



# TEST REPORT

**Report Reference No.**..... : **TRE1712002905** R/C.....: 23847

**FCC ID**..... : **WA6S5701**

**Applicant's name**..... : **Verykool USA Inc**

**Address**..... : 3636 Nobel Drive,Suite 325, San Diego,CA 92122 USA

**Manufacturer**..... : HUAWO TECHNOLOGY LIMITED

**Address**..... : 3 floor west,B building,New world shopping plaza,Gushu 2nd road,Xixiang street,Baoan District,Shenzhen,China

**Test item description** ..... : **Mobile Phone**

**Trade Mark** ..... : Verykool

**Model/Type reference**..... : s5702

**Listed Model(s)** ..... : s5701

**Standard** ..... : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

**Date of receipt of test sample**..... : Dec.05, 2017

**Date of testing**..... : Dec.05, 2017 - Dec.25, 2017

**Date of issue**..... : Dec.26, 2017

**Result**..... : **PASS**

Compiled by  
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Approved by  
( Position+Printed name+Signature) : RF Manager Hans Hu *Hans Hu*

**Testing Laboratory Name** ..... : **Shenzhen Huatongwei International Inspection Co., Ltd.**

**Address**..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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The test report merely correspond to the test sample.

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# **1. TEST STANDARDS AND REPORT VERSION**

## **1.1. Test Standards**

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10:2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 558074 D01 DTS Meas Guidance v04](#): Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247

## **1.2. Report version**

Version No.	Date of issue	Description
00	Dec.26, 2017	Original

## **2. TEST DESCRIPTION**

<b>Test Item</b>	<b>FCC Rule</b>	<b>Result</b>	<b>Test Engineer</b>
Antenna requirement	15.203/15.247(c)	Pass	William Wang
Line Conducted Emissions (AC Main)	15.207	Pass	William Wang
Conducted Peak Output Power	15.247(b)(3)	Pass	Baozhu Hu
Power Spectral Density	15.247(e)	Pass	Baozhu Hu
6dB Bandwidth	15.247(a)(2)	Pass	Baozhu Hu
Restricted band	15.247(d)/15.205	Pass	Baozhu Hu
Spurious Emissions	15.247(d)/15.209	Pass	Baozhu Hu

Note: The measurement uncertainty is not included in the test result.

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	Verykool USA Inc
Address:	3636 Nobel Drive,Suite 325, San Diego,CA 92122 USA
Manufacturer:	HUAWO TECHNOLOGY LIMITED
Address:	3 floor west,B building,New world shopping plaza,Gushu 2nd road, Xixiang street,Baoan District,Shenzhen,China

#### 3.2. Product Description

Name of EUT:	Mobile Phone
Trade Mark:	Verykool
Model No.:	s5702
Listed Model(s):	s5701
IMEI 1 :	352484079998752
IMEI 2 :	352484079999874
Power supply:	DC 3.8V
Adapter information:	Input: 100-240Va.c., 50/60Hz, 0.2A Output: 5Vd.c.,1000mA
Hardware version:	MF0MCCRA1-1
Software version:	s5072_VK_Movi_Dual_SW_V1.0
<b>Bluetooth</b>	
Version:	Supported BT4.1+BLE
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	Integral antenna
Antenna gain:	-1.2dBi

### 3.3. Operation state

➤ **Test frequency list**

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
00	2402
01	2404
⋮	⋮
19	2440
⋮	⋮
38	2478
39	2480

➤ **Test mode**

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For Radiated suprious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

### 3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

/	Manufacturer:	/
	Model No.:	/
/	Manufacturer:	/
	Model No.:	/

### 3.5. Modifications

No modifications were implemented to meet testing criteria.

## **4. TEST ENVIRONMENT**

### **4.1. Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

### **4.2. Test Facility**

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 3902.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **FCC-Registration No.: 762235**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

#### **IC-Registration No.:5377B-1**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377B-1.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### 4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

### 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.39 dB	(1)
Radiated Emissions 30~1000MHz	4.24 dB	(1)
Radiated Emissions 1~18GHz	5.16 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.



#### 4.5. Equipments Used during the Test

Conducted Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
2	Artificial Mains	SCHWARZBECK	NNLK 8121	573	11/11/2017	11/10/2018
3	Pulse Limiter	R&S	ESH3-Z2	101488	11/11/2017	11/10/2018
4	Test Software	R&S	ES-K1	N/A	N/A	N/A
5	RF Connection Cable	HUBER+SUHNER	EF400	N/A	11/21/2017	11/20/2018
6	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	11/11/2017	11/10/2018
7	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	11/11/2017	11/10/2018
8	Four Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T8-02	20375	11/11/2017	11/10/2018
9	V-Network	R&S	ESH3-Z6	100211	11/11/2017	11/10/2018
10	V-Network	R&S	ESH3-Z6	100210	11/11/2017	11/10/2018
11	2-Line V-Network	R&S	ESH3-Z5	100049	11/11/2017	11/10/2018

Radiated Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
2	Loop Antenna	R&S	HFH2-Z2	100020	11/20/2017	11/19/2018
3	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	4/5/2017	4/4/2018
4	Horn Antenna	SCHWARZBECK	9120D	1011	3/27/2017	3/26/2018
5	Horn Antenna	SCHWARZBECK	BBHA9170	25841	3/27/2017	3/26/2018
6	Preamplifier	SCHWARZBECK	BBV 9743	9743-0022	10/18/2017	10/17/2018
7	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-248	10/18/2017	10/17/2018
8	High pass filter	Compliance Direction systems	BSU-6	34202	11/11/2017	11/10/2018
9	Turntable	MATURO	TT2.0	/	N/A	N/A
10	Antenna Mast	MATURO	TAM-4.0-P	/	N/A	N/A
11	EMI Test Software	R&S	ESK1	N/A	N/A	N/A
12	EMI Test	Audix	E3	N/A	N/A	N/A

	Software					
13	RF Connection Cable	HUBER+SUHNER	3m 3GHz S	N/A	11/21/2017	11/20/2018
14	RF Connection Cable	HUBER+SUHNER	3m 3GHz RG	N/A	11/21/2017	11/20/2018
15	RF Connection Cable	HUBER+SUHNER	6m 18GHz S	N/A	11/21/2017	11/20/2018

RF Conducted Method						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Spectrum Analyzer	R&S	FSV40	100048	11/11/2017	11/10/2018
2	OSP	R&S	OSP120	101317	N/A	N/A
3	OSP	R&S	OSP-B157	100890	N/A	N/A
4	Signal generator	R&S	SMB100A	177956	11/11/2017	11/10/2018
5	Vector signal generator	R&S	SMBV100A	260790	7/20/2017	7/19/2018
6	EXA Signal Analyzer	Agilent	N9020A	184247	9/22/2017	9/21/2018
7	Power Meter	Agilent	U2021XA	178231	9/22/2017	9/21/2018
8	DAQ Device	Agilent	U2531A	132812	9/22/2017	9/21/2018

The Cal.Interval was one year.

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Antenna Requirement

#### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C Section 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

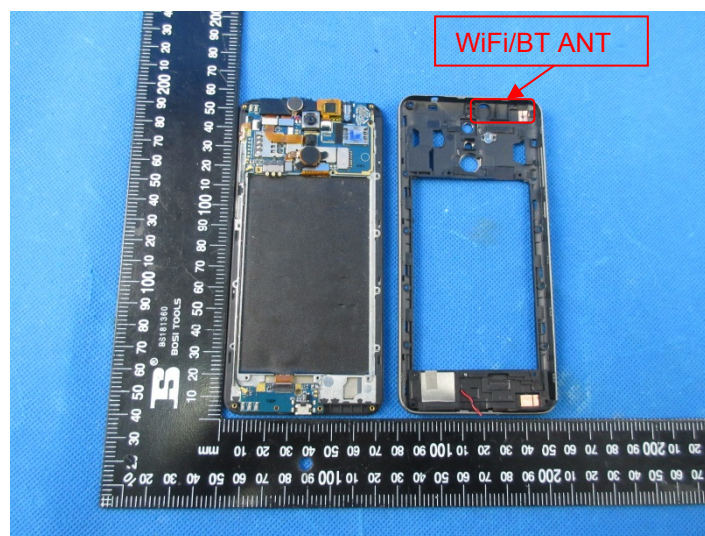
##### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### TEST RESULTS

Passed       Not Applicable

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



## 5.2. Conducted Emissions (AC Main)

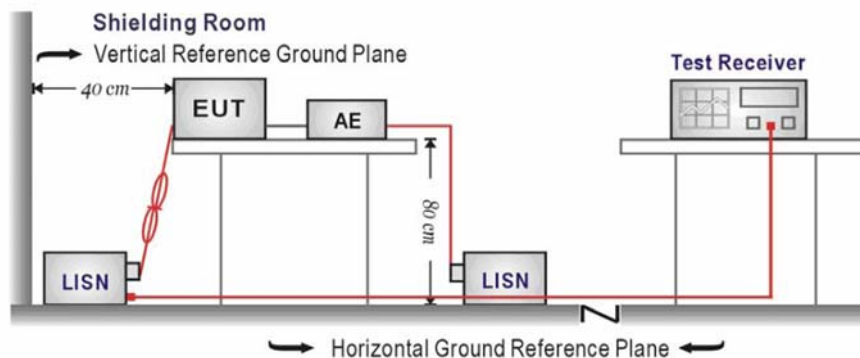
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

### TEST MODE:

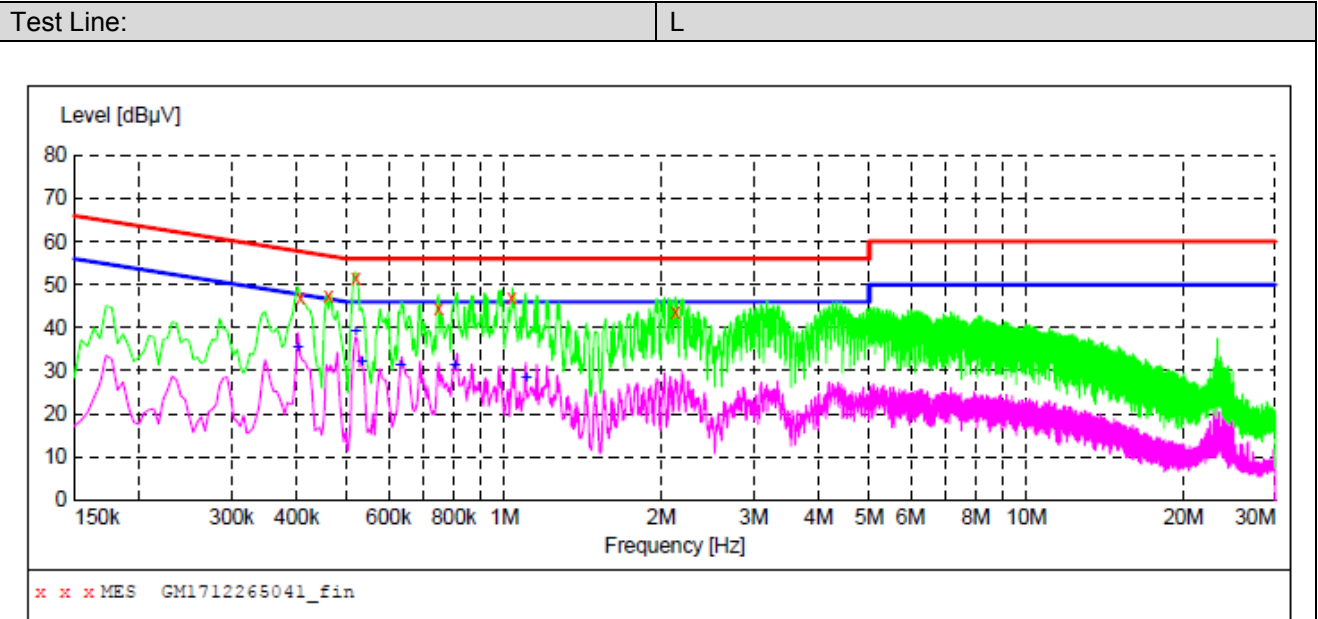
Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

Note:

- 1) Transd = Cable lose + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin = Limit - Level



**MEASUREMENT RESULT: "GM1712265041\_fin"**

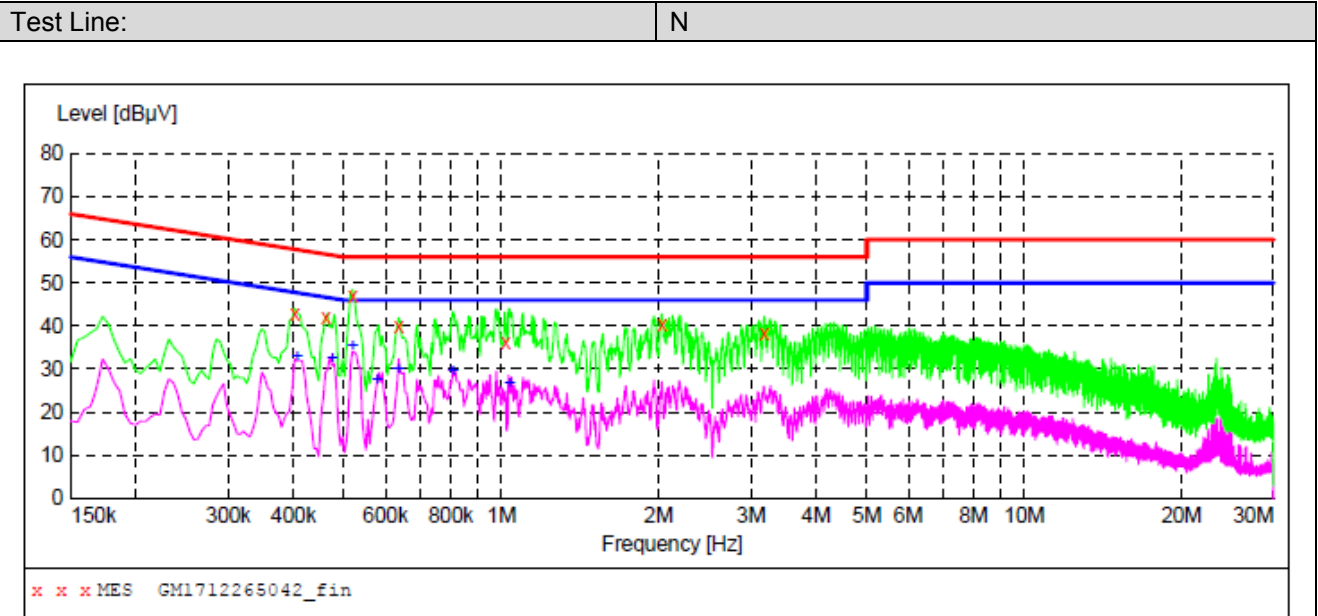
26/12/2017 13:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.406500	46.80	9.9	58	10.9	QP	L1	GND
0.460500	47.30	9.9	57	9.4	QP	L1	GND
0.519000	51.60	10.0	56	4.4	QP	L1	GND
0.748500	44.40	10.0	56	11.6	QP	L1	GND
1.032000	47.00	10.1	56	9.0	QP	L1	GND
2.125500	43.50	10.1	56	12.5	QP	L1	GND

**MEASUREMENT RESULT: "GM1712265041\_fin2"**

26/12/2017 13:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.402000	35.30	9.9	48	12.5	AV	L1	GND
0.519000	39.20	10.0	46	6.8	AV	L1	GND
0.532500	32.20	10.0	46	13.8	AV	L1	GND
0.631500	31.40	10.0	46	14.6	AV	L1	GND
0.802500	31.40	10.0	46	14.6	AV	L1	GND
1.099500	28.40	10.1	46	17.6	AV	L1	GND



**MEASUREMENT RESULT: "GM1712265042\_fin"**

26/12/2017 13:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.402000	42.80	9.9	58	15.0	QP	N	GND
0.460500	41.90	9.9	57	14.8	QP	N	GND
0.519000	47.10	10.0	56	8.9	QP	N	GND
0.636000	39.70	10.0	56	16.3	QP	N	GND
1.018500	36.30	10.1	56	19.7	QP	N	GND
2.026500	40.30	10.1	56	15.7	QP	N	GND
3.178500	38.30	10.1	56	17.7	QP	N	GND

**MEASUREMENT RESULT: "GM1712265042\_fin2"**

26/12/2017 13:42

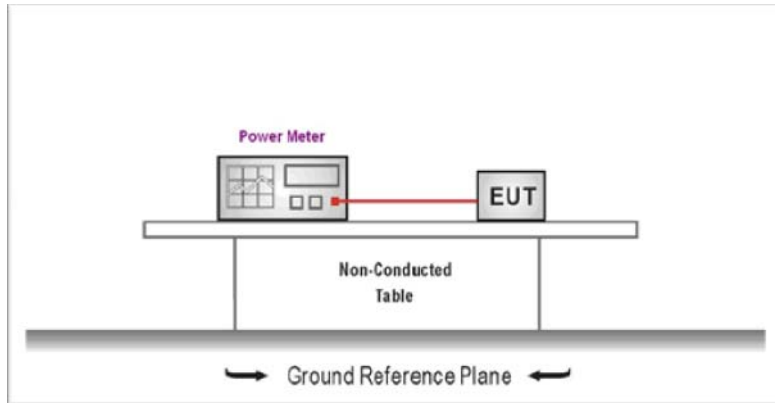
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.406500	32.90	9.9	48	14.8	AV	N	GND
0.474000	32.50	9.9	46	13.9	AV	N	GND
0.519000	35.30	10.0	46	10.7	AV	N	GND
0.577500	27.60	10.0	46	18.4	AV	N	GND
0.636000	30.00	10.0	46	16.0	AV	N	GND
0.807000	29.50	10.0	46	16.5	AV	N	GND
1.036500	26.70	10.1	46	19.3	AV	N	GND

### 5.3. Conducted Peak Output Power

#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): **30 dBm**

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10: 2013 and KDB 558074 D01 for compliance to FCC 47 CFR 15.247 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
4. Record the measurement data.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

**Passed**       **Not Applicable**

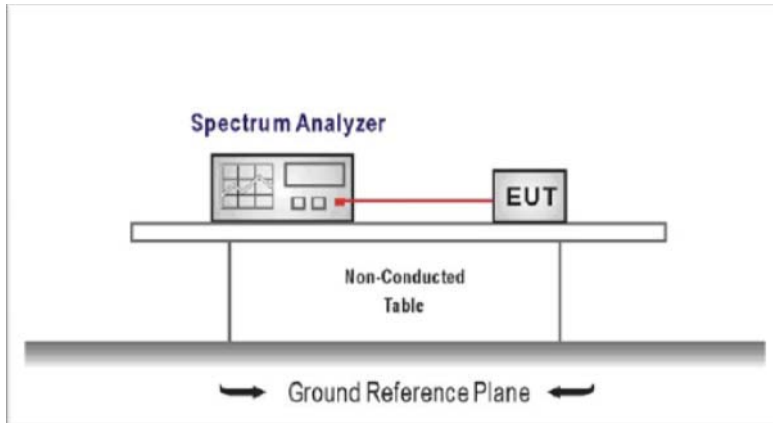
Type	Channel	Output power (dBm)	Limit (dBm)	Result
BT-BLE	00	-3.58	≤30.00	Pass
	19	-3.51		
	39	-4.17		

### 5.4. Power Spectral Density

#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input,
2. Configure the spectrum analyzer as shown below:  
 Center frequency=DTS channel center frequency  
 Span =1.5 times the DTS bandwidth  
 RBW = 3 kHz ≤ RBW ≤ 100 kHz, VBW ≥ 3 × RBW  
 Sweep time = auto couple  
 Detector = peak  
 Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### TEST MODE:

Please refer to the clause 3.3




#### TEST RESULTS

Passed       Not Applicable

Type	Channel	Power Spectral Density(dBm/3KHz)	Limit (dBm/3KHz)	Result
BT-BLE	00	-19.08	≤8.00	Pass
	19	-19.03		
	39	-19.74		

Test plot as follows:



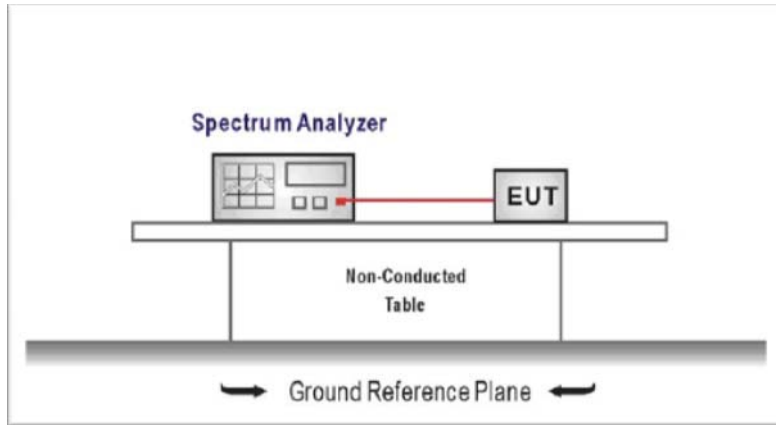
<p>CH00</p>		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.40200000 GHz</p> <p>Start Freq 2.401500000 GHz</p> <p>Stop Freq 2.402500000 GHz</p> <p>CF Step 100.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
<p>CH19</p>		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.44000000 GHz</p> <p>Start Freq 2.439500000 GHz</p> <p>Stop Freq 2.440500000 GHz</p> <p>CF Step 100.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
<p>CH39</p>		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.48000000 GHz</p> <p>Start Freq 2.479500000 GHz</p> <p>Stop Freq 2.480500000 GHz</p> <p>CF Step 100.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>

### 5.5. 6dB bandwidth

#### LIMIT

**FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):**For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).  
 Center Frequency =DTS channel center frequency  
 Span=2 x DTS bandwidth  
 RBW = 100 kHz, VBW ≥ 3 × RBW  
 Sweep time= auto couple  
 Detector = Peak  
 Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

Passed       Not Applicable

Type	Channel	6dB Bandwidth(MHz)	Limit (kHz)	Result
BT-BLE	00	0.71	≥500	Pass
	19	0.71		
	39	0.71		

Test plot as follows:

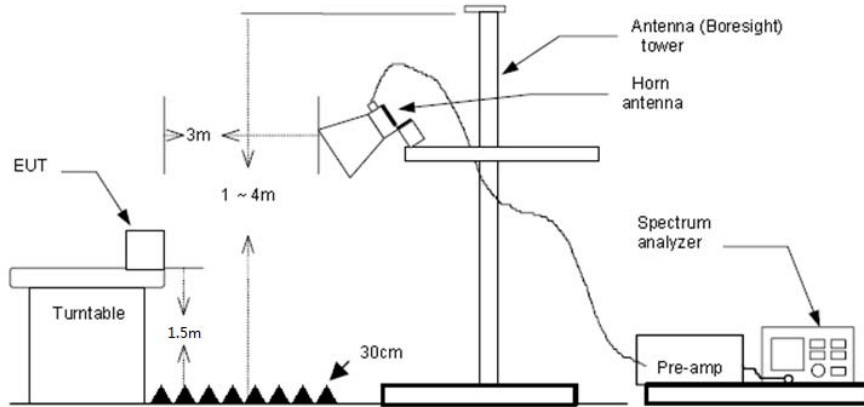
<p>CH00</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Center Freq: 2.402000000 GHz</p> <p>Mkr1 2.402244 GHz -4.4144 dBm</p> <p>Center 2.402 GHz</p> <p>Occupied Bandwidth 1.0653 MHz</p> <p>Total Power 2.80 dBm</p> <p>Transmit Freq Error 1.570 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 712.2 kHz</p> <p>x dB -6.00 dB</p>
<p>CH19</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.440000000 GHz</p> <p>Center Freq: 2.440000000 GHz</p> <p>Mkr1 2.440242 GHz -4.3856 dBm</p> <p>Center 2.44 GHz</p> <p>Occupied Bandwidth 1.0641 MHz</p> <p>Total Power 2.83 dBm</p> <p>Transmit Freq Error 1.435 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 712.4 kHz</p> <p>x dB -6.00 dB</p>
<p>CH39</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Center Freq: 2.480000000 GHz</p> <p>Mkr1 2.480244 GHz -5.1243 dBm</p> <p>Center 2.48 GHz</p> <p>Occupied Bandwidth 1.0646 MHz</p> <p>Total Power 2.09 dBm</p> <p>Transmit Freq Error 679 Hz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 710.9 kHz</p> <p>x dB -6.00 dB</p>

**5.6. Restricted band**

**LIMIT**

**FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):**In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

**TEST CONFIGURATION**



**TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
 RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
 RBW=1MHz, VBW=3MHz RMS detector for Average value.

**TEST MODE:**

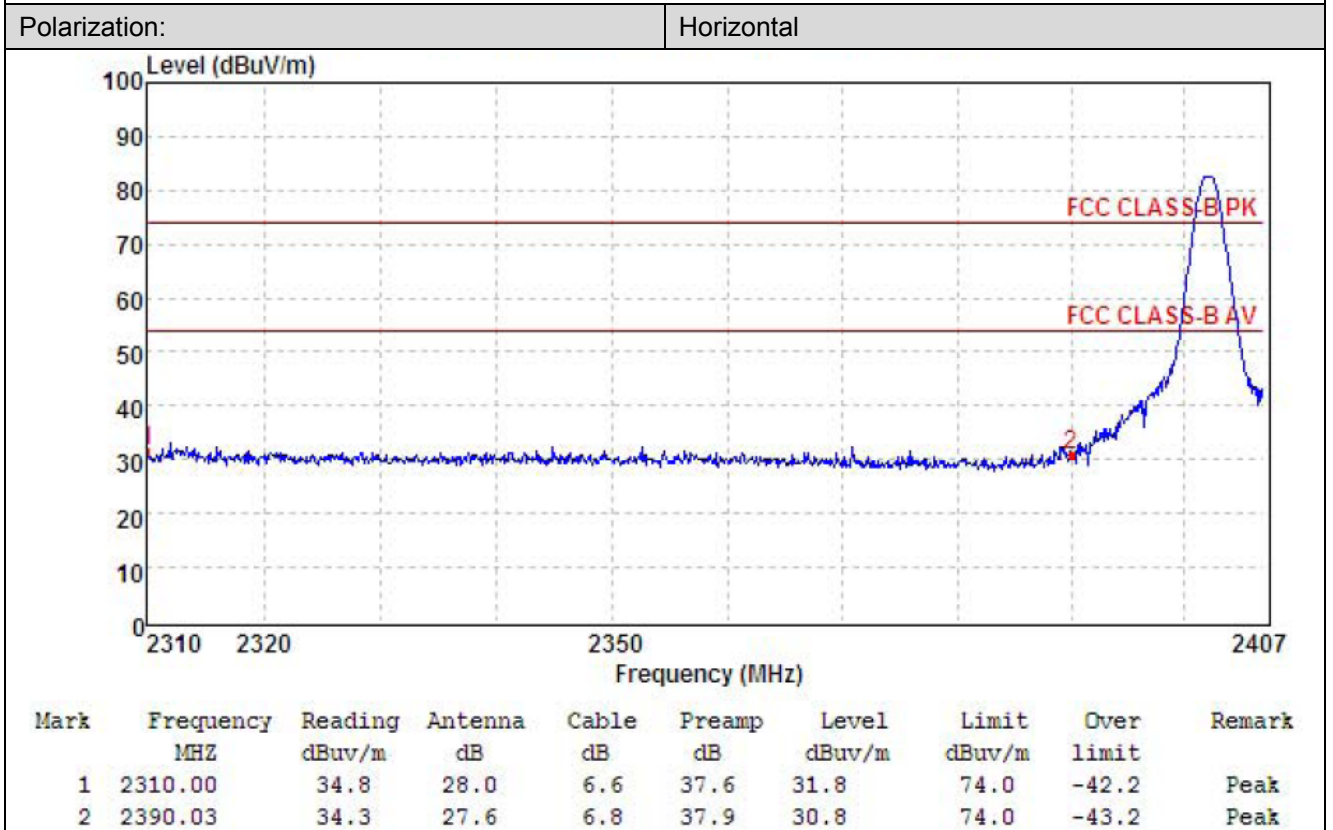
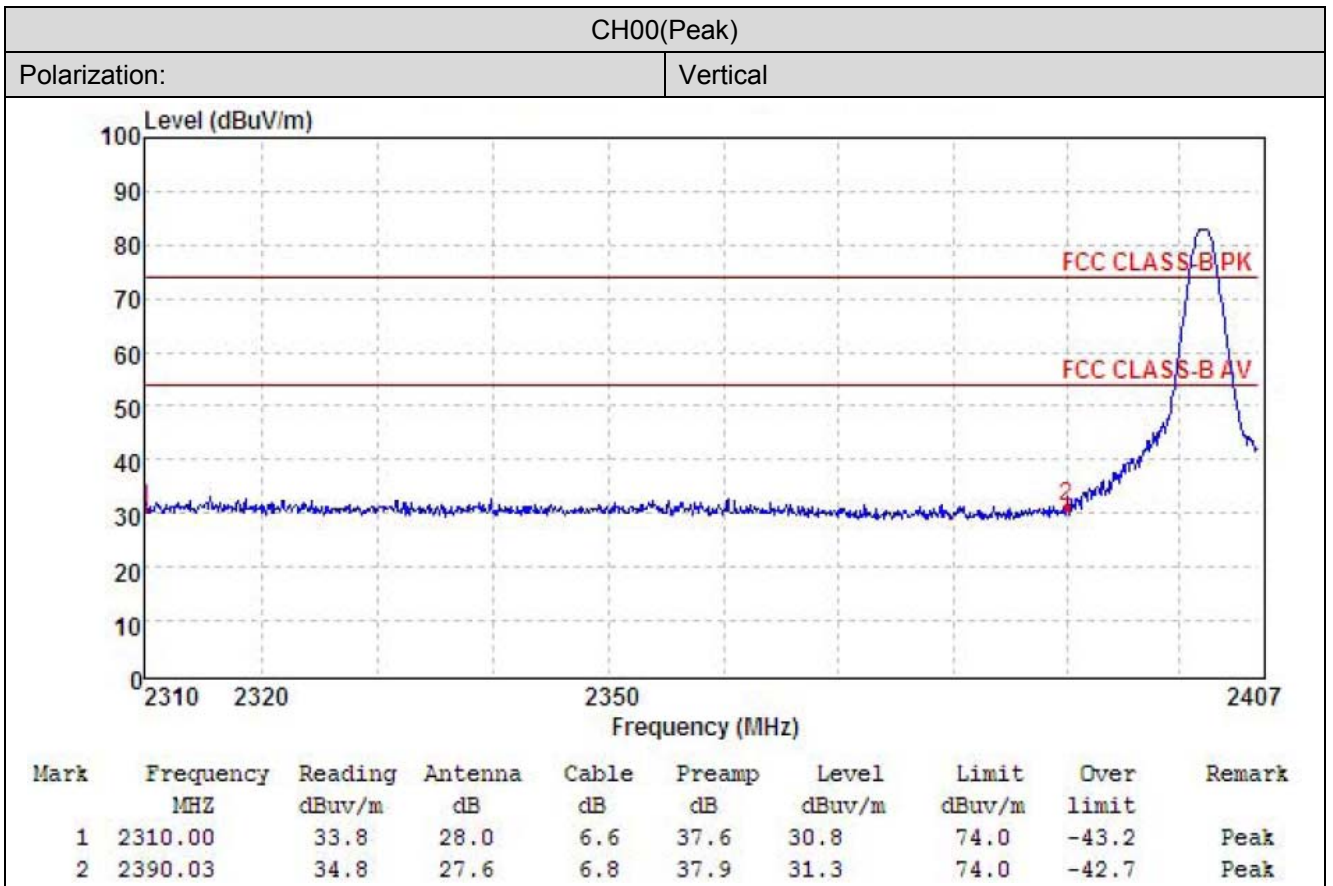
Please refer to the clause 3.3

**TEST RESULTS**

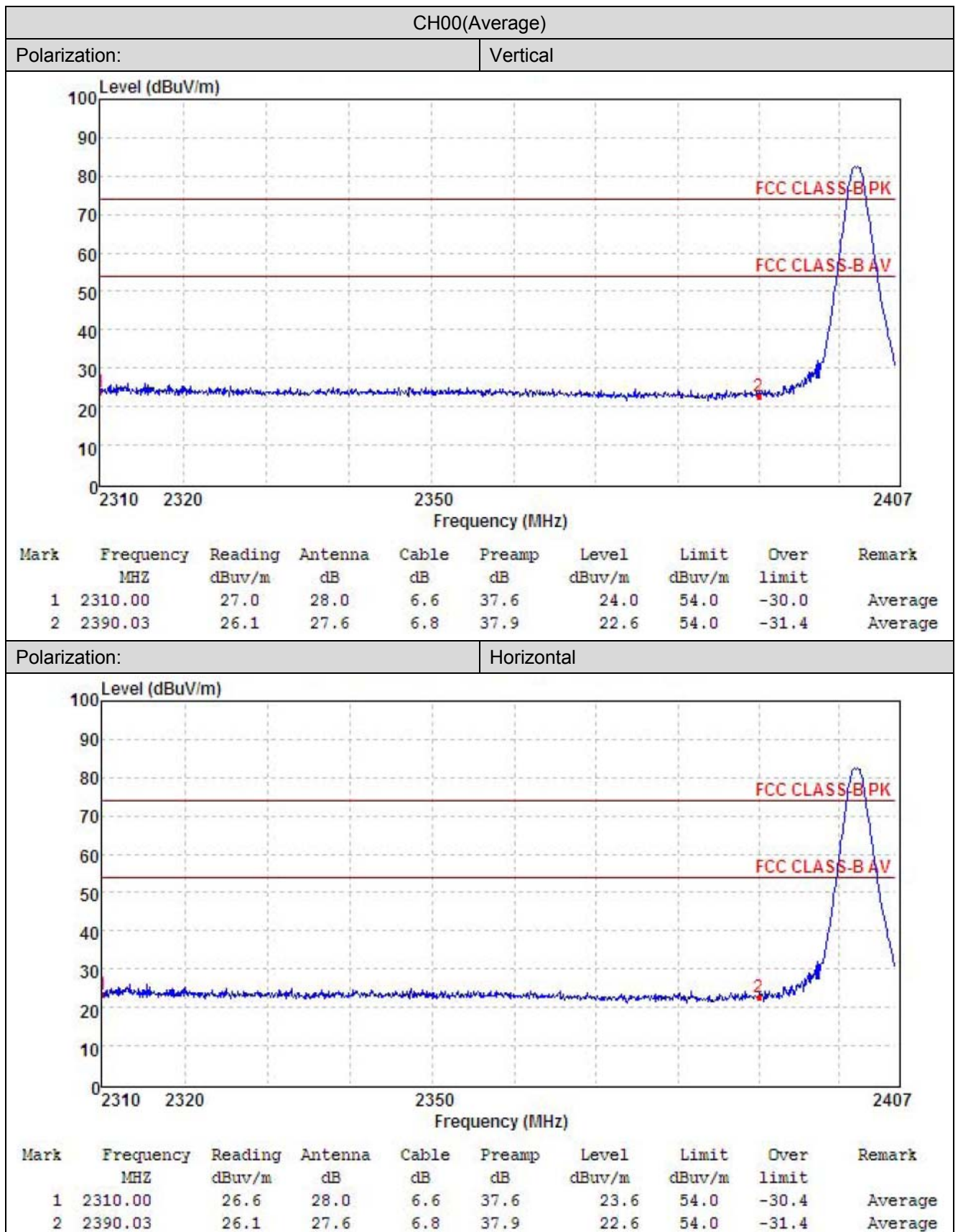
**Passed**       **Not Applicable**

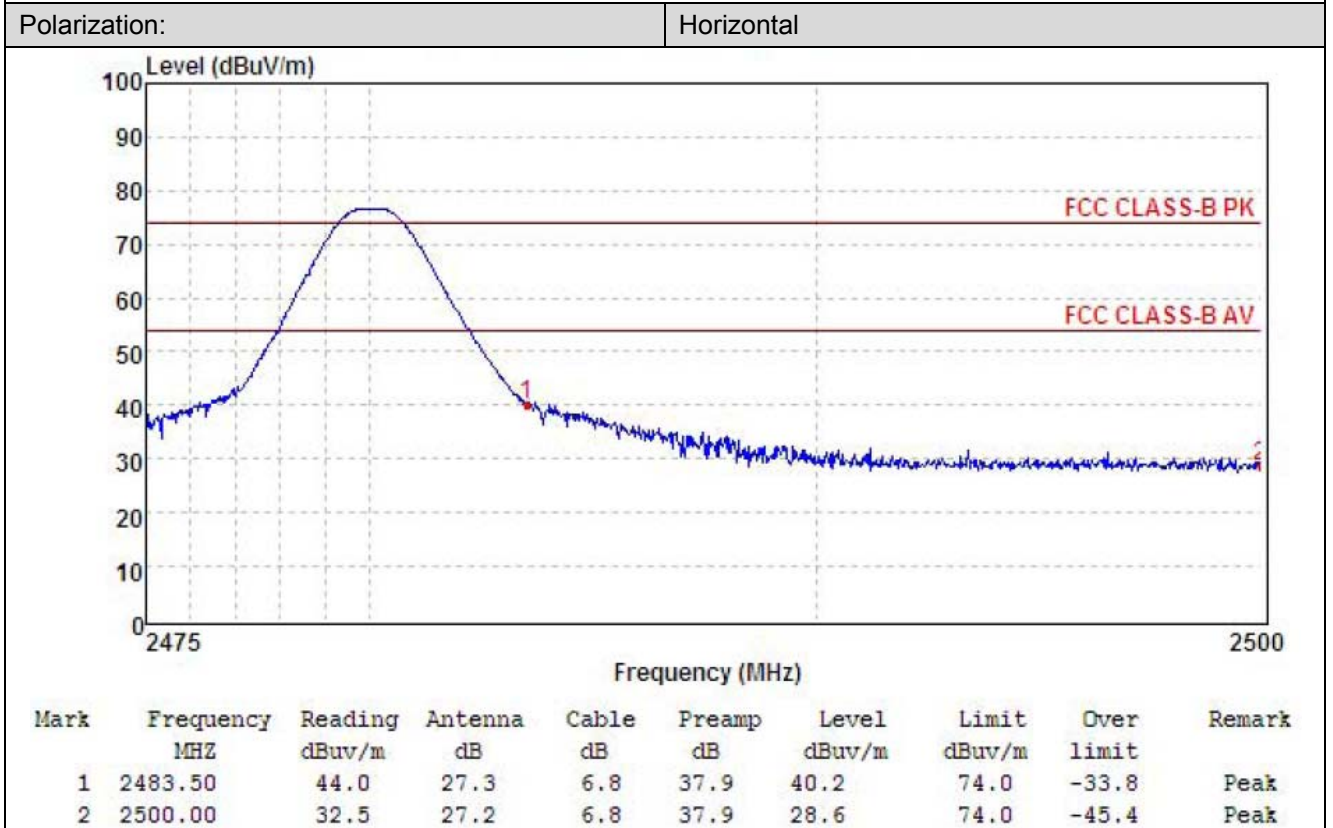
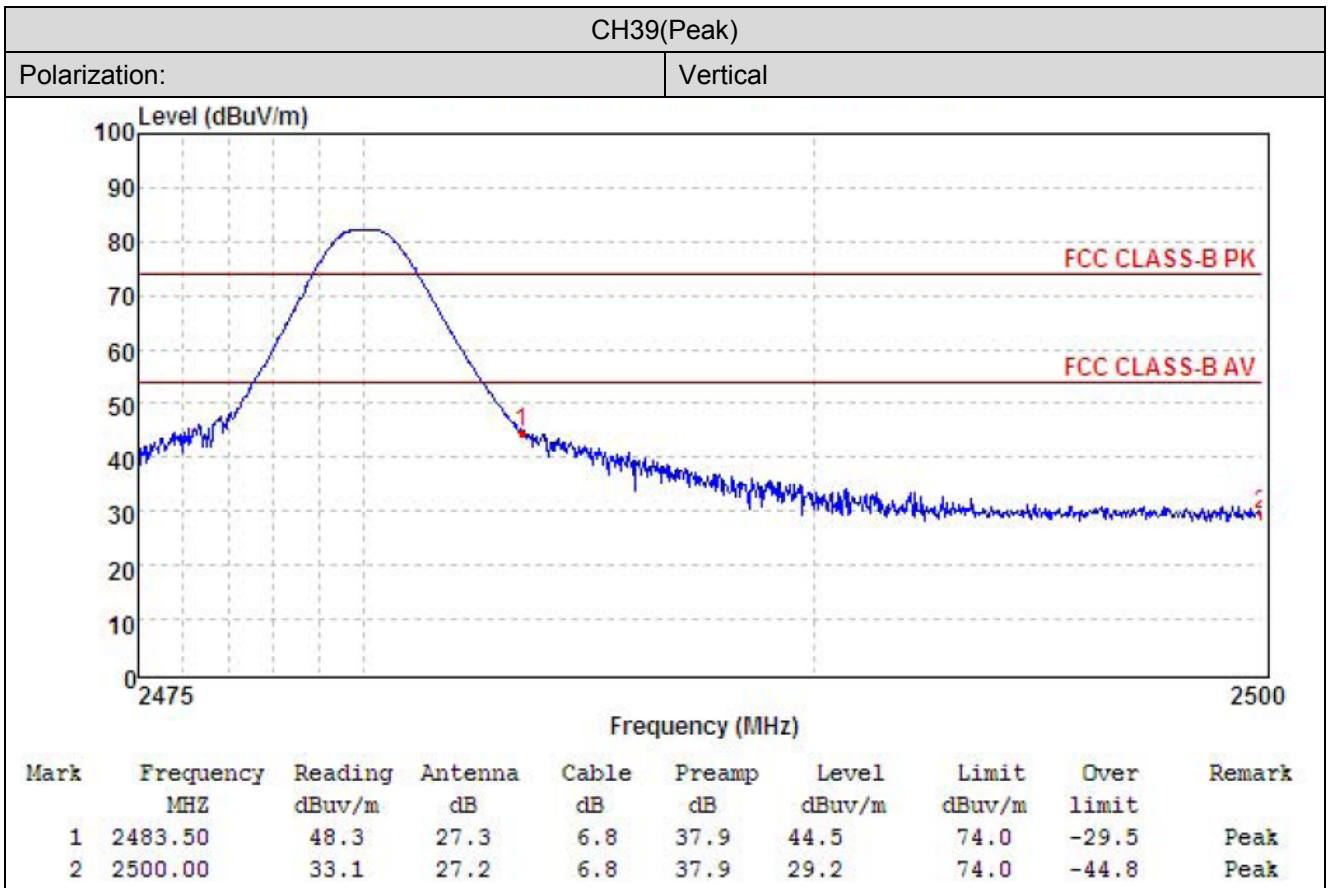
Note:

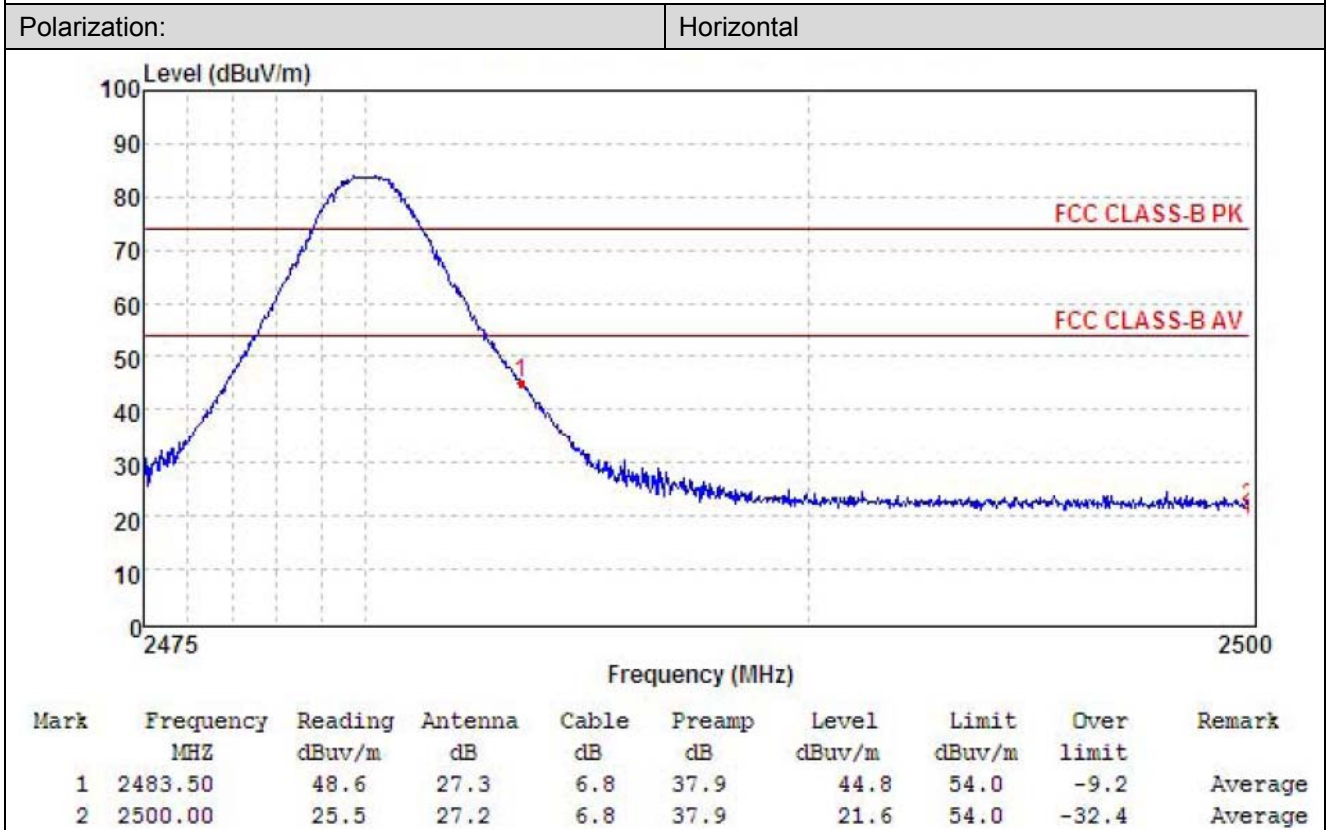
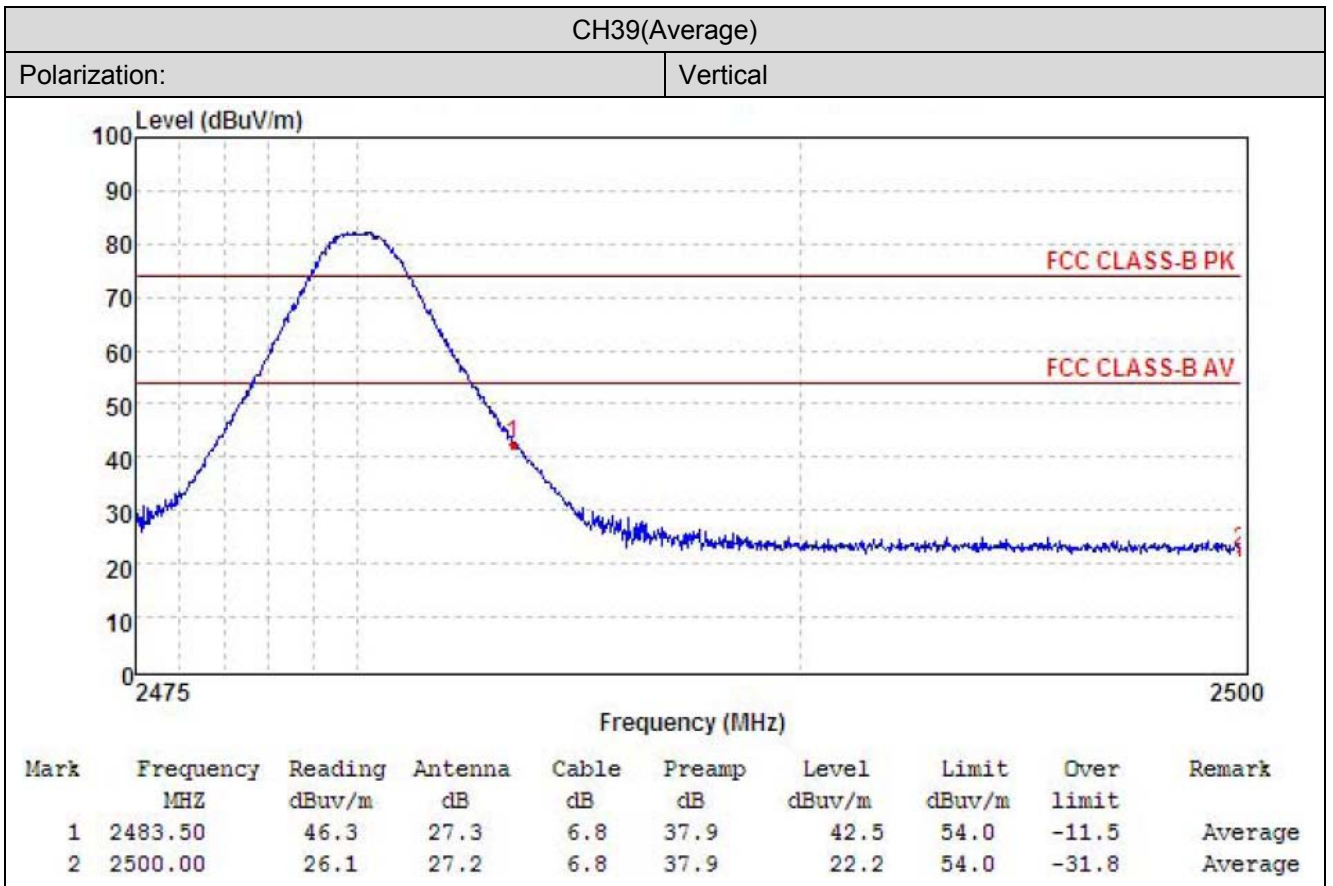
- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor
- 2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.











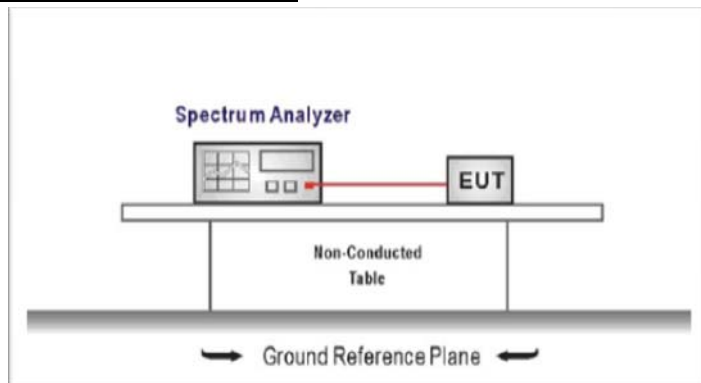


## 5.7. Band edge and Spurious Emissions (conducted)

### LIMIT

**FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Establish a reference level by using the following procedure  
Center frequency=DTS channel center frequency  
The span = 1.5 times the DTS bandwidth.  
RBW = 100 kHz, VBW  $\geq$  3 x RBW  
Detector = peak, Sweep time = auto couple, Trace mode = max hold  
Allow trace to fully stabilize  
Use the peak marker function to determine the maximum PSD level

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

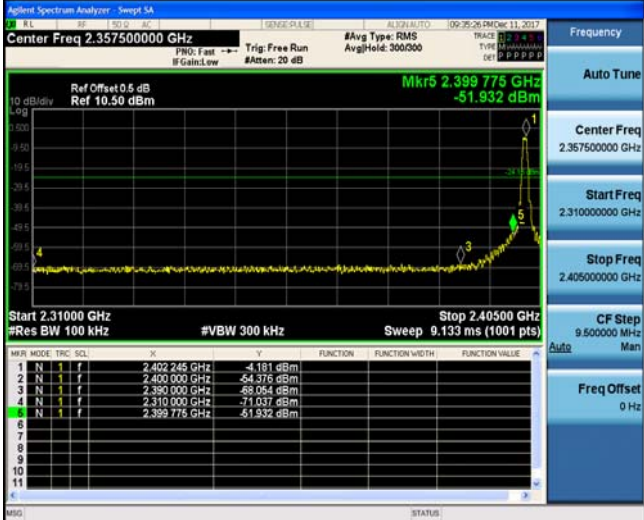
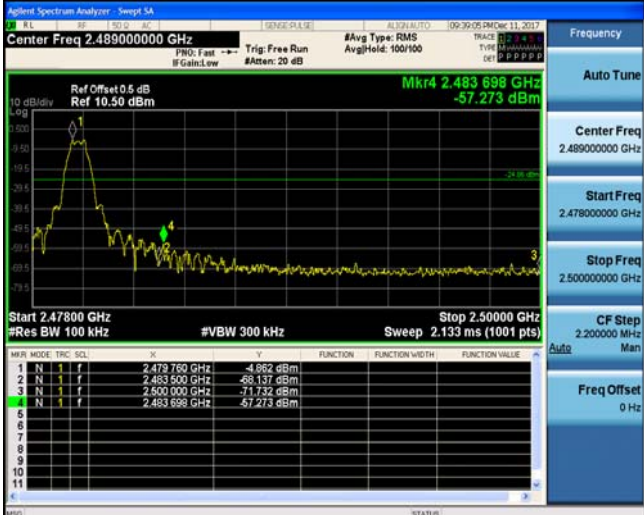
3. Emission level measurement  
Set the center frequency and span to encompass frequency range to be measured  
RBW = 100 kHz, VBW  $\geq$  3 x RBW  
Detector = peak, Sweep time = auto couple, Trace mode = max hold  
Allow trace to fully stabilize  
Use the peak marker function to determine the maximum amplitude level.
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
5. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

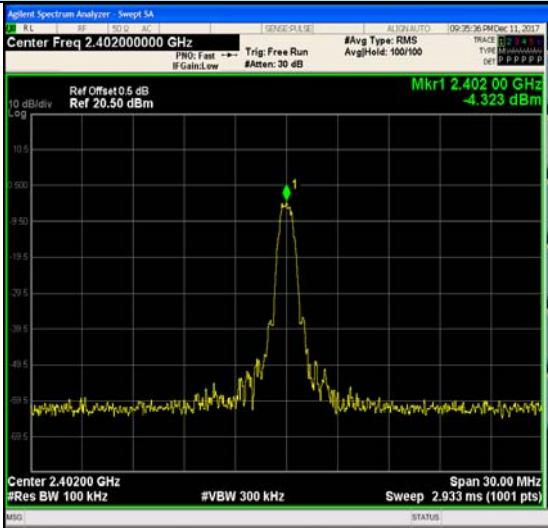
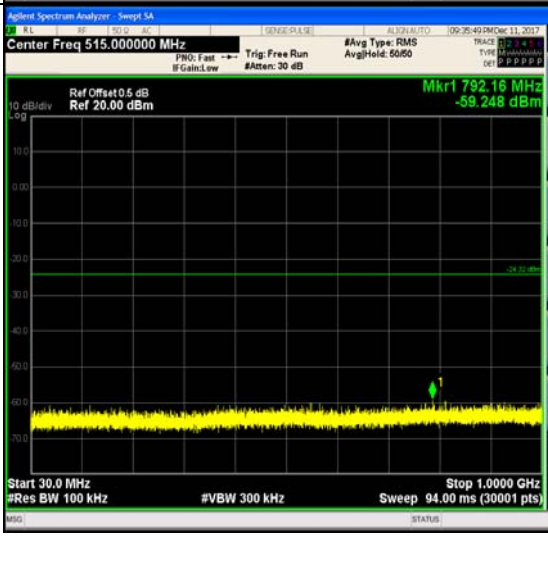
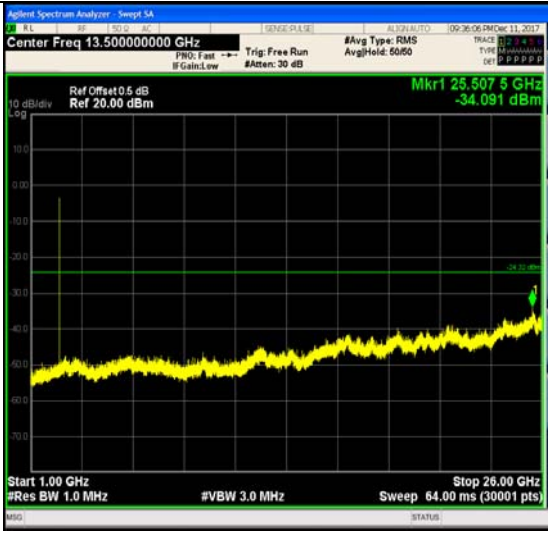
### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

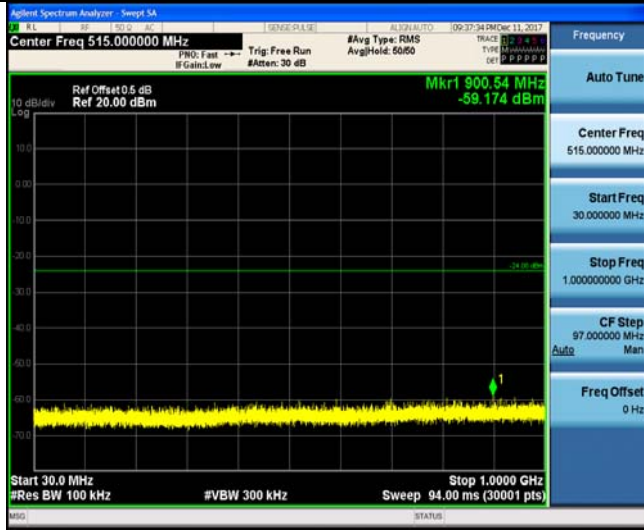
Test Item:	Band edge																																																						
CH00	 <p>Agilent Spectrum Analyzer - Sweep SA Center Freq 2.357500000 GHz #Avg Type: RMS #Res BW 100 kHz #VBW 300 kHz Sweep 9.133 ms (1001 pts)</p> <table border="1"> <thead> <tr> <th>MNR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>F</th> <th>dBm</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>N</td> <td>1</td> <td>f</td> <td>2.402245 GHz</td> <td>-4.101</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>N</td> <td>1</td> <td>f</td> <td>2.400000 GHz</td> <td>-54.576</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>N</td> <td>1</td> <td>f</td> <td>2.390000 GHz</td> <td>-68.054</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>N</td> <td>1</td> <td>f</td> <td>2.310000 GHz</td> <td>-71.037</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>N</td> <td>1</td> <td>f</td> <td>2.399775 GHz</td> <td>-51.932</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MNR	MODE	TRC	SCL	F	dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.402245 GHz	-4.101				2	N	1	f	2.400000 GHz	-54.576				3	N	1	f	2.390000 GHz	-68.054				4	N	1	f	2.310000 GHz	-71.037				5	N	1	f	2.399775 GHz	-51.932			
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5	N	1	f	2.399775 GHz	-51.932																																																		
CH39	 <p>Agilent Spectrum Analyzer - Sweep SA Center Freq 2.489000000 GHz #Avg Type: RMS #Res BW 100 kHz #VBW 300 kHz Sweep 2.133 ms (1001 pts)</p> <table border="1"> <thead> <tr> <th>MNR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>F</th> <th>dBm</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>N</td> <td>1</td> <td>f</td> <td>2.479760 GHz</td> <td>-4.862</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>N</td> <td>1</td> <td>f</td> <td>2.483500 GHz</td> <td>-68.137</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>N</td> <td>1</td> <td>f</td> <td>2.500000 GHz</td> <td>-71.732</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>N</td> <td>1</td> <td>f</td> <td>2.483698 GHz</td> <td>-57.273</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MNR	MODE	TRC	SCL	F	dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.479760 GHz	-4.862				2	N	1	f	2.483500 GHz	-68.137				3	N	1	f	2.500000 GHz	-71.732				4	N	1	f	2.483698 GHz	-57.273												
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3	N	1	f	2.500000 GHz	-71.732																																																		
4	N	1	f	2.483698 GHz	-57.273																																																		

Test Item:	SE	
Reference level CH00		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.40200000 GHz</p> <p>Start Freq 2.387000000 GHz</p> <p>Stop Freq 2.417000000 GHz</p> <p>CF Step 3.000000 MHz</p> <p>Freq Offset 0 Hz</p>
CH00		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 515.000000 MHz</p> <p>Start Freq 30.000000 MHz</p> <p>Stop Freq 1.000000000 GHz</p> <p>CF Step 97.000000 MHz</p> <p>Freq Offset 0 Hz</p>
		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 13.50000000 GHz</p> <p>Start Freq 1.000000000 GHz</p> <p>Stop Freq 26.000000000 GHz</p> <p>CF Step 2.500000000 GHz</p> <p>Freq Offset 0 Hz</p>

Reference level CH19



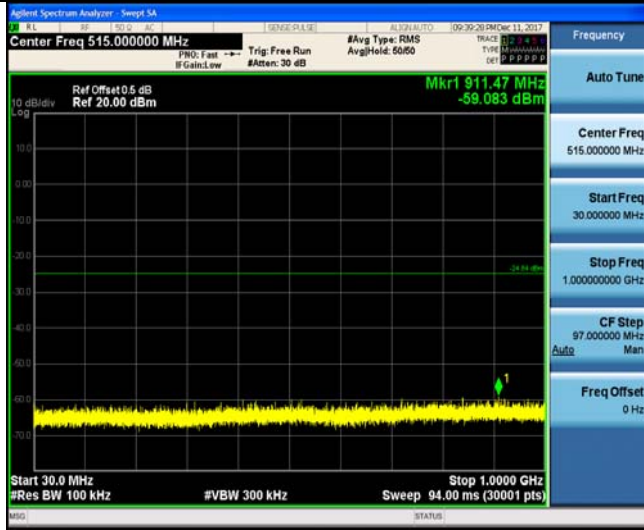
CH19



Reference level CH39



CH39



### 5.8. Spurious Emissions (radiated)

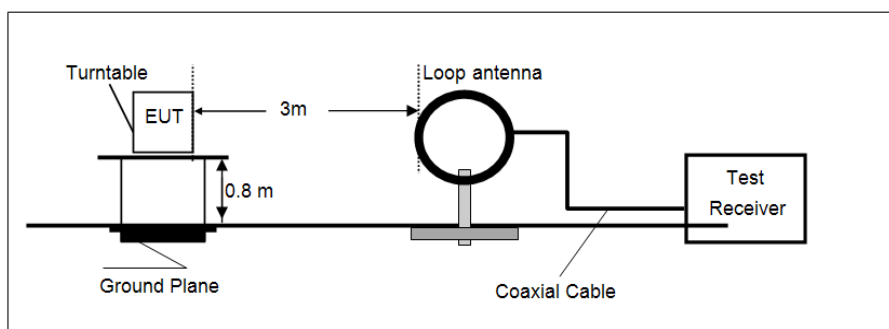
#### LIMIT

#### FCC CFR Title 47 Part 15 Subpart C Section 15.209

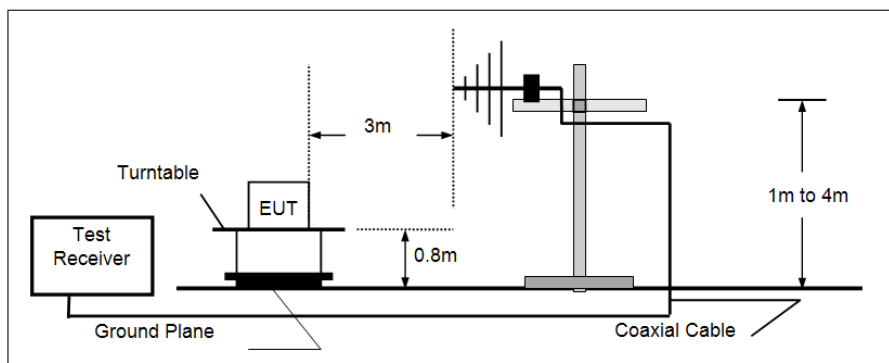
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

#### TEST CONFIGURATION

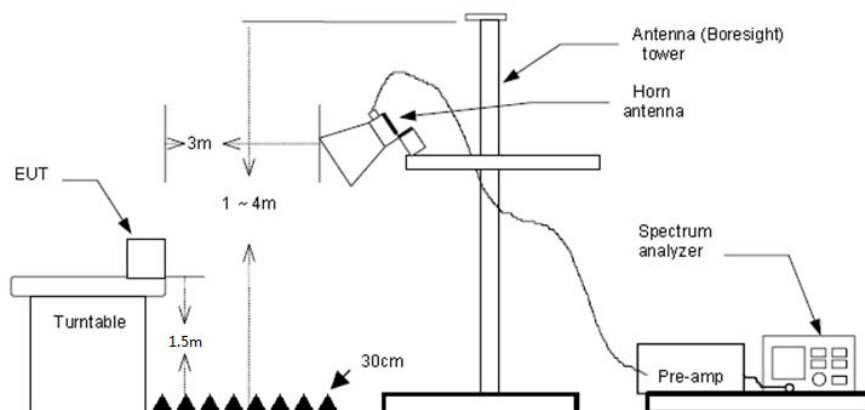
- 9 kHz ~ 30 MHz



- 30 MHz ~ 1 GHz



- Above 1 GHz



**TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz, RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
  - (3) Above 1GHz, RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
RBW=1MHz, VBW=3MHz RMS detector for Average value.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

**Passed**       **Not Applicable**

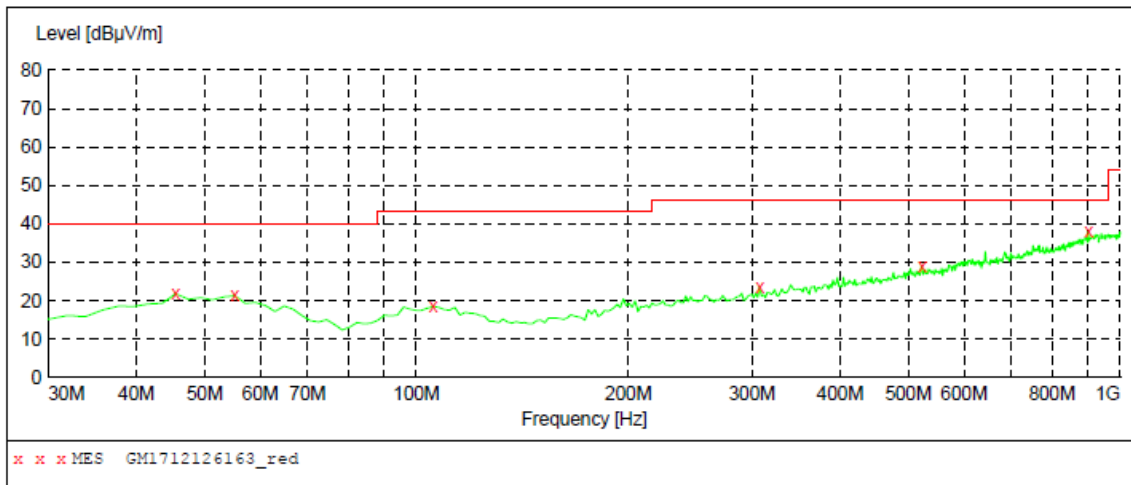
Note:

- 1) Above 1GHz Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
  - 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- **9 kHz ~ 30 MHz**  
The EUT was pre-scanned the frequency band (9 kHz ~ 30 MHz), found the radiated level lower than the limit, so don't show on the report.
- **30 MHz ~ 1000 MHz**  
Have pre-scan all modulation mode, found the BT-BLE mode CH39 which it was worst case, so only the worst case's data on the test report.



➤ 30 MHz ~ 1 GHz

Polarization: Vertical

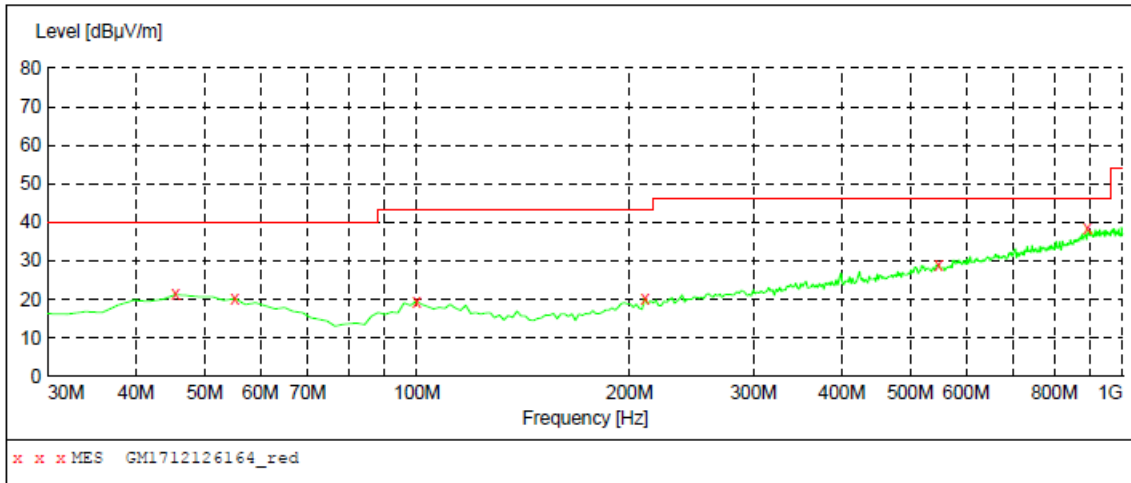


**MEASUREMENT RESULT: "GM1712126163\_red"**

12/12/2017 11:50PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	21.90	-8.8	40.0	18.1	QP	100.0	319.00	VERTICAL
55.220000	21.40	-9.2	40.0	18.6	QP	100.0	6.00	VERTICAL
105.660000	18.50	-10.5	43.5	25.0	QP	100.0	177.00	VERTICAL
307.420000	23.50	-7.1	46.0	22.5	QP	100.0	126.00	VERTICAL
522.760000	29.00	-1.3	46.0	17.0	QP	100.0	0.00	VERTICAL
901.060000	37.90	6.7	46.0	8.1	QP	100.0	330.00	VERTICAL

Polarization: Horizontal



**MEASUREMENT RESULT: "GM1712126164\_red"**

12/12/2017 11:53PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	21.30	-8.8	40.0	18.7	QP	100.0	127.00	HORIZONTAL
55.220000	20.30	-9.2	40.0	19.7	QP	100.0	0.00	HORIZONTAL
99.840000	19.60	-10.6	43.5	23.9	QP	100.0	139.00	HORIZONTAL
210.420000	20.20	-10.5	43.5	23.3	QP	100.0	234.00	HORIZONTAL
547.980000	28.90	-0.8	46.0	17.1	QP	100.0	53.00	HORIZONTAL
891.360000	38.30	6.5	46.0	7.7	QP	100.0	356.00	HORIZONTAL



## ➤ 1 GHz ~ 25 GHz

CH00									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1715.41	35.54	25.23	5.80	36.96	29.61	74.00	-44.39	Vertical	Peak
3616.45	34.67	29.30	8.29	38.27	33.99	74.00	-40.01	Vertical	Peak
5646.08	33.12	31.71	10.34	35.74	39.43	74.00	-34.57	Vertical	Peak
8125.22	32.70	36.92	12.59	34.54	47.67	74.00	-26.33	Vertical	Peak
1553.29	36.66	25.31	5.44	36.66	30.75	74.00	-43.25	Horizontal	Peak
3579.82	33.76	29.24	8.24	38.30	32.94	74.00	-41.06	Horizontal	Peak
4809.50	37.24	31.58	9.55	36.93	41.44	74.00	-32.56	Horizontal	Peak
7489.60	31.51	36.12	12.36	34.89	45.10	74.00	-28.90	Horizontal	Peak

CH19									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1514.25	36.14	25.67	5.33	36.61	30.53	74.00	-43.47	Vertical	Peak
3923.37	35.34	29.70	8.67	38.16	35.55	74.00	-38.45	Vertical	Peak
4883.52	36.58	31.43	9.59	36.73	40.87	74.00	-33.13	Vertical	Peak
7063.69	32.68	35.49	11.85	34.88	45.14	74.00	-28.86	Vertical	Peak
1561.22	36.07	25.24	5.46	36.67	30.10	74.00	-43.90	Horizontal	Peak
3598.09	35.48	29.29	8.27	38.27	34.77	74.00	-39.23	Horizontal	Peak
4883.52	41.70	31.43	9.59	36.73	45.99	74.00	-28.01	Horizontal	Peak
7451.57	33.23	36.20	12.24	34.86	46.81	74.00	-27.19	Horizontal	Peak

CH39									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1777.65	44.01	25.36	5.92	37.09	38.20	74.00	-35.80	Vertical	Peak
3873.75	35.36	29.67	8.60	38.19	35.44	74.00	-38.56	Vertical	Peak
4958.68	37.97	31.46	9.64	36.52	42.55	74.00	-31.45	Vertical	Peak
8125.22	32.84	36.92	12.59	34.54	47.81	74.00	-26.19	Vertical	Peak
1795.84	36.46	25.39	5.95	37.13	30.67	74.00	-43.33	Horizontal	Peak
3104.22	36.24	28.80	7.61	38.21	34.44	74.00	-39.56	Horizontal	Peak
4958.68	40.24	31.46	9.64	36.52	44.82	74.00	-29.18	Horizontal	Peak
7702.28	33.47	36.10	13.00	35.03	47.54	74.00	-26.46	Horizontal	Peak

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

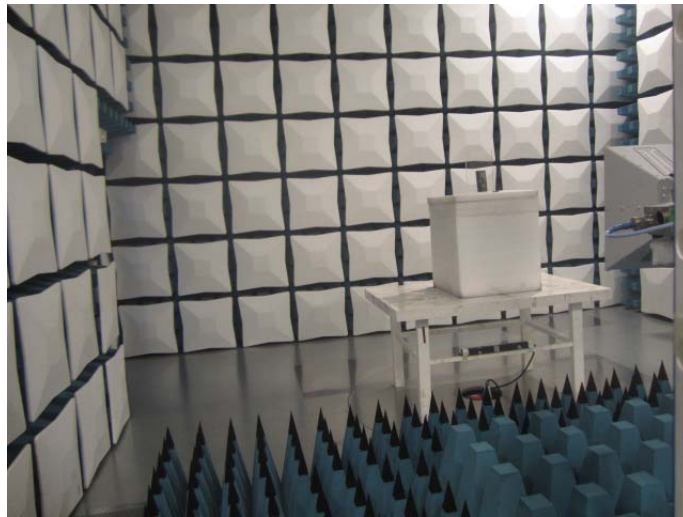
## 6. TEST SETUP PHOTOS

### Conducted Emissions (AC Mains)



### Radiated Emissions





## 7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: TRE1712002901

.....**End of Report**.....