



FCC RF TEST REPORT

47 CFR FCC Part 15 Subpart C § 15.249

Applicant : Bullitt Group
Equipment : Rugged Smart Phone
BRAND NAME : CAT
MODEL NAME : S50
FCC ID : ZL5S50

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.

Report Template No.: BU5-FR15CANT Version 1.0



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR463004E	Rev. 01	Initial issue of report	Aug. 20, 2014

**1. SUMMARY OF THE TEST RESULT**

Applied Standard:					
Part	FCC Rule	IC Rule	Description of Test	Result	Under Limit
3.1	15.207	RSS-GEN 7.2.4	AC Power Line Conducted Emissions	Complies	11.00 dB at 0.174MHz
3.2	2.1049	RSS-GEN 4.6.1	20dB & 99% Occupied Bandwidth	Complies	-
3.3	15.249(a)	RSS-210 A2.9	Field Strength of Fundamental Emissions	Complies	19 dB at 2441MHz
3.4	15.249(a)(d)	RSS-210 A2.9	Radiated Spurious Emissions	Complies	5.41 dB at 40.530MHz
3.5	15.203	-	Antenna Requirements	Complies	-

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.50
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2. GENERAL INFORMATION

2.1 Applicant

Bullitt Group

No. 4, The Aquarium, King Street, Reading, RG1 2AN United Kingdom

2.2 Manufacturer

Compal Electronics, INC.

No. 385, Yangguang St. Neihu District, Taipei City 11491, Taiwan, R.O.C.

2.3 Product Details

For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Modulation	GFSK
Channel Bandwidth (99%)	1.02MHz
Max. Field Strength (Peak)	95dB μ V/m
Max. Field Strength (Average)	58.52dB μ V/m
ANT+ Channel Number	79
ANT+ Frequency Range	2402-2480MHz

2.4 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode
AC Power Line Conducted Emissions	CTX
Field Strength of Fundamental Emissions	CTX
Bandwidth	CTX
Radiated Emissions	CTX

Note:

1. CTX=continuously transmitting.
2. The programmed RF utility, "QRCT Tool" installed in the notebook to make the EUT get into the engineering modes to continuously transmit.

2.5 Table for Testing Locations

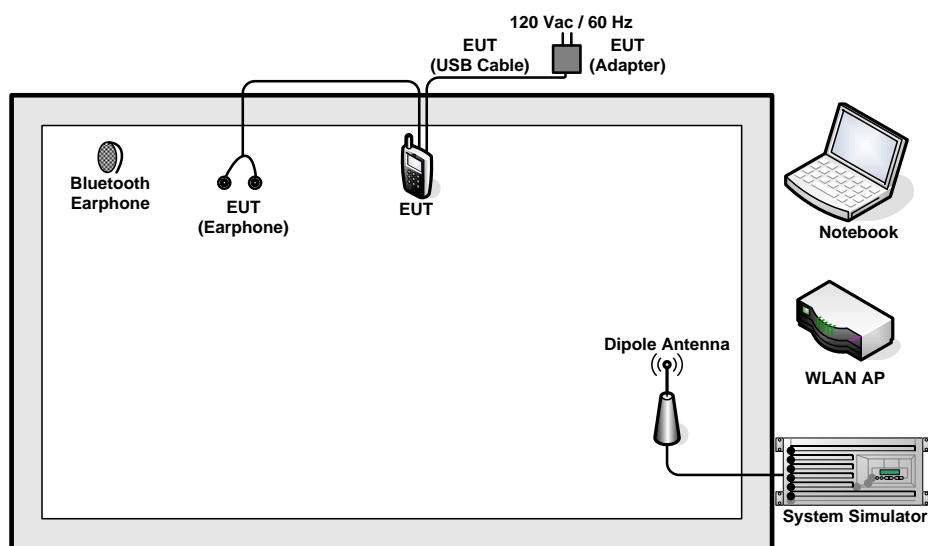
Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
	TH02-HY	03CH07-HY	CO05-HY

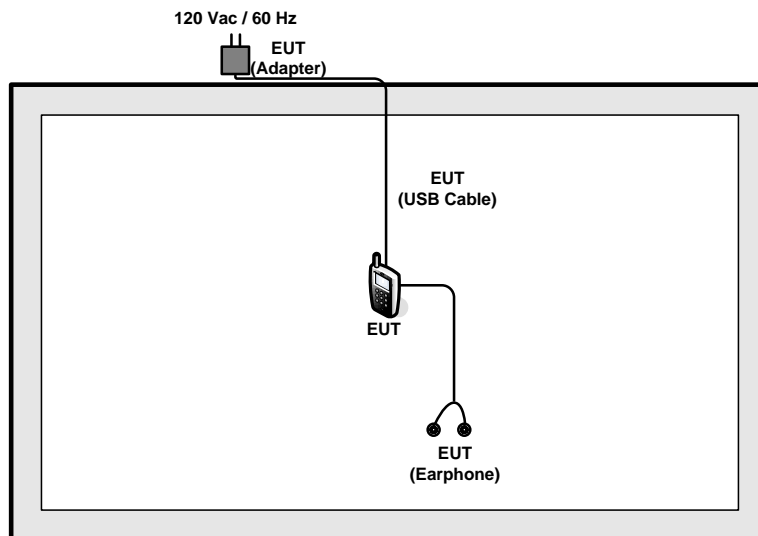
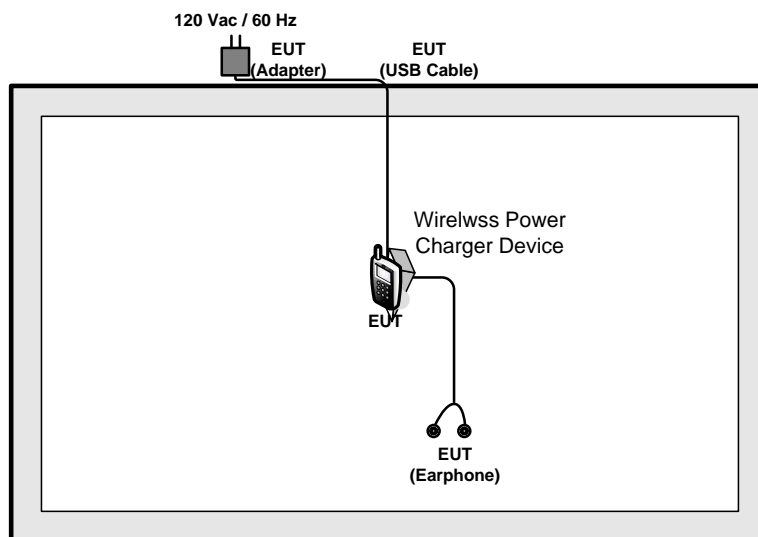
2.6 Table for Supporting Units

Support Unit	Manufacturer	Model	FCC ID
System Simulator	R&S	CMU 200	N/A
WLAN AP	D-Link	DIR-628	KA2DIR628A2
Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054
Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029
Wirelss Power Charger Device	Samsung	EP-1001EWE	A3LEPP100IJWU
SD Card	SanDisk	MicroSD HC	FCC DoC

2.7 Test Configurations

<AC Conducted Emissions>



<Radiated Spurious Emissions>

<Radiated Spurious Emissions for WPC Mode>


3. TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For a Low-power Radio-frequency device which is designed to be connected to the 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 below limits table.

Frequency (MHz)	QP Limit (dB μ V)	AV Limit (dB μ V)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

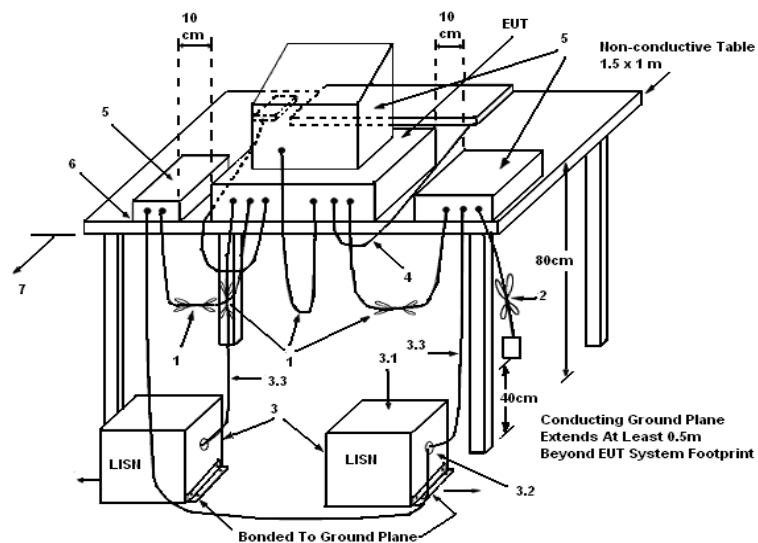
3.1.2 Measuring Instruments

Please refer to section 4 of equipment list in this report.

3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5 Test Deviation

There is no deviation with the original standard.

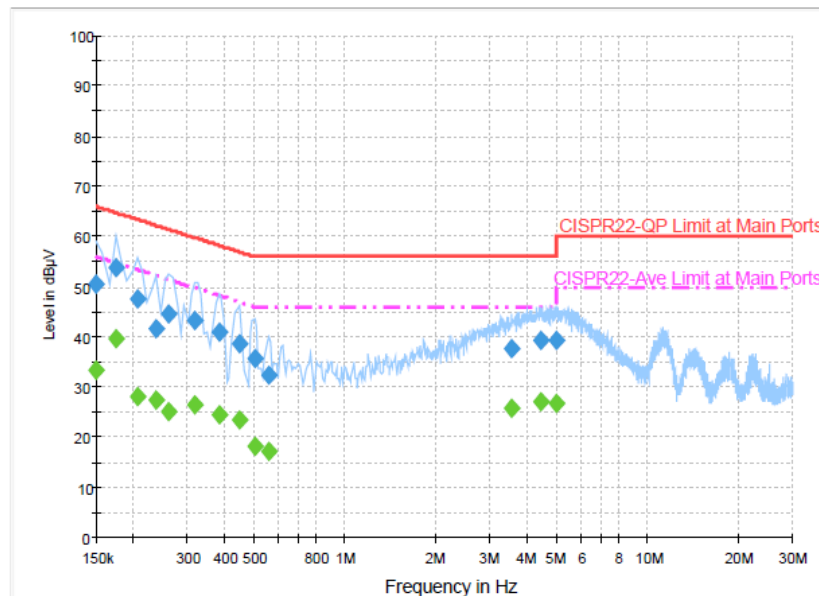
3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in transmitting function.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

Test Date	Jul. 31, 2014	Test Site No.	CO05-HY
Temperature	20~22°C	Humidity	45~47%
Test Engineer	Cosmo Xu	Configuration	Line
Mode	GSM850 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) +ANT Tx		

Line



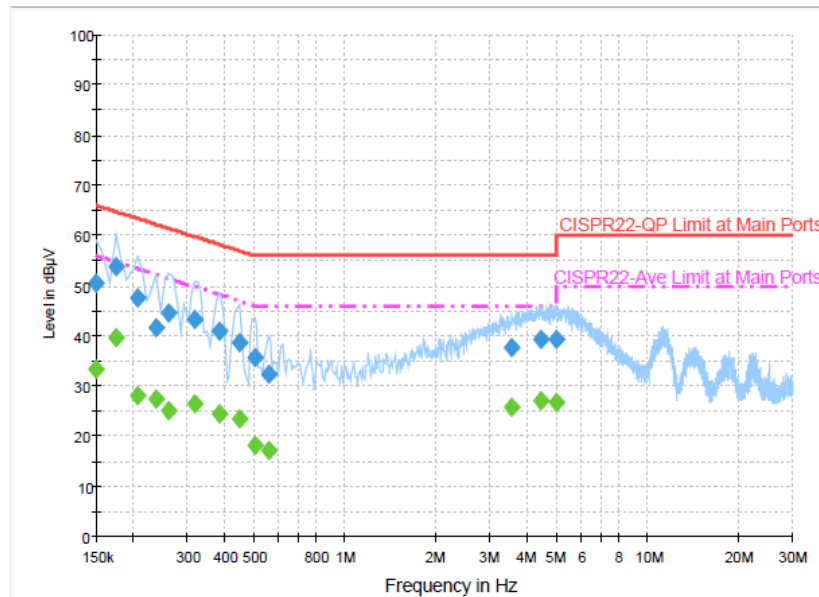
Final Result: Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	50.4	Off	L1	19.3	15.6	66.0
0.174000	53.8	Off	L1	19.3	11.0	64.8
0.206000	47.4	Off	L1	19.3	16.0	63.4
0.238000	41.7	Off	L1	19.4	20.5	62.2
0.262000	44.4	Off	L1	19.4	17.0	61.4
0.318000	43.2	Off	L1	19.4	16.6	59.8
0.382000	40.8	Off	L1	19.4	17.4	58.2
0.446000	38.7	Off	L1	19.4	18.2	56.9
0.502000	35.7	Off	L1	19.4	20.3	56.0
0.558000	32.4	Off	L1	19.4	23.6	56.0
3.542000	37.6	Off	L1	19.6	18.4	56.0
4.398000	39.1	Off	L1	19.5	16.9	56.0
4.982000	39.4	Off	L1	19.7	16.6	56.0



Test Date	Jul. 31, 2014	Test Site No.	CO05-HY
Temperature	20~22°C	Humidity	45~47%
Test Engineer	Cosmo Xu	Configuration	Line
Mode	GSM850 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) +ANT Tx		

Line

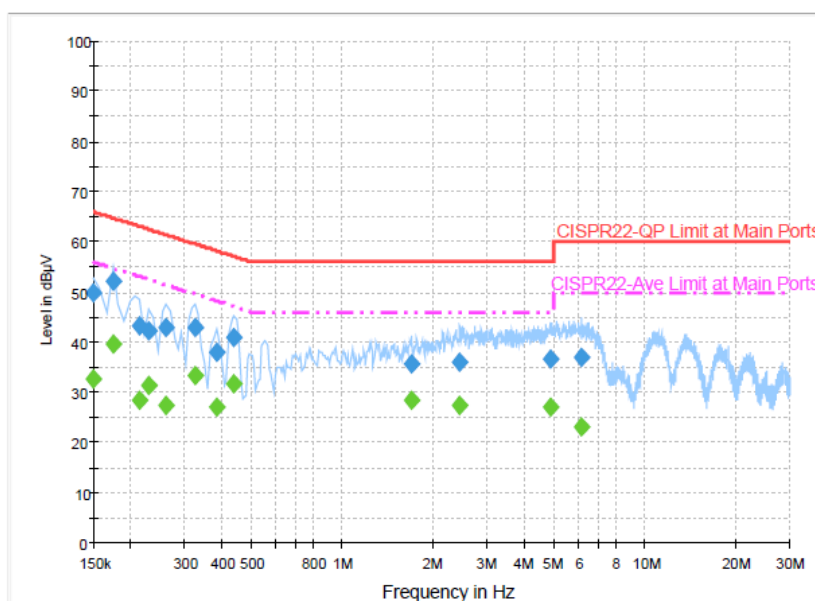


Final Result: Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.3	Off	L1	19.3	22.7	56.0
0.174000	39.5	Off	L1	19.3	15.3	54.8
0.206000	28.1	Off	L1	19.3	25.3	53.4
0.238000	27.5	Off	L1	19.4	24.7	52.2
0.262000	25.1	Off	L1	19.4	26.3	51.4
0.318000	26.5	Off	L1	19.4	23.3	49.8
0.382000	24.3	Off	L1	19.4	23.9	48.2
0.446000	23.3	Off	L1	19.4	23.6	46.9
0.502000	18.2	Off	L1	19.4	27.8	46.0
0.558000	17.1	Off	L1	19.4	28.9	46.0
3.542000	25.9	Off	L1	19.6	20.1	46.0
4.398000	27.0	Off	L1	19.5	19.0	46.0
4.982000	26.6	Off	L1	19.7	19.4	46.0

Test Date	Jul. 31, 2014	Test Site No.	CO05-HY
Temperature	20~22°C	Humidity	45~47%
Test Engineer	Cosmo Xu	Configuration	Neutral
Mode	GSM850 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) +ANT Tx		

Neutral

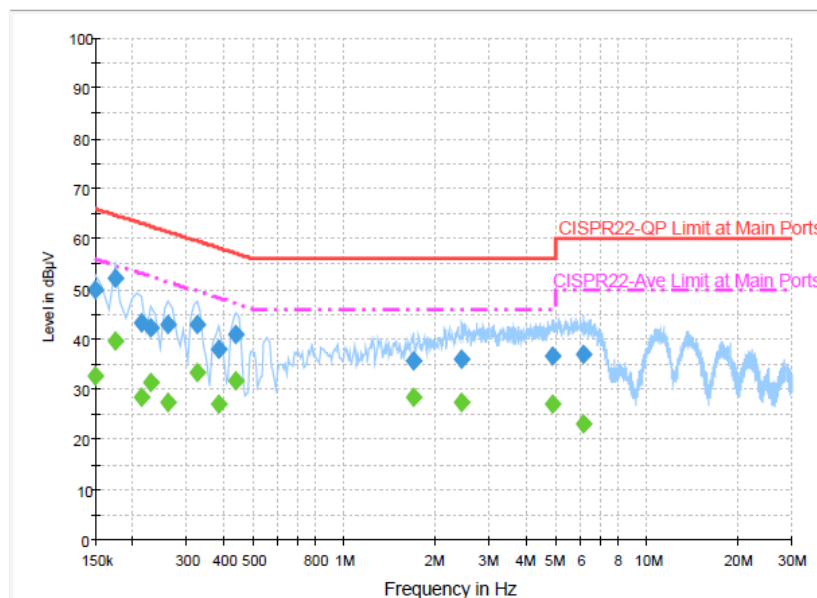


Final Result: Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	49.7	Off	N	19.4	16.3	66.0
0.174000	52.1	Off	N	19.3	12.7	64.8
0.214000	43.4	Off	N	19.4	19.6	63.0
0.230000	42.2	Off	N	19.4	20.2	62.4
0.262000	42.9	Off	N	19.4	18.5	61.4
0.326000	42.8	Off	N	19.4	16.8	59.6
0.382000	38.0	Off	N	19.4	20.2	58.2
0.438000	40.8	Off	N	19.4	16.3	57.1
1.686000	35.7	Off	N	19.6	20.3	56.0
2.438000	36.1	Off	N	19.6	19.9	56.0
4.830000	36.6	Off	N	19.6	19.4	56.0
6.166000	37.0	Off	N	19.6	23.0	60.0

Test Date	Jul. 31, 2014	Test Site No.	CO05-HY
Temperature	20~22°C	Humidity	45~47%
Test Engineer	Cosmo Xu	Configuration	Neutral
Mode	GSM850 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) +ANT Tx		

Neutral



Final Result: Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	32.6	Off	N	19.4	23.4	56.0
0.174000	39.5	Off	N	19.3	15.3	54.8
0.214000	28.3	Off	N	19.4	24.7	53.0
0.230000	31.3	Off	N	19.4	21.1	52.4
0.262000	27.4	Off	N	19.4	24.0	51.4
0.326000	33.5	Off	N	19.4	16.1	49.6
0.382000	27.1	Off	N	19.4	21.1	48.2
0.438000	31.7	Off	N	19.4	15.4	47.1
1.686000	28.3	Off	N	19.6	17.7	46.0
2.438000	27.5	Off	N	19.6	18.5	46.0
4.830000	27.0	Off	N	19.6	19.0	46.0
6.166000	23.3	Off	N	19.6	26.7	50.0

3.2 20dB and & 99% Occupied Bandwidth

3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band.

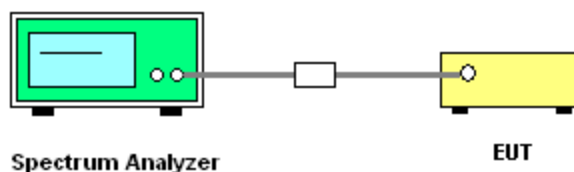
3.2.2 Measuring Instruments

Please refer to section 4 of equipment list in this report.

3.2.3 Test Procedures

1. The transmitter output port was connected to the spectrum analyzer.
2. Measured the spectrum width with highest power setting.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

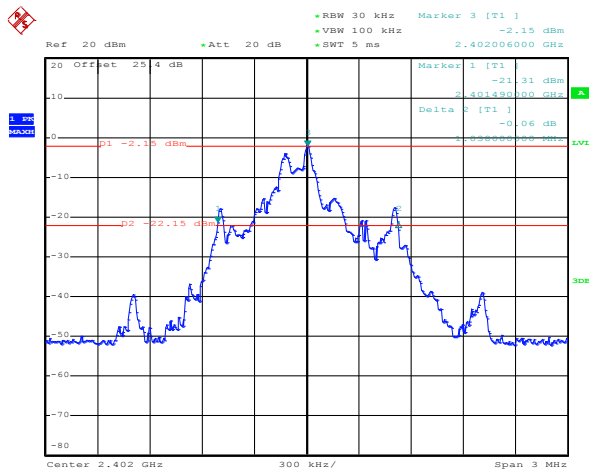


3.2.7 Test Result of 20dB Spectrum Bandwidth

Final Test Date	Aug. 07, 2014	Test Site No.	TH02-HY
Temperature	20~22°C	Humidity	45~47%
Test Engineer	Alen Tsui		

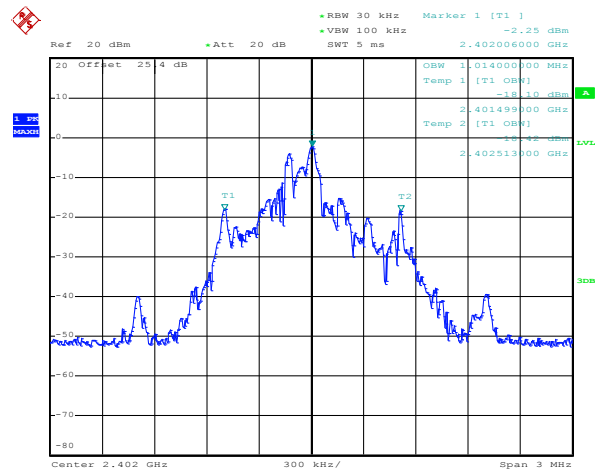
Frequency	20dB BW (MHz)	99% OBW (MHz)
2402MHz	1.04	1.01
2441MHz	1.04	1.02
2480MHz	1.04	1.01

20 dB Bandwidth Plot on 2402MHz



Date: 7.AUG.2014 16:07:33

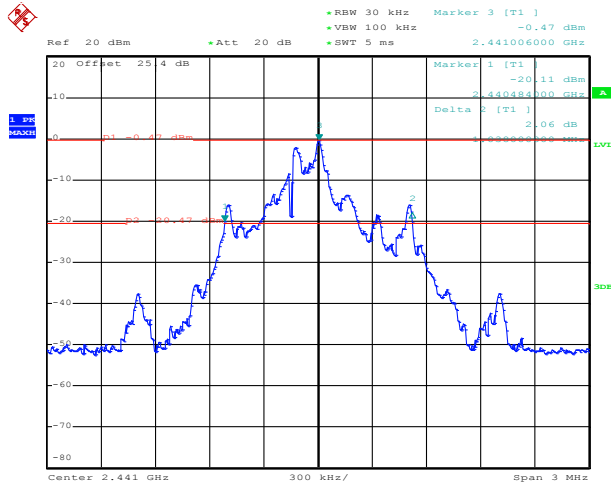
99% Bandwidth Plot on 2402MHz



Date: 6.AUG.2014 19:09:07

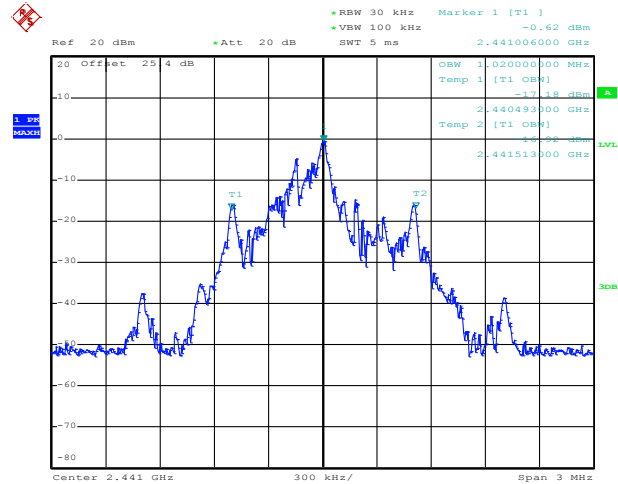


20 dB Bandwidth Plot on 2441MHz



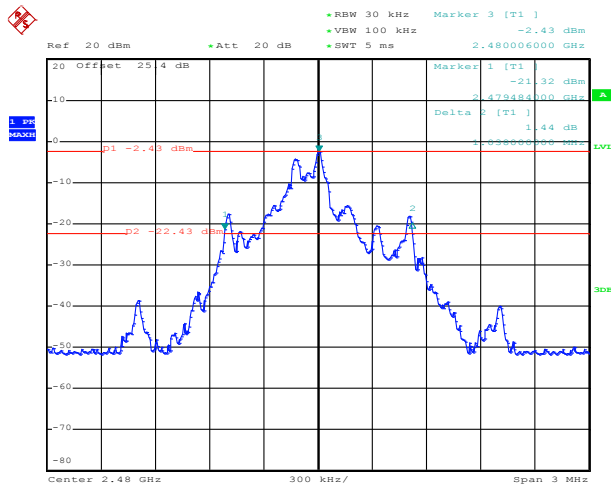
Date: 7.AUG.2014 15:54:22

99% Bandwidth Plot on 2441MHz



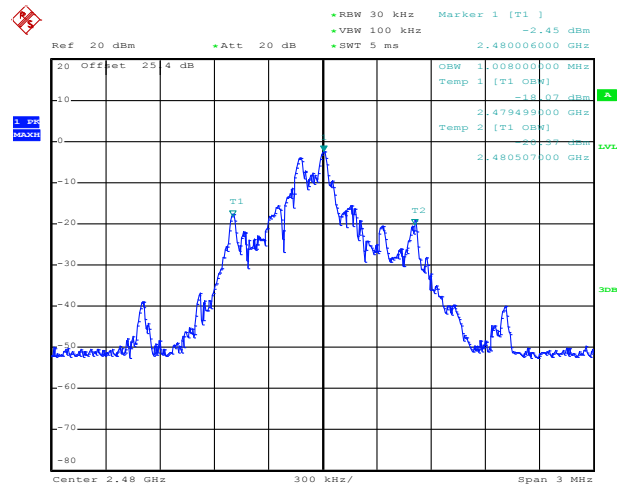
Date: 6.AUG.2014 19:16:02

20 dB Bandwidth Plot on 2480MHz



Date: 7.AUG.2014 15:44:46

99% Bandwidth Plot on 2480MHz



Date: 7.AUG.2014 16:26:30

3.3 Field Strength of Fundamental Emissions and Radiated Spurious Emissions

3.3.1 Limit

The field strength measured at 3 meters shall not exceed the limits in the following table:

Fundamental Frequencies(MHz)	Field Strength(millivolts/m)	
	Fundamental	Harmonics
902~928	50	0.5
2400~2483.5	50	0.5
5725~5875	50	0.5

Note: The limits shown in the above table are based on measurements using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

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 field strength limits listed in 15.209 as below, whichever is less stringent.

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



3.3.2 Measuring Instruments

Please refer to section 4 of equipment list in this report.

3.3.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.

Remark:

1. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
2. For average measurement: use duty cycle correction factor method per 15.35(c).

Duty cycle = On time/100 milliseconds

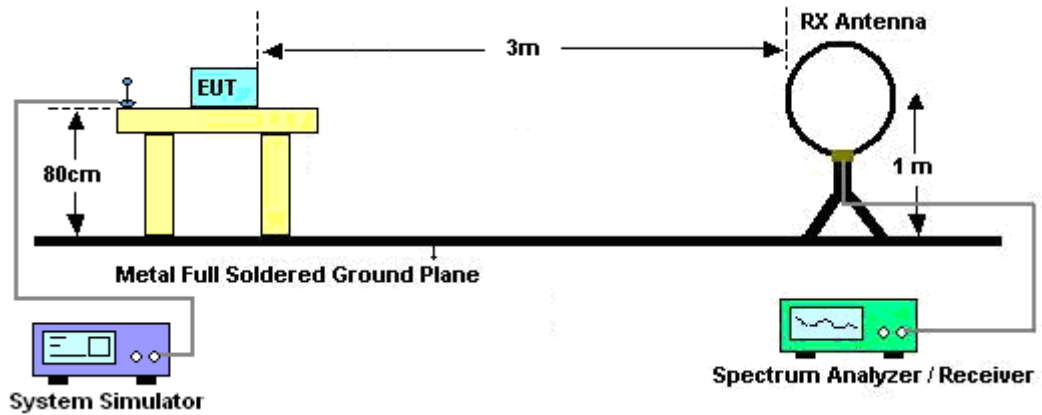
On time = $N1 \cdot L1 + N2 \cdot L2 + \dots + Nn-1 \cdot L_{Nn-1} + Nn \cdot Ln$

Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.

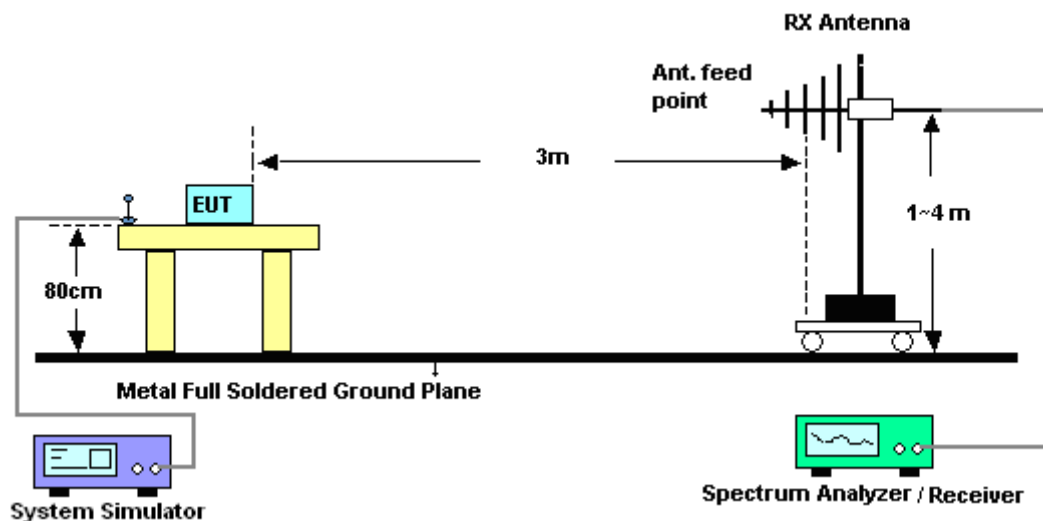
Average Emission Level = Peak Emission Level + $20 \cdot \log(\text{Duty cycle})$

3.3.4 Test Setup Layout

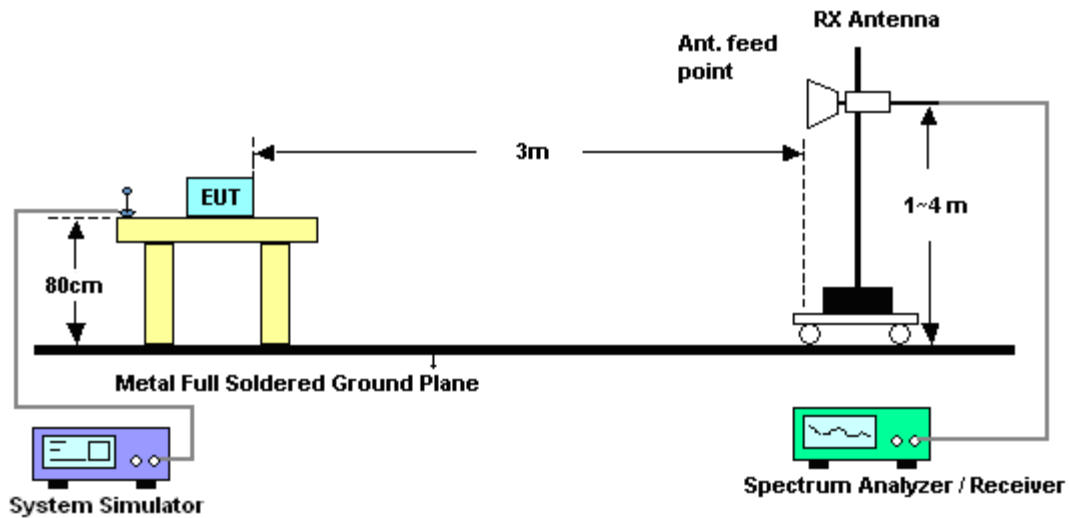
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

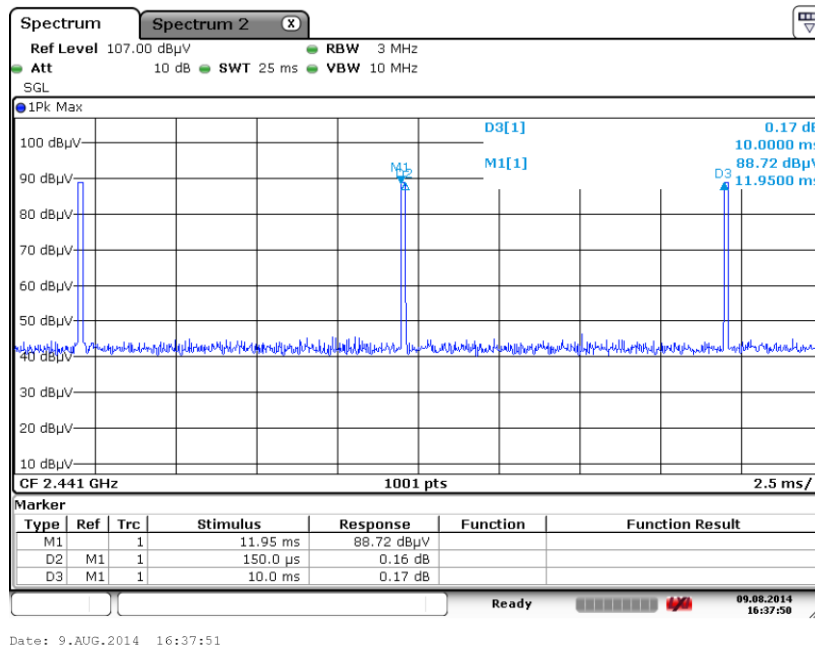
3.3.7 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

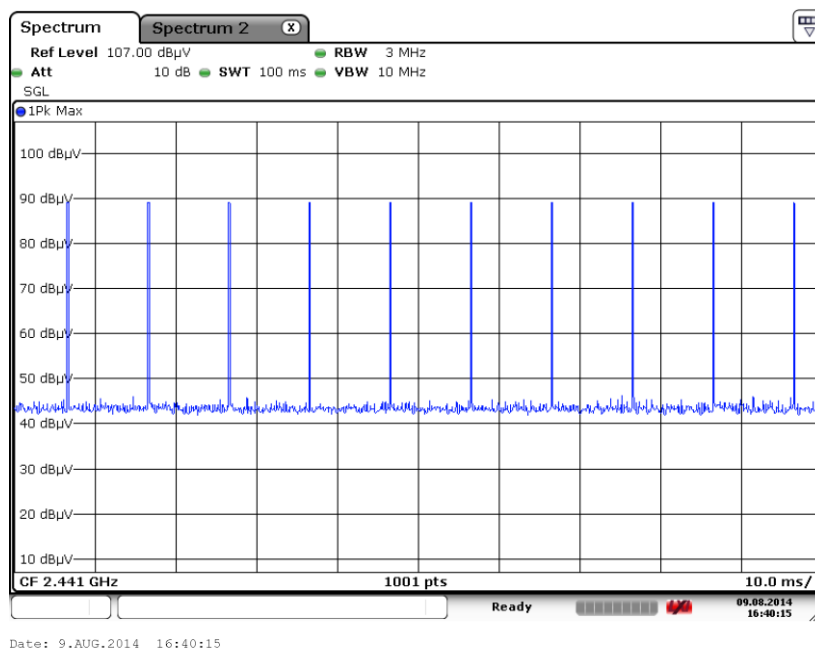


3.3.8 Duty cycle correction factor for average measurement

On time (One Pulse) Plot on 2441MHz



On time (Count Pulses) Plot on 2441MHz



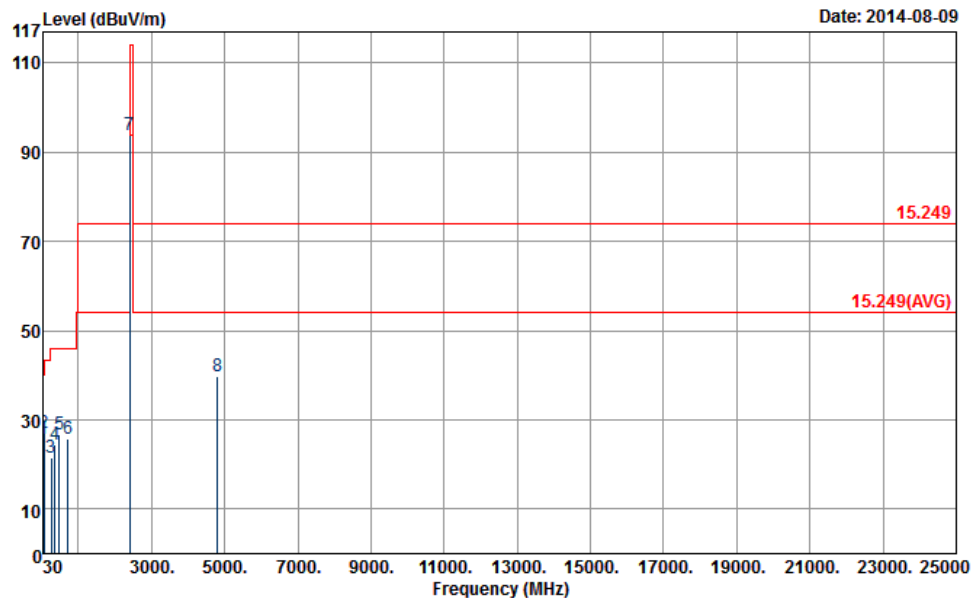
Note:

1. Worst case Duty cycle = on time/100 milliseconds = $10 * 0.15 / 100 = 1.50 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -36.48 \text{ dB}$



3.3.9 Test Result of Field Strength of Fundamental Emissions and Spurious Emissions

Test Date	Aug. 09, 2014	Test Engineer	Eric Shih
Temperature	21~23°C	Humidity	47~49%

2402MHz

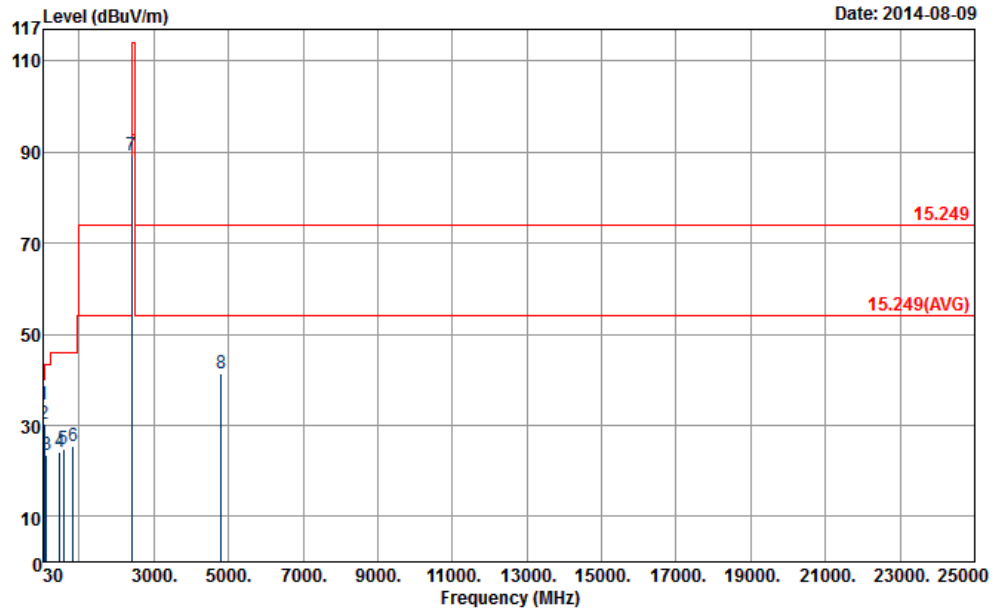
Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 HORIZONTAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
41.88	25.83	-14.17	40	43.8	12.6	0.63	31.2	-	-	Peak
66.18	26.98	-13.02	40	51.31	6.08	0.81	31.22	142	28	Peak
252.48	21.59	-24.41	46	38.33	12.72	1.54	31	-	-	Peak
364.4	24.33	-21.67	46	38.55	14.79	2.07	31.08	-	-	Peak
470.1	26.63	-19.37	46	37.58	17.5	2.35	30.8	-	-	Peak
723.5	25.8	-20.2	46	31.58	21.62	3	30.4	-	-	Peak
2402	94.02	-	-	89.23	32.18	6.91	34.3	194	221	Peak
2402	57.54	-	-	-	-	-	-	-	-	Average
4803	39.77	-34.23	74	55.73	34.25	8.75	58.96	100	0	Peak
4803	3.29	-50.71	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



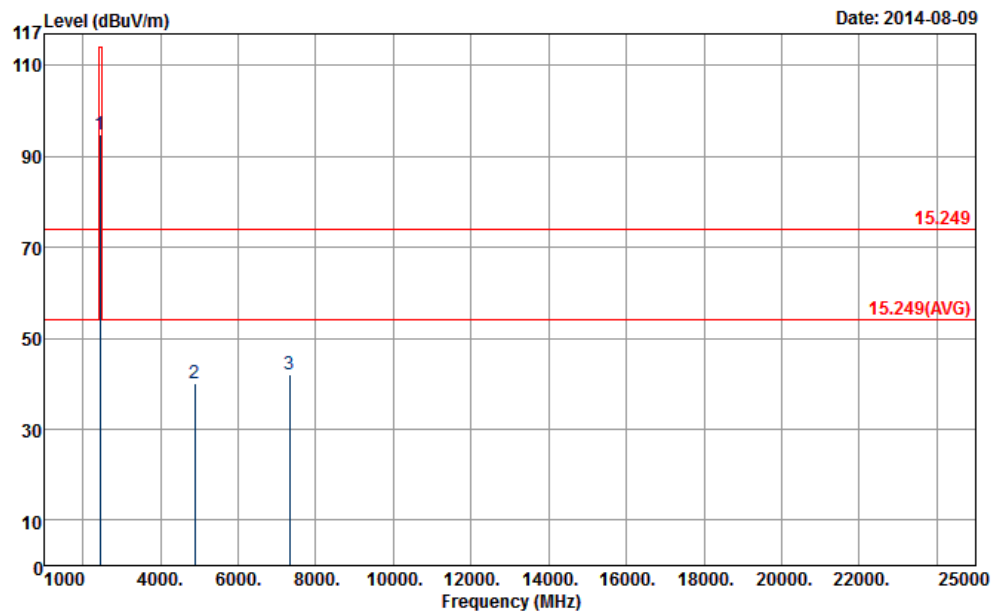
Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF 131029 VERTICAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.53	34.59	-5.41	40	51.86	13.3	0.63	31.2	125	96	Peak
66.99	30.32	-9.68	40	54.58	6.16	0.82	31.24	-	-	Peak
118.83	23.45	-20.05	43.5	42.11	11.35	1.1	31.11	-	-	Peak
470.1	24.28	-21.72	46	35.23	17.5	2.35	30.8	-	-	Peak
585.6	24.7	-21.3	46	33.17	19.54	2.65	30.66	-	-	Peak
825	25.44	-20.56	46	29.92	22.66	3.21	30.35	-	-	Peak
2402	89.42	-	-	84.63	32.18	6.91	34.3	100	264	Peak
2402	52.94	-	-	-	-	-	-	-	-	Average
4803	41.45	-32.55	74	57.41	34.25	8.75	58.96	100	0	Peak
4803	4.97	-49.03	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.

**2441MHz**

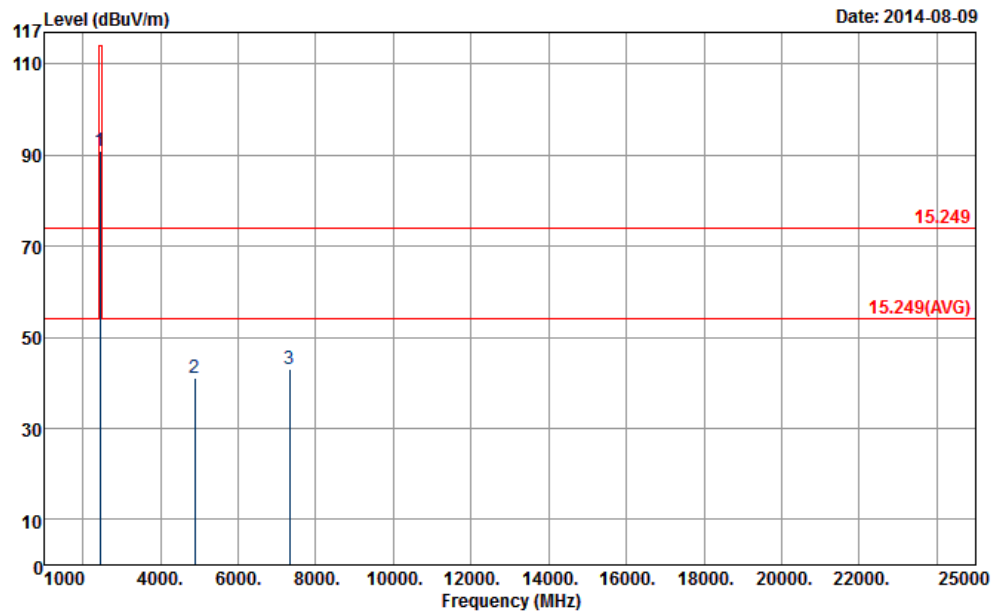
Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF 131029 HORIZONTAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2441	95	-	-	90.16	32.24	6.99	34.39	158	322	Peak
2441	58.52	-	-	-	-	-	-	-	-	Average
4881	40.09	-33.91	74	55.77	34.3	8.85	58.83	100	0	Peak
4881	3.61	-50.39	54	-	-	-	-	-	-	Average
7323	42.08	-31.92	74	53.31	35.6	10.91	57.74	100	0	Peak
7323	5.6	-48.4	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 VERTICAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2441	90.98	-	-	86.14	32.24	6.99	34.39	122	52	Peak
2441	54.5	-	-	-	-	-	-	-	-	Average
4881	41.12	-32.88	74	56.8	34.3	8.85	58.83	100	0	Peak
4881	4.64	-49.36	54	-	-	-	-	-	-	Average
7323	43.15	-30.85	74	54.38	35.6	10.91	57.74	100	0	Peak
7323	6.67	-47.33	54	-	-	-	-	-	-	Average

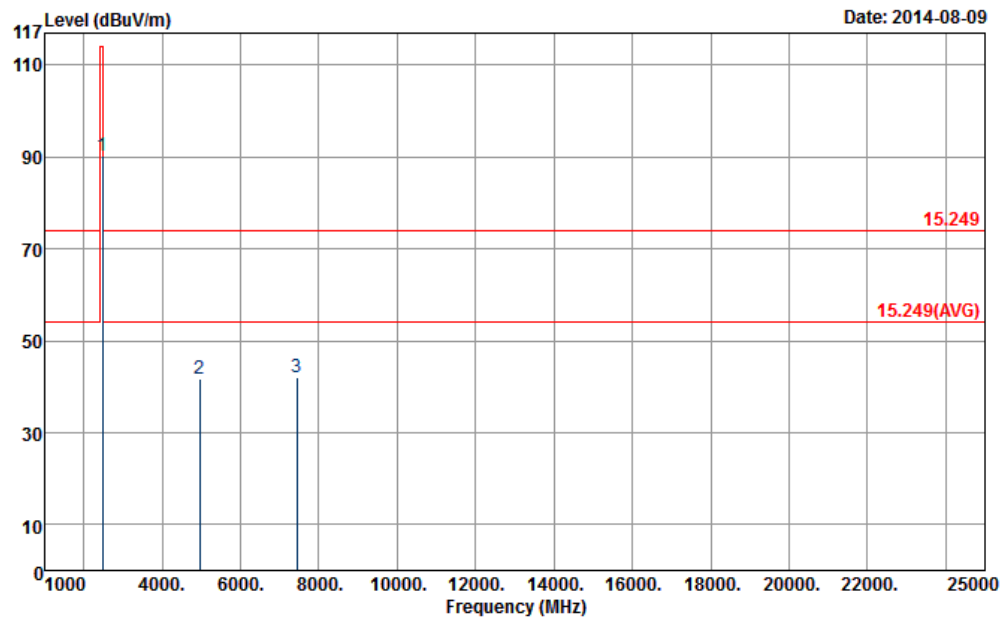
Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



2480MHz



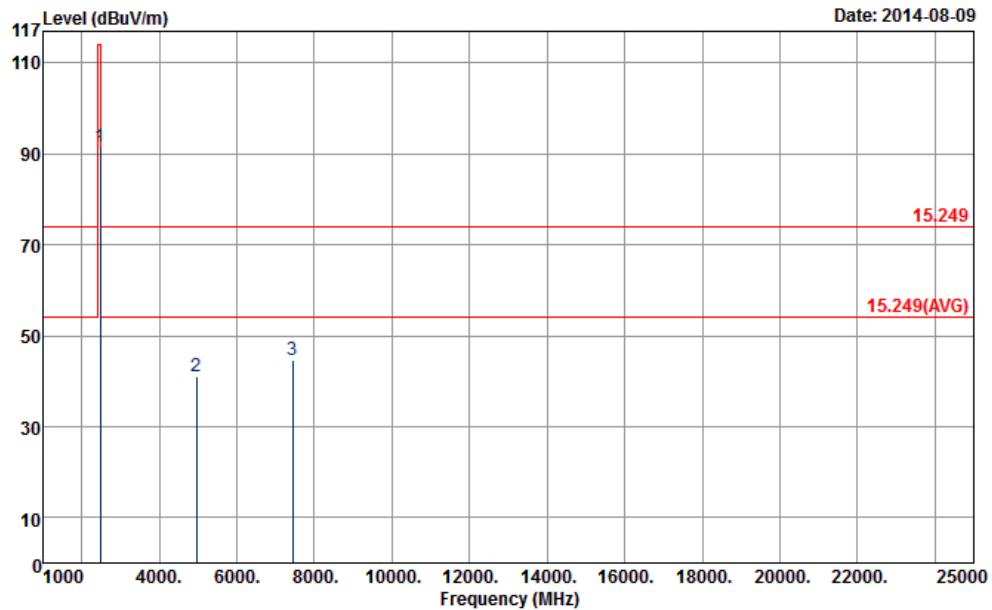
Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF 131029 HORIZONTAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	90.3	-	-	85.39	32.28	7.06	34.43	101	146	Peak
2480	53.82	-	-	-	-	-	-	-	-	Average
4959	41.87	-32.13	74	57.24	34.37	8.92	58.66	100	0	Peak
4959	5.39	-48.61	54	-	-	-	-	-	-	Average
7440	41.99	-32.01	74	53.2	35.6	11.04	57.85	100	0	Peak
7440	5.51	-48.49	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



Site : 03CH07-HY
Condition : 15 249.3m SHF-FHF 131029 VERTICAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	91.49	-	-	86.58	32.28	7.06	34.43	101	52	Peak
2480	55.01	-	-	-	-	-	-	-	-	Average
4959	41.11	-32.89	74	56.48	34.37	8.92	58.66	100	0	Peak
4959	4.63	-49.37	54	-	-	-	-	-	-	Average
7440	44.66	-29.34	74	55.87	35.6	11.04	57.85	100	0	Peak
7440	8.18	-45.82	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

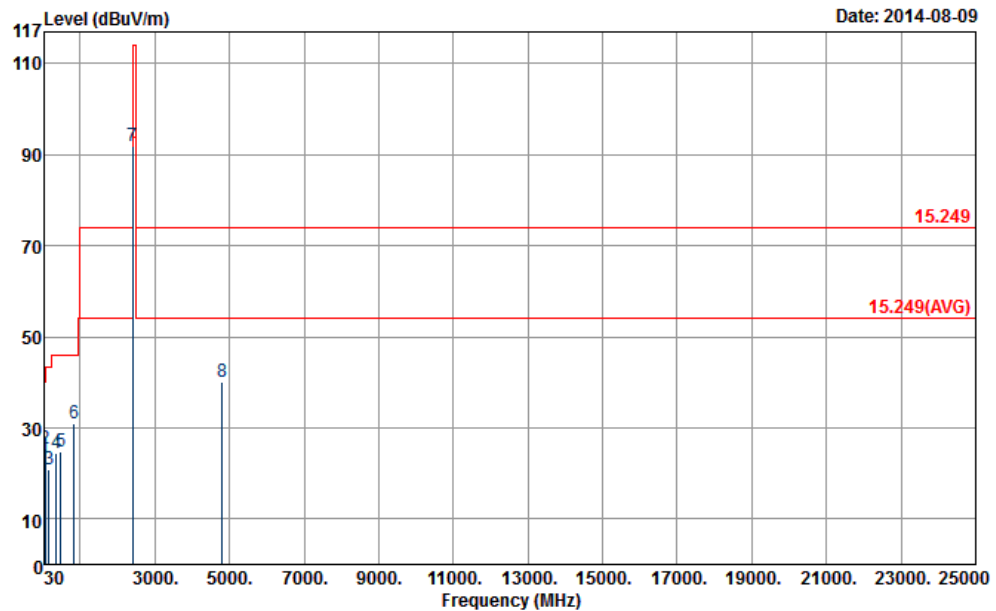
Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



<For WPC Mode>

<Above 30M>

2402MHz

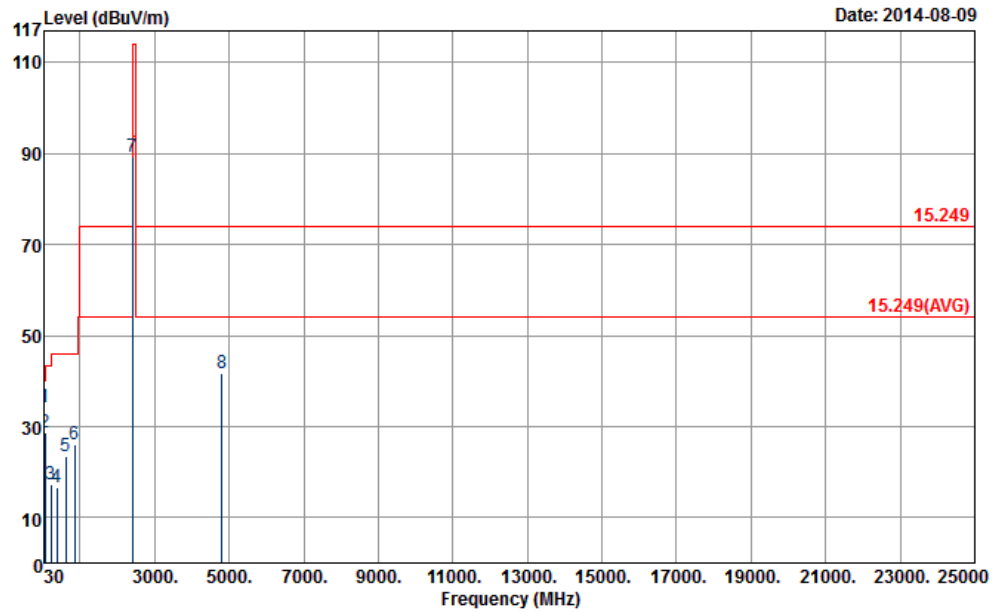
Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 HORIZONTAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
41.61	23.87	-16.13	40	41.84	12.6	0.63	31.2	-	-	Peak
65.37	25.54	-14.46	40	49.94	6	0.8	31.2	145	21	Peak
168.51	20.98	-22.52	43.5	41.15	9.72	1.23	31.12	-	-	Peak
364.4	24.47	-21.53	46	38.69	14.79	2.07	31.08	-	-	Peak
467.3	24.7	-21.3	46	35.69	17.47	2.34	30.8	-	-	Peak
833.4	30.85	-15.15	46	35.07	22.92	3.23	30.37	-	-	Peak
2402	91.86	-	-	87.05	32.2	6.91	34.3	190	228	Peak
2402	55.38	-	-	-	-	-	-	-	-	Average
4803	40.22	-33.78	74	56.18	34.25	8.75	58.96	100	0	Peak
4803	3.74	-50.26	54	-	-	-	-	-	-	Average

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 VERTICAL

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
41.61	34.28	-5.72	40	52.25	12.6	0.63	31.2	158	47	Peak
67.53	28.8	-11.2	40	53	6.24	0.82	31.26	-	-	Peak
218.46	17.28	-28.72	46	37.61	9.28	1.41	31.02	-	-	Peak
367.9	16.72	-29.28	46	30.85	14.85	2.08	31.06	-	-	Peak
615	23.34	-22.66	46	31.13	20.05	2.73	30.57	-	-	Peak
846.7	25.98	-20.02	46	29.84	23.27	3.26	30.39	-	-	Peak
2402	89.23	-	-	84.44	32.18	6.91	34.3	100	80	Peak
2402	52.75	-	-	-	-	-	-	-	-	Average
4803	41.68	-32.32	74	57.64	34.25	8.75	58.96	100	0	Peak
4803	5.2	-48.8	54	-	-	-	-	-	-	Average

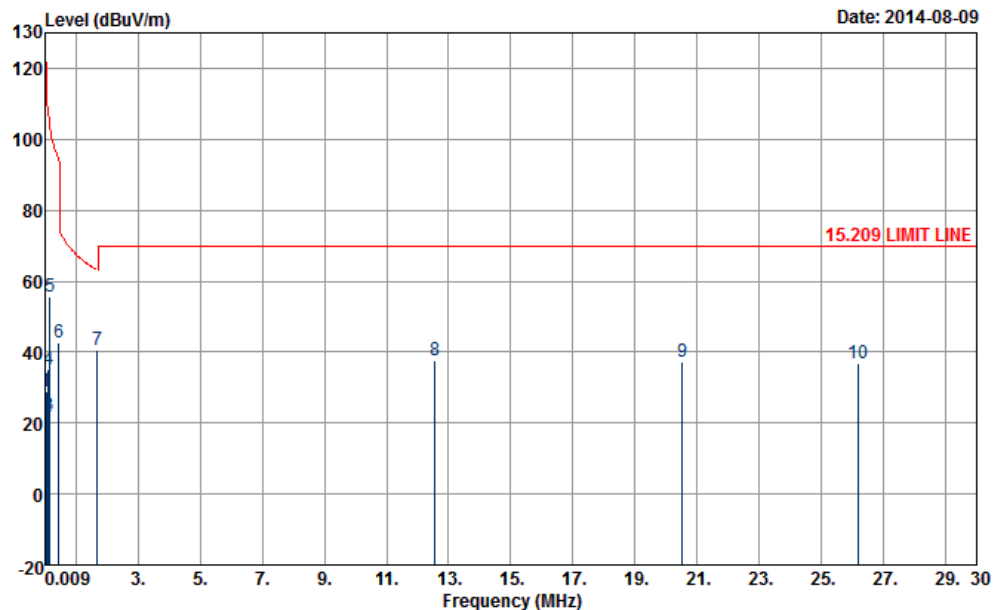
Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



<Below 30M>

2402MHz

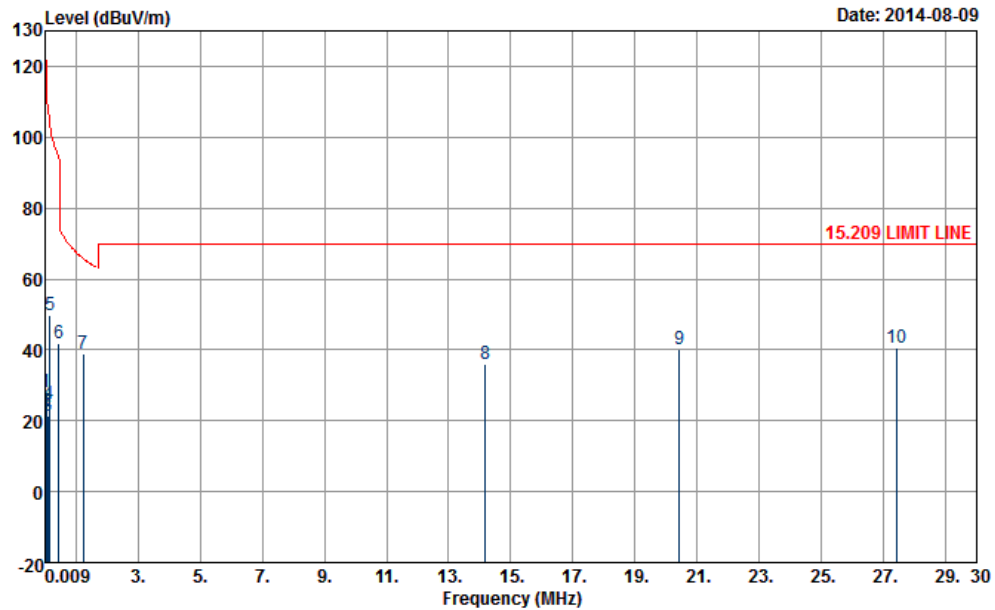
Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP ANT(ICC) HORIZONTAL

Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.04832	28.75	-85.17	113.92	8.29	20.17	0.29	-	-	Average
0.07881	21.83	-87.84	109.67	1.47	20.07	0.29	-	-	Average
0.10548	22.33	-84.81	107.14	1.99	20.05	0.29	-	-	QP
0.11184	35.08	-71.55	106.63	14.74	20.05	0.29	-	-	Average
0.17414	55.55	-47.24	102.79	35.29	19.97	0.29	-	-	Average
0.44104	42.67	-52.04	94.71	22.47	19.91	0.29	-	-	Average
1.699	40.38	-22.62	63	20.11	19.94	0.33	100	46	QP
12.568	37.82	-32.18	70	17.76	19.66	0.4	-	-	QP
20.527	37.43	-32.57	70	16.94	20.06	0.43	-	-	QP
26.195	36.91	-33.09	70	16.09	20.35	0.47	-	-	QP

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP ANT(ICC) VERTICAL

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.05215	28.05	-85.21	113.26	7.59	20.17	0.29	-	-	Average
0.07875	22.61	-87.07	109.68	2.25	20.07	0.29	-	-	Average
0.09918	21.47	-86.21	107.68	1.13	20.05	0.29	-	-	QP
0.14172	24.79	-79.79	104.58	4.48	20.02	0.29	-	-	Average
0.17346	49.75	-53.07	102.82	29.46	20	0.29	-	-	Average
0.44376	41.99	-52.67	94.66	21.79	19.91	0.29	-	-	Average
1.241	38.74	-26.99	65.73	18.5	19.93	0.31	100	299	QP
14.184	36.03	-33.97	70	16.02	19.61	0.4	-	-	QP
20.437	40.14	-29.86	70	19.66	20.05	0.43	-	-	QP
27.43	40.43	-29.57	70	19.62	20.33	0.48	-	-	QP

Note: For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per 15.31.



3.4 Antenna Requirements

3.4.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.4.2 Antenna Connector Construction

Embedded in Antenna.

**4. LIST OF MEASURING EQUIPMENT**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Aug. 07, 2014	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Aug. 07, 2014	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Aug. 07, 2014	Aug. 16, 2014	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9 kHz~7 GHz	Sep. 06, 2013	Aug. 09, 2014	Sep. 05, 2014	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	Aug. 09, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Dec. 02, 2012	Aug. 09, 2014	Dec. 03, 2014	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30 MHz ~ 1 GHz	Oct. 10, 2013	Aug. 09, 2014	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1 GHz~18 GHz	Aug. 22, 2013	Aug. 09, 2014	Aug. 21, 2014	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15 GHz- 40 GHz	Oct. 03, 2013	Aug. 09, 2014	Oct. 02, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 17, 2014	Aug. 09, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Nov. 29, 2013	Aug. 09, 2014	Nov. 28, 2014	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Aug. 09, 2014	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Aug. 09, 2014	N/A	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Jul. 31, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Jul. 31, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Jul. 31, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 31, 2014	N/A	Conduction (CO05-HY)