.18
Mismatch	M	+ 0.98 - 1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
EUT Volume Diameter	Vd	0.33	normal 1	1.00	0.33	1	0.11
Remark							
Combined Standard Uncertainty	Normal						
Expanded Uncertainty U	Normal ($k = 2$)						