

**TEST REPORT**

Applicant Name & : Casada International GmbH  
Address : Obermeiers Feld3 ,33104 Paderborn,Germany

Sample Description  
Product : POWER BOARD 2.1  
FCC ID : 2AGDG801001  
Model No. : CFG-519  
Electrical Rating : AC110-120V, 60Hz,220W

Date Received : 11 October 2015

Date Test Conducted : 12 October 2015-02 December 2015  
Test standards : **47 CFR PART 15 Subpart C: 2014 section 15.249**

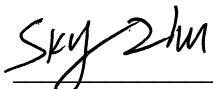
Test Result : Pass

Conclusion : The submitted samples complied with the above rules/standards.

Remark : None.

\*\*\*\*\*End of Page\*\*\*\*\*

*Prepared and Checked By:*

  
\_\_\_\_\_  
Sky Zhu  
Engineer  
Intertek Guangzhou

*Approved By:*

  
\_\_\_\_\_  
Helen Ma  
Team Leader  
Intertek Guangzhou  
09 January 2016  
\_\_\_\_\_  
Signature  
Date

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. The test report only allows to be revised within three years from its original issued date unless further standard or the requirement was noticed.

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch  
Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China  
Tel / Fax: 86-20-8213 9688/86-20-3205 7538

**CONTENT**

<b>TEST REPORT .....</b>	1
<b>CONTENT .....</b>	2
1.0    Summary of Test.....	3
2.0    General Description .....	4
2.1    Product Description.....	4
2.2    Related Submittal(s) Grants.....	5
2.3    Test Methodology.....	5
2.4    Test Facility.....	5
3.0    System Test Configuration.....	6
3.1    Justification .....	6
3.2    EUT Exercising Software.....	7
3.3    Special Accessories.....	7
3.4    Measurement Uncertainty.....	7
3.5    Equipment Modification.....	7
3.6    Support Equipment List and Description.....	7
4.0    Measurement Results .....	8
4.1    Antenna Requirement: .....	8
4.2    Occupied Bandwidth: .....	9
4.7    Radiated Emission .....	13
4.8    Band Edges Requirement .....	26
4.9    Conducted Emissions at Mains Terminals.....	29
10.0    Test Equipment List.....	32

**1.0 Summary of Test**

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Antenna Requirement	FCC PART 15 C Section 15.203	FCC PART 15 C Section 15.203	PASS
Occupied Bandwidth	FCC PART 15 C section 15.215(c)	ANSI C63.10: Clause 6.9	PASS
Radiated Emission	FCC PART 15 C section 15.249 (a), (d)	ANSI C63.10: Clause 6.4, 6.5 & 6.6	PASS
Band Edges Measurement	FCC PART 15 C section 15.249 (d)	ANSI C63.10: Clause 6.10	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	PASS
<b>Remark:</b>			
N/A: not applicable. Refer to the relative section for the details. EUT: In this whole report EUT means Equipment Under Test. Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver. RF: In this whole report RF means Radio Frequency. ANSI C63.10: the detail version is ANSI C63.10:2013 in the whole report.			

**2.0 General Description****2.1 Product Description**

Operating Frequency	2402 MHz to 2480 MHz
Type of Modulation:	GFSK
Number of Channels	40 Channels
Channel Separation:	2 MHz
Antenna Type	Integral
Antenna gain:	2 dBi
Speciality:	Bluetooth 4.0 with BLE (Bluetooth Low Energy)
Function:	Receive data from heart rate monitor
Power Supply:	120V/60Hz 180W
Power cord:	1.1 m x 3 wires unscreened AC supply cable
EUT modulation and data packet during test:	

The EUT has been tested on the Modulation of GFSK with 1 Mbps data rate.

EUT channels and frequencies list:

Test frequencies are the lowest channel 0: 2402 MHz, middle channel 19: 2440 MHz and the highest channel 39: 2480 MHz

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	/	/
13	2428	27	2456	/	/

## 2.2 Related Submittal(s) Grants

This is an application for certification of:  
DXX - Low power communications device transmitter

Remaining portions are subject to the following procedures:

1. Receiver portion of BLE: exempt from technical requirement of this Part.

## 2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10:2013. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

## 2.4 Test Facility

All of the tests are performed at:  
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch  
Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City,  
GETDD Guangzhou, China.

This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 549654.

### 3.0 System Test Configuration

#### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, AC power line was manipulated to produce worst case emissions. It was powered by AC 120V/60Hz supply.

The signal is maximized through rotation; the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. The spurious emissions more than 20 dB below the permissible value are not reported.

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

### **3.2 EUT Exercising Software**

No special exercising software

### **3.3 Special Accessories**

No special accessories used.

### **3.4 Measurement Uncertainty**

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

### **3.5 Equipment Modification**

Any modifications installed previous to testing by Casada International GmbH. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

### **3.6 Support Equipment List and Description**

The client make an Engineering Sample and used the software “Smart RF\_Studio \_7-1.16” adjust the high, middle, low frequency channel for test. The software install in the PC “Lenovo T430”. The Engineering sample connected with PC through a “Texas Instruments CC Debugger” Debug board. During the test, the PC, Engineer sample and the Debug board all in the test.

## 4.0 Measurement Results

### 4.1 Antenna Requirement:

Standard requirement

15.203 requirement:

For intentional device. According to 15.203. 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.

EUT Antenna

The antenna is an integral antenna and no consideration of replacement. The best case gain of the antenna is 2 dBi.



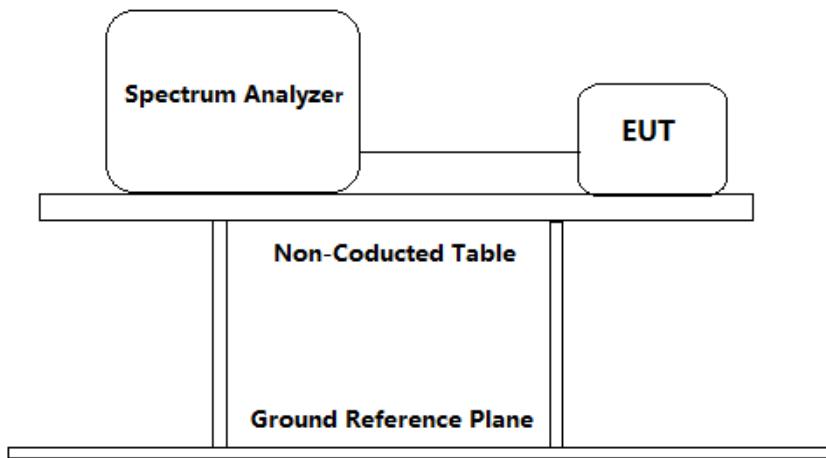
#### 4.2 Occupied Bandwidth:

Test Requirement: FCC PART 15 C section 15.215(c)  
(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated

Test Method: ANSI C63.10: Clause 6.9

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The highest, middle and the lowest channels were selected for the final test as listed below.

Test Configuration:



Test Procedure:

The transmitter was operated at its maximum carrier power measured under normal test conditions.

- The instrument center frequency was set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer was between 1.5 times and 5.0 times the OBW(20 dB Bandwidth).
- The nominal IF filter bandwidth (3 dB RBW) was set to 100kHz and VBW was approximately three times the RBW.
- Set the reference level of the instrument as required, keeping the signal from exceeding the

maximum input mixer level for linear operation. In general, the peak of the spectral envelope was more than [10 log (OBW/RBW)] below the reference level.

- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) The dynamic range of the instrument at the selected RBW was more than 10 dB below the target “-20 dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW was at least 30 dB below the reference value.
- f) Peak detection and max hold mode (until the trace stabilizes) was used.
- g) Used the 20dB bandwidth function of the instrument and reported the measured bandwidth.
- h) The occupied bandwidth was reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division was clearly labeled. Tabular data was reported in addition to the plot(s).

20 dB bandwidth:

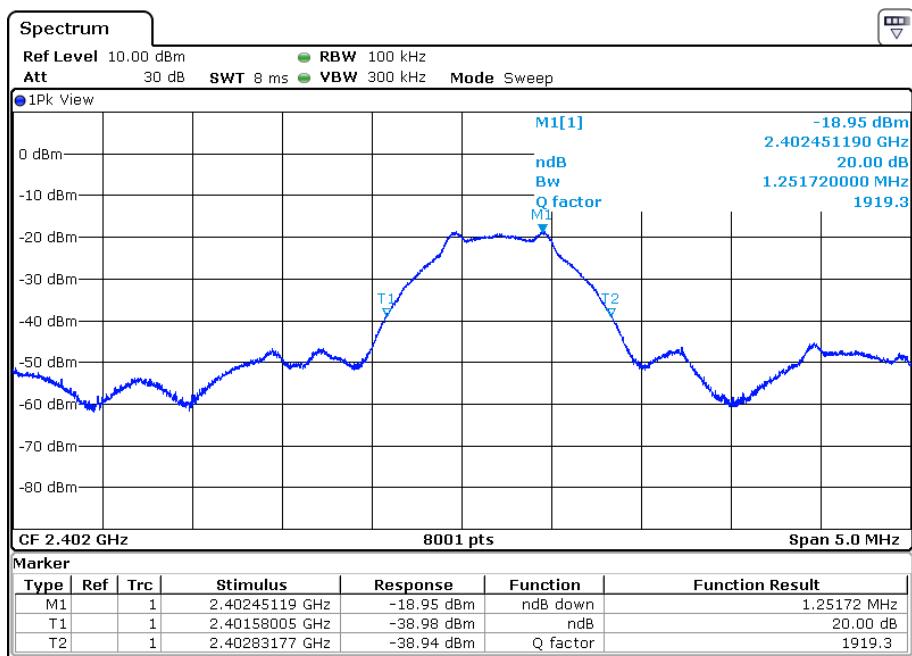
Channel No.	Frequency (MHz)	Measured 20 dB bandwidth (MHz)	Limit MHz	Result
0	2402	1.25	2400 to 2483.5	Pass
19	2440	1.26		Pass
39	2480	1.24		Pass

**20dB bandwidth:**

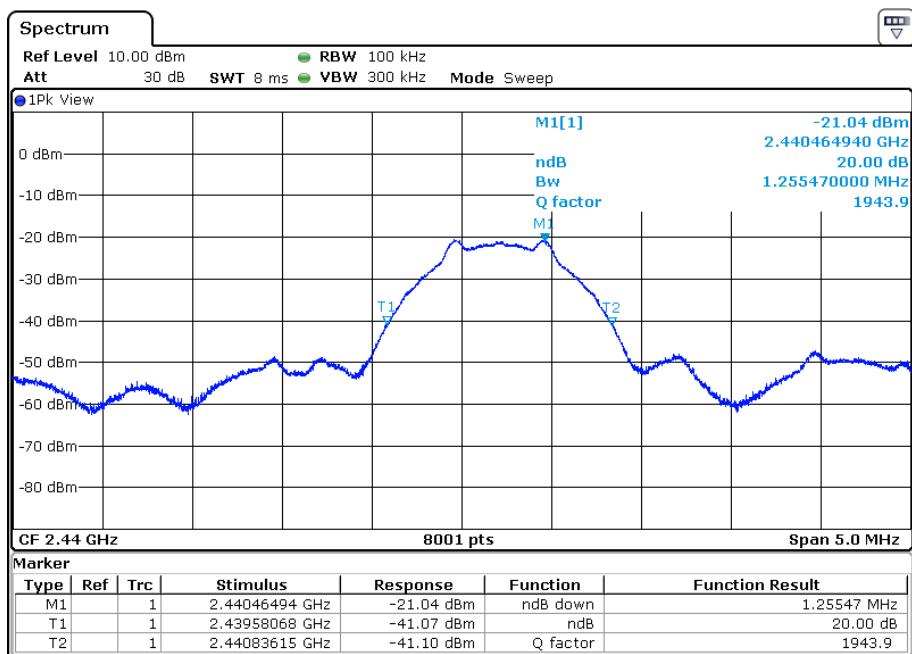
Result plot as follows:

Report No.: 150921116GZU-001  
 Issued: 2016-01-09

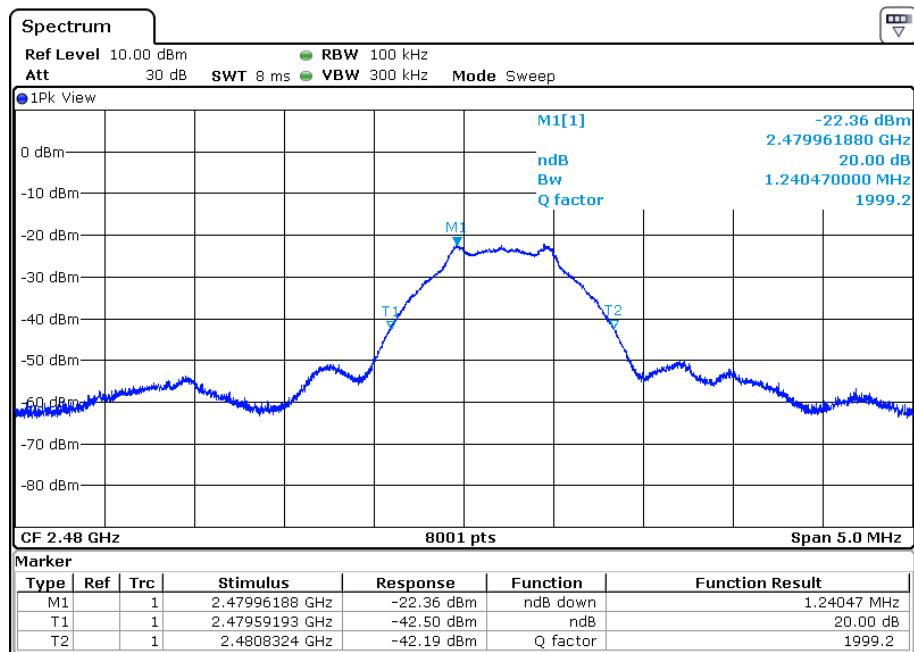
**Lowest channel (2.402 GHz):**



**Middle Channel (2.440 GHz):**



Report No.: 150921116GZU-001  
Issued: 2016-01-09

**Highest Channel (2.480 GHz):**

#### 4.7 Radiated Emission

Test Requirement:

FCC PART 15 C section 15.249 (a), (d)

(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 (MHz)	Field Strength of Fundamental (dB $\mu$ V/m @ 3m)	Field Strength of Harmonics (dB $\mu$ V/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0

**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.

(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.

Test Method:

ANSI C63.10: Clause 6.4, 6.5 and 6.6

Test Status:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The lowest, middle and the lowest channels were selected for the final test as listed below.

Test site:

Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit:

The field strength of radiated emission outside of the specified frequency bands, except for harmonics at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field Strength (dB $\mu$ V/m @ 3m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

Detector:

For Peak and Quasi-Peak value:

200 Hz for 9 kHz to 150 kHz

9 kHz for 150 kHz to 30 MHz

Report No.: 150921116GZU-001  
Issued: 2016-01-09

120 kHz for 30 MHz to 1GHz

RBW = 1 MHz for  $f \geq 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak for  $f \geq 1$  GHz, QP for  $f < 1$  GHz

Trace = max hold

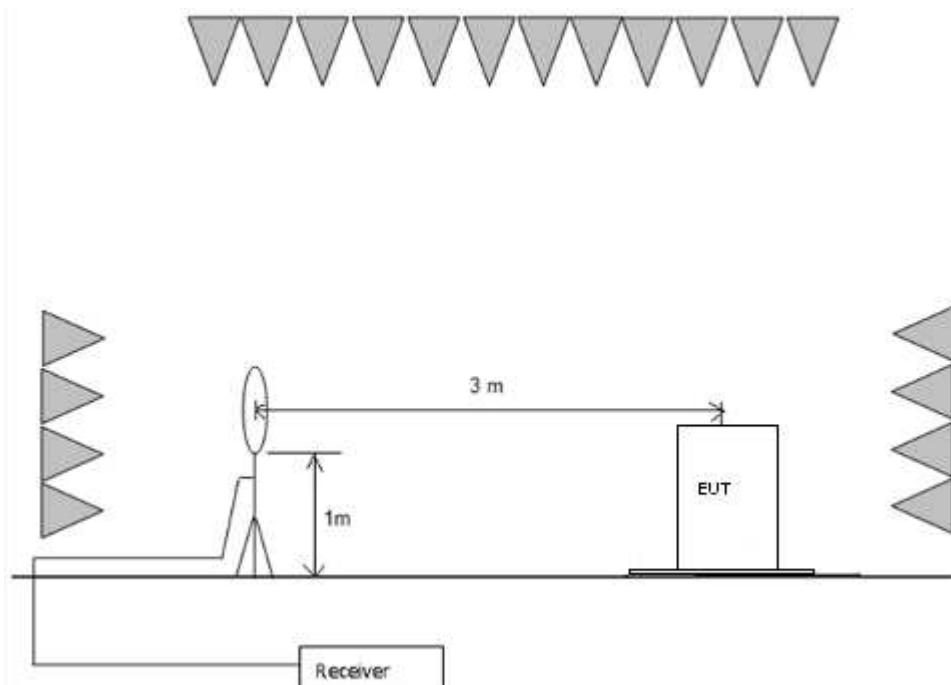
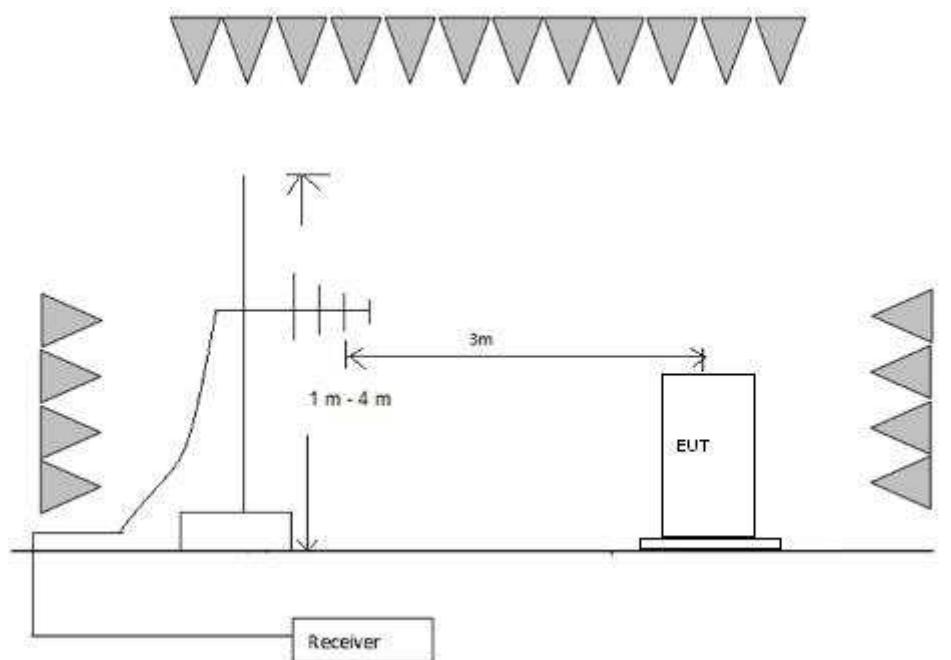
According 15.35(c), when the field strength (or envelope power) is not constant or it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 second, the average value of field strength or output power shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

All measurement for radiated emission within the restricted band were performed using a QP detector with 120kHz RBW,300kHz VBW below 1GHz and PK detector with 1MHz RBW,3MHz VBW above 1GHz. average detector with 1MHz RBW,10Hz VBW above 1GHz

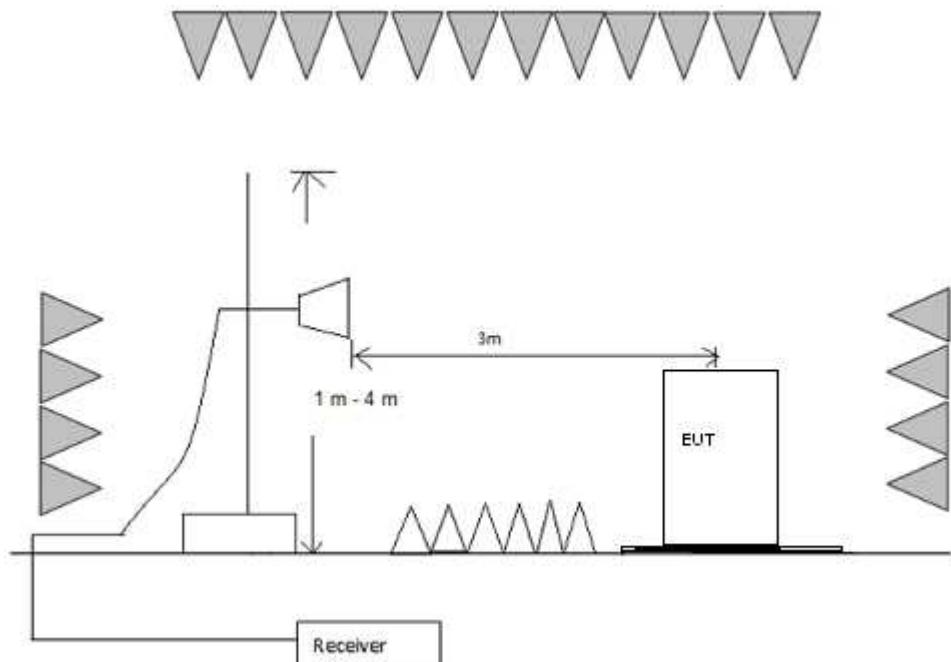
## Section 15.205 Restricted bands of operation.

<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>GHz</b>
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 -	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.69525	960 - 1240	7.25 - 7.75
4.125 - 4.128	16.80425 -	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	16.80475	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	25.5 - 25.67	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	37.5 - 38.25	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	73 - 74.6	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	74.8 - 75.2	2200 - 2300	14.47 - 14.5
8.291 - 8.294	108 - 121.94	2310 - 2390	15.35 - 16.2
8.362 - 8.366	123 - 138	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	149.9 - 150.05	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.52475 -	3260 - 3267	23.6 - 24.0
12.29 - 12.293	156.52525	3332 - 3339	31.2 - 31.8
12.51975 -	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
12.52025	162.0125 - 167.17	3600 - 4400	
12.57675 -	167.72 - 173.2		
12.57725	240 - 285		
13.36 - 13.41	322 - 335.4		

## Test Configuration:

1) 9 kHz to 30 MHz emissions:2) 30 MHz to 1 GHz emissions:

3) 1 GHz to 40 GHz emissions:



**Test Procedure:****1) 9 kHz to 30 MHz emissions:**

For testing performed with the loop antenna. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the special distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

**2) 30 MHz to 1 GHz emissions:**

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

**3) 1 GHz to 25 GHz emissions:**

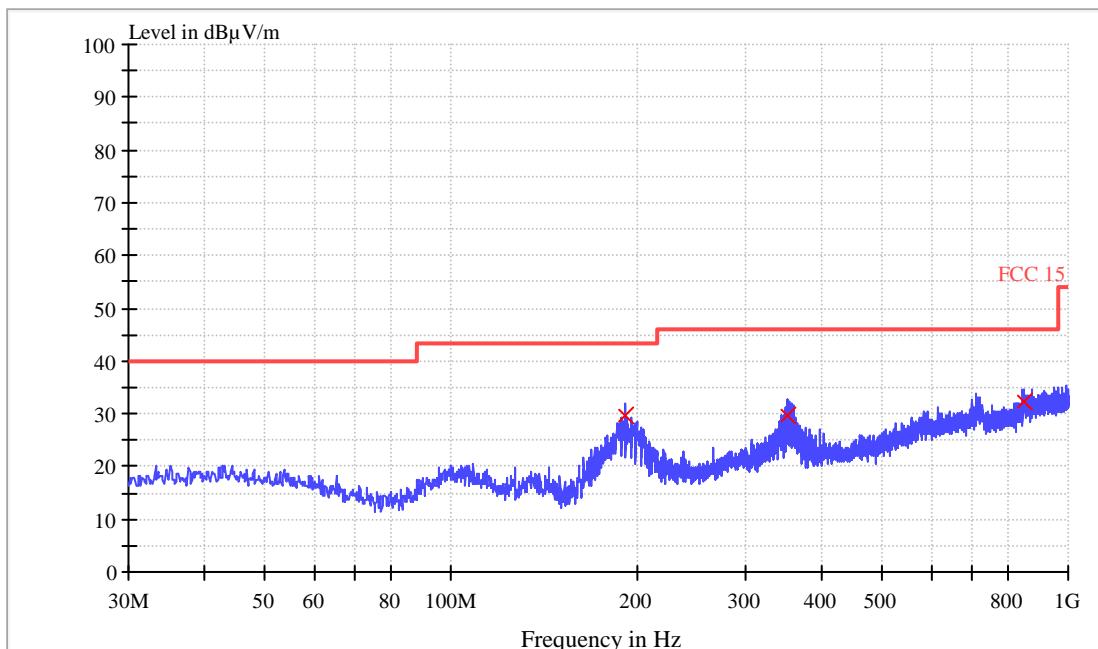
Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

**4) The receiver was scanned from 9 kHz to 25 GHz.** When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

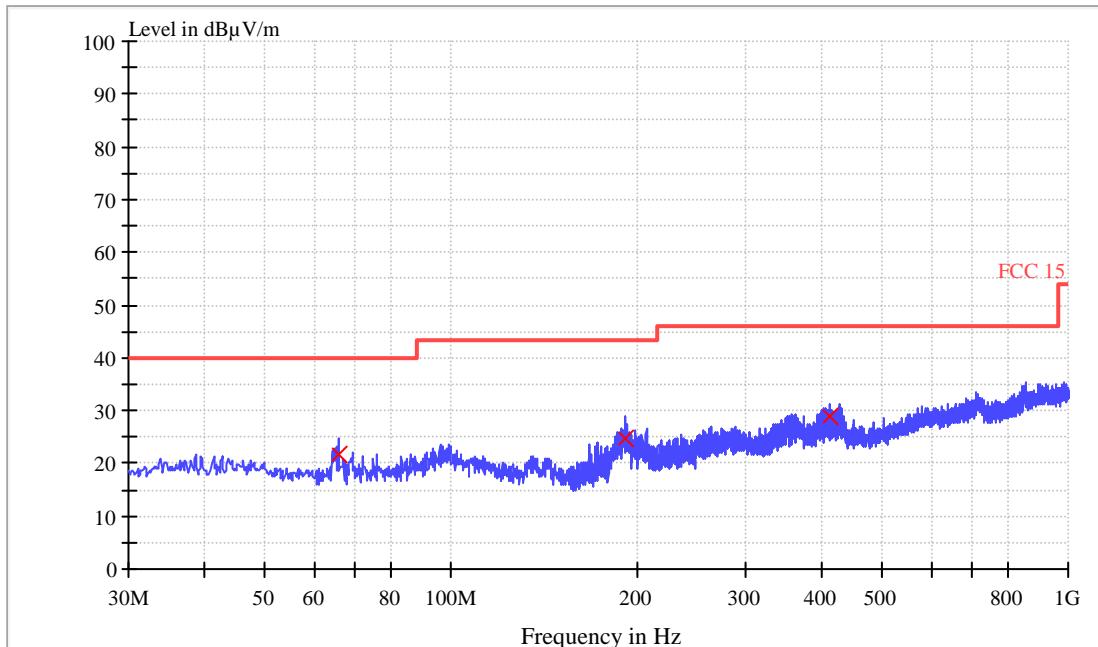
**9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement**

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

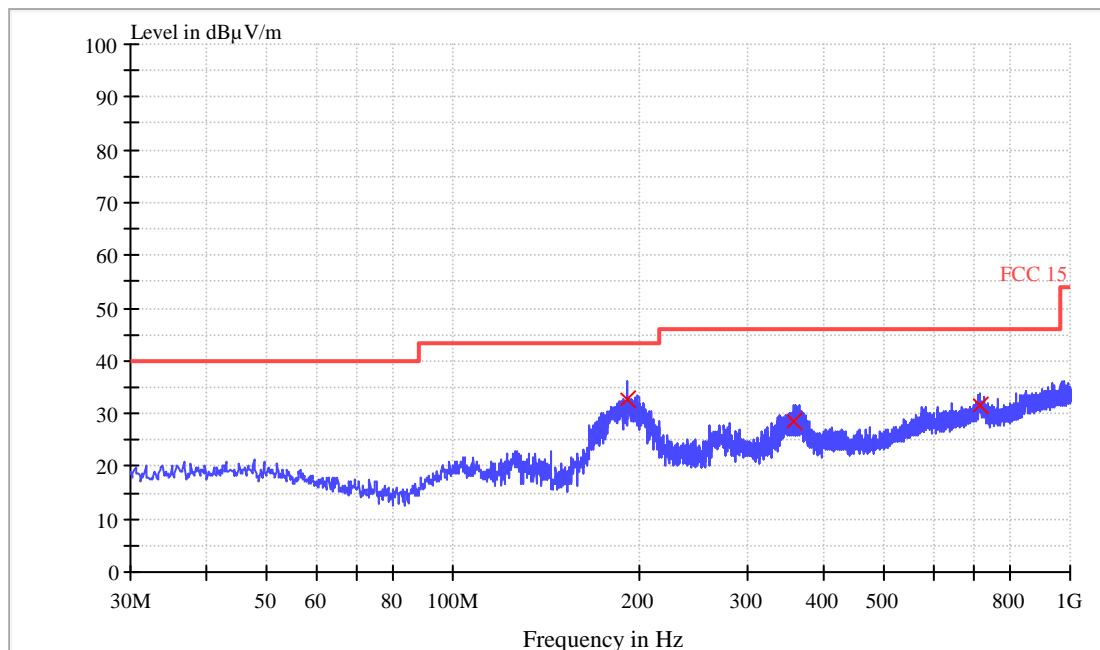
**Radiated Emissions (Below 1GHz)**Test curve and data: Operation Frequency: 2402MHz  
Horizontal**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
191.960000	29.7	120.000	V	9.7	13.8	43.5
351.880000	29.7	120.000	V	16.4	16.3	46.0
849.960000	32.5	120.000	V	25.2	13.5	46.0

Vertical

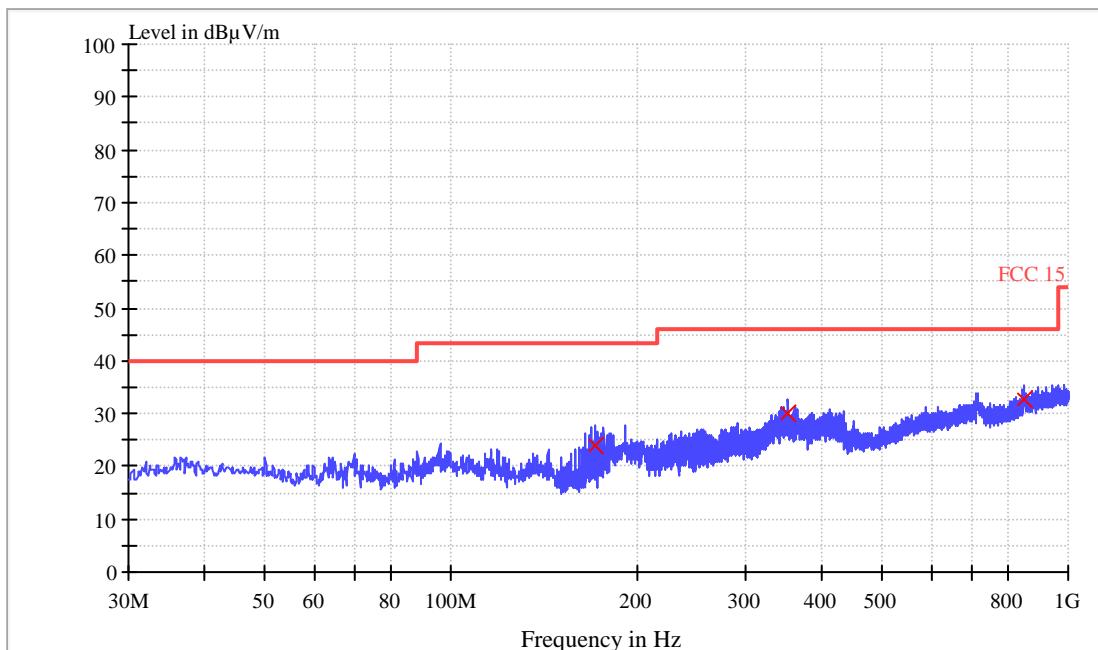
**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
65.720000	21.7	120.000	V	10.4	18.3	40.0
191.960000	24.7	120.000	V	9.7	18.8	43.5
410.080000	28.9	120.000	V	18.1	17.1	46.0

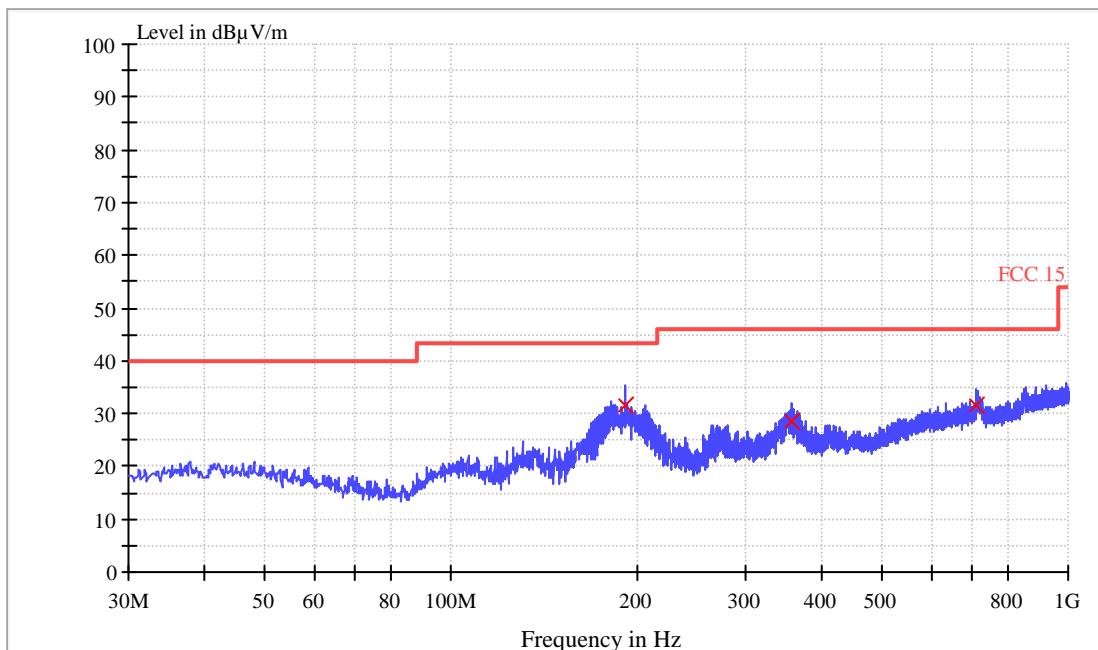
Test curve and data: Operation Frequency: 2440MHz  
Horizontal**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
191.960000	32.6	120.000	H	9.7	10.9	43.5
357.440000	28.4	120.000	H	16.4	17.6	46.0
716.480000	31.7	120.000	H	23.1	14.3	46.0

Vertical

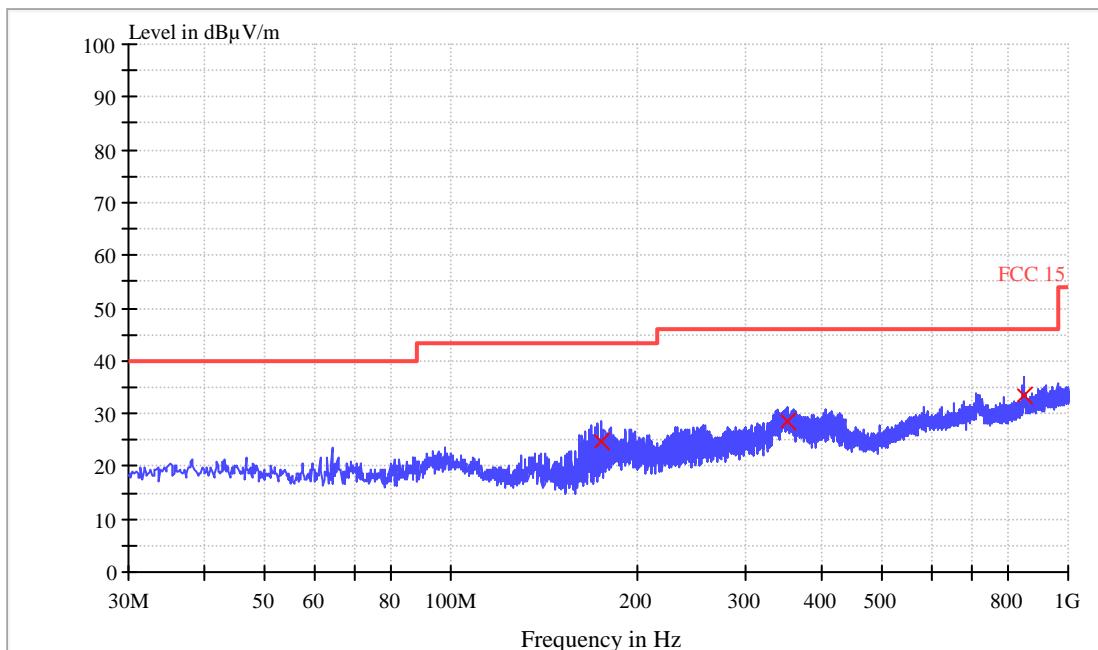
**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
171.080000	24.0	120.000	V	8.7	19.5	43.5
352.320000	29.9	120.000	V	16.4	16.1	46.0
850.400000	32.6	120.000	V	25.2	13.4	46.0

Test curve and data: Operation Frequency: 2480MHz  
Horizontal**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
191.960000	31.6	120.000	H	9.7	11.9	43.5
357.440000	28.3	120.000	H	16.4	17.7	46.0
709.280000	31.6	120.000	H	23.0	14.4	46.0

Vertical

**Test result QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
175.040000	24.8	120.000	V	8.9	18.7	43.5
350.840000	28.7	120.000	V	16.4	17.3	46.0
846.560000	33.5	120.000	V	25.1	12.5	46.0

**Radiated Emissions (Above 1GHz)**

Operation Frequency: 2402MHz:

Polarization	Frequency (MHz)	PK Net at 3m (dB $\mu$ V/m)	AV Net at 3m (dB $\mu$ V/m)	Correction Factor (dB)	PK Limit at 3m (dB $\mu$ V/m)	PK Margin (dB)	AV Limit at 3m (dB $\mu$ V/m)	AV Margin (dB)
Horizontal	2401.437	78.3	70.3	-7.3	114.0	-35.7	94.0	-23.7
Horizontal	4803.600	37.3	--	-8.8	--	--	54.0	-16.7
Horizontal	7103.600	35.4	--	-6.2	--	--	54.0	-18.6
Horizontal	10250.000	35.9	--	-4.7	--	--	54.0	-18.1
Vertical	1953.600	44.6	--	-14.0	--	--	54.0	-9.4
Vertical	2401.437	87.9	82.8	-7.3	114.0	-26.1	94.0	-11.2
Vertical	4804.000	57.3	51.8	-8.8	74.0	-16.7	54.0	-2.2
Vertical	7206.000	38.4	--	-6.2	--	--	54.0	-15.6

Operation Frequency: 2440MHz:

Polarization	Frequency (MHz)	PK Net at 3m (dB $\mu$ V/m)	AV Net at 3m (dB $\mu$ V/m)	Correction Factor (dB)	PK Limit at 3m (dB $\mu$ V/m)	PK Margin (dB)	AV Limit at 3m (dB $\mu$ V/m)	AV Margin (dB)
Horizontal	2439.688	85.2	78.5	-7.1	114.0	-28.8	94.0	-15.5
Horizontal	4884.200	50.5	--	-8.8	--	--	54.0	-3.5
Horizontal	7321.200	35.6	--	-6.1	--	--	54.0	-18.4
Horizontal	10322.400	35.6	--	-4.6	--	--	54.0	-18.4
Vertical	1368.800	32.9	--	-17.0	--	--	54.0	-21.1
Vertical	2439.687	86.6	80.4	-7.1	114.0	-27.4	94.0	-13.6
Vertical	4880.400	53.8	48.6	-8.8	74.0	-20.2	54.0	-5.4
Vertical	7320.400	38.4	--	-6.1	--	--	54.0	-15.6

Operation Frequency: 2480MHz:

Polarization	Frequency (MHz)	PK Net at 3m (dB $\mu$ V/m)	AV Net at 3m (dB $\mu$ V/m)	Correction Factor (dB)	PK Limit at 3m (dB $\mu$ V/m)	PK Margin (dB)	AV Limit at 3m (dB $\mu$ V/m)	AV Margin (dB)
Horizontal	2479.531	85.7	78.9	-7.0	114.0	-28.3	94.0	-15.1
Horizontal	4960.800	51.3	--	-8.9	--	--	54.0	-2.7
Horizontal	7678.400	35.1	--	-6.0	--	--	54.0	-18.9
Horizontal	10306.800	35.8	--	-4.6	--	--	54.0	-18.2
Vertical	2479.531	87.8	82.3	-7.0	114.0	-26.2	94.0	-11.7
Vertical	4960.000	56.5	52.4	-8.9	74.0	-17.5	54.0	-1.6
Vertical	7440.800	39.7	--	-6.0	--	--	54.0	-14.3
Vertical	10368.400	35.7	--	-4.6	--	--	54.0	-18.3

Notes:

1. AT frequencies equal to or less than 1000MHz, quasi-peak detector was used, above 1000MHz, Peak detector was used.
2. All measurements were made at 3 meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. When Peak emission level was below AV limit, the AV emission level did not be recorded.

#### 4.8 Band Edges Requirement

Test Requirement: FCC PART 15 C section 15.249 (d)

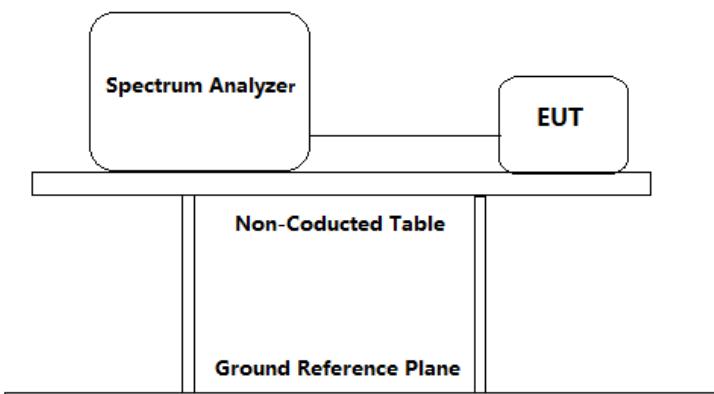
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in§ 15.209, whichever is the lesser attenuation.

Frequency Band: 2400 MHz to 2483.5 MHz

Test Method: ANSI C63.10: Clause 6.10

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The lowest, middle and the highest channels were selected for the final test as listed below.

Test Configuration:

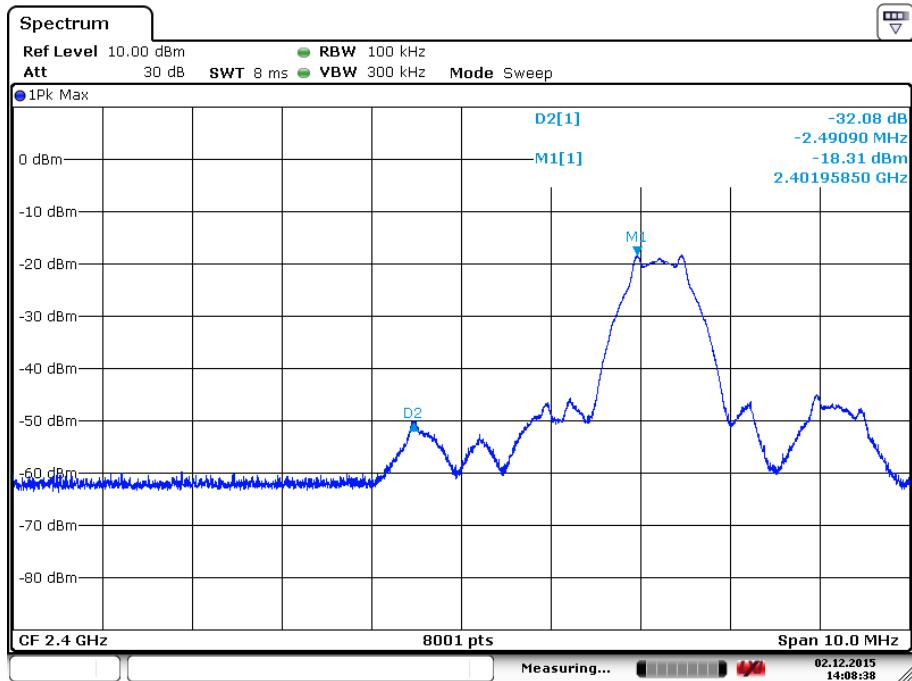


**Test result with plots as follows:**

**Result plot as follows:**

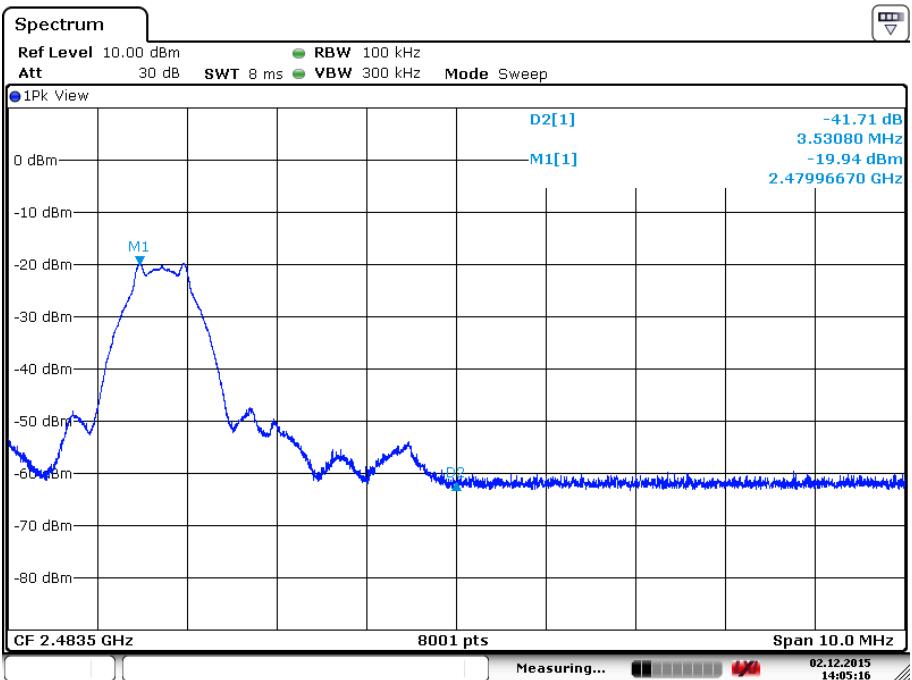
Report No.: 150921116GZU-001  
Issued: 2016-01-09

Channel 0: 2.402 GHz



Date: 2.DEC.2015 14:08:37

Channel 39: 2.480 GHz



Date: 2.DEC.2015 14:05:16

### Peak Measurement

Band-edge compliance is determined by applying marker-delta method, i.e (Band-edge Plot).

(i) Lower band-edge:

Peak Resultant field strength

$$\begin{aligned} &= \text{Fundamental emissions (Peak value)} - \text{delta from the band-edge plot} \\ &= 87.9 \text{dB}\mu\text{v/m} - 32.1 \text{dB} \\ &= 55.8 \text{dB}\mu\text{v/m} \end{aligned}$$

Average Resultant field strength

$$\begin{aligned} &= \text{Fundamental emissions (Average value)} - \text{delta from the band-edge plot} \\ &= 82.8 \text{dB}\mu\text{v/m} - 32.1 \text{dB} \\ &= 50.7 \text{dB}\mu\text{v/m} \end{aligned}$$

(ii) Upper band-edge:

Peak Resultant field strength

$$\begin{aligned} &= \text{Fundamental emissions (Peak value)} - \text{delta from the band-edge plot} \\ &= 87.8 \text{dB}\mu\text{v/m} - 41.7 \text{dB} \\ &= 46.1 \text{dB}\mu\text{v/m} \end{aligned}$$

AV Resultant field strength

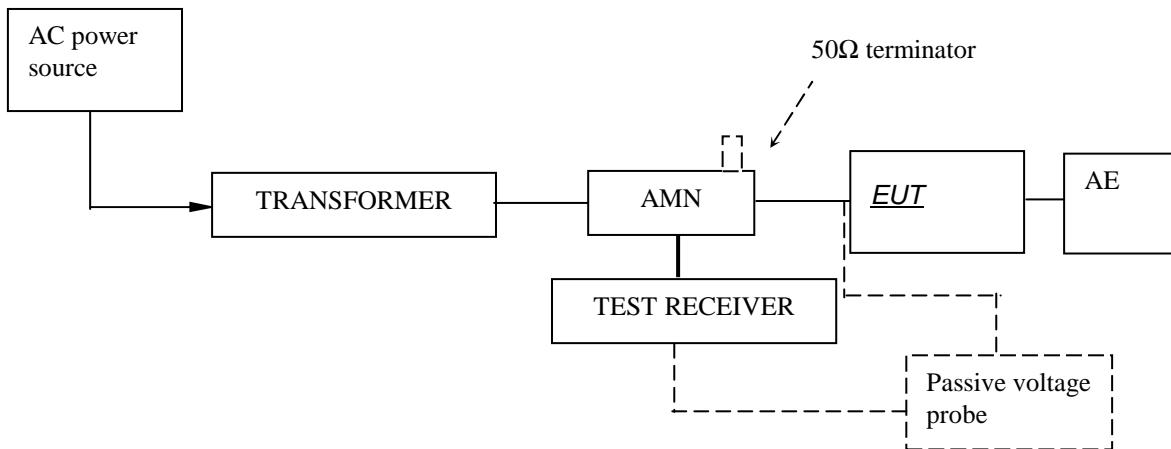
$$\begin{aligned} &= \text{Fundamental emissions (Average value)} - \text{delta from the band-edge plot} \\ &= 82.3 \text{dB}\mu\text{v/m} - 41.7 \text{dB} \\ &= 40.6 \text{dB}\mu\text{v/m} \end{aligned}$$

The Peak resultant field strength meets the general radiated emission Peak limit 74dB $\mu$ v/m, so it complies with the requirement.

The AV resultant field strength meets the general radiated emission AV limit 54dB $\mu$ v/m, so it complies with the requirement.

#### 4.9 Conducted Emissions at Mains Terminals

Test Configuration:



#### Test Setup and Procedure

Test was performed according to ANSI C63.10 Clause 6.2. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a  $50\Omega$  linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 10mm high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

Pre-test in the three channels: 2402MHz, 2440MHz and 2480MHz and found the conducted emission on 2440MHz was the worst case, so below test data was for 2440MHz.

**Test Data**

At main terminal: Pass

Tested Wire: Live

Operation Mode: Operate at 2440MHz Continues transmit

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC15QP			
Trace2:	FCC15AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB $\mu$ V	DELTA	LIMIT dB
2 Average	1.246 MHz	38.23 L1	-7.76	
2 Average	1.37 MHz	37.33 L1	-8.66	
2 Average	686 kHz	35.80 L1	-10.19	
2 Average	406 kHz	33.93 L1	-13.79	
2 Average	2.65 MHz	30.03 L1	-15.96	
1 Quasi Peak	1.37 MHz	39.51 L1	-16.48	
1 Quasi Peak	1.122 MHz	39.25 L1	-16.74	
2 Average	218 kHz	32.33 L1	-20.55	
1 Quasi Peak	2.182 MHz	34.60 L1	-21.39	
2 Average	4.986 MHz	24.35 L1	-21.64	
1 Quasi Peak	654 kHz	33.50 L1	-22.49	
1 Quasi Peak	406 kHz	34.07 L1	-23.65	

Tested Wire: Neutral

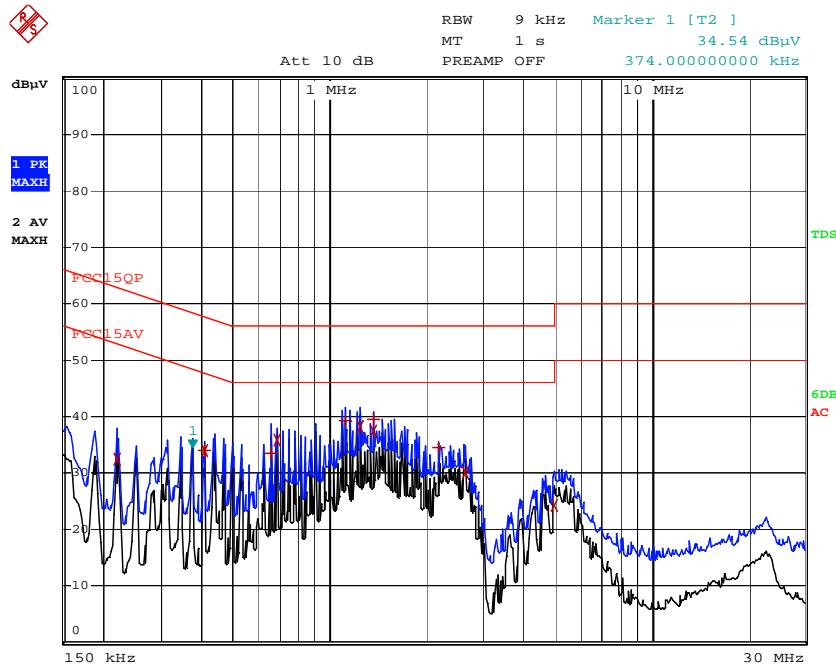
Operation Mode: Operate at 2440MHz Continues transmit

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC15QP			
Trace2:	FCC15AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB $\mu$ V	DELTA	LIMIT dB
2 Average	2.618 MHz	36.69 L1	-9.30	
2 Average	1.434 MHz	35.23 L1	-10.76	
2 Average	1.246 MHz	34.26 L1	-11.73	
1 Quasi Peak	2.618 MHz	39.68 L1	-16.31	
1 Quasi Peak	1.434 MHz	38.65 L1	-17.34	
1 Quasi Peak	1.214 MHz	36.98 L1	-19.01	
2 Average	654 kHz	23.90 L1	-22.09	
2 Average	150 kHz	33.10 L1	-22.89	
2 Average	302 kHz	26.88 L1	-23.30	
2 Average	4.362 MHz	19.34 L1	-26.65	
1 Quasi Peak	530 kHz	27.02 L1	-28.97	

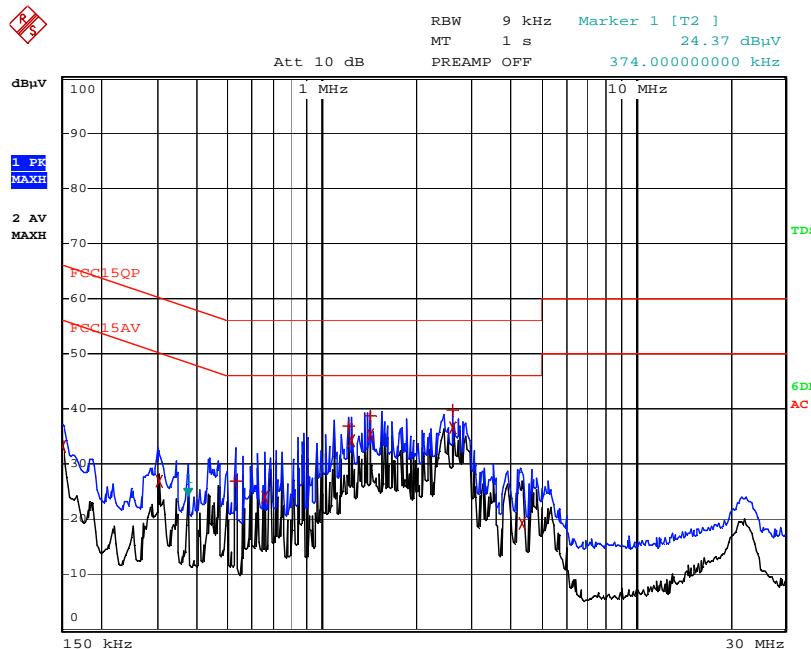


Report No.: 150921116GZU-001  
Issued: 2016-01-09

## Emission Curve Tested Wire: Live



Tested Wire: Neutral



## 10.0 Test Equipment List

### Radiated Emission

Equipment No.	Equipment	Model	Manufacturer	Cal. date (YYYY-MM-DD)	Calibration Interval
EM030-01	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS•LINDGREN	2015-04-02	1Y
EM030-02	Control room for 3m Semi-Anechoic Chamber	4×4×3 m <sup>3</sup>	ETS•LINDGREN		
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2015-06-03	1Y
SZ056-03	Spectrum Analyzer	FSP30	R&S	2015-03-10	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2015-06-03	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2015-05-25	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz)	VULB 9161	SCHWARZBECK	2015-05-25	1Y
EM033-02	Double-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)	R&S HF907	R&S	2015-05-25	1Y
EM033-03	High Frequency Antenna & preamplifier (18 GHz~26.5 GHz)	R&S SCU-26	R&S	2015-05-25	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2015-05-25	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	/	R&S	2015-06-03	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	/	R&S	2015-06-09	
EM033-04-02	Coaxial cable (18~40) GHz	/	R&S	2015-06-09	
EM022-03	2.45 GHz Filter	BRM 50702	Micro-Tronics	2015-05-06	1Y

### Conducted emission at the mains terminals test

Equipment No.	Equipment	Model	Manufacturer	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	2015-08-04	1Y
EM006-05	LISN	ENV216	R&S	2015-09-12	1Y
EM006-06	LISN	ENV216	R&S	2015-09-12	1Y
EM006-06-01	Coaxial cable	/	R&S	2015-04-12	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	2015-08-04	1Y