

FCC ANT+ REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,
16677, Rep. of Korea

Date of Issue:

May 02, 2018

Test Site/Location:

HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-
myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1804-FC033-R1

FCC ID: **A3LSMG8750**

APPLICANT: **SAMSUNG Electronics Co., Ltd.**

Model(s): SM-G8750
EUT Type: Mobile Phone
Max. RF Output Power: 90.50 dBuV/m @3 m
Frequency Range: 2402 MHz -2480 MHz
Modulation type GFSK
FCC Classification: Low Power communication Device Transmitter(DXX)
FCC Rule Part(s): Part 15.249

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Jung Ki Lim
Engineer of Telecommunication testing center



Approved by : Jong Seok Lee
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1804-FC033	April 23, 2018	- First Approval Report
HCT-RF-1804-FC033-R1	May 02, 2018	- Revised the harmonic field strength unit (Page 8 & 14)

Table of Contents

- 1. GENERAL INFORMATION 4
- 2. EUT DESCRIPTION 4
- 3. TEST METHODOLOGY 5
 - 3.1 EUT CONFIGURATION 5
 - 3.2 EUT EXERCISE 5
 - 3.3 GENERAL TEST PROCEDURES 5
 - 3.4 DESCRIPTION OF TEST MODES 5
- 4. INSTRUMENT CALIBRATION..... 6
- 5. FACILITIES AND ACCREDITATIONS 6
 - 5.1 FACILITIES 6
 - 5.2 EQUIPMENT 6
- 6. ANTENNA REQUIREMENTS 6
- 7. MEASUREMENT UNCERTAINTY 7
- 8. SUMMARY TEST OF RESULTS 8
- 9. TEST RESULT 9
 - 9.1 DUTY CYCLE..... 9
 - 9.2 OCCUPIED BANDWIDTH MEASUREMENT 11
 - 9.3 RADIATED MEASUREMENT..... 14
 - 9.3.1 FUNDAMENTAL FIELD STRENGTH LEVEL MEASUREMENT 14
 - 9.3.2 RADIATED SPURIOUS EMISSIONS..... 18
 - 9.3.3 RADIATED BAND EDGES MEASUREMENTS..... 28
 - 9.4 POWERLINE CONDUCTED EMISSIONS 31
- 10. LIST OF TEST EQUIPMENT 40
 - 10.1 LIST OF TEST EQUIPMENT (Conducted Test) 40
 - 10.2 LIST OF TEST EQUIPMENT (Radiated Test)..... 41

1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID: A3LSMG8750
EUT Type: Mobile Phone
Model: SM-G8750
Date(s) of Tests: March 30, 2018 ~ April 20, 2018
Place of Tests: HCT Co., Ltd.
 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model	SM-G8750	
EUT Type	Mobile Phone	
Power Supply	DC 4.00 V	
Frequency Range	TX: 2402 MHz ~ 2480 MHz RX: 2402 MHz ~ 2480 MHz	
Fundamental Field Strength Level	Peak	90.50 dBuV/m @3 m
	Average	40.04 dBuV/m @3 m
Operating Mode	ANT+	
Modulation Type	GFSK	
Number of Channels	79 Channels	
Antenna Specification	Antenna type: LDS + Frame	
	Peak Gain : -3.46 dBi	

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) Operating Under §15.249” were used in the measurement.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.249 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3.75 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty (\pm dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
Occupied Bandwidth	§2.1049	N/A	CONDUCTED	PASS
Duty Cycle	§15.35(c)	N/A		N/A
AC Power line Conducted Emissions	§15.207	cf. Section 9.4		PASS
Fundamental Field Strength Level	§15.249(a)(e)	< 50 mV/m	RADIATED	PASS
Harmonic Field Strength Level	§15.249(a)(e)	< 500 uV/m		PASS
General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	§15.205, 15.209, 15.249(d)(e)	< 15.209 limits or 50dB below the level of the fundamental		PASS

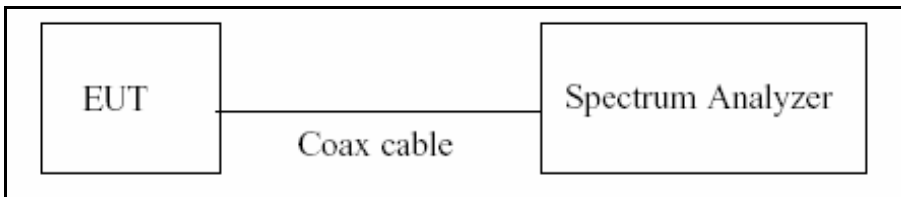
9. TEST RESULT

9.1 DUTY CYCLE

Test Requirements §15.35(c)

(c) Unless otherwise specified, e.g. § 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification

■ TEST CONFIGURATION



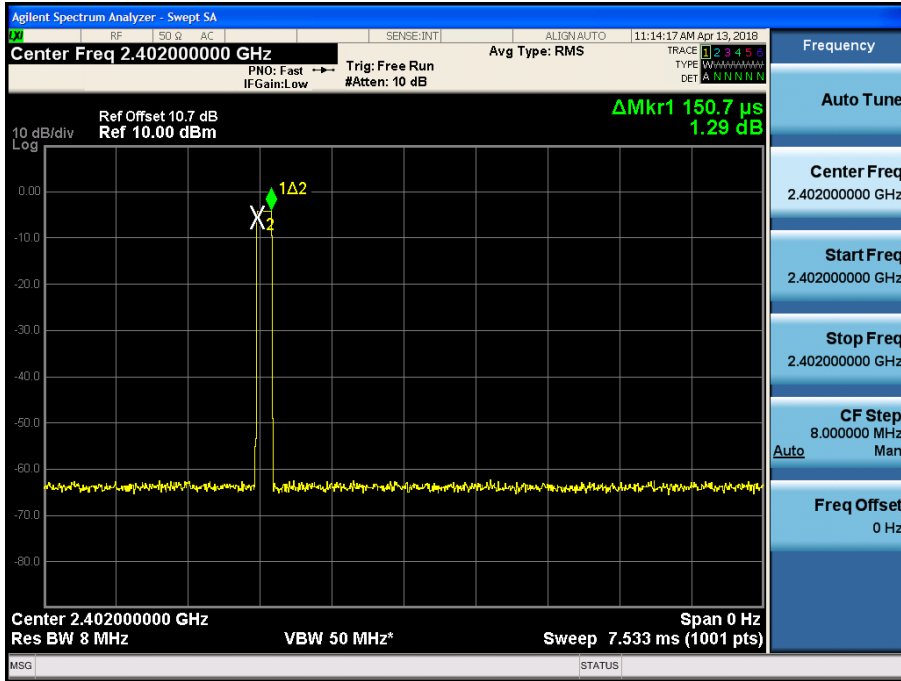
■ TEST RESULTS

$$\begin{aligned}
 \text{DCCF} &= 20 \cdot \log_{10}(\text{Pulse width} / \text{Period of the pulse train}) \\
 &= 20 \cdot \log_{10}(2 \times 0.15 \text{ ms} / 100 \text{ ms}) = -50.46 \text{ dB}
 \end{aligned}$$

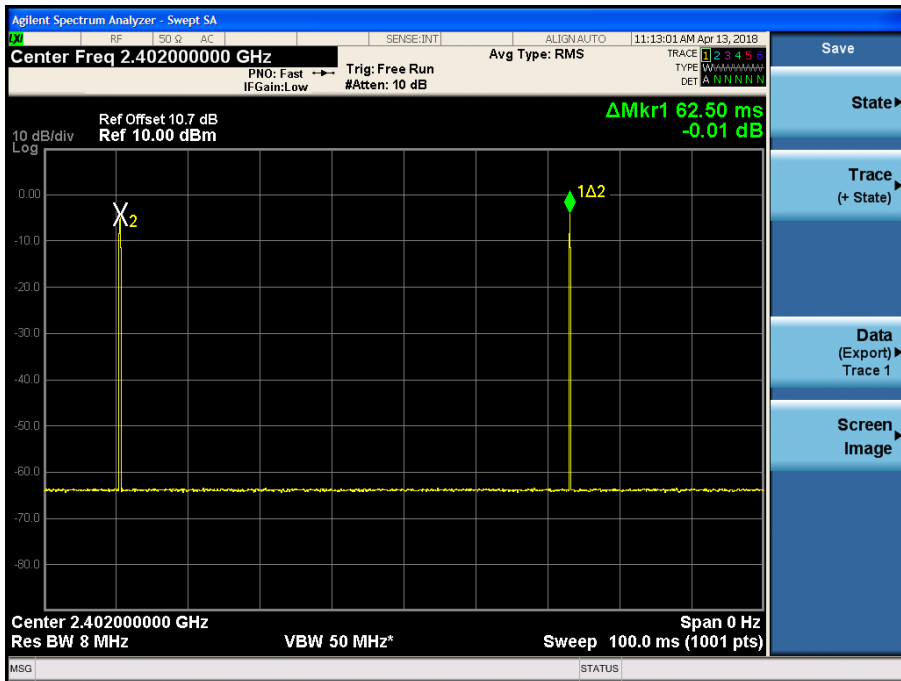
DCCF
-50.46 dB

TEST RESULTS PLOTS

Pulse Width plot



Period of the Pulse Train

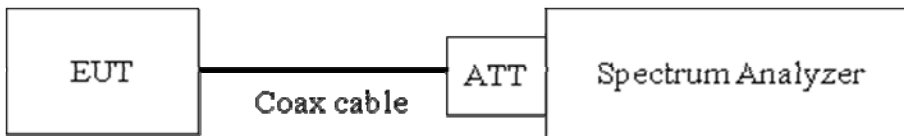


9.2 OCCUPIED BANDWIDTH MEASUREMENT

Test Requirements and limit, §2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

RBW = 1% to 3% of the 99% bandwidth.

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

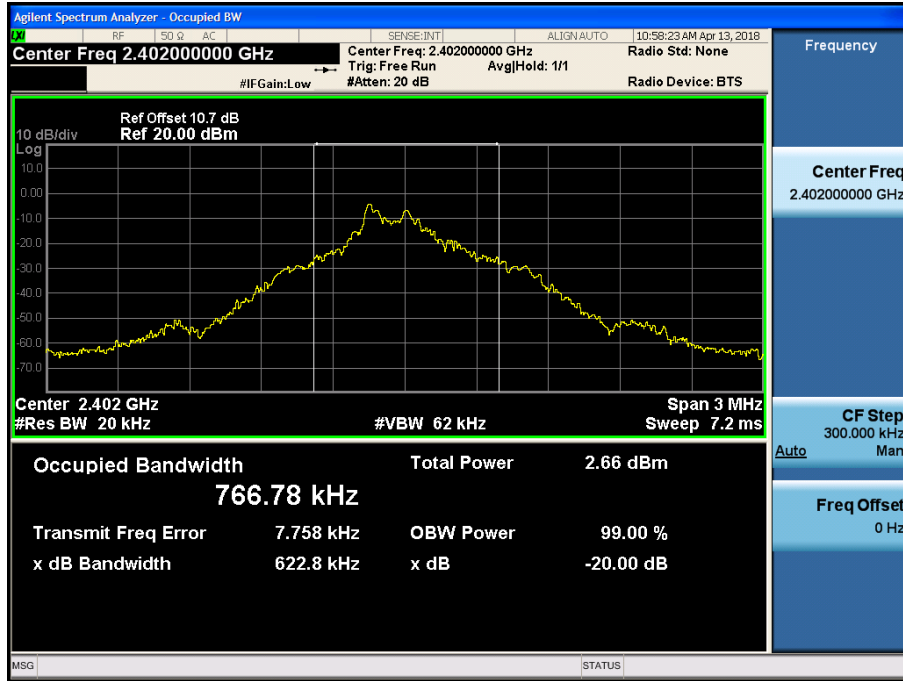
Note : We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

■ TEST RESULTS

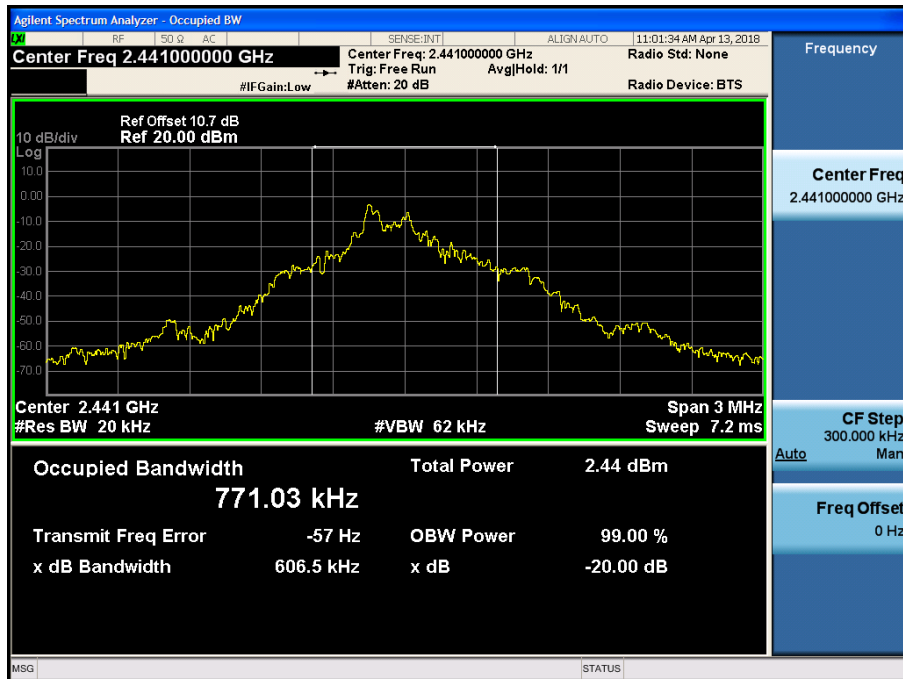
ANT+ Mode	99% Bandwidth
Frequency[MHz]	(kHz)
2402	766.78
2441	771.03
2480	768.51

RESULT PLOTS

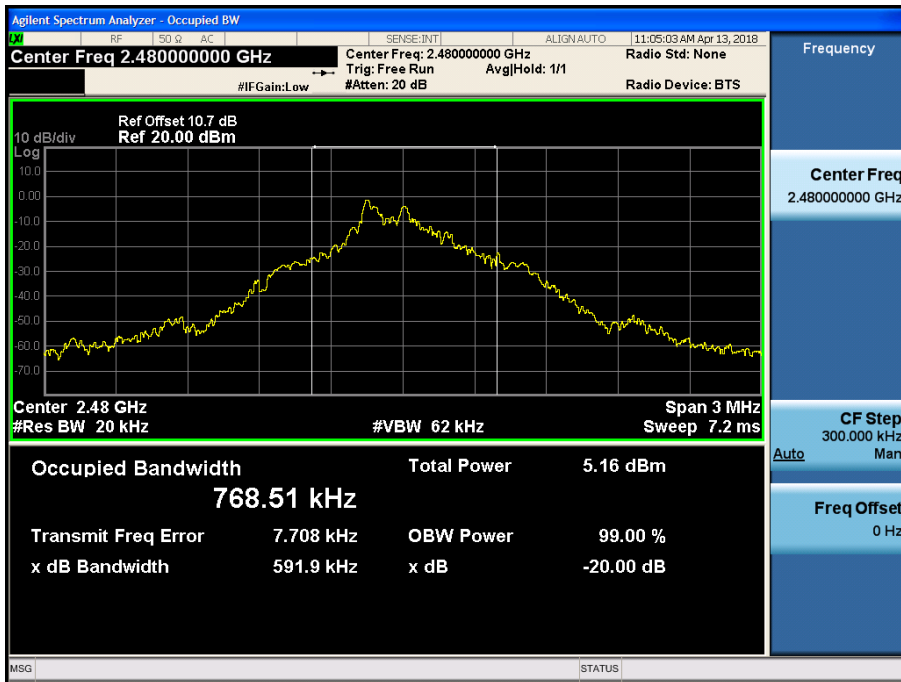
Occupied Bandwidth plot (Low)



Occupied Bandwidth plot (Mid)



Occupied Bandwidth plot (High)



9.3 RADIATED MEASUREMENT.

9.3.1 FUNDAMENTAL FIELD STRENGTH LEVEL MEASUREMENT

Test Requirements and limit, §15.249(a)(e)

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

The maximum permissible average field strength level is 50 mV/m (93.98 dBuV/m).

The maximum permissible peak field strength level is 500 mV/m (113.98 dBuV/m).

TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. Spectrum Setting
 - a. Peak: 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥3*RBW
8. Average value of pulsed emissions

Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission and pulsed operation is employed, the average measurement shall be determined from the peak field strength after correcting for the worst-case duty cycle as described in section 9.1.

■ TEST RESULTS

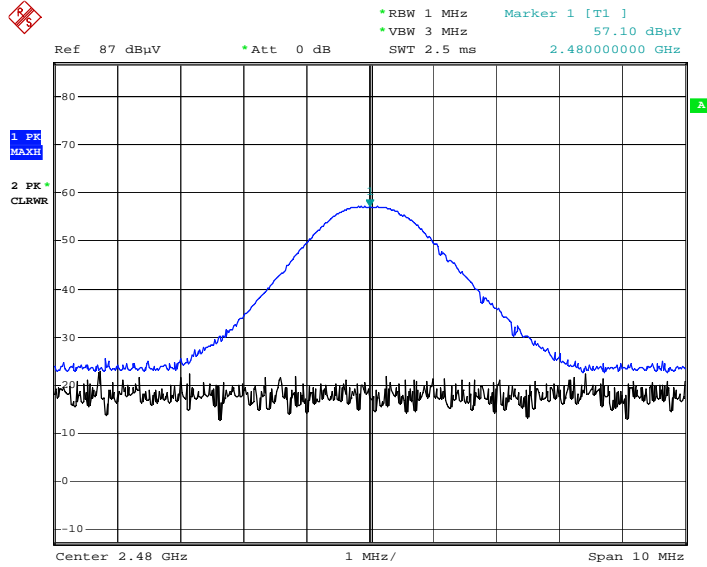
Frequency [MHz]	Reading [dBuV/m]	A.F.+C.L. +D.F. [dB]	Ant. Pol. [H/V]	D.C.C.F [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2402	50.16	33.33	V	0.00	83.49	113.98	30.49	PK
2402	50.16	33.33	V	-50.46	33.03	93.98	60.95	AV
2402	51.96	33.33	H	0.00	85.29	113.98	28.69	PK
2402	51.96	33.33	H	-50.46	34.83	93.98	59.15	AV
2441	52.89	33.40	V	0.00	86.29	113.98	27.69	PK
2441	52.89	33.40	V	-50.46	35.83	93.98	58.15	AV
2441	54.34	33.40	H	0.00	87.74	113.98	26.24	PK
2441	54.34	33.40	H	-50.46	37.28	93.98	56.70	AV
2480	55.98	33.40	V	0.00	89.38	113.98	24.60	PK
2480	55.98	33.40	V	-50.46	38.92	93.98	55.06	AV
2480	57.10	33.40	H	0.00	90.50	113.98	23.48	PK
2480	57.10	33.40	H	-50.46	40.04	93.98	53.94	AV

Note :

1. Average field strength data is determined by applying the duty cycle correction factor(DCCF) found in Section 9.1 to the measured peak field strength values.
2. Peak: Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor
Average: Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor
+ Duty Cycle Correction Factor
3. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. Measurement distance : 3.75 m

■ RESULT PLOTS (Worst case : Z-H)

Fundamental Field Strength plot (Ch.78)



Date: 6.APR.2018 10:10:26

Note : Only the worst case plots for Fundamental Field Strength

9.3.2 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.249(d)(e)

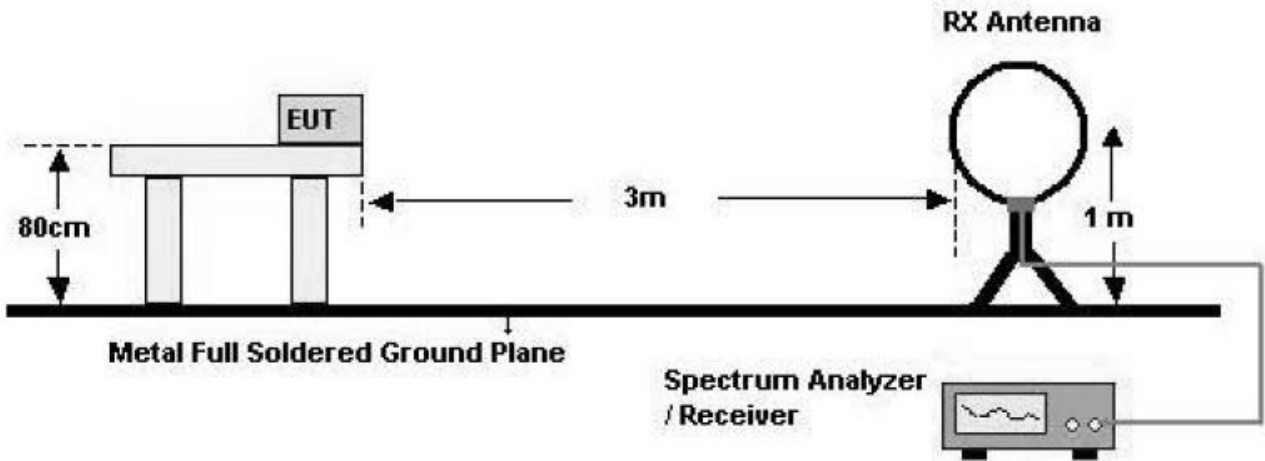
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

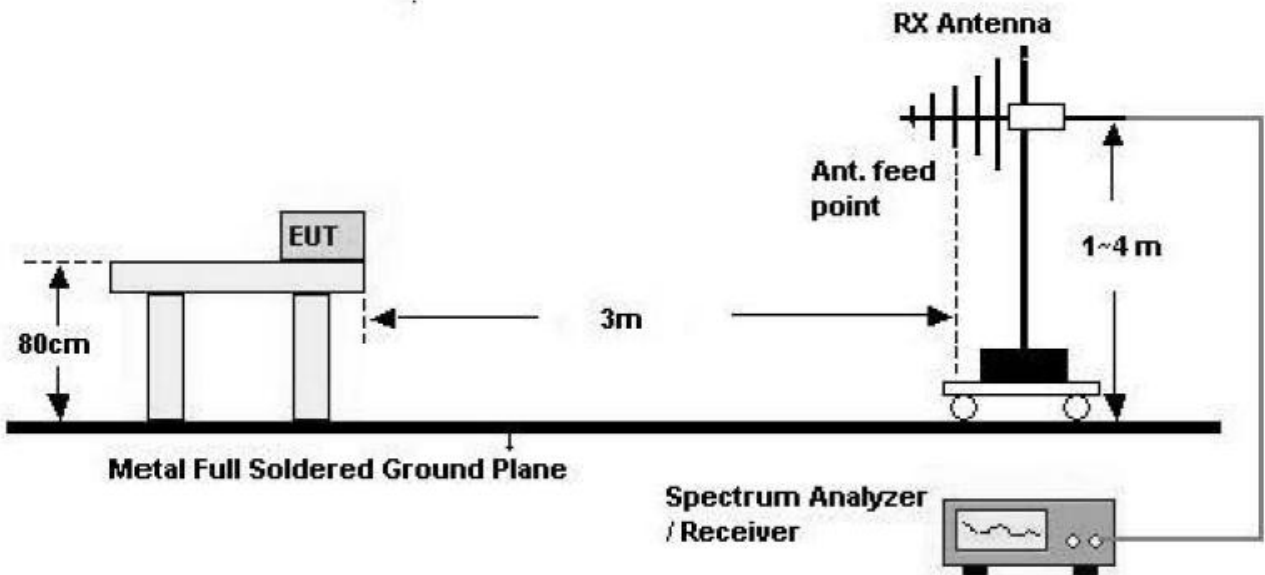
(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Test Configuration

Below 30 MHz



30 MHz - 1 GHz



- a) Perform an in-band field strength measurement of the fundamental emission using the RBW and detector function required for the frequency being measured. For example, for a device operating in the 902 MHz to 928 MHz band, use a 120 kHz RBW with a CISPR QP detector (a peak detector with 100 kHz RBW alternatively may be used). For transmitters operating above 1 GHz, use a 1 MHz RBW, a 3 MHz VBW, and a peak detector, as required. Repeat the measurement with an average detector (or alternatively, a peak detector and reduced VBW). For pulsed emissions, other factors shall be included; see 4.1.4.2.6.
- b) Choose an EMI receiver or spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the instrument RBW to 1% of the total span (but never less than 30 kHz), with a VBW equal to or greater than three times the RBW. Record the peak levels of the fundamental emission and the relevant band-edge emission(i.e., run several sweeps in peak hold mode). Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
- c) Subtract the delta measured in step b) from the field strengths measured in step a). The resulting field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band-edge emissions compliance, where required.

Note :

- 1. We used the standard radiated method for RSE and used the average value of pulsed emission and delta marker method for band edge.
- 2. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
- 3. Below VBW is for RSE test

ANT+ Mode	T _{on} (ms)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
	0.150	6667	10000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. This test is performed with hopping off.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. The test results for below 30 MHz is correlated to an open site.
The result on OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. This test is performed with hopping off.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Frequency: 2402 MHz

Frequency [MHz]	Reading [dBuV/m]	A.F.+C.L.-AMP G +D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	48.71	0.62	V	49.33	73.98	24.65	PK
4804	37.68	0.62	V	38.30	53.98	15.68	AV
7206	45.96	10.05	V	56.01	73.98	17.97	PK
7206	34.27	10.05	V	44.32	53.98	9.66	AV
4804	49.69	0.62	H	50.31	73.98	23.67	PK
4804	37.55	0.62	H	38.17	53.98	15.81	AV
7206	46.02	10.05	H	56.07	73.98	17.91	PK
7206	35.00	10.05	H	45.05	53.98	8.93	AV

※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP G: AMPLIFIER GAIN

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss – Amplifier Gain + Distance Factor
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Measurement distance : 3.75 m

Operation Frequency: 2441 MHz

Frequency [MHz]	Reading [dBuV/m]	A.F.+C.L.-AMP G +D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4882	49.76	1.61	V	51.37	73.98	22.61	PK
4882	37.90	1.61	V	39.51	53.98	14.47	AV
7323	45.71	10.02	V	55.73	73.98	18.25	PK
7323	34.71	10.02	V	44.73	53.98	9.25	AV
4882	49.51	1.61	H	51.12	73.98	22.86	PK
4882	37.88	1.61	H	39.49	53.98	14.49	AV
7323	45.56	10.02	H	55.58	73.98	18.40	PK
7323	34.85	10.02	H	44.87	53.98	9.11	AV

※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP G: AMPLIFIER GAIN

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss – Amplifier Gain + Distance Factor
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Measurement distance : 3.75 m

Operation Frequency: 2480 MHz

Frequency [MHz]	Reading [dBuV/m]	A.F.+C.L.-AMP G +D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	49.59	1.69	V	51.28	73.98	22.70	PK
4960	37.83	1.69	V	39.52	53.98	14.46	AV
7440	45.56	11.43	V	56.99	73.98	16.99	PK
7440	34.30	11.43	V	45.73	53.98	8.25	AV
4960	49.10	1.69	H	50.79	73.98	23.19	PK
4960	37.78	1.69	H	39.47	53.98	14.51	AV
7440	46.20	11.43	H	57.63	73.98	16.35	PK
7440	34.72	11.43	H	46.15	53.98	7.83	AV

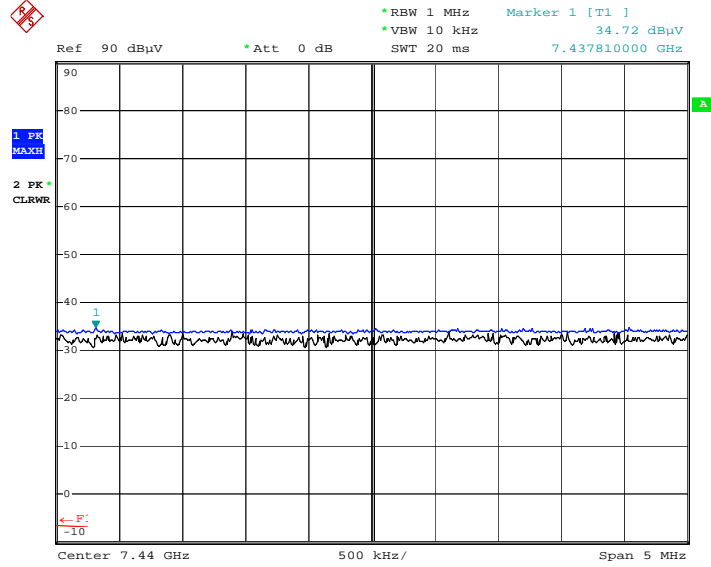
※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP G: AMPLIFIER GAIN

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss – Amplifier Gain + Distance Factor
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
7. Measurement distance : 3.75 m

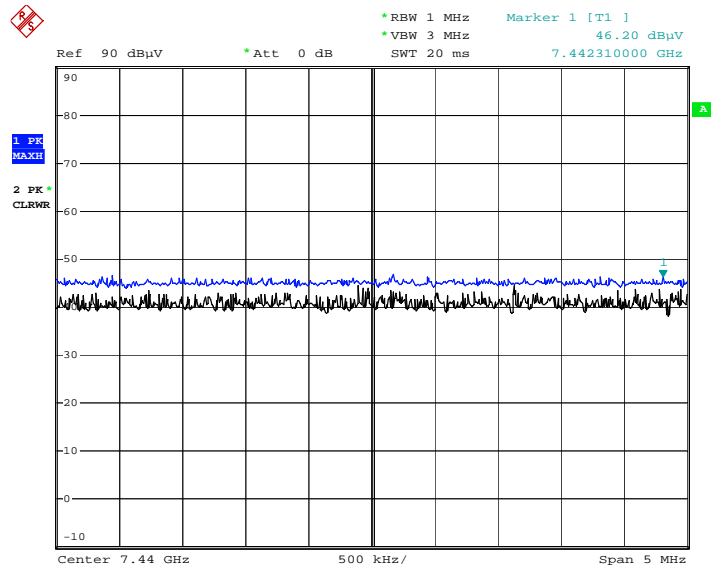
■ RESULT PLOTS (Worst case : Z-H)

Radiated Spurious Emissions plot – Average Reading (Ch.78 3rd Harmonic)



Date: 6.APR.2018 11:07:18

Radiated Spurious Emissions plot – Peak Reading (Ch.78 3rd Harmonic)



Date: 6.APR.2018 11:08:34

Note : Only the worst case plots for Radiated Spurious Emissions.

9.3.3 RADIATED BAND EDGES MEASUREMENTS

Test Requirements and limit, §15.205, §15.209, §15.249

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or tho the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Operation Mode	ANT+
Operating Frequency	2402 MHz

Frequency [MHz]	Reading [dBuV/m]	A.F.+CL +D.F [dB]	Ant. Pol. [H/V]	D.C.C.F [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2400.0	30.72	33.33	H	0	64.05	73.98	9.93	PK
2400.0	25.86	33.33	H	-50.46	8.73	53.98	45.25	AV
2400.0	29.82	33.33	V	0	63.15	73.98	10.83	PK
2400.0	25.14	33.33	V	-50.46	8.01	53.98	45.97	AV

※ A:F: ANTENNA FACTOR
C:L: CABLE LOSS

Notes:

1. Frequency range of measurement = 2310 MHz ~ 2400 MHz
2. Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor +D.C.C.F
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna
5. Measurement distance : 3.75 m

Operation Mode ANT+
 Operating Frequency 2480 MHz

Frequency [MHz]	Reading [dBuV/m]	A.F.+CL +D.F [dB]	Ant. Pol. [H/V]	D.C.C.F [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	25.36	33.41	H	0	58.77	73.98	15.21	PK
2483.5	16.36	33.41	H	-50.46	-0.69	53.98	54.67	AV
2483.5	25.80	33.41	V	0	59.21	73.98	14.77	PK
2483.5	15.28	33.41	V	-50.46	-1.77	53.98	55.75	AV

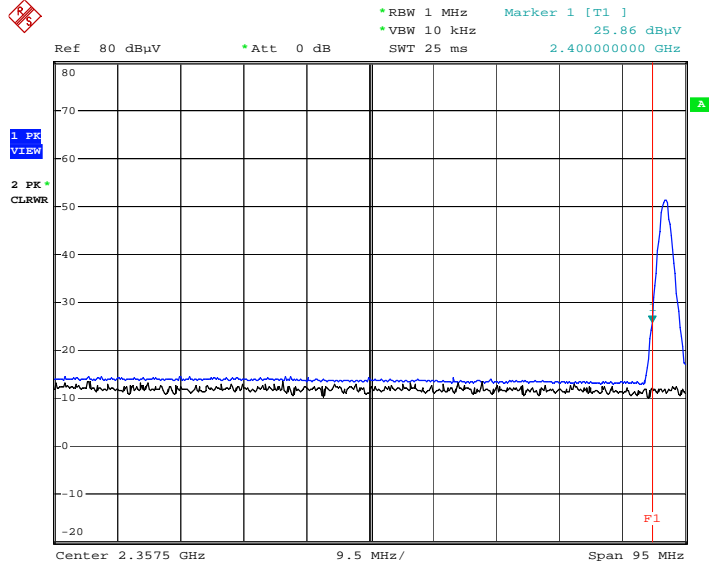
※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS

Notes:

1. Frequency range of measurement = 2483.5 MHz ~ 2500 MHz
2. Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor +D.C.C.F
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. Measurement distance : 3.75 m

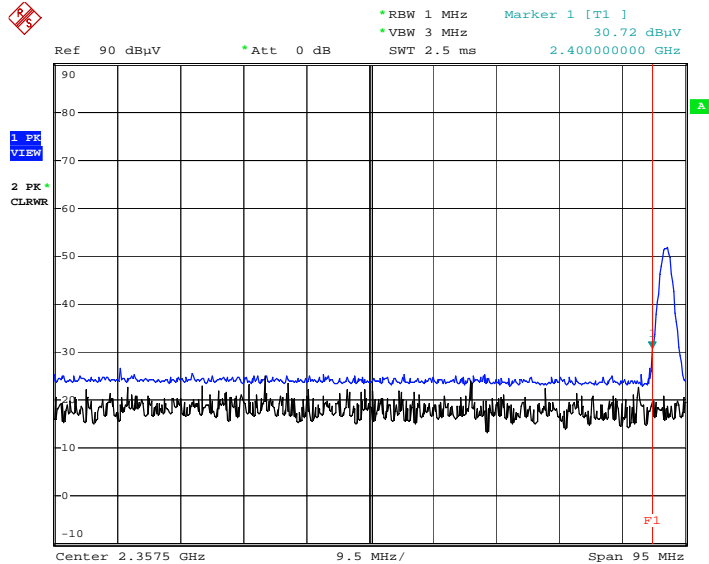
■ RESULT PLOTS (Worst case : Z-H)

Radiated Band Edges plot – Average Reading (Ch.0)



Date: 6.APR.2018 10:37:24

Radiated Band Edges plot – Peak Reading (Ch.0)



Date: 6.APR.2018 10:40:01

Note : We attached Only the worst case plots for Radiated Band Edges.

9.4 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

RESULT PLOTS_Normal Charging
Conducted Emissions (Line 1)

EMI Auto Test(20)

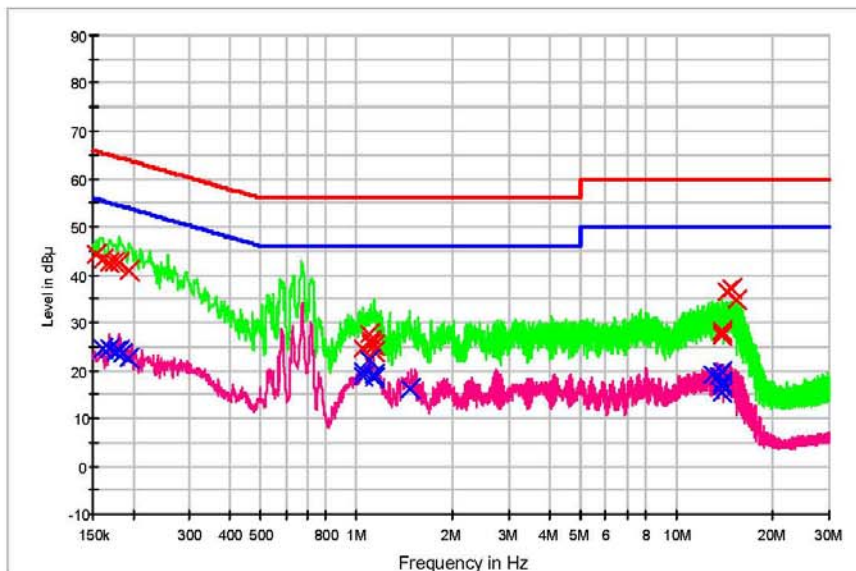
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8750
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: ANT+ MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-OPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	44.3	9.000	Off	N	9.7	21.4	65.8
0.160000	43.4	9.000	Off	N	9.7	22.1	65.5
0.168000	42.6	9.000	Off	N	9.7	22.5	65.1
0.174000	42.7	9.000	Off	N	9.7	22.1	64.8
0.180000	42.5	9.000	Off	N	9.7	22.0	64.5
0.194000	40.8	9.000	Off	N	9.7	23.1	63.9
1.046000	24.7	9.000	Off	N	9.8	31.3	56.0
1.094000	27.8	9.000	Off	N	9.8	28.2	56.0
1.102000	26.3	9.000	Off	N	9.8	29.7	56.0
1.110000	25.6	9.000	Off	N	9.8	30.4	56.0
1.134000	25.1	9.000	Off	N	9.8	30.9	56.0
1.140000	24.1	9.000	Off	N	9.8	31.9	56.0
13.894000	27.8	9.000	Off	N	10.4	32.2	60.0
13.918000	27.2	9.000	Off	N	10.4	32.8	60.0
13.930000	28.4	9.000	Off	N	10.4	31.6	60.0
14.362000	36.5	9.000	Off	N	10.4	23.5	60.0
14.944000	37.0	9.000	Off	N	10.5	23.0	60.0
15.384000	34.8	9.000	Off	N	10.5	25.2	60.0

EMI Auto Test(20)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.160000	24.5	9.000	Off	N	9.7	31.0	55.5
0.168000	24.5	9.000	Off	N	9.7	30.6	55.1
0.176000	24.0	9.000	Off	N	9.7	30.7	54.7
0.180000	24.1	9.000	Off	N	9.7	30.4	54.5
0.186000	23.4	9.000	Off	N	9.7	30.8	54.2
0.194000	22.5	9.000	Off	N	9.7	31.4	53.9
1.040000	19.7	9.000	Off	N	9.8	26.3	46.0
1.046000	19.0	9.000	Off	N	9.8	27.0	46.0
1.092000	22.3	9.000	Off	N	9.8	23.7	46.0
1.134000	19.1	9.000	Off	N	9.8	26.9	46.0
1.140000	18.4	9.000	Off	N	9.8	27.6	46.0
1.472000	16.1	9.000	Off	N	9.8	29.9	46.0
12.864000	19.2	9.000	Off	N	10.4	30.8	50.0
13.464000	19.0	9.000	Off	N	10.4	31.0	50.0
13.894000	17.4	9.000	Off	N	10.4	32.6	50.0
13.918000	15.4	9.000	Off	N	10.4	34.6	50.0
13.930000	19.9	9.000	Off	N	10.4	30.1	50.0
13.944000	16.9	9.000	Off	N	10.4	33.1	50.0

2018-04-04

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Conducted Emissions (Line 2)

EMI Auto Test(20)

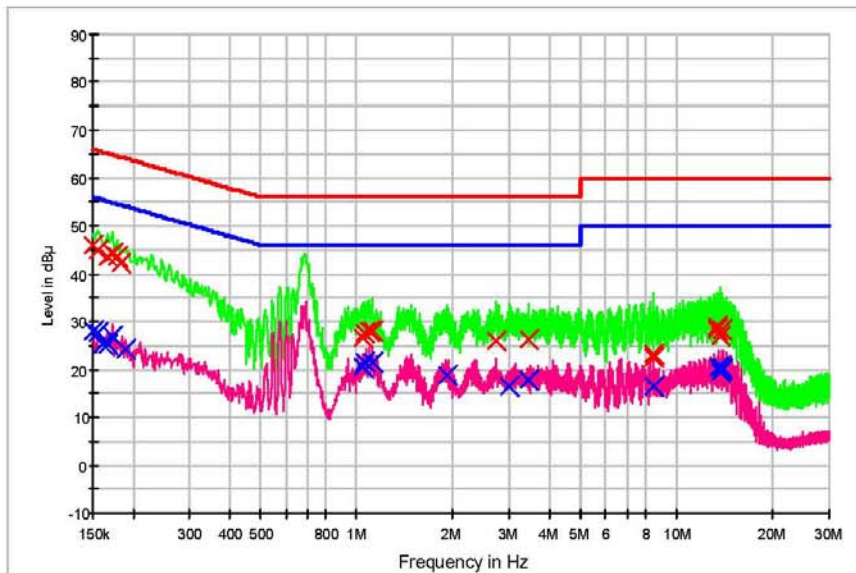
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8750
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: ANT+ MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP
 — FCC CLASS B_AV
 — Preview Result 1-PK+
— Preview Result 2-AVG
 X Final Result 1-QPK
 X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.8	9.000	Off	L1	9.7	20.2	66.0
0.156000	44.8	9.000	Off	L1	9.7	20.9	65.7
0.166000	43.7	9.000	Off	L1	9.7	21.5	65.2
0.172000	44.1	9.000	Off	L1	9.7	20.8	64.9
0.178000	43.6	9.000	Off	L1	9.7	20.9	64.6
0.182000	42.1	9.000	Off	L1	9.7	22.3	64.4
1.044000	26.6	9.000	Off	L1	9.8	29.4	56.0
1.054000	27.7	9.000	Off	L1	9.8	28.3	56.0
1.090000	28.0	9.000	Off	L1	9.8	28.0	56.0
1.122000	28.1	9.000	Off	L1	9.8	27.9	56.0
2.724000	26.1	9.000	Off	L1	9.9	29.9	56.0
3.436000	26.3	9.000	Off	L1	9.9	29.7	56.0
8.488000	23.3	9.000	Off	L1	10.1	36.7	60.0
8.502000	22.6	9.000	Off	L1	10.1	37.4	60.0
13.448000	28.9	9.000	Off	L1	10.2	31.1	60.0
13.452000	28.2	9.000	Off	L1	10.2	31.8	60.0
13.740000	26.9	9.000	Off	L1	10.2	33.1	60.0
13.830000	28.4	9.000	Off	L1	10.2	31.6	60.0

2018-04-04

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EMI Auto Test(20)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	27.8	9.000	Off	L1	9.7	28.2	56.0
0.156000	27.5	9.000	Off	L1	9.7	28.2	55.7
0.160000	25.3	9.000	Off	L1	9.7	30.2	55.5
0.166000	25.2	9.000	Off	L1	9.7	30.0	55.2
0.172000	26.8	9.000	Off	L1	9.7	28.1	54.9
0.190000	24.1	9.000	Off	L1	9.7	30.0	54.0
1.044000	20.4	9.000	Off	L1	9.8	25.6	46.0
1.054000	21.6	9.000	Off	L1	9.8	24.4	46.0
1.122000	21.4	9.000	Off	L1	9.8	24.6	46.0
1.922000	18.8	9.000	Off	L1	9.8	27.2	46.0
2.990000	16.5	9.000	Off	L1	9.9	29.5	46.0
3.436000	17.7	9.000	Off	L1	9.9	28.3	46.0
8.488000	16.4	9.000	Off	L1	10.1	33.6	50.0
13.504000	20.4	9.000	Off	L1	10.2	29.6	50.0
13.740000	19.4	9.000	Off	L1	10.2	30.6	50.0
13.830000	19.9	9.000	Off	L1	10.2	30.1	50.0
13.874000	20.2	9.000	Off	L1	10.2	29.8	50.0
13.942000	20.5	9.000	Off	L1	10.2	29.5	50.0

2018-04-04

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RESULT PLOTS_Fast Charging
Conducted Emissions (Line 1)

EMI Auto Test(21)

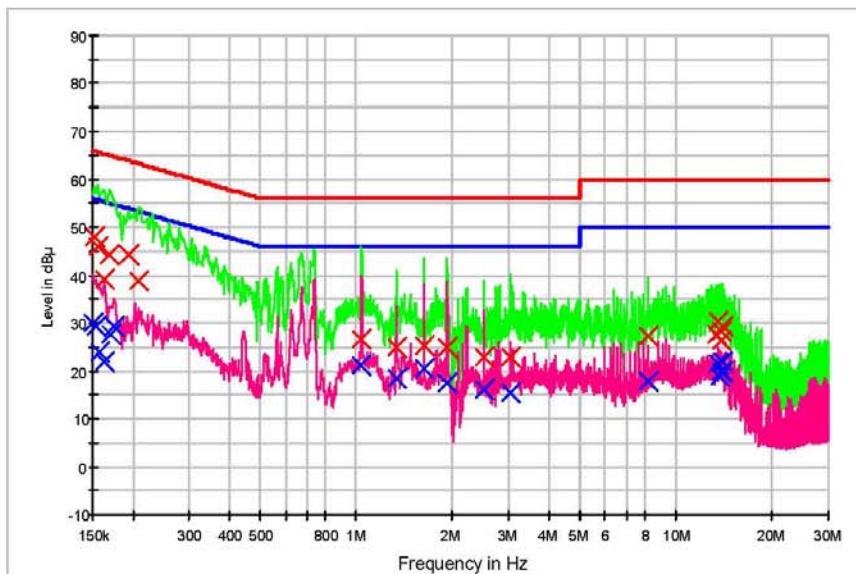
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8750
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: ANT+ MODE (FAST CHARGING)

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG x Final Result 1-QPK x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	48.0	9.000	Off	N	9.7	17.9	65.9
0.156000	45.9	9.000	Off	N	9.7	19.8	65.7
0.162000	39.2	9.000	Off	N	9.7	26.2	65.4
0.168000	44.1	9.000	Off	N	9.7	20.9	65.1
0.194000	44.4	9.000	Off	N	9.7	19.5	63.9
0.208000	38.8	9.000	Off	N	9.7	24.4	63.3
1.038000	26.7	9.000	Off	N	9.8	29.3	56.0
1.336000	24.8	9.000	Off	N	9.8	31.2	56.0
1.632000	25.3	9.000	Off	N	9.8	30.7	56.0
1.928000	25.1	9.000	Off	N	9.8	30.9	56.0
2.518000	22.7	9.000	Off	N	9.9	33.3	56.0
3.022000	22.7	9.000	Off	N	9.9	33.3	56.0
8.196000	27.2	9.000	Off	N	10.2	32.8	60.0
13.404000	27.7	9.000	Off	N	10.4	32.3	60.0
13.508000	30.4	9.000	Off	N	10.4	29.6	60.0
13.934000	28.3	9.000	Off	N	10.4	31.7	60.0
13.938000	26.4	9.000	Off	N	10.4	33.6	60.0
14.038000	29.5	9.000	Off	N	10.4	30.5	60.0

EMI Auto Test(21)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.1	9.000	Off	N	9.7	25.9	56.0
0.154000	29.4	9.000	Off	N	9.7	26.4	55.8
0.158000	23.7	9.000	Off	N	9.7	31.8	55.6
0.162000	21.9	9.000	Off	N	9.7	33.5	55.4
0.170000	27.6	9.000	Off	N	9.7	27.3	55.0
0.174000	29.3	9.000	Off	N	9.7	25.4	54.8
1.038000	21.0	9.000	Off	N	9.8	25.0	46.0
1.334000	18.5	9.000	Off	N	9.8	27.5	46.0
1.632000	20.4	9.000	Off	N	9.8	25.6	46.0
1.928000	17.5	9.000	Off	N	9.8	28.5	46.0
2.518000	16.1	9.000	Off	N	9.9	29.9	46.0
3.022000	15.4	9.000	Off	N	9.9	30.6	46.0
8.194000	17.9	9.000	Off	N	10.2	32.1	50.0
13.508000	21.7	9.000	Off	N	10.4	28.3	50.0
13.732000	19.0	9.000	Off	N	10.4	31.0	50.0
13.934000	19.8	9.000	Off	N	10.4	30.2	50.0
14.030000	19.7	9.000	Off	N	10.4	30.3	50.0
14.038000	21.9	9.000	Off	N	10.4	28.1	50.0

2018-04-13

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Conducted Emissions (Line 2)

EMI Auto Test(21)

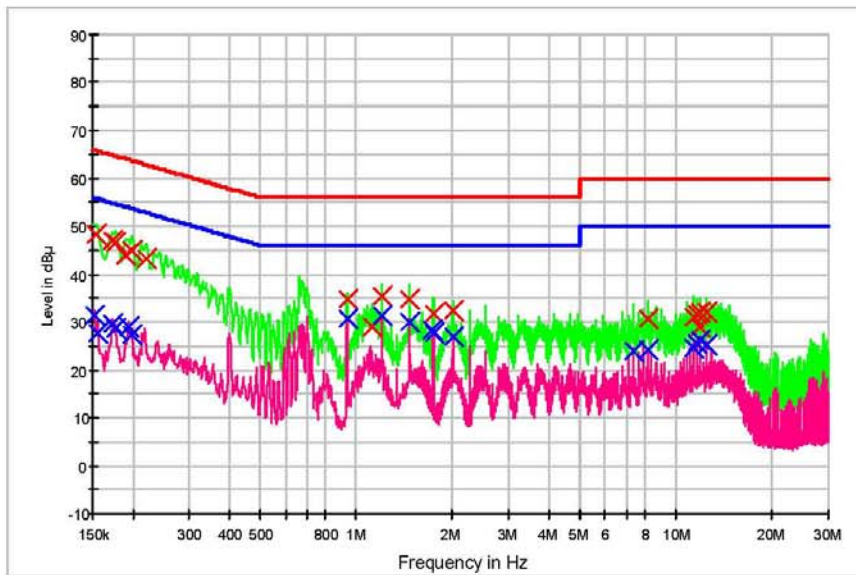
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8750
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: ANT+ MODE (FAST CHARGING)

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG x Final Result 1-QPK x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	48.5	9.000	Off	L1	9.7	17.3	65.8
0.172000	47.1	9.000	Off	L1	9.7	17.7	64.9
0.176000	46.6	9.000	Off	L1	9.7	18.1	64.7
0.190000	44.1	9.000	Off	L1	9.7	20.0	64.0
0.198000	44.9	9.000	Off	L1	9.7	18.8	63.7
0.220000	43.1	9.000	Off	L1	9.7	19.7	62.8
0.936000	34.7	9.000	Off	L1	9.8	21.3	56.0
1.126000	29.1	9.000	Off	L1	9.8	26.9	56.0
1.204000	35.3	9.000	Off	L1	9.8	20.7	56.0
1.472000	34.7	9.000	Off	L1	9.8	21.3	56.0
1.740000	31.9	9.000	Off	L1	9.8	24.1	56.0
2.006000	32.3	9.000	Off	L1	9.8	23.7	56.0
8.152000	30.7	9.000	Off	L1	10.1	29.3	60.0
11.360000	31.0	9.000	Off	L1	10.2	29.0	60.0
11.630000	31.8	9.000	Off	L1	10.2	28.2	60.0
11.896000	32.0	9.000	Off	L1	10.2	28.0	60.0
11.900000	28.9	9.000	Off	L1	10.2	31.1	60.0
12.432000	31.9	9.000	Off	L1	10.2	28.1	60.0

2018-04-13

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EMI Auto Test(21)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	31.4	9.000	Off	L1	9.7	24.5	55.9
0.156000	27.6	9.000	Off	L1	9.7	28.1	55.7
0.172000	29.8	9.000	Off	L1	9.7	25.1	54.9
0.176000	28.6	9.000	Off	L1	9.7	26.0	54.7
0.194000	29.0	9.000	Off	L1	9.7	24.9	53.9
0.198000	27.4	9.000	Off	L1	9.7	26.3	53.7
0.936000	30.8	9.000	Off	L1	9.8	15.2	46.0
1.204000	31.2	9.000	Off	L1	9.8	14.8	46.0
1.472000	30.1	9.000	Off	L1	9.8	15.9	46.0
1.736000	28.3	9.000	Off	L1	9.8	17.7	46.0
1.740000	27.6	9.000	Off	L1	9.8	18.4	46.0
2.006000	26.9	9.000	Off	L1	9.8	19.1	46.0
7.352000	23.7	9.000	Off	L1	10.1	26.3	50.0
8.154000	24.1	9.000	Off	L1	10.1	25.9	50.0
11.360000	24.6	9.000	Off	L1	10.2	25.4	50.0
11.630000	25.7	9.000	Off	L1	10.2	24.3	50.0
11.896000	26.1	9.000	Off	L1	10.2	23.9	50.0
12.432000	25.3	9.000	Off	L1	10.2	24.7	50.0

2018-04-13

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10.LIST OF TEST EQUIPMENT

10.1 LIST OF TEST EQUIPMENT (Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2017	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/30/2018	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/13/2017	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Agilent	87300B / Directional Coupler	11/20/2017	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/12/2017	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/30/2017	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2017	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A

10.2 LIST OF TEST EQUIPMENT (Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640 /800-XP-ET / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	04/06/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/12/2017	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/15/2017	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/30/2017	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2018	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/12/2017	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/19/2017	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/11/2017	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/11/2017	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/30/2017	Annual	25956