FCC REPORT

FCC Certification

Applicant Name:
Information System Technology LLC

Address:
46559 Fremont Blvd, Fremont, CA 94538, U.S.A.

Date of Issue:
March 29, 2019

Test Site/Location:
EMCE Engineering
1726 Ringwood Avenue San Jose, California USA

Report No.: EMCE-R-1903-F001-3

FCC ID:	**2ASFN80-100-000002**
APPLICANT:	**Information System Technology LLC**

Model:	WSDU
EUT Type:	Wearable Scan and Display Unit
Max. Transmit Power:	92.1 dBuV/m
Frequency Range:	915 MHz
Modulation type	GFSK
FCC Classification:	FCC Part 15 Low Power Communication Device Transmitter
FCC Rule Part(s):	Part 15 subpart C 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.

Steve.In
Test Engineer
Certification Division

Billy Kim
Technical Manager
Certification Division

Version

TEST REPORT NO.	DATE	DESCRIPTION
EMCE-R-1903-F001	March 07, 2019	- First Approval Report
EMCE-R-1903-F001-1	March 18, 2019	- Added the Below 30 MHz test plot
EMCE-R-1903-F001-2	March 27, 2019	- Added the correlation of measurements below 30MHz to an Open Field Site
EMCE-R-1903-F001-3	March 29, 2019	-Revised the Above 1 GHz RSE result.

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1. GENERAL INFORMATION

Applicant:	Information System Technology LLC
Address:	46559 Fremont Blvd, Fremont, CA 94538, U.S.A.
FCC ID:	2ASFN80-100-000002
EUT Type:	Wearable Scan and Display Unit
Model:	WSDU
Date(s) of Tests:	February 04, 2019 ~ February 26, 2019
Place of Tests:	EMCE Engineering 1726 Ringwood Avenue San Jose, California USA

2. EUT DESCRIPTION

Model	WSDU
EUT Type	Wearable Scan and Display Unit
Power Supply	Battery 3.7 V
Frequency Range	915 MHz
Max. RF Output Power:	92.1 dBuV/m
Modulation Type	GFSK
Number of Channels	1 Channels
Antenna Specification	Antenna type: Chip Antenna Peak Gain : -1.0 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) is used in the measurement of the test device.

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.

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). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector with a reduced VBW setting(RBW = 1 MHz, VBW = 1/T Hz, where T = Pulse width).

Conducted Antenna Terminal

See Section from 7.8.2 to 7.8.8.(ANSI 63.10-2013)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

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 equipments, which is traceable to recognized national standards.
Espectially, 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 1726 Ringwood Avenue, San Jose, CA 95131, USA
The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

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 (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.68
Radiated Disturbance (9 kHz ~ 30 MHz)	3.20
Radiated Disturbance (30 MHz ~ 1 GHz)	4.73
Radiated Disturbance (1 GHz ~ 18 GHz)	5.21
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Condition	Test Result
20 dB Bandwidth	47 CFR Part 15, Subpart C 15.249	CONDUCTED	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15, Subpart C 15.249(a)	RADIATED	PASS
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249		PASS
Radiated Emissions	47 CFR Part 15, Subpart C 15.249		PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C 15.207		PASS

9. TEST RESULT

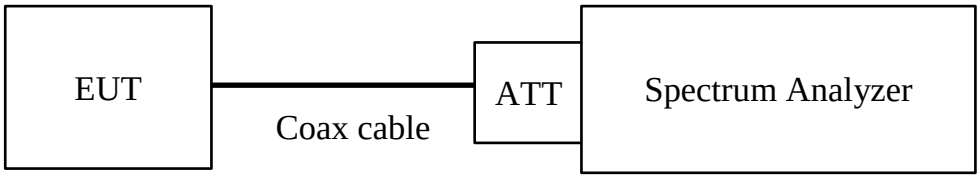
9.1 20 dB Bandwidth

Test Requirements and limit, §15.249

The bandwidth at 20dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies**.**

Limit : N/A

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

RBW = auto

VBW ≥ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

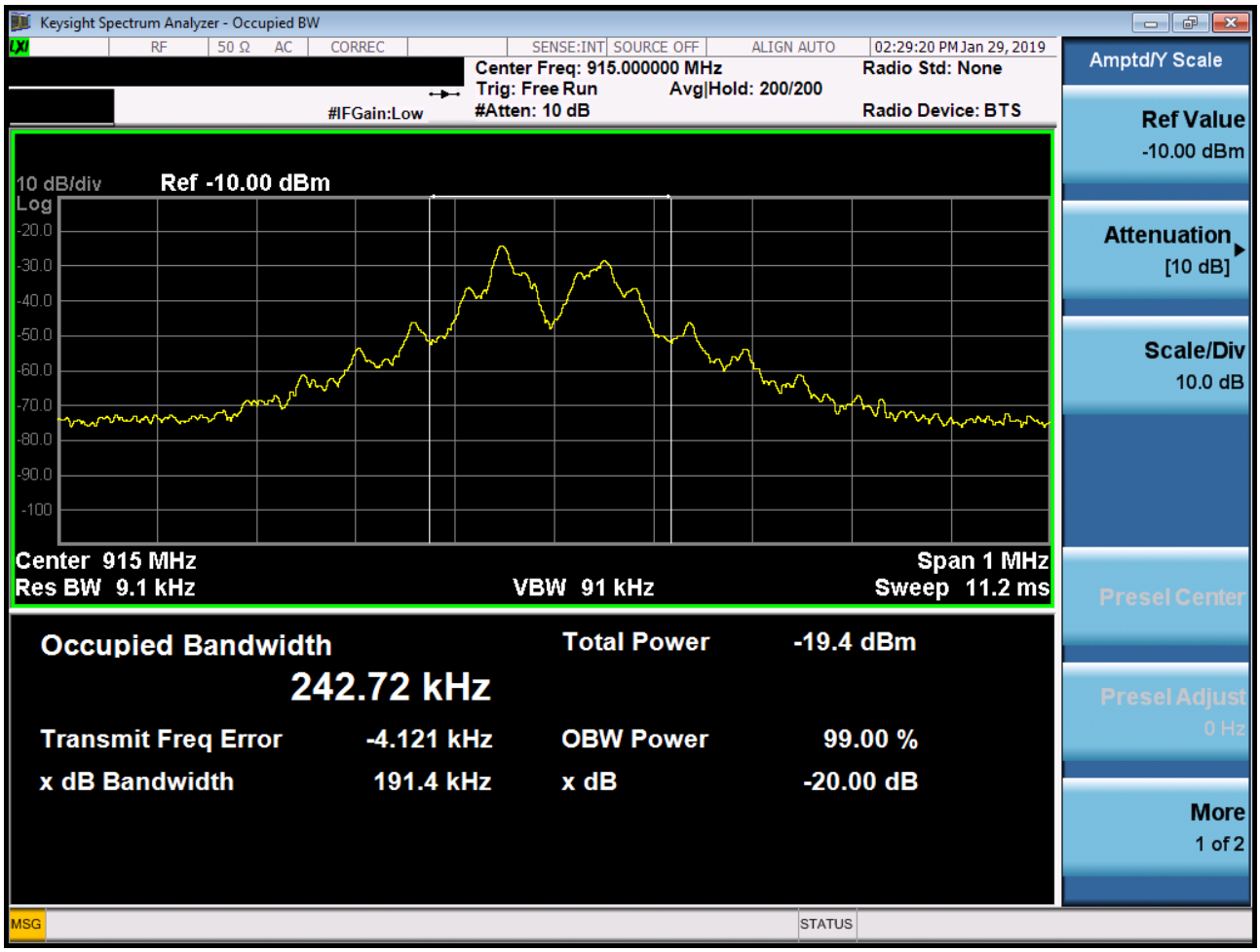
Allow the trace to stabilize

Note : We tested 20 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 20 dB.

Result

20 dB Bandwidth (kHz)	
Frequncy	**GFSK**
915 MHz	191.4

PLOT

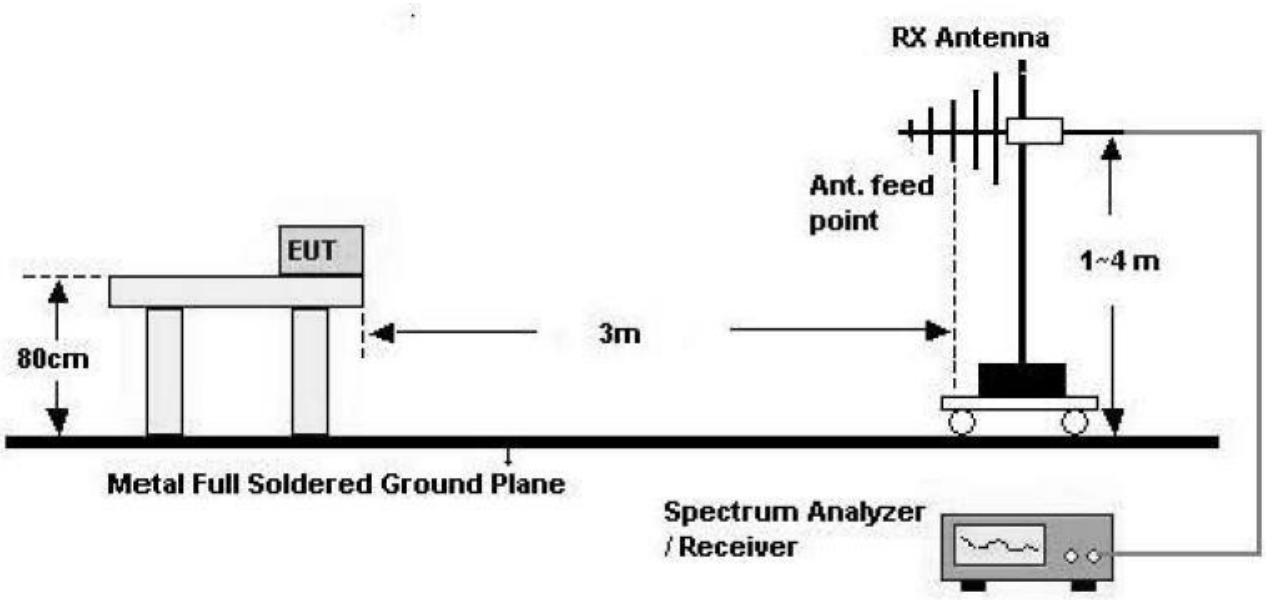


9.2 Field Strength of the Fundamental Signal

Test Requirements and limit, §15.249

Frequency	Limit (dBuV/m @3m)	Remark
902MHz-928MHz	94.0	Quasi-peak Value

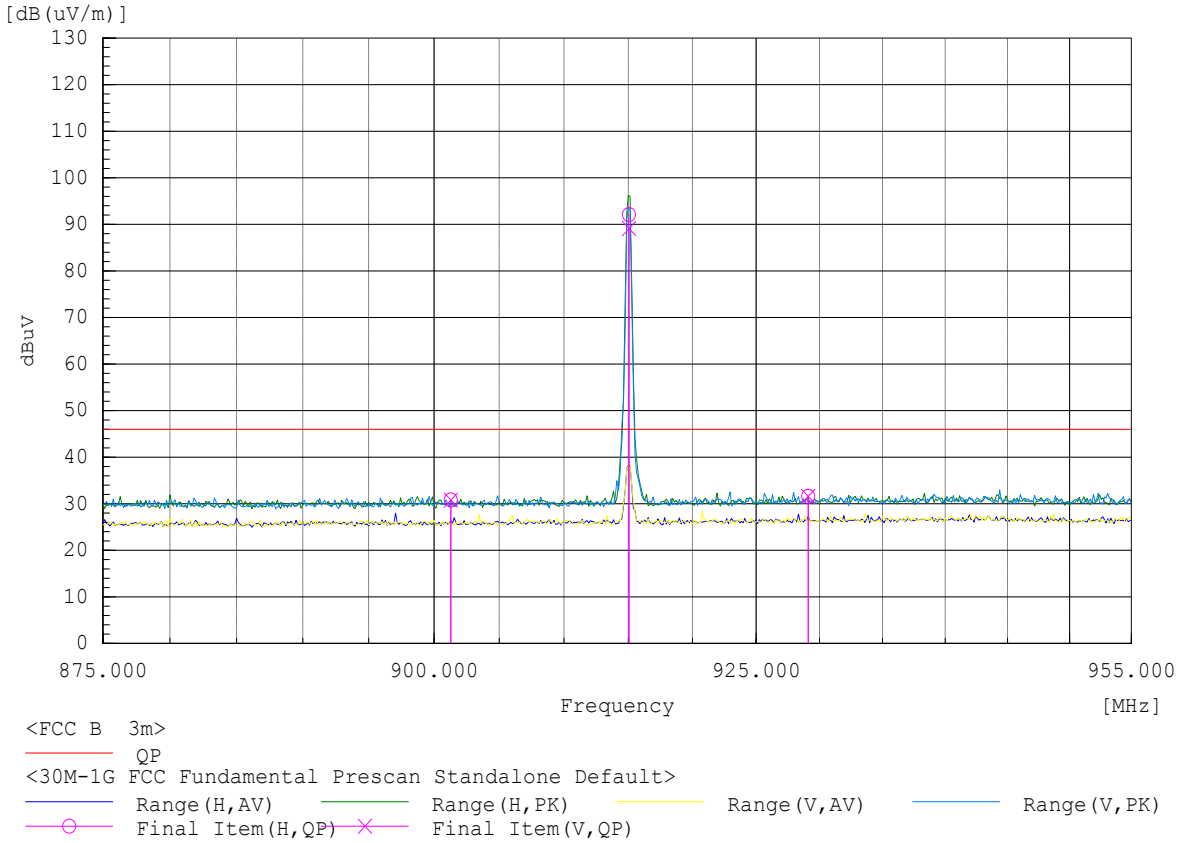
▣ TEST CONFIGURATION



Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Quasi-peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize

PLOT



Result

Frequency [MHz]	Reading [dBuV]	※A.F.+C.L.-A.G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
915	95.4	-3.3	H	92.1	94	1.9	QP
915	92.4	-3.3	V	89.1	94	4.9	QP

9.3 Duty cycle correction factor

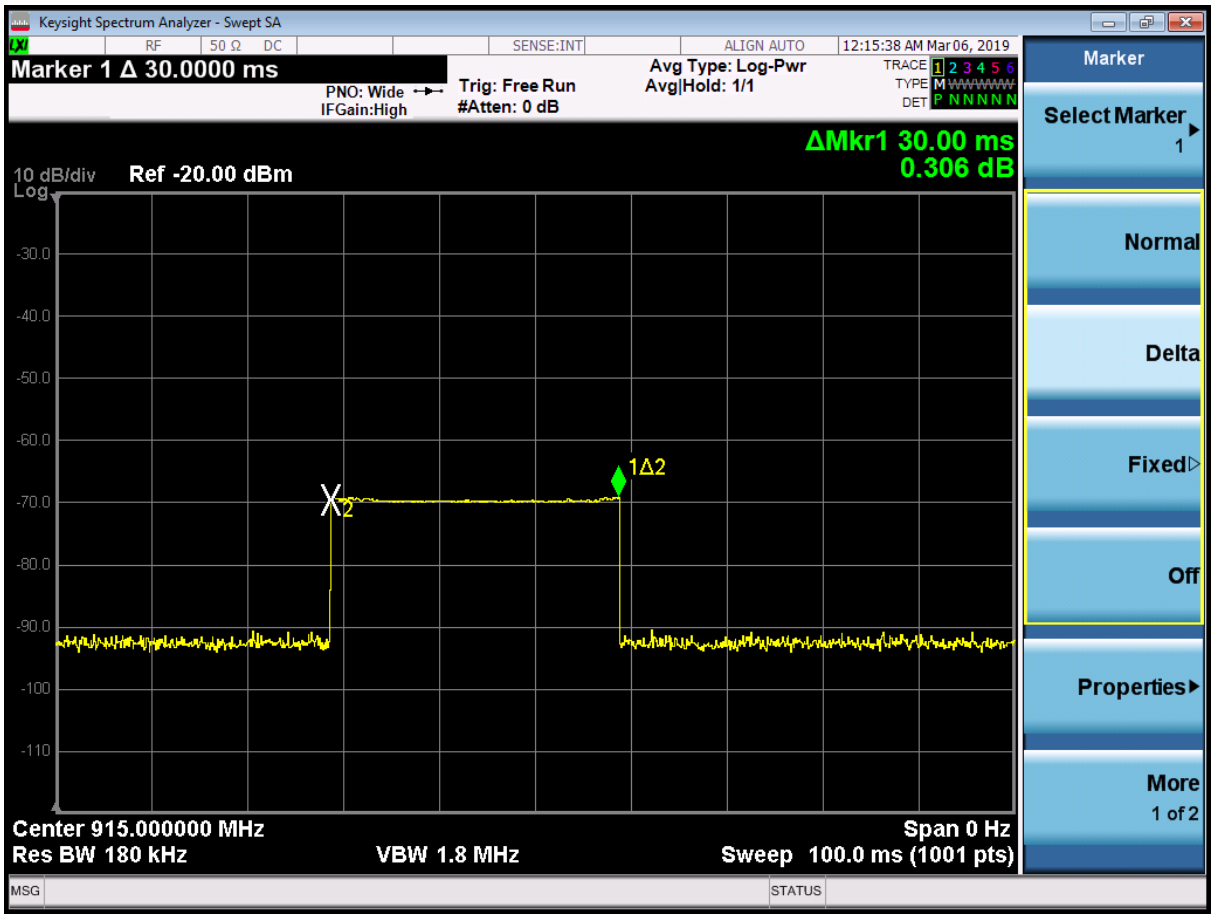
Test Requirements and limit, §15.35

For frequency hopping or pulsed systems where the dwell time per channel or transmitter on-time is less than 100 mS, the field strength can be determined by averaging over one complete pulse train, including blanking intervals.

The correction factor can be calculated by using the following formula:

$$C_F(dB) = 20\log\left(\frac{dwell\ time}{100mS}\right)$$

As an alternative, if the dwell time or pulse duration exceeds 100 mS, 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.



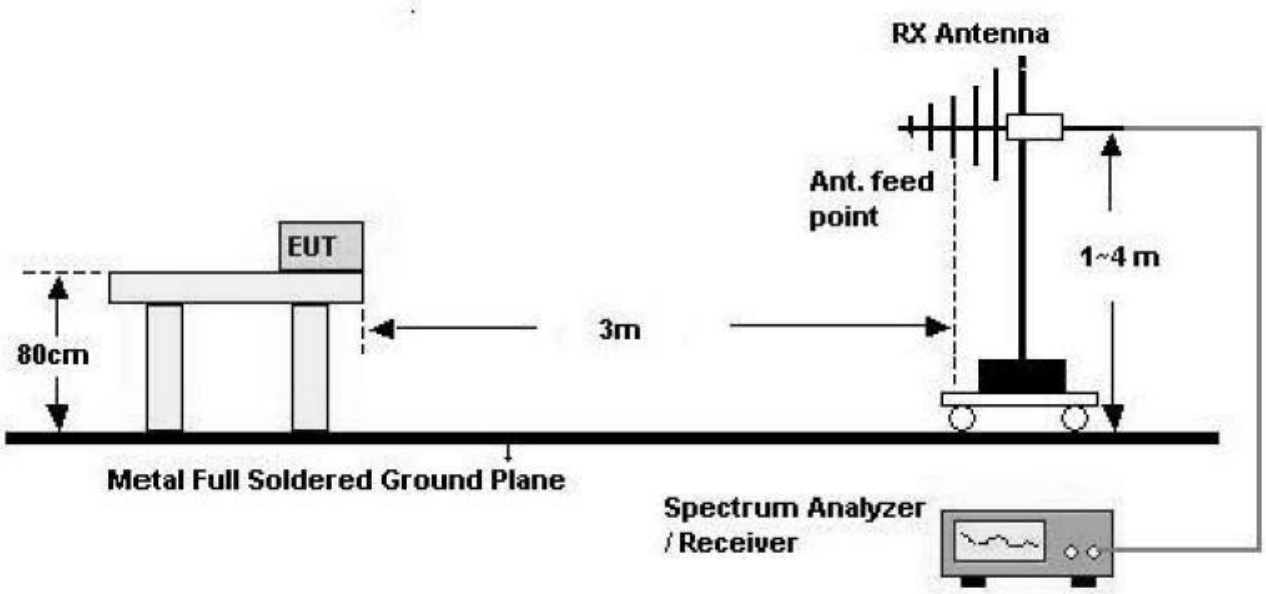
dwell time = 30ms, idle time (don't transmit) =70ms, Cf = 20log(0.3/100) = -10.5db,

9.4 Restricted Band Around Fundamental Frequency

Test Requirements and limit, §15.249

Emission 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 Section 15.249,whichever is the lesser attenuation.

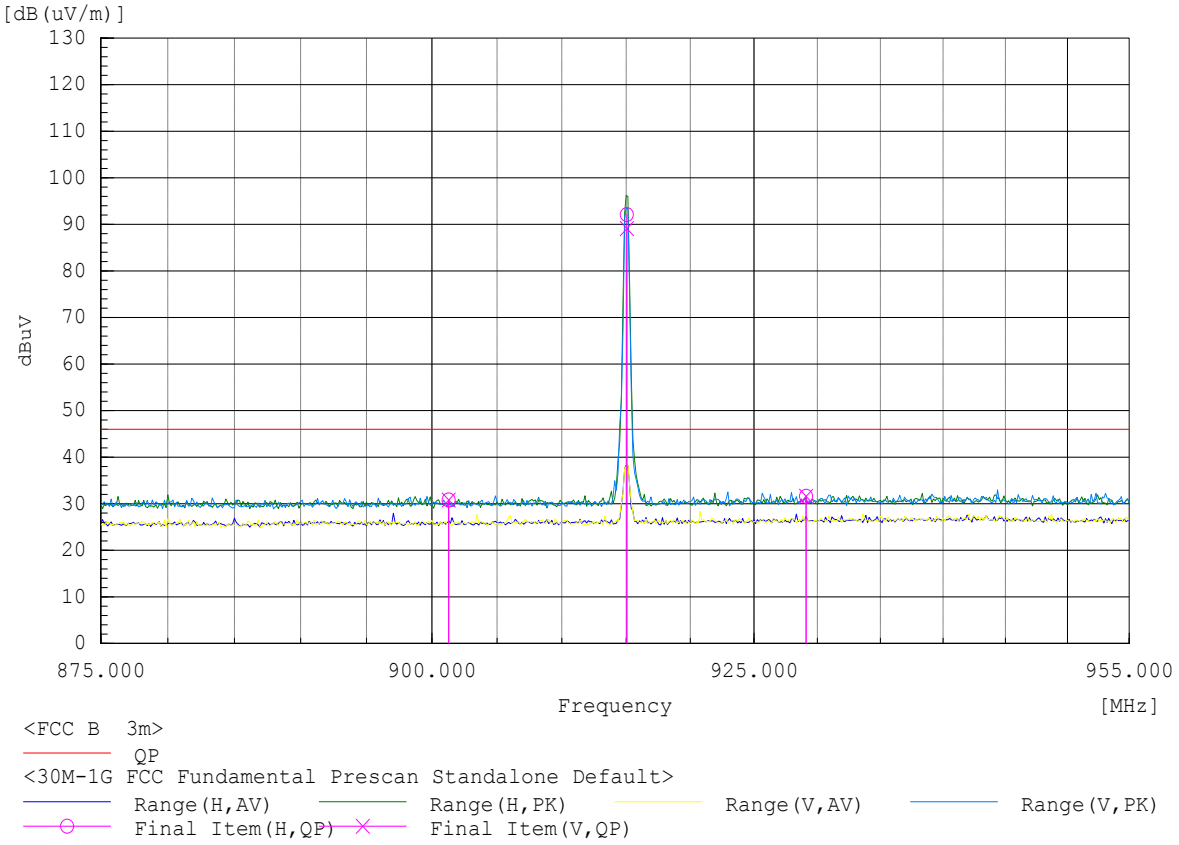
▣ TEST CONFIGURATION



Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 100 MHz
4. No. of sweep points > 2 x span / RBW
5. Detector = Quasi-peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Middle

PLOT



RESULT

Frequency [MHz]	Reading [dBuV]	※A.F.+C.L.-A.G.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBc]	Margin [dB]	Measurement Type
915	95.4	-3.3	H	92.1	-	-	QP
915	92.4	-3.3	V	89.1	-	-	QP
902	34.3	-3.5	V	30.8	50	8.3	QP
902	34.3	-3.5	H	30.8	50	11.3	QP
928	34.5	-2.9	H	31.6	50	10.5	QP
928	34.5	-2.9	V	31.6	50	7.5	QP

9.5 RADIATED SPURIOUS EMISSIONS

LIMIT : §15.249

20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.209(a), then the 15.249(a) limit in the table below has to be followed.

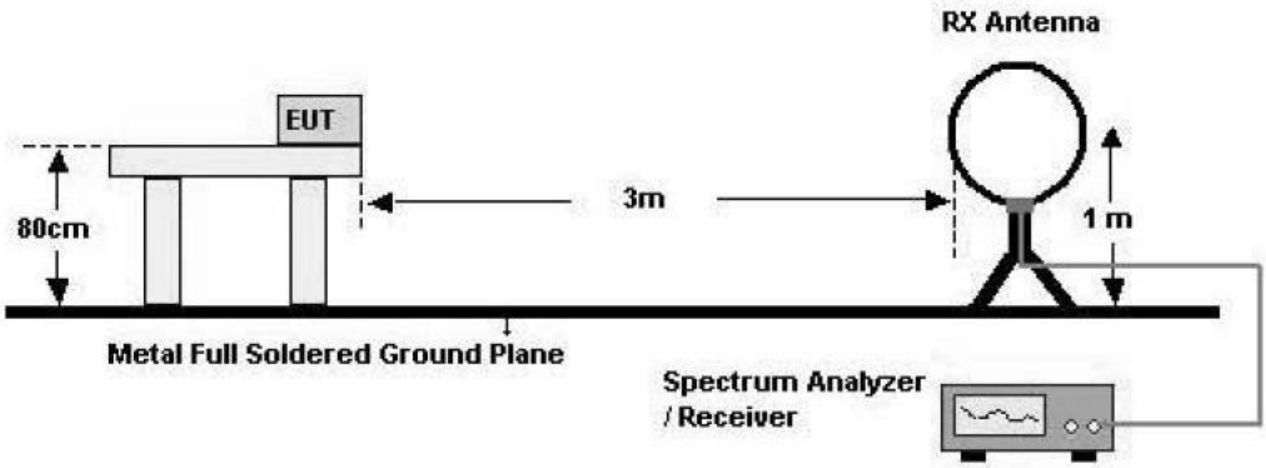
Frequency (MHz)	Field Strength Limit (uV/m)	Measurement Distance (m)	Field Strength Limit (dBuV/m)
0.009 – 0.490	2400/F(kHz)	300	(48.5 ~ 13.8) + 80
0.490 – 1.705	24000/F(kHz)	30	(33.8 ~ 23.0) + 40
1.705 – 30	30	30	69.5
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
Above 960	500	3	54

Note.

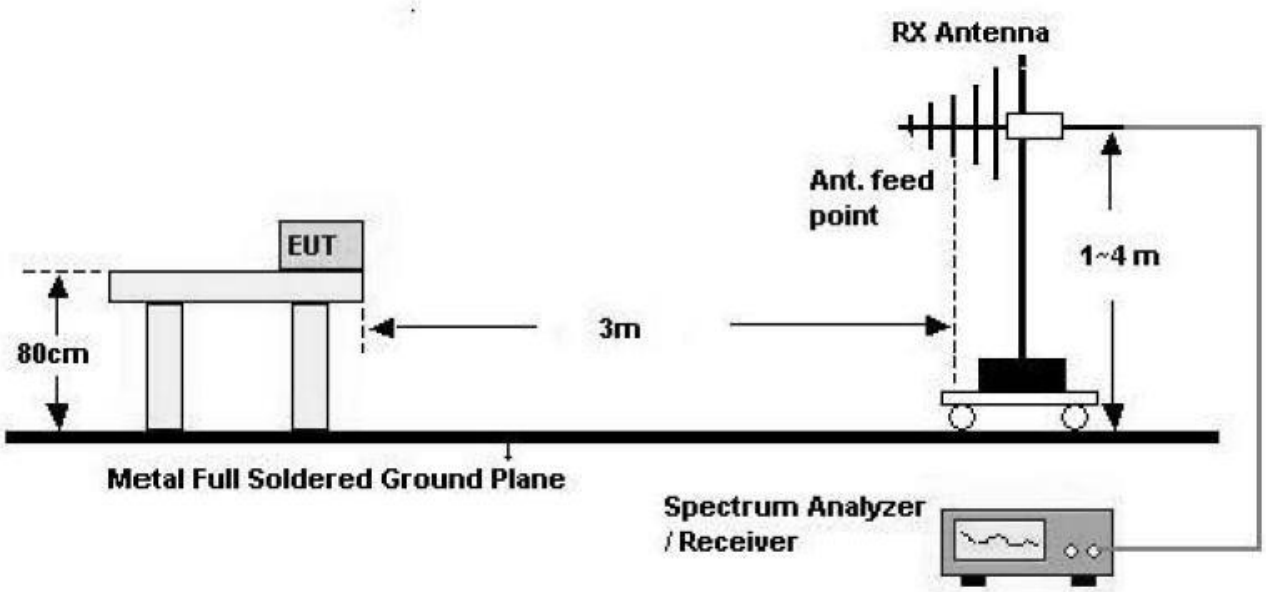
1. 0.009 ~ 30 MHz measurement distance is 3 meter.
2. 0.009 ~ 30 MHz Limit line = specific Limits (dBuV) + Distance extrapolation factor
3. Used comversion factor : Limit (uV/m) = 20 log(Limit (uV/m)/1 uV/m)

Test Configuration

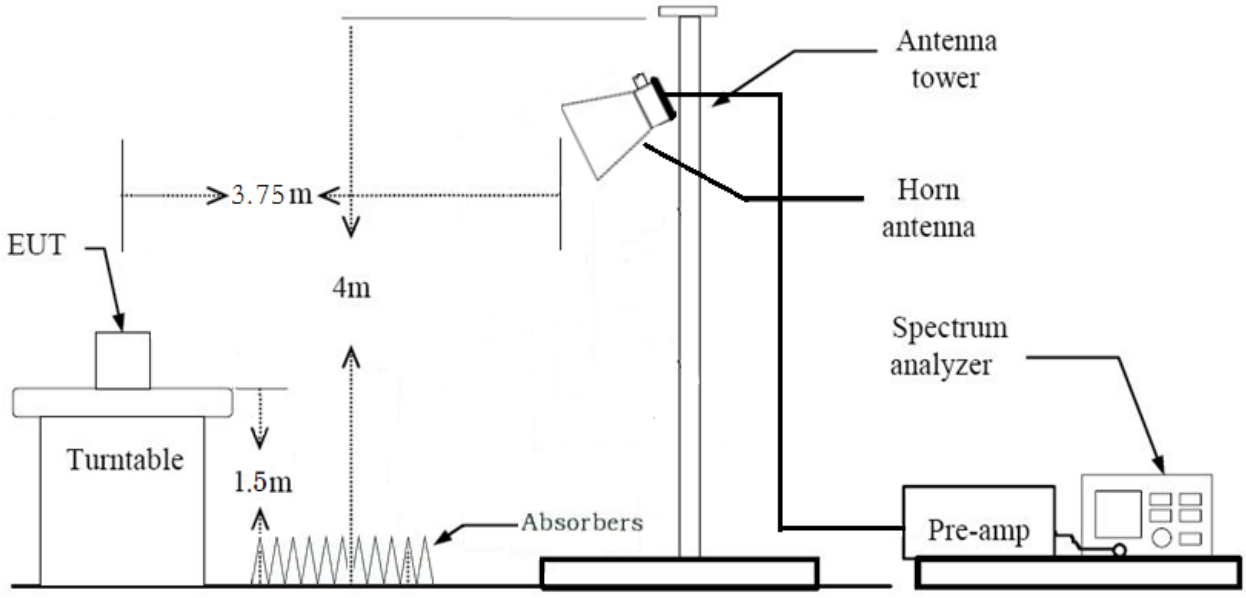
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



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
   b. Average: 1 GHz – 25 GHz, RBW = 1 MHz, VBW ≥ 1/τ Hz, where τ = pulse width in seconds.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.
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. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Charging Mode

Frequency [kHz]	Reading [dBuV]	※A.F.+C.L.-A.G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
150	14.4	20.0	H	34.4	96.0	61.6	QP
16465	5.2	21.9	H	27.1	69.5	42.4	QP
150	15.0	20.0	V	35.0	96.0	61.0	QP
18763	4.7	22.2	V	26.9	69.5	42.6	QP

Operation Mode: Battery Mode

Frequency [kHz]	Reading [dBuV]	Factor [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
150	14.7	20.0	H	34.7	96.0	61.3	QP
150	14.5	20.0	V	34.5	96.0	61.5	QP

Notes:

Although these tests were performed at a test site other than an open area test site, adequate comparison measurements were confirmed against an open area test site.Therefore sufficient test were made to demonstrate that the alternative site produces Result that correlate with the one of test made in an open field based on KDB 414788

Sample validation

Reference-signal Frequency [kHz]	Reading [dBuV]	Measurement Distance [m]	Extrapolation Factor	Total [dBuV/m]
135	76.1	3	88.4	-12.3
135	47.4	10	59.1	-11.7

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The measurement distance is 3 meter.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. Corrected reading : Antenna Factor + Cable loss + Read Level
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Charging Mode

Frequency [MHz]	Reading [dBuV]	※A.F.+C.L.-A.G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
726.9	39.1	-6.0	H	33.1	46	12.9	QP
726.8	28.9	-6.0	V	22.9	46	23.1	QP

Operation Mode: Battery Mode

Frequency [MHz]	Reading [dBuV]	※A.F.+C.L.-A.G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
726.6	37.8	-6.0	H	31.8	46	14.2	QP
727.1	28.6	-6.0	V	22.6	46	23.4	QP

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. Corrected reading : Antenna Factor + Cable loss - Amplifier gain + Read Level
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Mode: Charging Mode

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G. [dB]	ANT. POL [H/V]	Duty cycle Factor	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
3659.787	62.3	-6.2	V	-10.5	45.6	54	8.4	AV
3659.818	61.8	-6.2	H	-10.5	45.1	54	8.9	AV
4575.56	61.9	-4.3	V	-10.5	47.1	54	6.9	AV
4575.278	64.6	-4.3	H	-10.5	49.8	54	4.2	AV
7319.928	48.1	2.1	V	-10.5	39.7	54	14.3	AV
7319.489	50.4	2.1	H	-10.5	42.0	54	12.0	AV
8235.633	50.0	2.0	V	-10.5	41.5	54	12.5	AV
8235.624	54.9	2.0	H	-10.5	46.4	54	7.6	AV
9149.52	58.5	4.3	V	-10.5	52.3	54	1.7	AV
9150.531	52.4	4.3	H	-10.5	46.2	54	7.8	AV
2743.997	67.6	-10.4	V	-	57.2	74	16.8	PK
2745.184	83.2	-10.4	H	-	72.8	74	1.2	PK
3659.787	67.2	-6.2	V	-	61.0	74	13.0	PK
3659.818	66.9	-6.2	H	-	60.7	74	13.3	PK
4575.56	77.2	-4.3	V	-	72.9	74	1.1	PK
4575.278	75.4	-4.3	H	-	71.1	74	2.9	PK
8235.633	63.9	2.0	V	-	65.9	74	8.1	PK
8235.624	68.5	2.0	H	-	70.5	74	3.5	PK
9149.52	63.6	4.3	V	-	67.9	74	6.1	PK
9150.531	65.6	4.3	H	-	69.9	74	4.1	PK

Operation Mode: Battery Mode

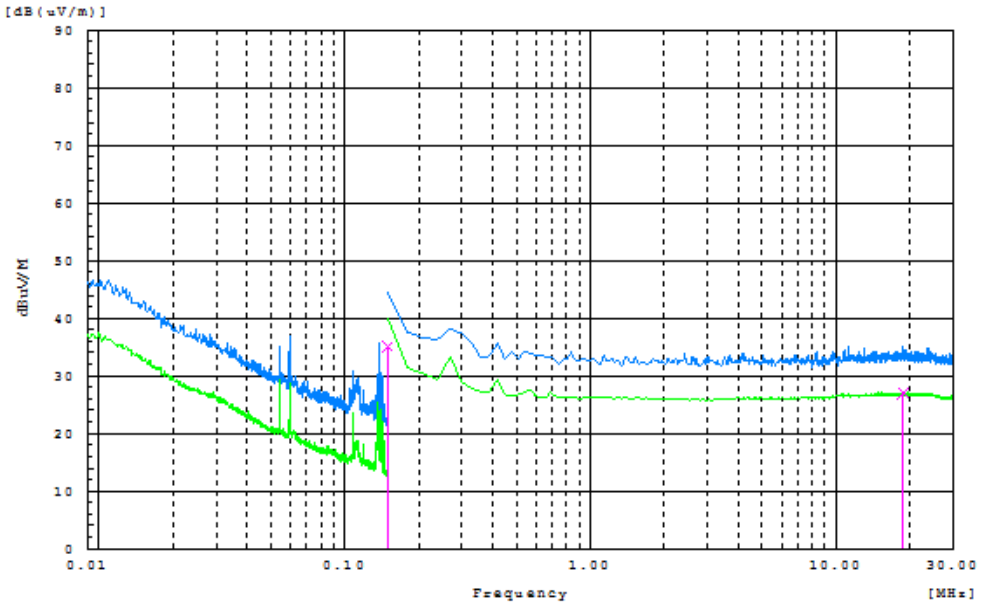
Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G. [dB]	ANT. POL [H/V]	Duty cycle Factor	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
3659.972	62.7	-6.2	V	-10.5	46.0	54	8.0	AV
3660.241	60.3	-6.2	H	-10.5	43.6	54	10.4	AV
4575.571	61.0	-4.3	V	-10.5	46.2	54	7.8	AV
4574.869	67.7	-4.3	H	-10.5	52.9	54	1.1	AV
8235.629	49.6	2.0	V	-10.5	41.1	54	12.9	AV
8235.304	57.8	2.0	H	-10.5	49.3	54	4.7	AV
9150.299	51.0	4.3	V	-10.5	44.8	54	9.2	AV
9150.782	51.4	4.3	H	-10.5	45.2	54	8.8	AV
10064.8	47.6	4.6	V	-10.5	41.7	54	12.3	AV
10064.49	50.3	4.6	H	-10.5	44.4	54	9.6	AV
2744.245	73.9	-10.4	V	-	63.5	74	10.5	PK
2745.214	82.6	-10.4	H	-	72.2	74	1.8	PK
3659.972	67.7	-6.2	V	-	61.5	74	12.5	PK
3660.241	67.7	-6.2	H	-	61.5	74	12.5	PK
4575.571	76.7	-4.3	V	-	72.4	74	1.6	PK
4574.869	75.9	-4.3	H	-	71.6	74	2.4	PK
8235.629	63.4	2.0	V	-	65.4	74	8.6	PK
8235.304	68.2	2.0	H	-	70.2	74	3.8	PK
9150.299	62.8	4.3	V	-	67.1	74	6.9	PK
9150.782	66.2	4.3	H	-	70.5	74	3.5	PK

Notes:

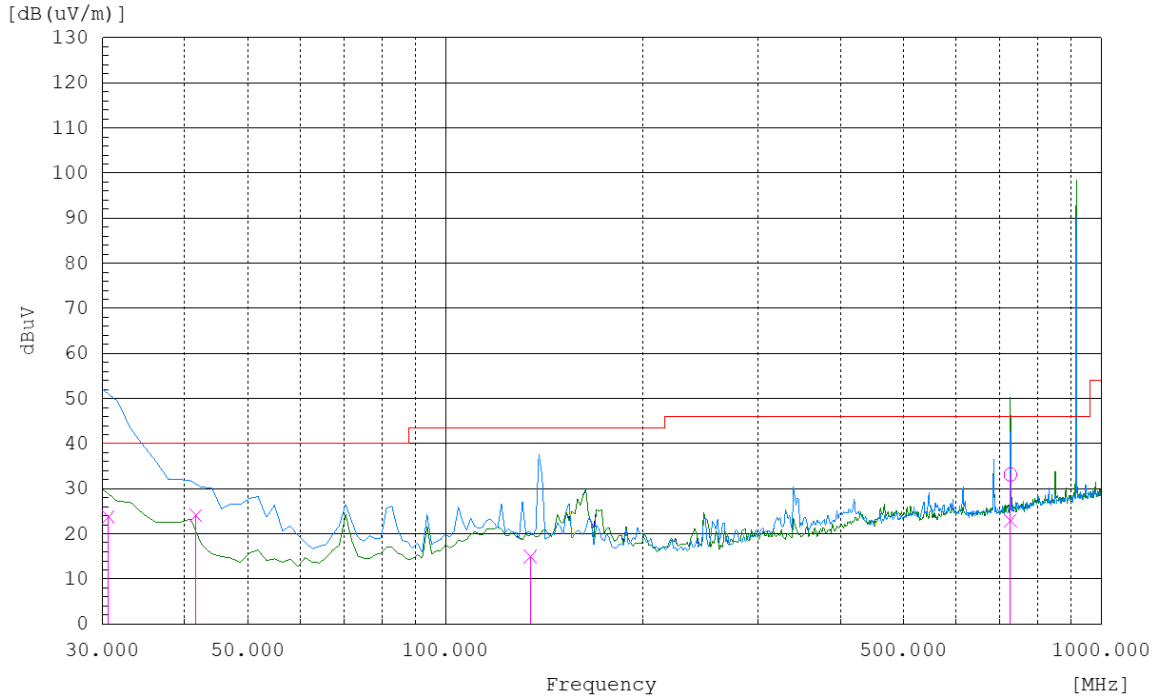
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz 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 - Amp Gain + Distance Factor
5. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
6. 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.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
8. A.F. : Antenna Factor / C.L. : Cable Loss / AMP.G. : Amplifier Gain / D.F. : Distance Factor

▣ RESULT PLOTS (Worst case : Z)

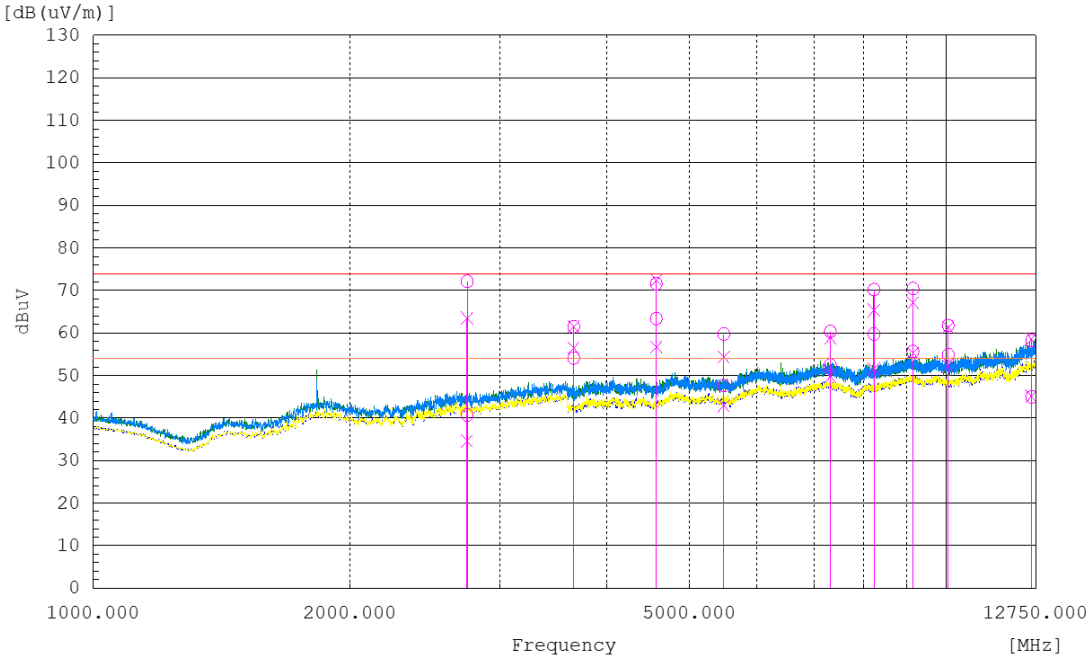
Radiated Spurious Emissions plot – Below 30 MHz



Radiated Spurious Emissions plot – Below 1 GHz



Radiated Spurious Emissions plot – Above 1 GHz



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

9.6 POWERLINE CONDUCTED EMISSIONS

LIMIT

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 microvolt (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

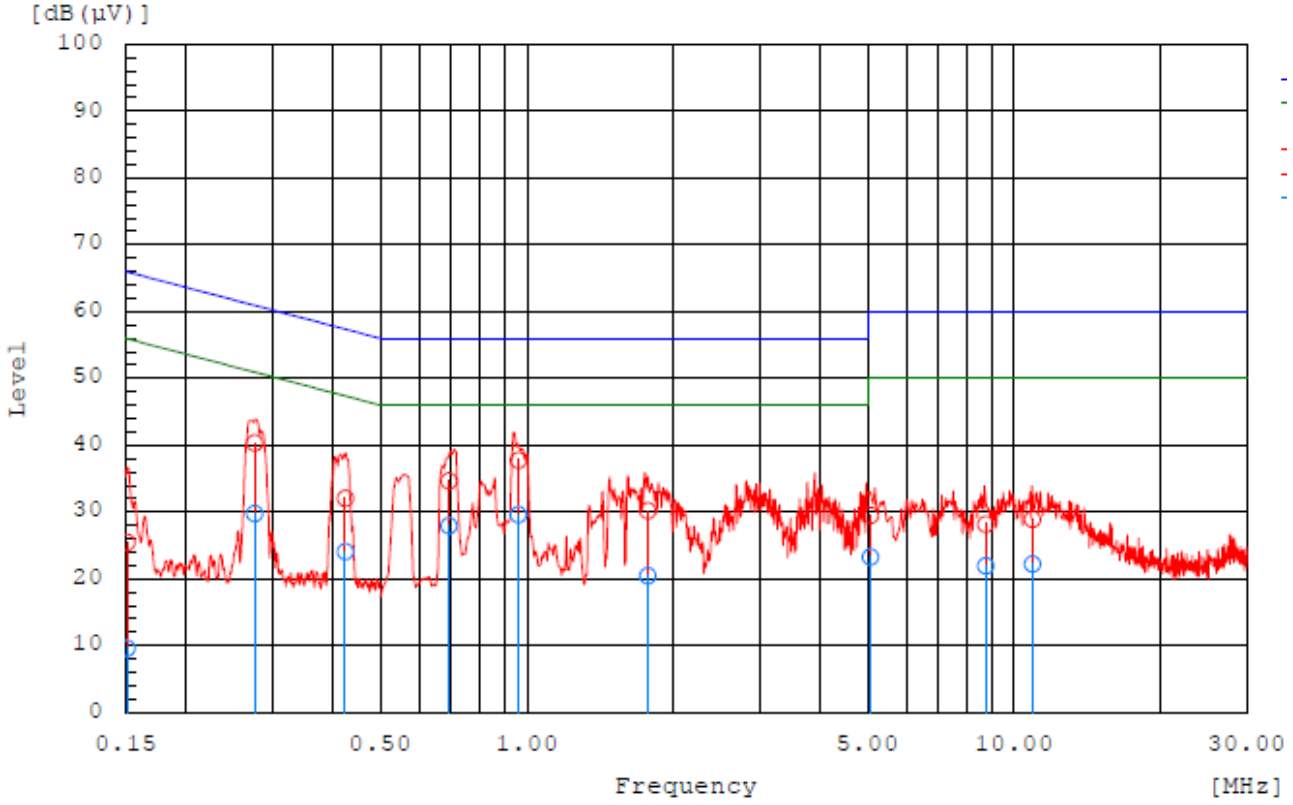
1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

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

Note : We don’t perform powerline conducted emission test. Because this EUT is used with vehicle.

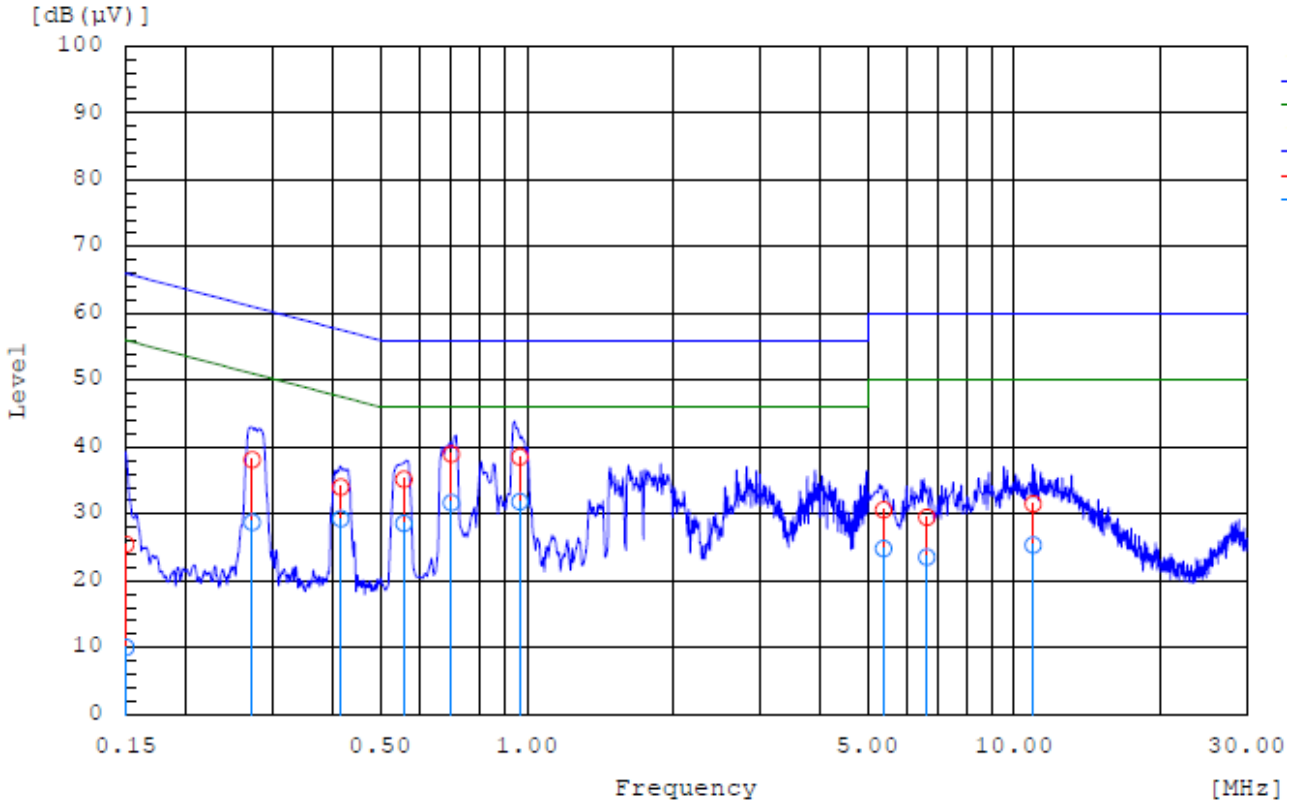
[AC Mains (L1)]



Final Results (L1)

Frequency MHz	Line	Reading dB(μV)		Corr. dB	Level dB(μV)		Limit dB(μV)		Margin dB	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.276	L1	30.8	20.2	9.6	40.4	29.8	60.9	50.9	20.5	21.1
0.423	L1	22.5	14.5	9.6	32.1	24.1	57.4	47.4	25.3	23.3
0.151	L1	15.9	0.1	9.6	25.5	9.7	66	56	40.5	46.3
0.959	L1	28.1	19.9	9.7	37.8	29.6	56	46	18.2	16.4
0.691	L1	25.1	18.4	9.6	34.7	28	56	46	21.3	18
1.768	L1	20.6	10.9	9.6	30.2	20.5	56	46	25.8	25.5
10.901	L1	18.9	12.2	10	28.9	22.2	60	50	31.1	27.8
8.729	L1	18.2	12	10	28.2	22	60	50	31.8	28
5.063	L1	19.8	13.5	9.8	29.6	23.3	60	50	30.4	26.7

[AC Mains (N)]



Final Results (N)

Frequency MHz	Line	Reading dB(µV)		Corr. dB	Level dB(µV)		Limit dB(µV)		Margin dB	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.273	N	28.6	19.2	9.6	38.2	28.8	61	51	22.8	22.2
0.414	N	24.5	19.7	9.6	34.1	29.3	57.6	47.6	23.5	18.3
0.15	N	15.9	0.5	9.6	25.5	10.1	66	56	40.5	45.9
0.966	N	28.9	22.2	9.7	38.6	31.9	56	46	17.4	14.1
0.699	N	29.4	22.1	9.6	39	31.7	56	46	17	14.3
0.559	N	25.6	19	9.6	35.2	28.6	56	46	20.8	17.4
10.94	N	21.6	15.4	10	31.6	25.4	60	50	28.4	24.6
6.617	N	19.7	13.8	9.8	29.5	23.6	60	50	30.5	26.4
5.389	N	20.8	15.1	9.8	30.6	24.9	60	50	29.4	25.1

10. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Due to Calibration	Manufacture	Serial No.
☒	Signal Analyzer (20 Hz ~ 40.0 GHz)	ESU40	2019-12-20	ROHDE & SCHWARZ	100529
☒	Signal Analyzer (3 ㎐ ~ 40 ㎓)	N9020A	2019-11-09	AGILENT	MY52091291
☒	BI-LOG Antenna (30 MHz ~ 1 GHz)	JB6	2019-06-27	Schwarzbeck	A060916
☒	Attenuator (20 dB, DC ~ 26.5 GHz)	8493C	2019-12-20	HP	09072
☒	POWER AMP (1 GHz ~ 18 GHz)	CBLU1183540B-01	2020-01-18	CERNEX	27974
☒	POWER AMP (0.3GHz ~ 1GHz)	PAM-103A	2020-01-18	Com-Power Corporation	18020005
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	2020-05-24	Sunol	A070516
☒	Loop Antenna (0.009 ~ 30 MHz)	HLA 6121	2020-08-27	Teseq	43964

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	EMCE-R-1903-F001-P