TESTING
No. L2264

Part 15C

TEST REPORT

Product Name	HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM Quad bands/LTE 5 bands mobile phone
Model Name	Rio-4G LATAM
Marketing Name	5050A
FCC ID	RAD488
Applicant	TCT Mobile Limited
Manufacturer	TCT Mobile Limited
Date of issue	May 21, 2014

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC CFR47 Part 15C (2013)** Radio Frequency Devices **15.205** Restricted bands of operation; **15.207** Conducted limits; **15.209** Radiated emission limits; general requirements; **15.247** Operation within the bands 902-928 MHz,2400-2483.5 MHz, and 5725-5850MHz. **ANSI C63.4** Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40GHz. (2009) **DA00-705** Filing and Frequency Measurement Guidelines For Frequency Hopping Spread Spectrum System.(2000)
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

Approved by	**Revised by**	**Performed by**
Weizhong Yang	Lingling Kang	Yiqi Chen
Director	RF Manager	RF Engineer

TABLE OF CONTENT

1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. The sample under test was selected by the Client. This report only refers to the item that has undergone the test.

This report alone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electronic report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing laboratory

Company:	TA Technology (Shanghai) Co., Ltd.
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1.3. Applicant Information

Company:	TCT Mobile Limited
Address:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai P.R. China 201203

1.4. Manufacturer Information

Company:	TCT Mobile Limited
Address:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai P.R. China 201203

1.5. Information of EUT

General information

IMEI:	014035000002295		
Hardware Version:	PIO		
Software Version:	9G1B		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Test Mode	Basic Rate	Enhanced Data Rate(EDR)	
Modulation Type:	Frequency Hopping Spread Spectrum (FHSS)		
	GFSK	π/4 DQPSK	8DQPSK
Packet Type:(Maximum Payload)	DH5	2DH5	3DH5
Max. Conducted Power	4.979 dBm		
Power Supply:	Battery or Charger (AC adaptor)		
Operating Frequency Range(s)	2402 ~ 2480MHz		
Tested Frequency Range(s)	2400 ~ 2483.5 MHz		

Auxiliary equipment details

Name	Model	Manufacturer	S/N
Battery 1	TLi020A1	BYD	B2000016C11001RB
Battery 2	TLp020A2	SCUD	C2000003C3Y008WQ
Earphone 1	CCB3000A12C2	Juwei	/
Earphone 2	CCB3000A12C1	Shunda	/
Charger	CBA3000AG0C1	Tenpao	/

1.6. Test Date

The test is performed from May 18, 2014 to May 20, 2014.

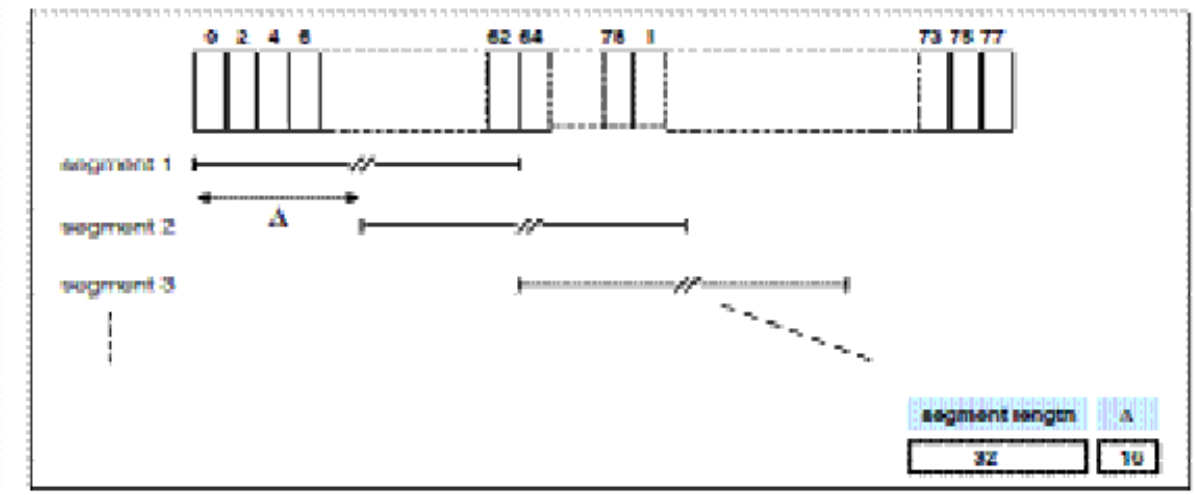
2. Information about the FHSS characteristics

2.1. Pseudorandom Frequency Hopping Sequence

Frequency Hopping Systems. A spread spectrum system in which the carrier is modulated with the coded information in a conventional manner causing a conventional spreading of the RF energy about the frequency carrier. The frequency of the carrier is not fixed but changes at fixed intervals under the direction of a coded sequence. The wide RF bandwidth needed by such a system is not required by spreading of the RF energy about the carrier but rather to accommodate the range of frequencies to which the carrier frequency can hop. The test of a frequency hopping system is that the near term distribution of hops appears random, the long term distribution appears evenly distributed over the hop set, and sequential hops are randomly distributed in both direction and magnitude of change in the hop set.

The selection scheme chooses a segment of 32 hop frequencies spanning about 64 MHz and visits these hops in a pseudo-random order. Next, a different 32-hop segment is chosen, etc. In the page, master page response, slave page response, page scan, inquiry, inquiry response and inquiry scan hopping sequences, the same 32-hop segment is used all the time (the segment is selected by the address; different devices will have different paging segments).

When the basic channel hopping sequence is selected, the output constitutes a pseudo-random sequence that slides through the 79 hops. The principle is depicted in the figure below.



Hop selection scheme in CONNECTION state.

Pseudorandom Frequency Hopping Sequence Table as below:

Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45, etc.

Each frequency used equally on the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

2.2. Equal Hopping Frequency Use

All Bluetooth units participating in the Pico net are time and hop-synchronized to the channel. Each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.

2.3. System Receiver Input Bandwidth

Each channel bandwidth is 1MHz. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

3. Test Information

3.1. Test Mode

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

EUT is stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded. Then this mode was measured in the following mode: EUT with cradle and EUT without cradle. The worst emission was found in EUT with cradle mode and the worst case was recorded.

Test Modes		
Band	Radiated Test Cases	Conducted Test Cases
BT	3DH5 8DQPSK(Channel 0/39/78)	DH5 GFSK(Channel 0/39/78) 2DH5 π/4-DQPSK(Channel 0/39/78) 3DH5 8DQPSK(Channel 0/39/78)

Note: The maximum RF output power levels are 3DH5 for 8DQPSK modulation, For RSE and CSE, only the maximum RF output power is chosen.

3.2. Summary of test results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Peak Power Output -Conducted	15.247(b)(1)	PASS
2	Occupied Bandwidth (20dB)	15.247(a)(1)	PASS
3	Frequency Separation	15.247(a)(1)	PASS
4	Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	PASS
5	Band Edge Compliance	15.247(d)	PASS
6	Spurious Radiated Emissions in the restricted band	15.247(d),15.205,15.209	PASS
7	Number of Hopping Frequency	15.247(a)(1)(iii)	PASS
8	Spurious RF Conducted Emissions	15.247(d)	PASS
9	Radiates Emission	15.247(d),15.205,15.209	PASS
10	AC Power Line Conducted Emission	15.207	PASS

3.3. Peak Power Output –Conducted

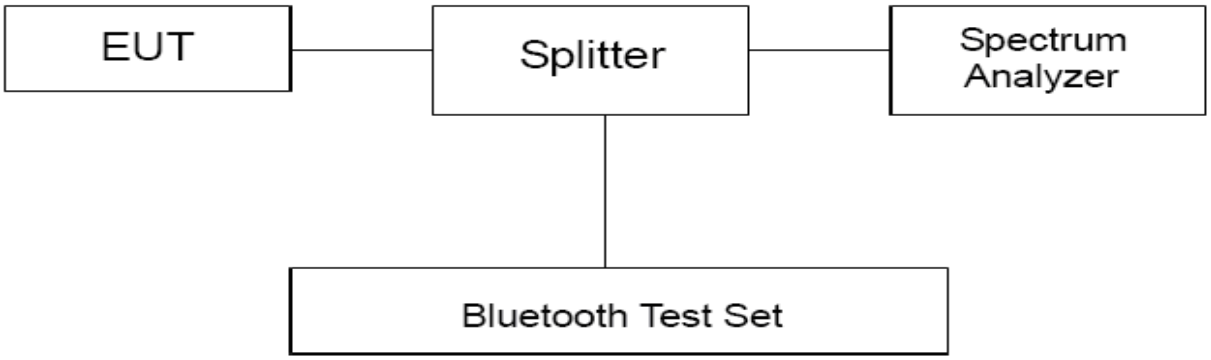
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The EUT is controlled by the Bluetooth test set to ensure max power transmission with proper modulation. The peak detector is used. RBW is set to 2 MHz; VBW is set to 6 MHz. These measurements have been tested at following channels: 0, 39, and 78.

Test Setup



Limits

Rule Part 15.247 (b) (1)specifies that " For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts."

Peak Output Power	≤ 0.125W (21dBm)

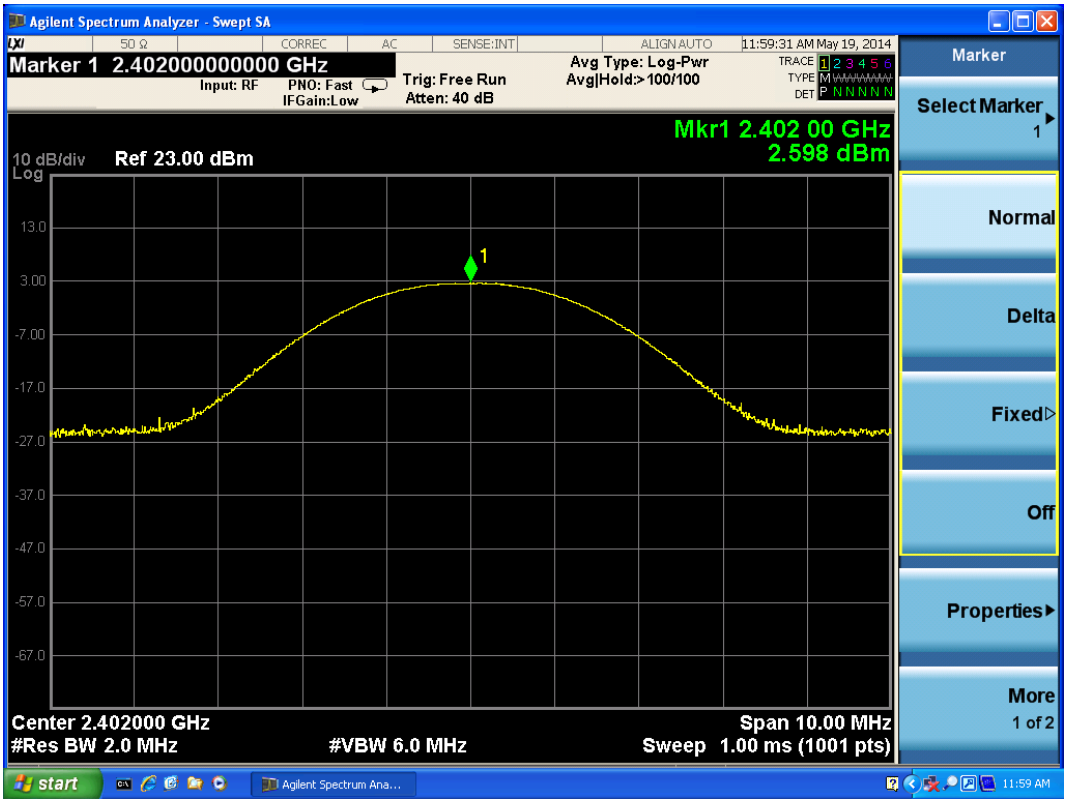
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.44 dB.

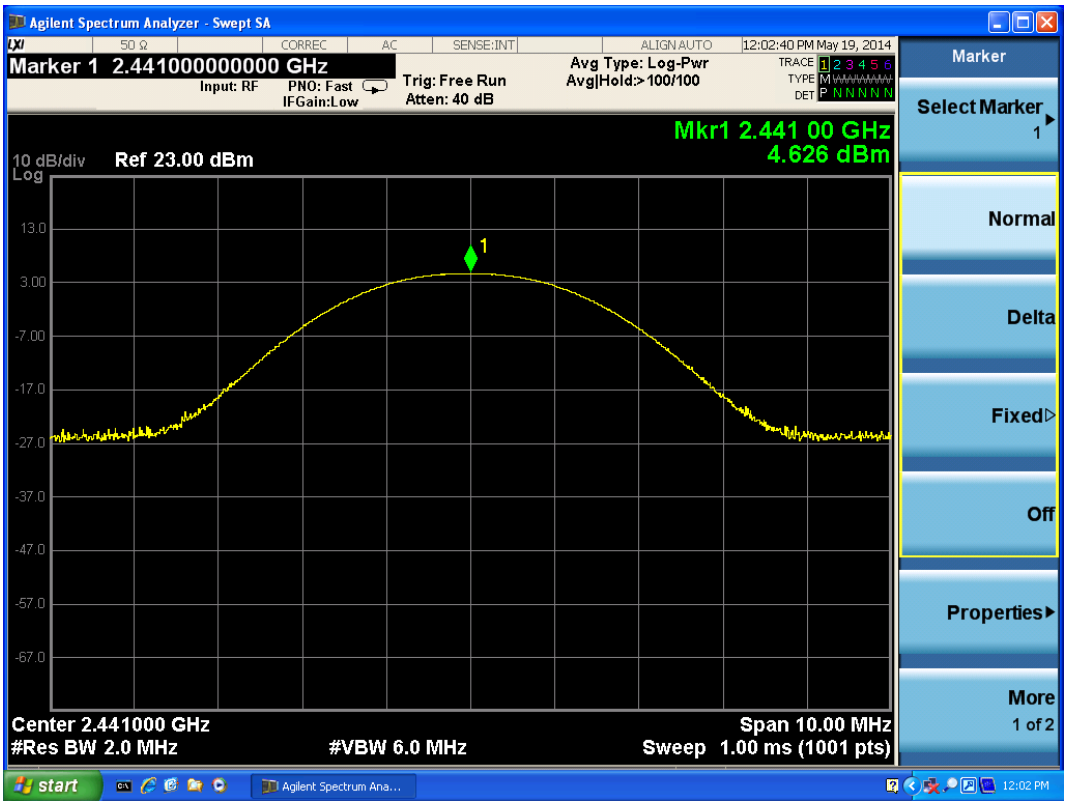
Test Results

Channel	Frequency (MHz)	Peak Output Power (dBm)			Conclusion
		DH5	2DH5	3DH5	
0	2402	2.598	2.495	2.803	PASS
39	2441	4.626	4.495	4.979	PASS
78	2480	2.928	2.893	3.196	PASS

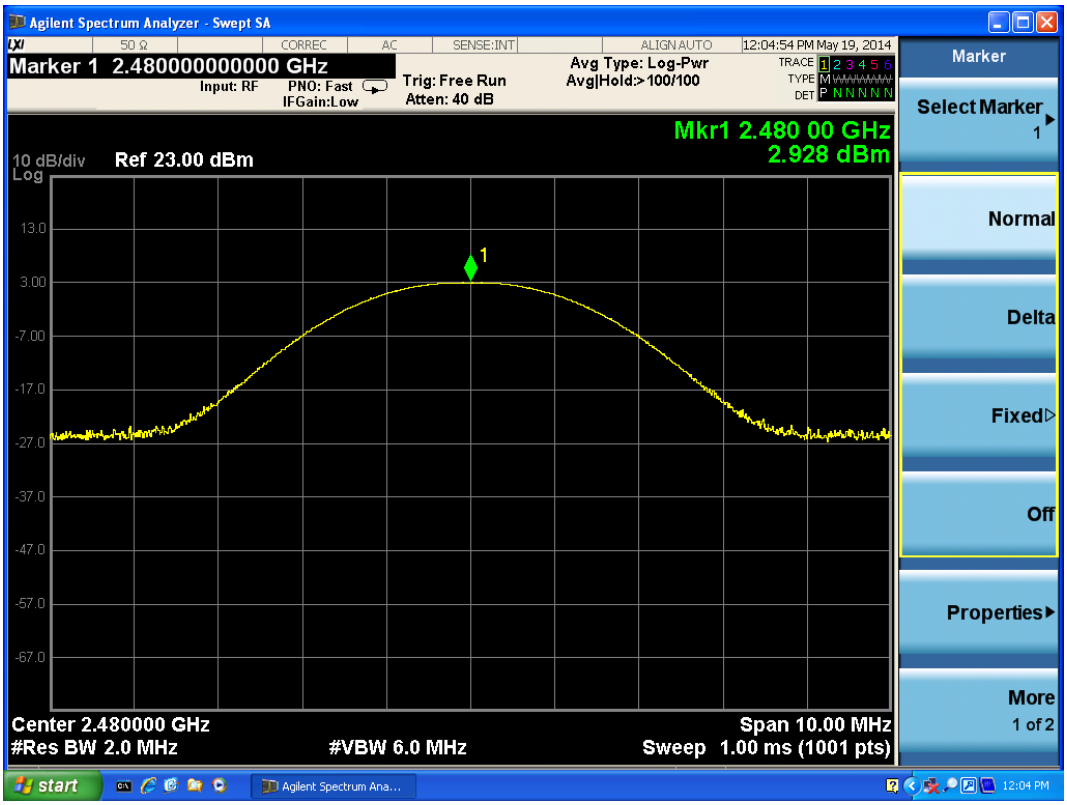
DH5



Carrier frequency (MHz): 2402
Channel No.:0

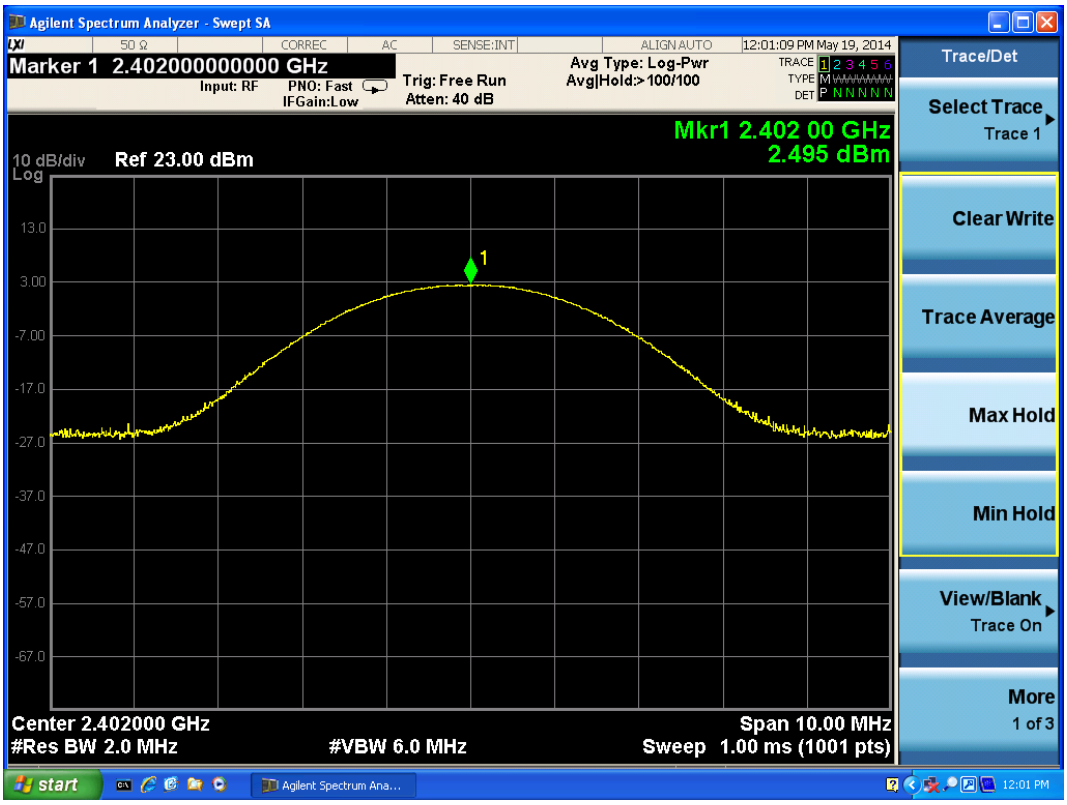


Carrier frequency (MHz): 2441
Channel No.:39

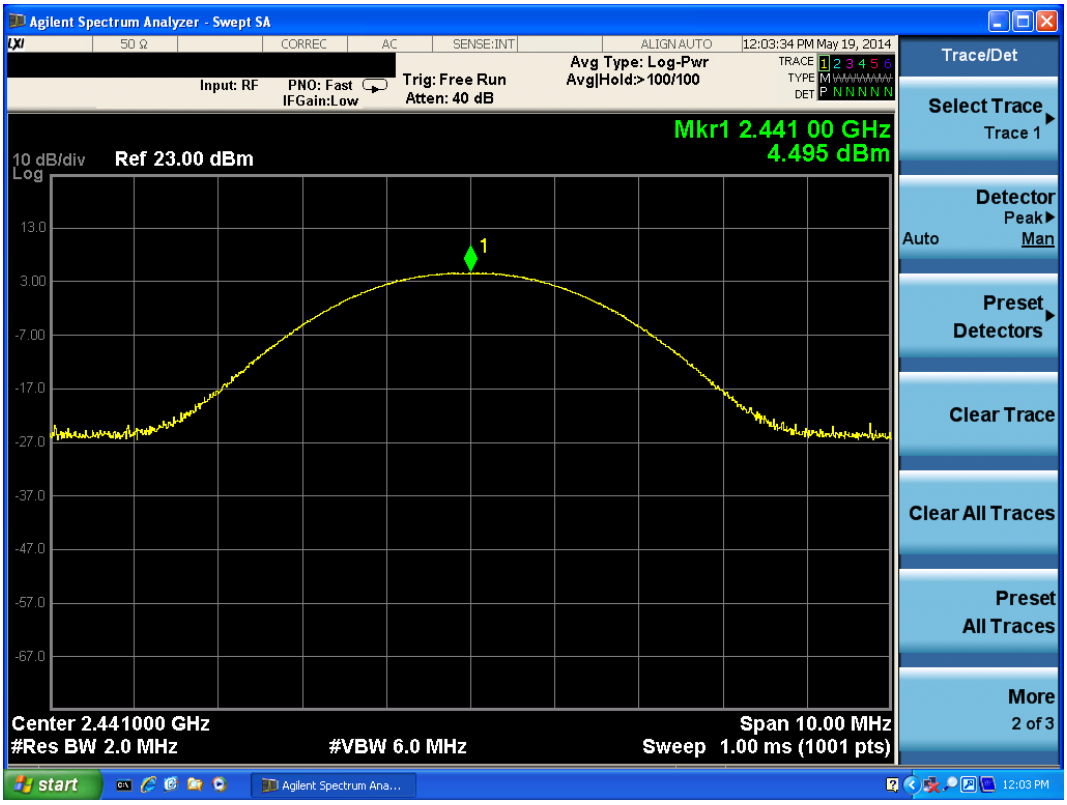


Carrier frequency (MHz): 2480
Channel No.:78

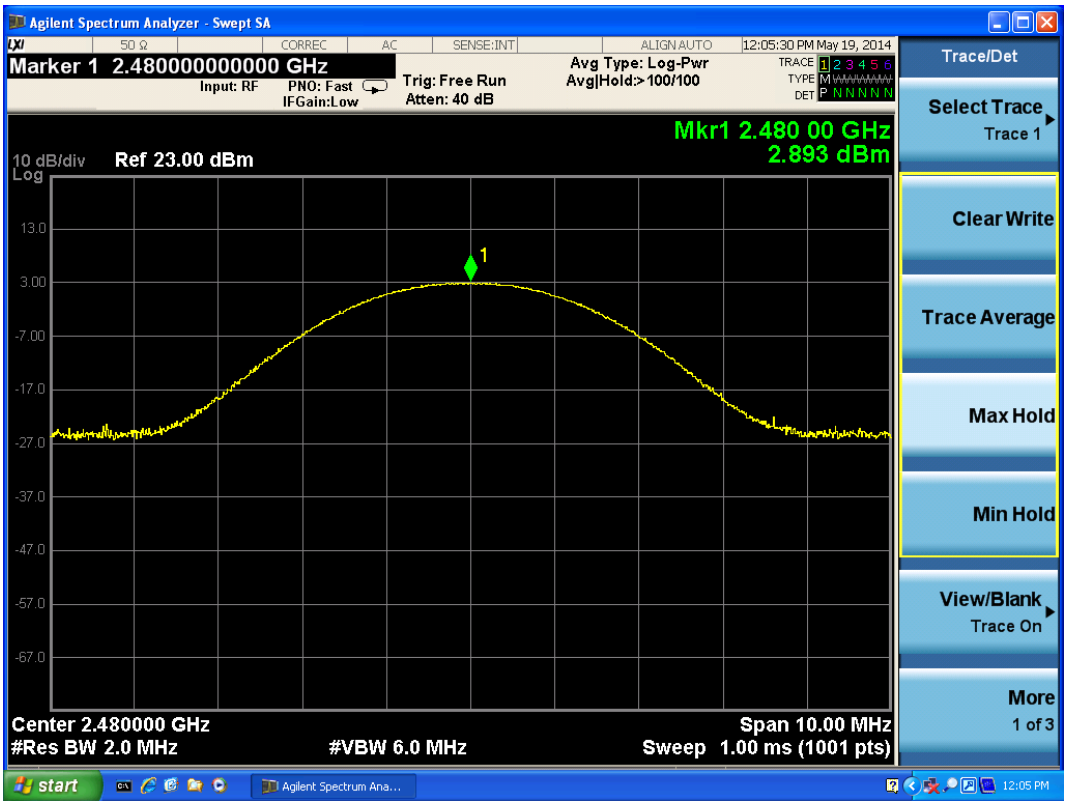
2DH5



Carrier frequency (MHz): 2402
Channel No.:0



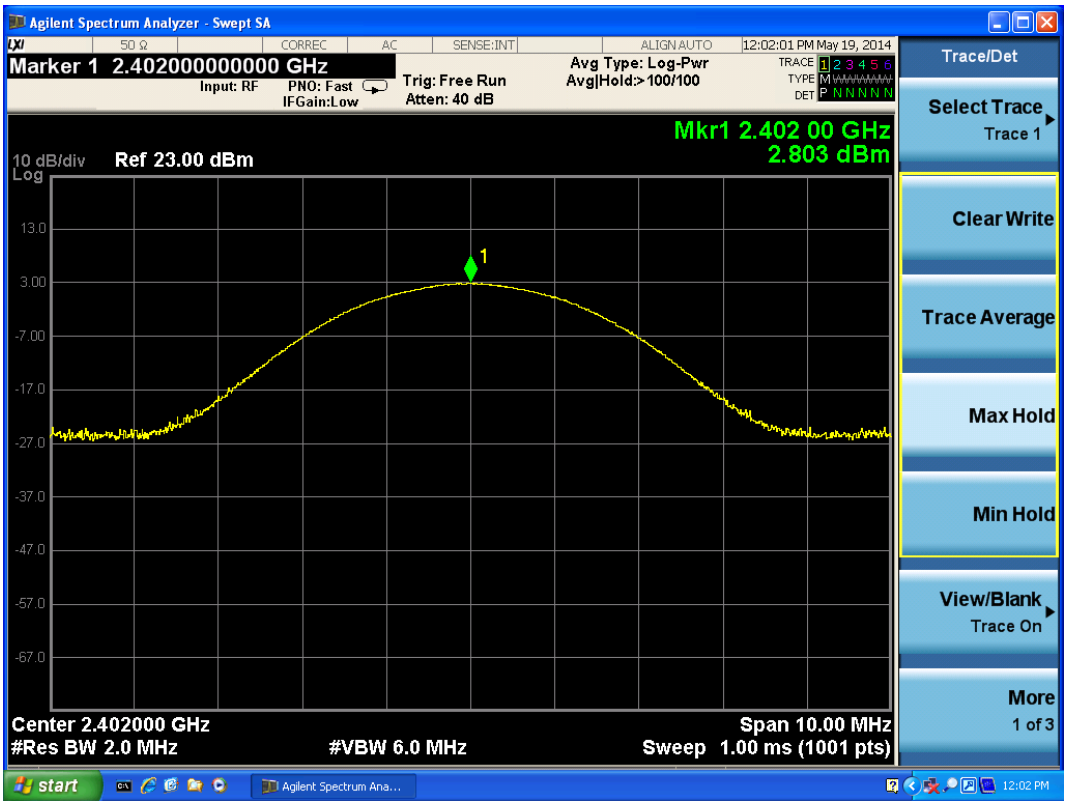
Carrier frequency (MHz): 2441
Channel No.:39



Carrier frequency (MHz): 2480

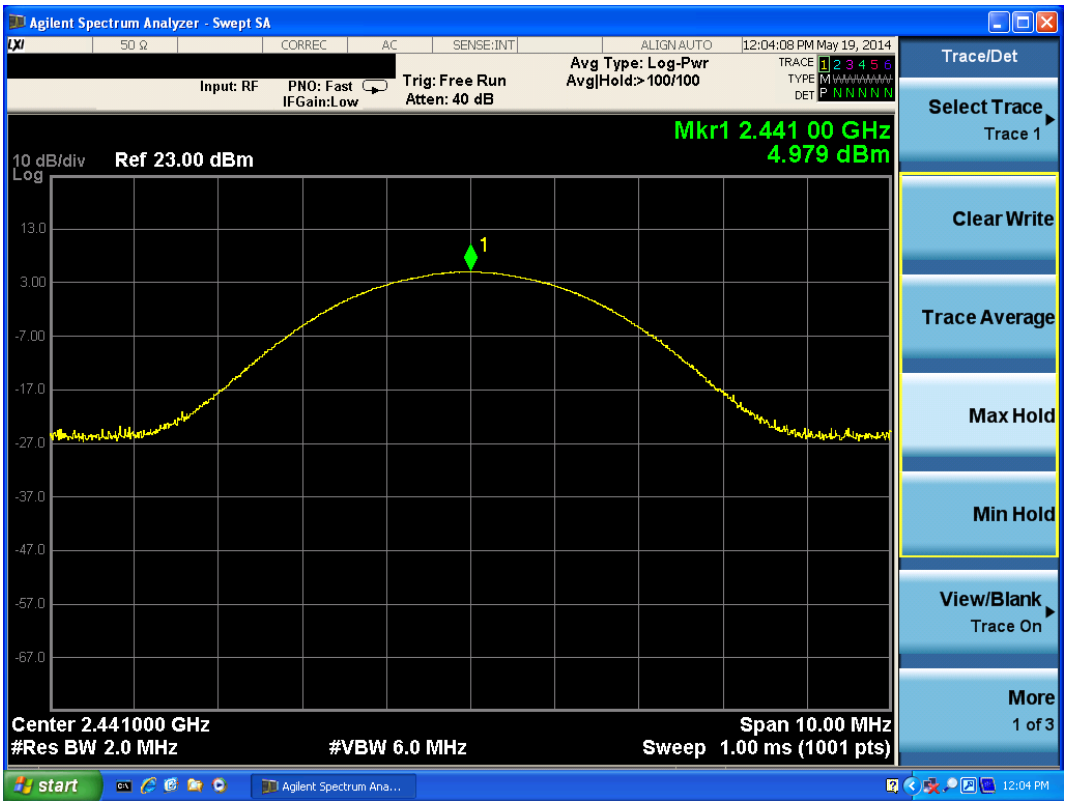
Channel No.:78

3DH5



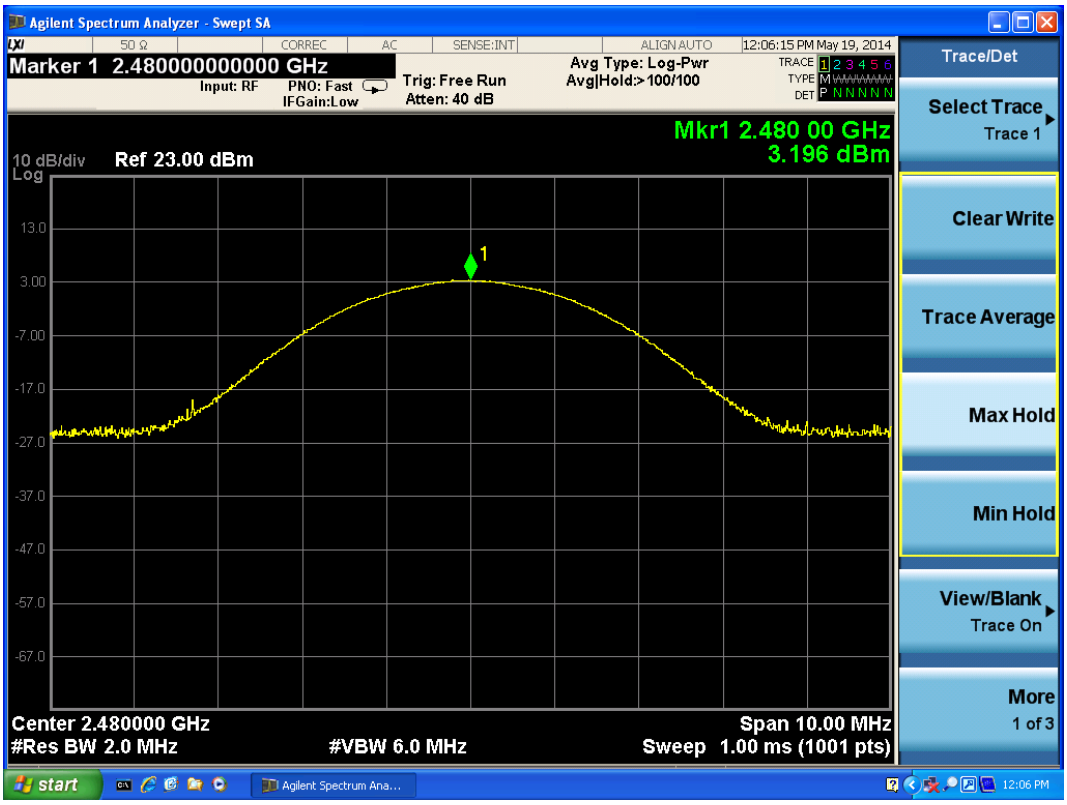
Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

3.4. Occupied Bandwidth (20dB)

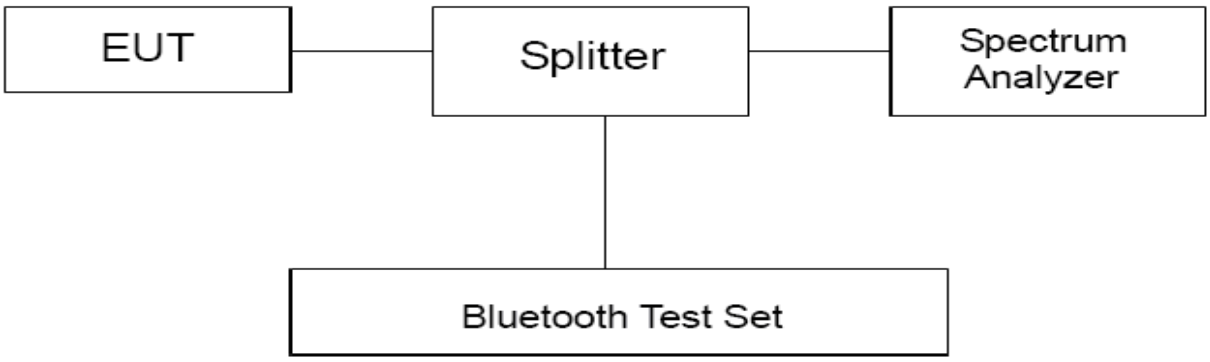
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 20kHz and VBW is set to 62kHz on spectrum analyzer. -20dB occupied bandwidths are recorded.

Test Setup



Limits

No specific occupied bandwidth requirements in part 15.247(a) (1).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results

DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	938.4
39	2441	934.2
78	2480	931.6

Carrier frequency (MHz): 2402

Channel No.:0

Carrier frequency (MHz): 2441

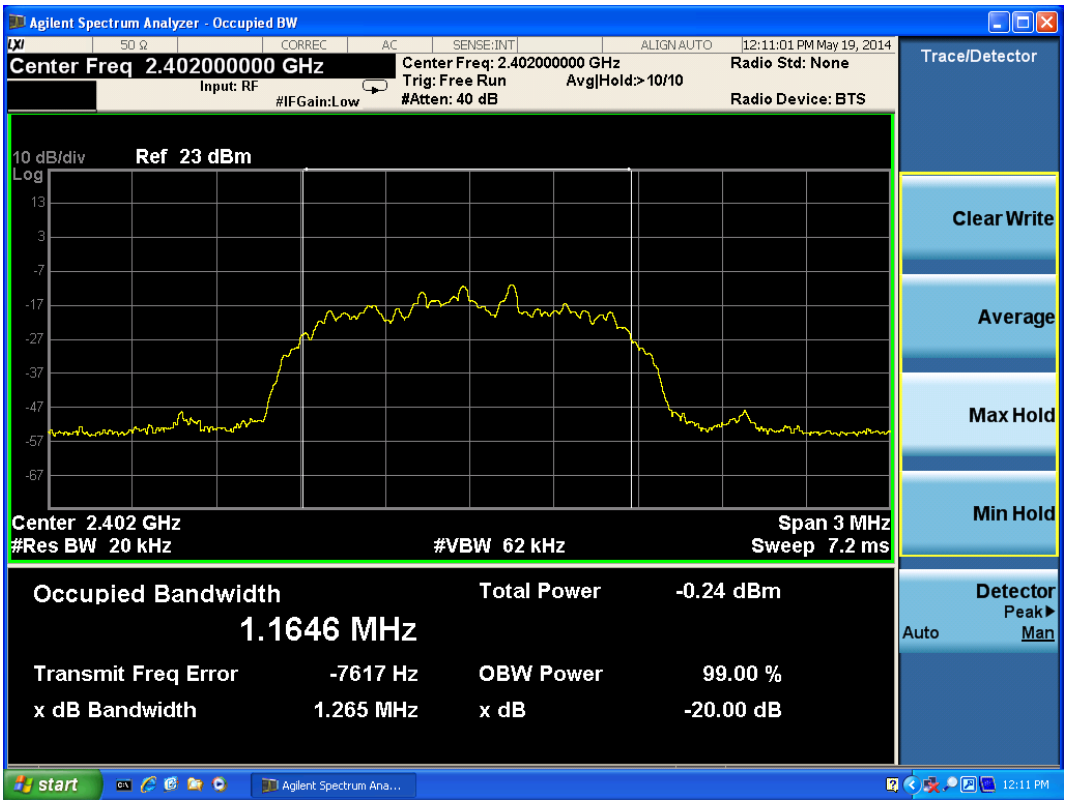
Channel No.:39

Carrier frequency (MHz): 2480

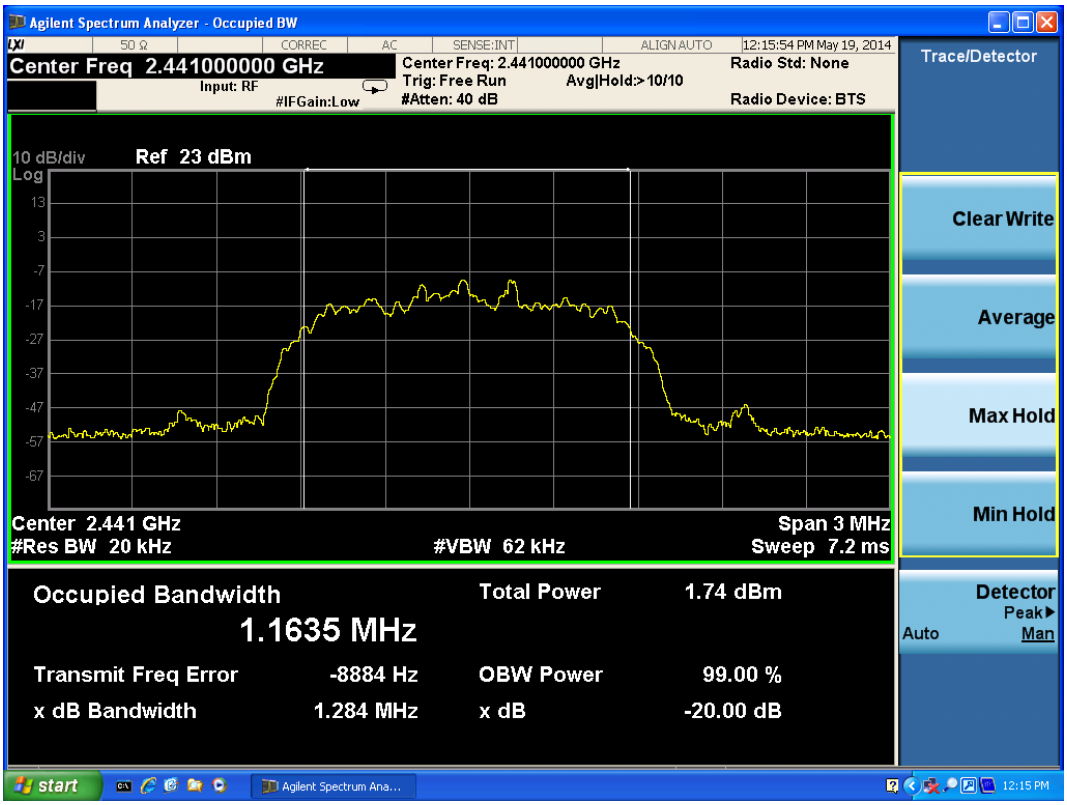
Channel No.:78

2DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	1265
39	2441	1284
78	2480	1278

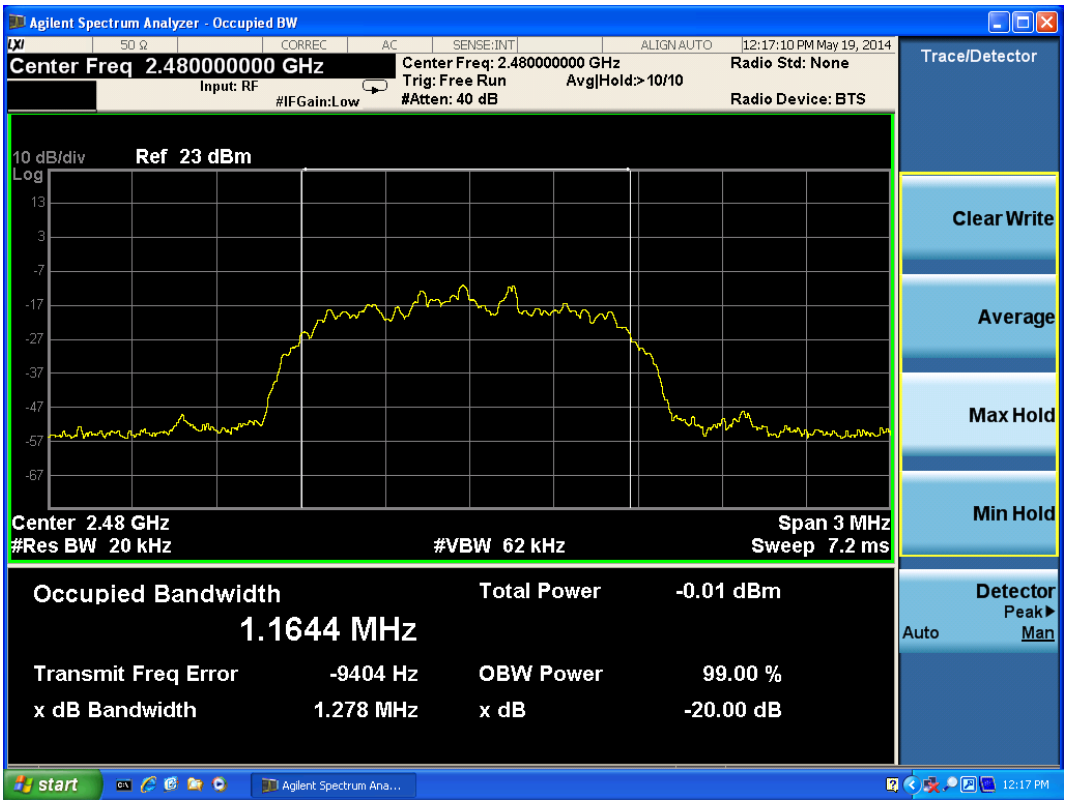


Carrier frequency (MHz): 2402
Channel No.:0



Carrier frequency (MHz): 2441

Channel No.:39

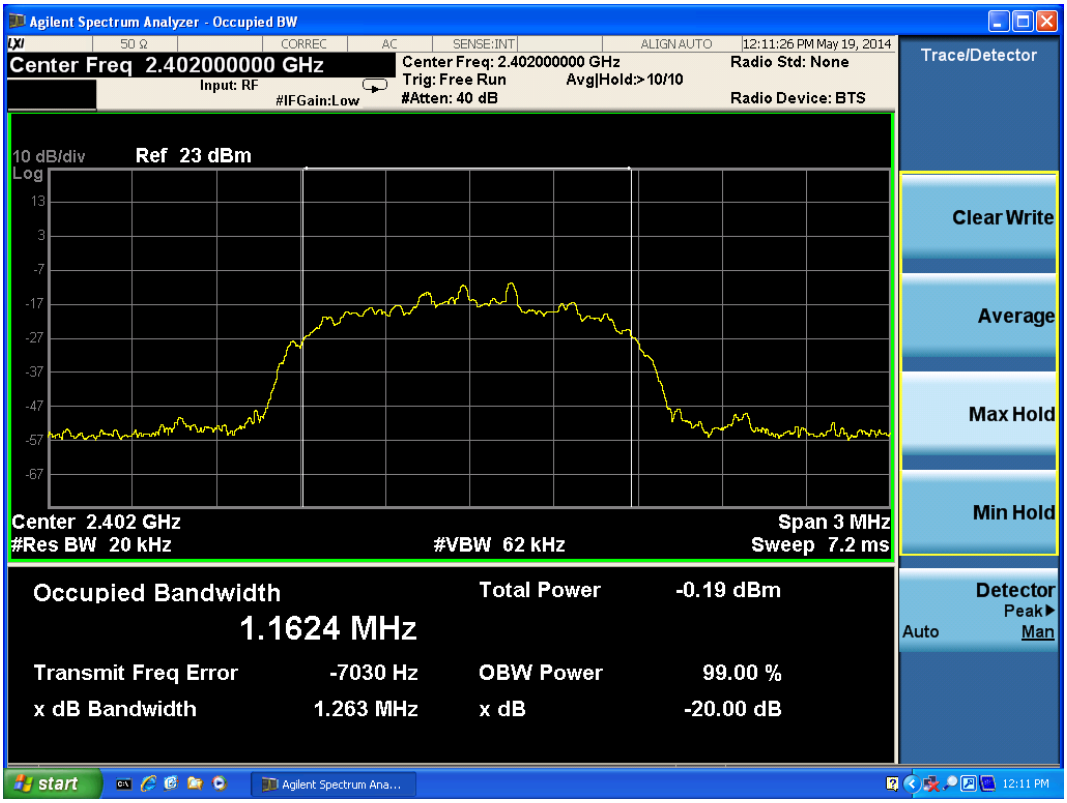


Carrier frequency (MHz): 2480

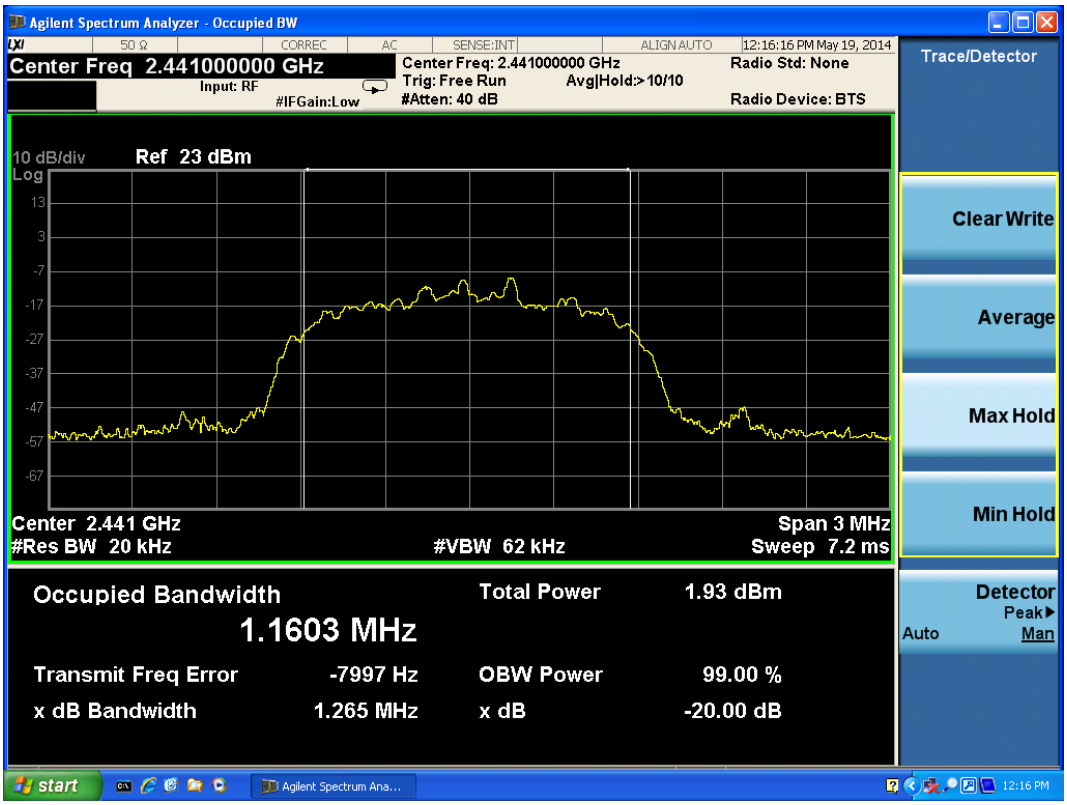
Channel No.:78

3DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	1263
39	2441	1265
78	2480	1264

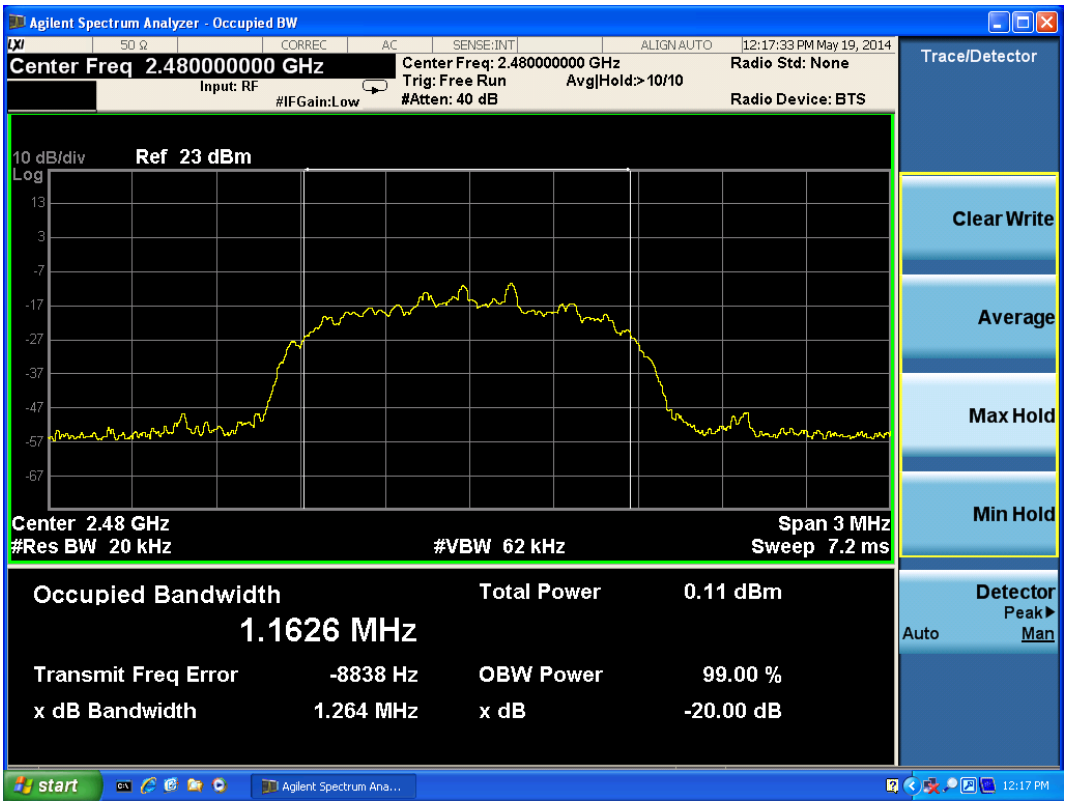


Carrier frequency (MHz): 2402
Channel No.:0



Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

3.5. Frequency Separation

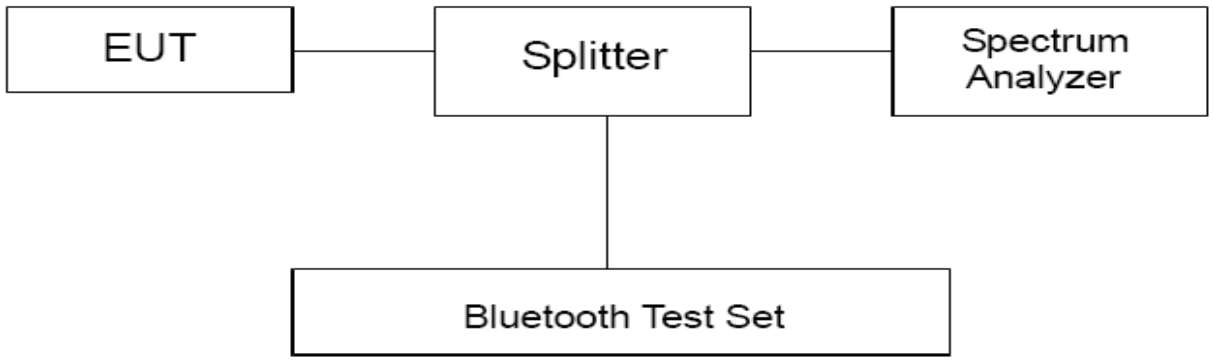
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 300 kHz and VBW is set to 3MHz on spectrum analyzer. Set EUT on Hopping on mode.

Test setup



Limits

Rule Part 15.247(a)(1)specifies that “Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. ”

Note: The value of two-thirds of 20 dB bandwidth is always greater than 25 kHz.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

DH5

Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	1002	938.4	625.6	PASS
2441	981	934.2	622.8	PASS
2480	972	931.6	621.1	PASS

Note: The limit is two-thirds of 20 dB bandwidth.

Carrier frequency (MHz): 2402

Channel No.:0

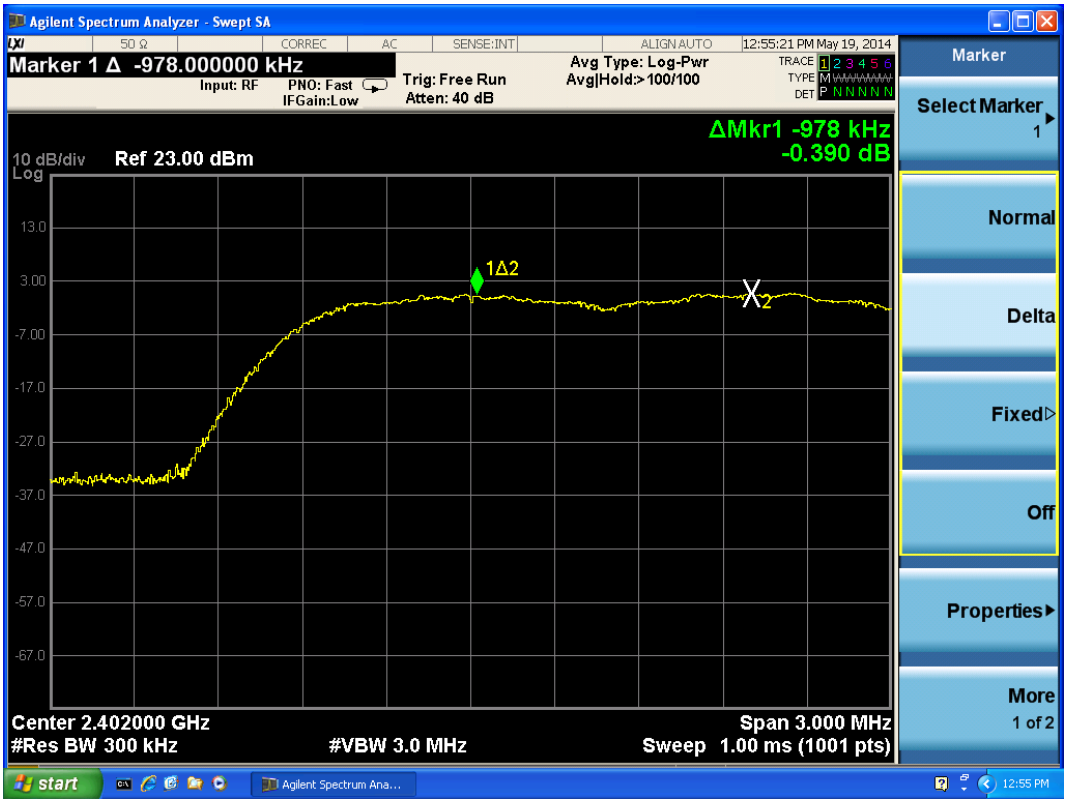
Carrier frequency (MHz): 2441
Channel No.:39

Carrier frequency (MHz): 2480
Channel No.:78

2DH5

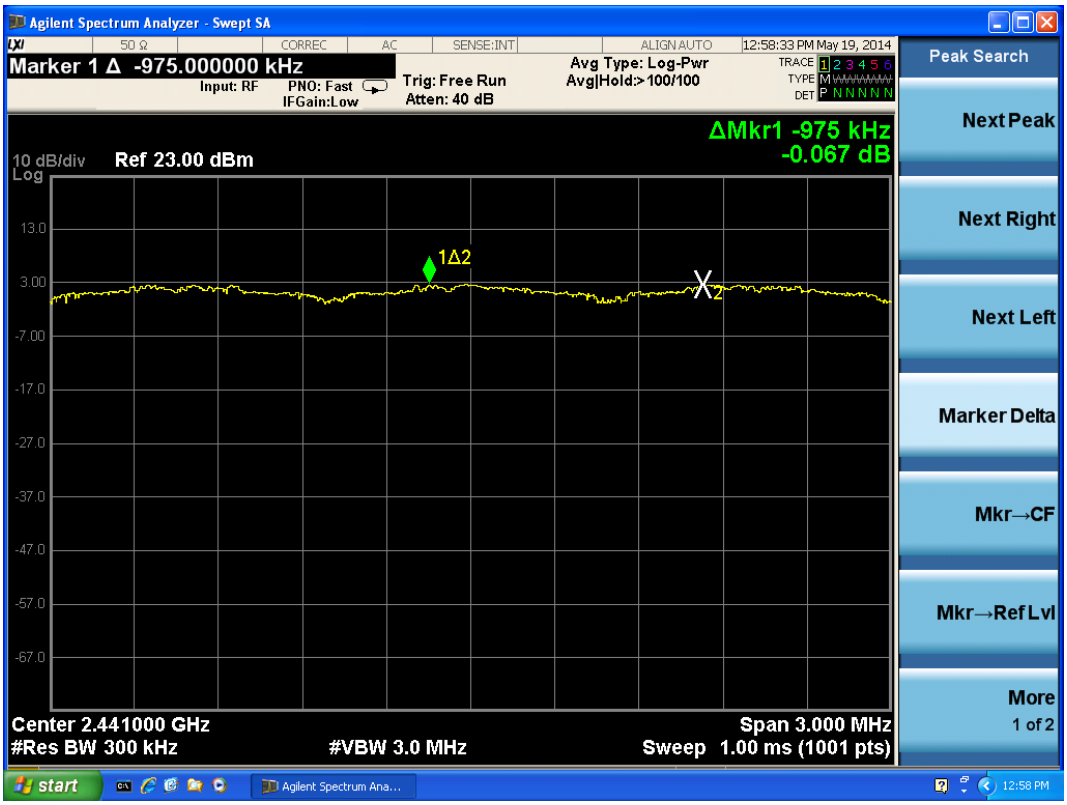
Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	978	1265	843.3	PASS
2441	975	1284	856.0	PASS
2480	993	1278	852.0	PASS

Note: The limit is two-thirds of 20 dB bandwidth.



Carrier frequency (MHz): 2402

Channel No.:0



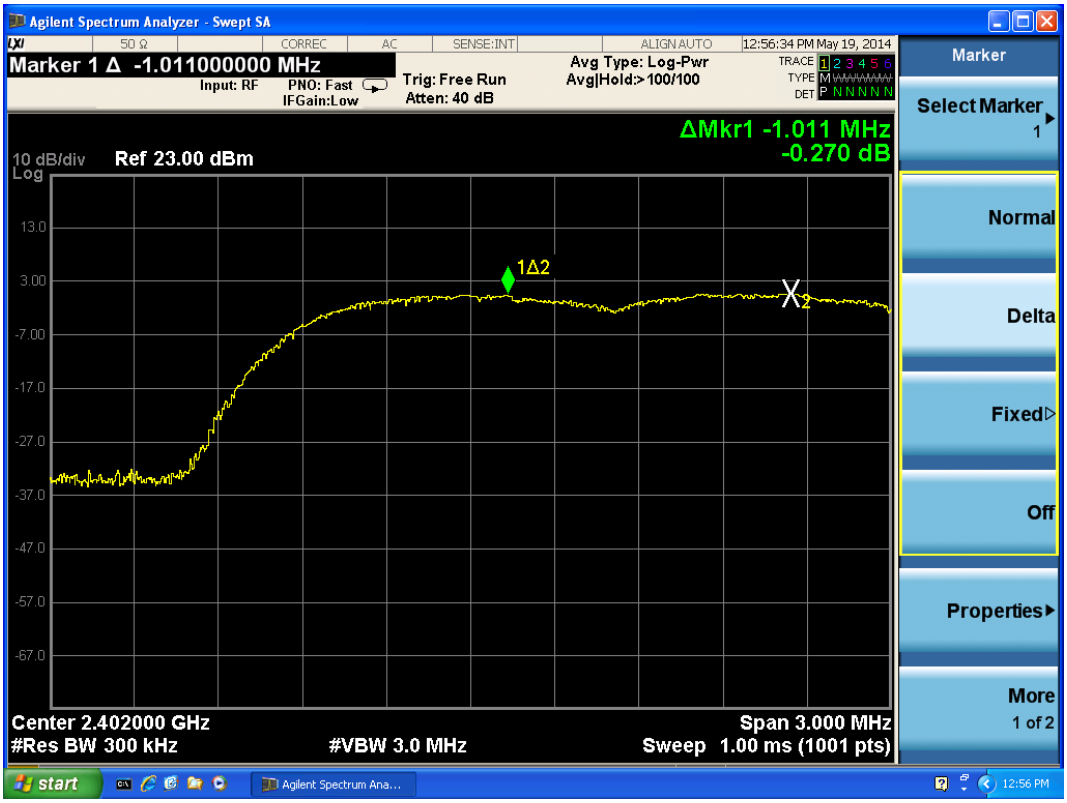
Carrier frequency (MHz): 2441
Channel No.:39

Carrier frequency (MHz): 2480
Channel No.:78

3DH5

Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	1011	1263	842.0	PASS
2441	996	1265	843.3	PASS
2480	996	1264	842.7	PASS

Note: The limit is two-thirds of 20 dB bandwidth.



Carrier frequency (MHz): 2402

Channel No.:0

Carrier frequency (MHz): 2441

Channel No.:39

Carrier frequency (MHz): 2480

Channel No.:78

3.6. Time of Occupancy (Dwell Time)

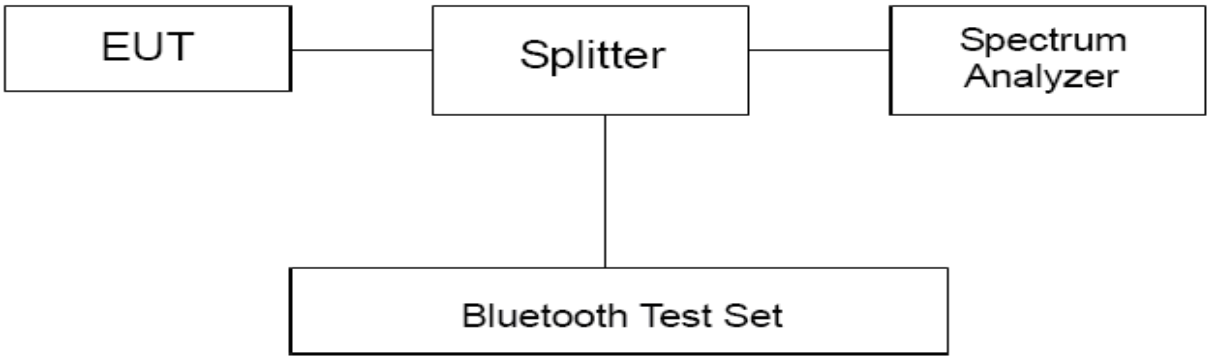
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 3MHz and VBW is set to 3MHz on spectrum analyzer .The time slot length is measured of three different packet types, which are available in the Bluetooth technology. Those are DH1, DH3 and DH5 packets. The dwell time is calculated by:
Dwell time = time slot length * hop rate * 0.4s with:
- hop rate=1600 * 1/s for DH1 packet =1600
- hop rate=1600/3 * 1/s for DH3 packet =533.33
- hop rate=1600/5 * 1/s for DH5 packet =320

Test Setup



Limits

Rule Part 22.913(a) specifies that " Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.."

Dwell time	≤ 400ms

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 2.

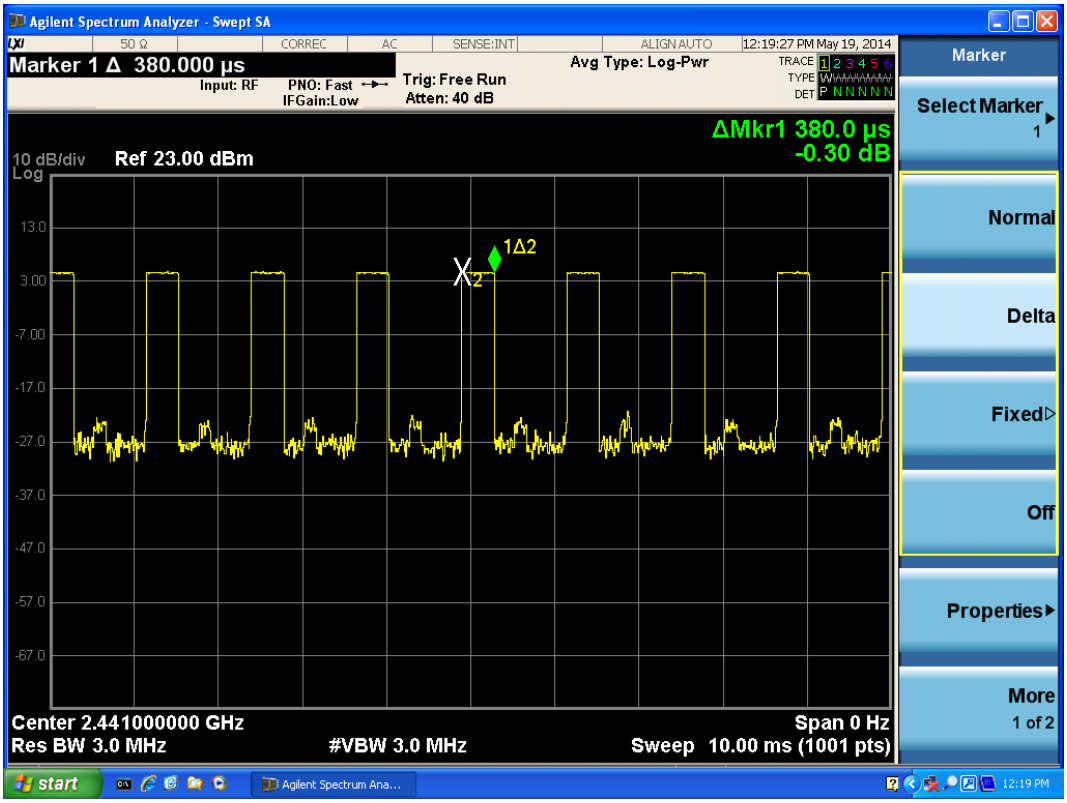
Requirements	Uncertainty	
Dwell Time	DH1	*U*= 0.64ms
	DH3	*U*= 0.80ms
	DH5	*U*= 0.70ms

Test Results:

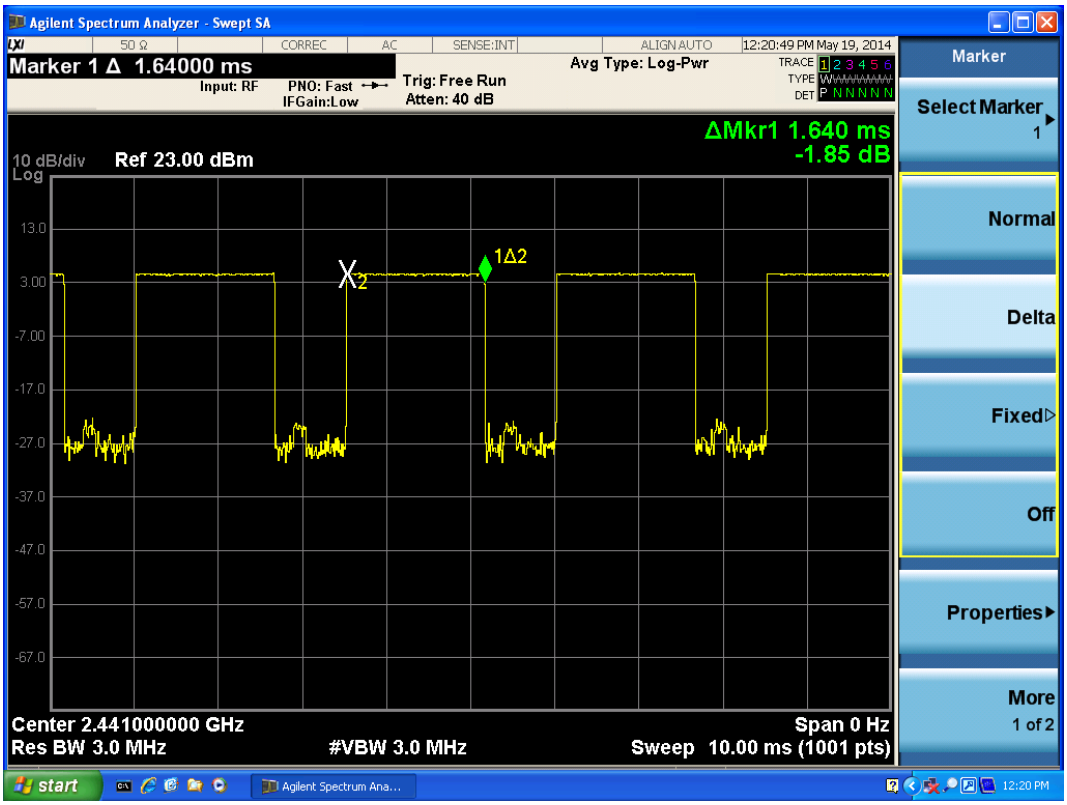
CH 39

Packet type	hop rate (1/s)	Time slot length(ms)	Dwell time (ms)	Limit (ms)	Conclusion
DH1	1600	0.38	243.20	400	PASS
DH3	533.33	1.64	349.86	400	PASS
DH5	320	2.89	369.92	400	PASS

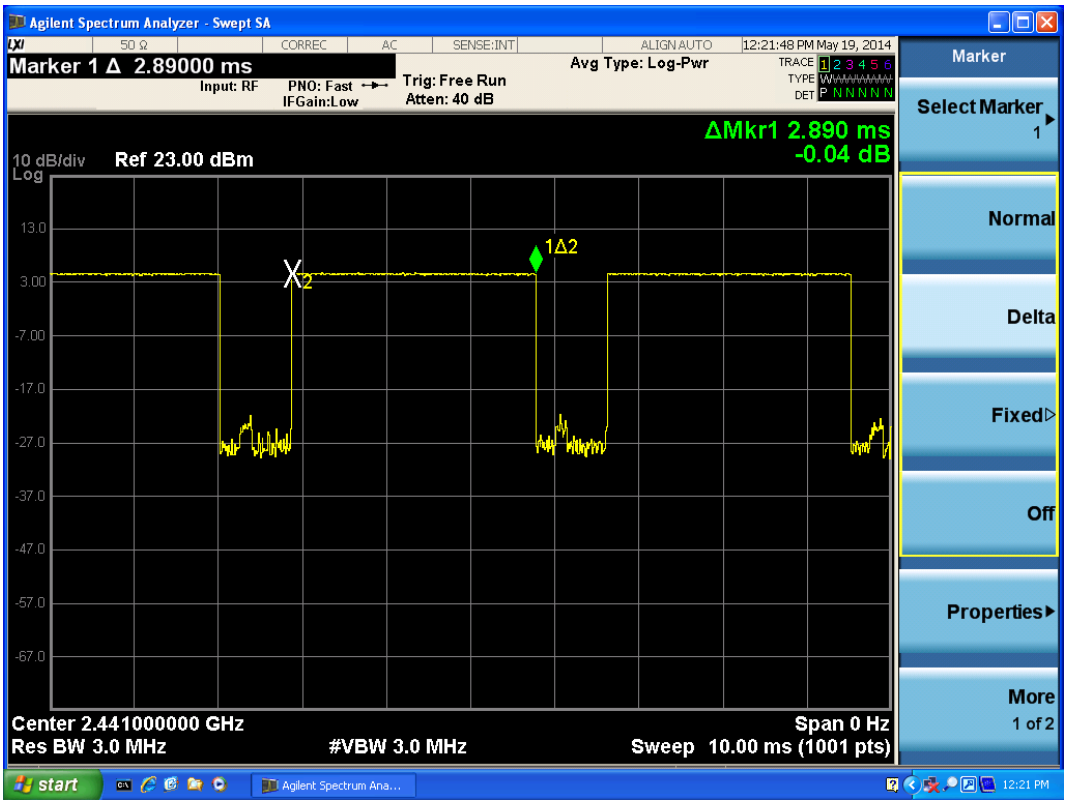
Note: Dwell time = time slot length * hop rate * 0.4s



Carrier frequency (MHz): 2441,DH1



Carrier frequency (MHz): 2441,DH3



Carrier frequency (MHz): 2441,DH5

3.7. Band Edge Compliance

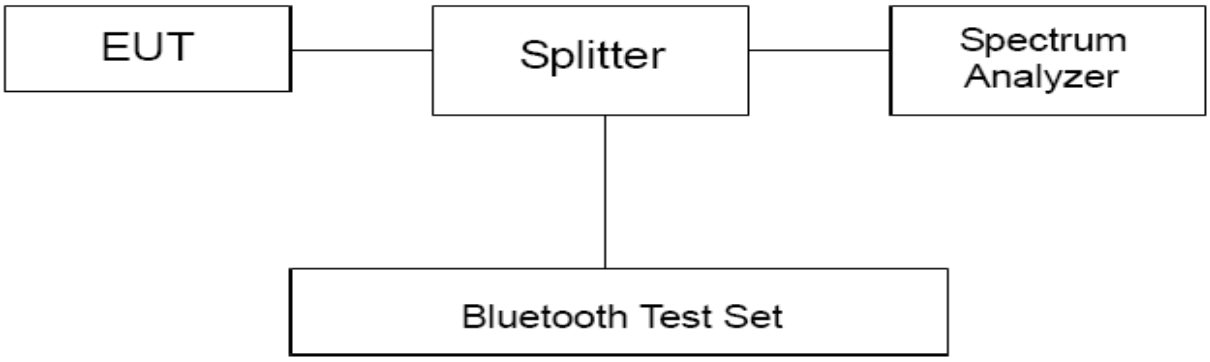
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The lowest and highest channels were measured. The peak detector is used. RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. EUT test for Hopping On mode and Hopping Off mode.

Test Setup



Limits

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.”

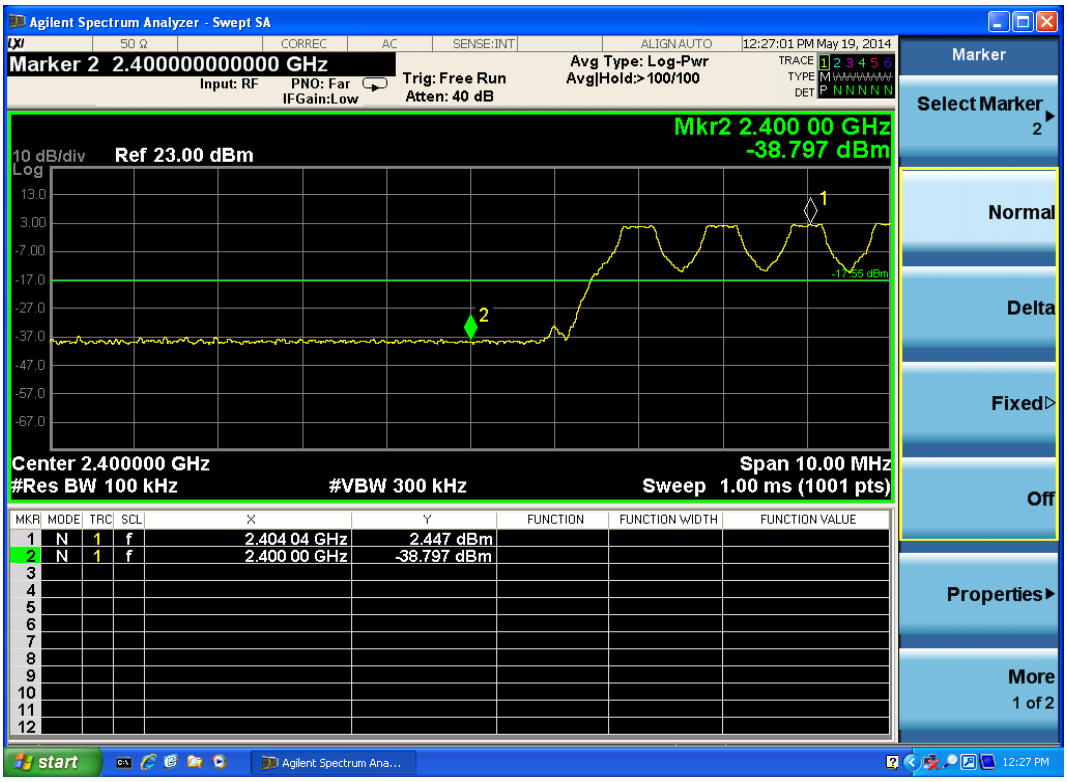
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
2GHz-3GHz	1.407 dB

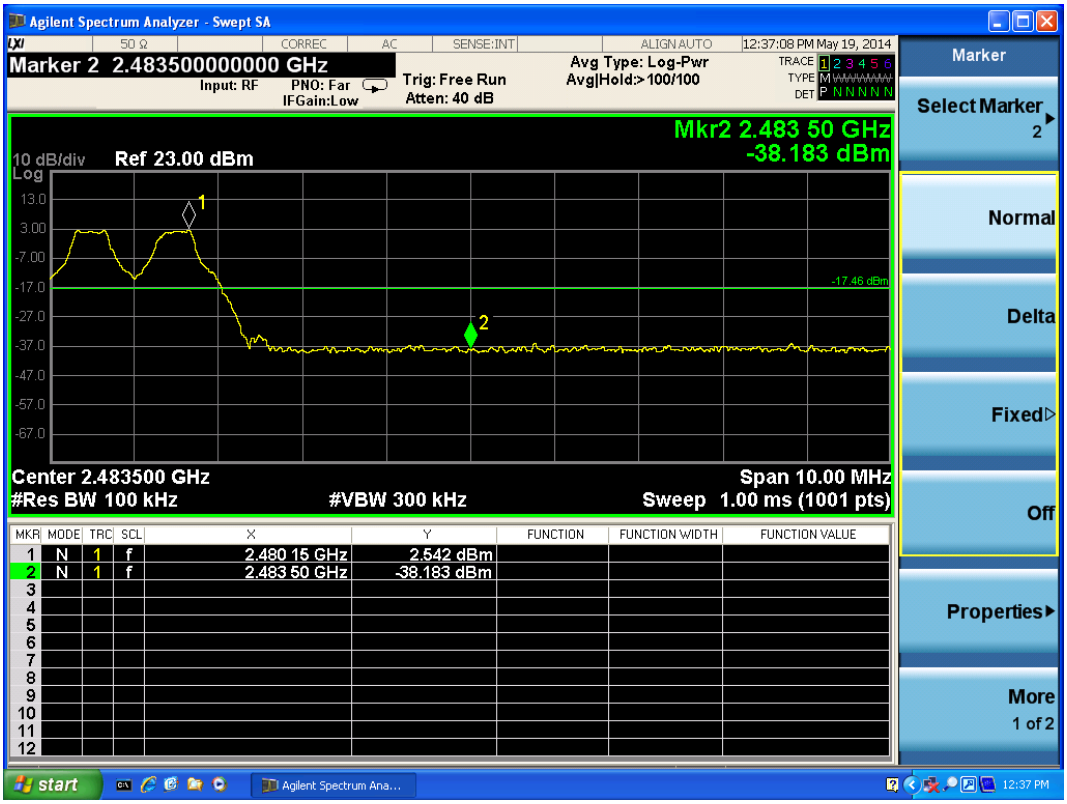
Test Results: PASS

Hopping On-DH5-



Carrier frequency (MHz): 2402

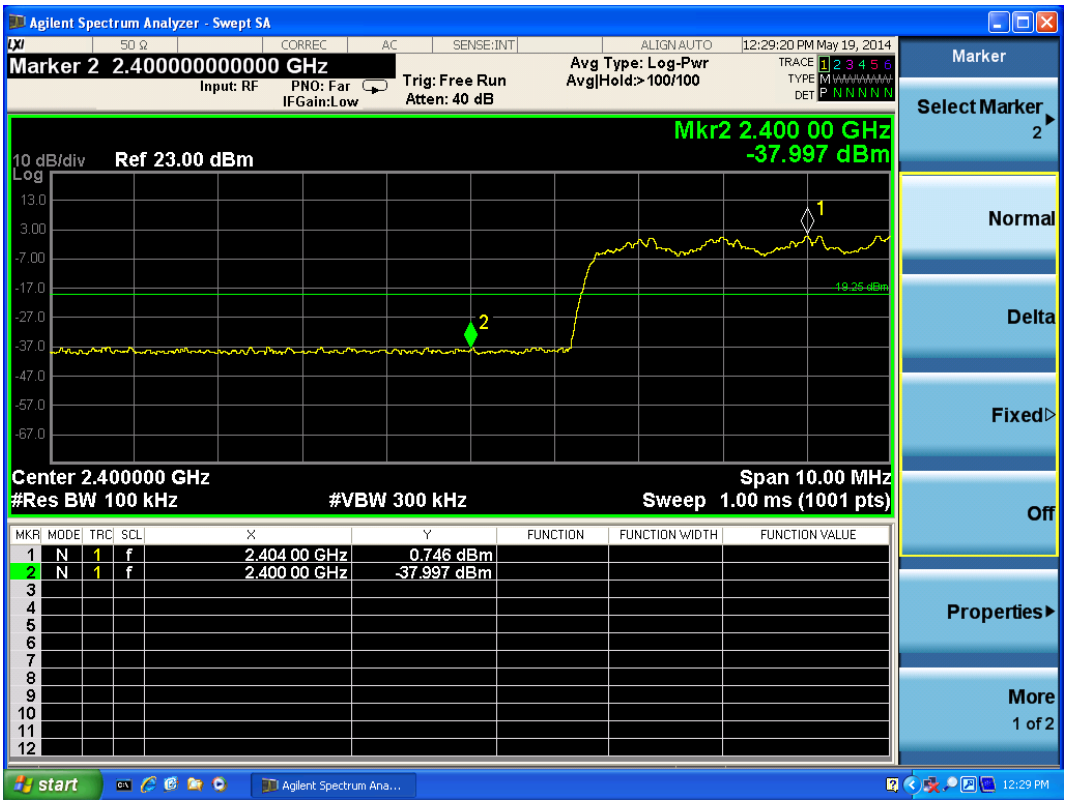
Channel No.:0



Carrier frequency (MHz): 2480

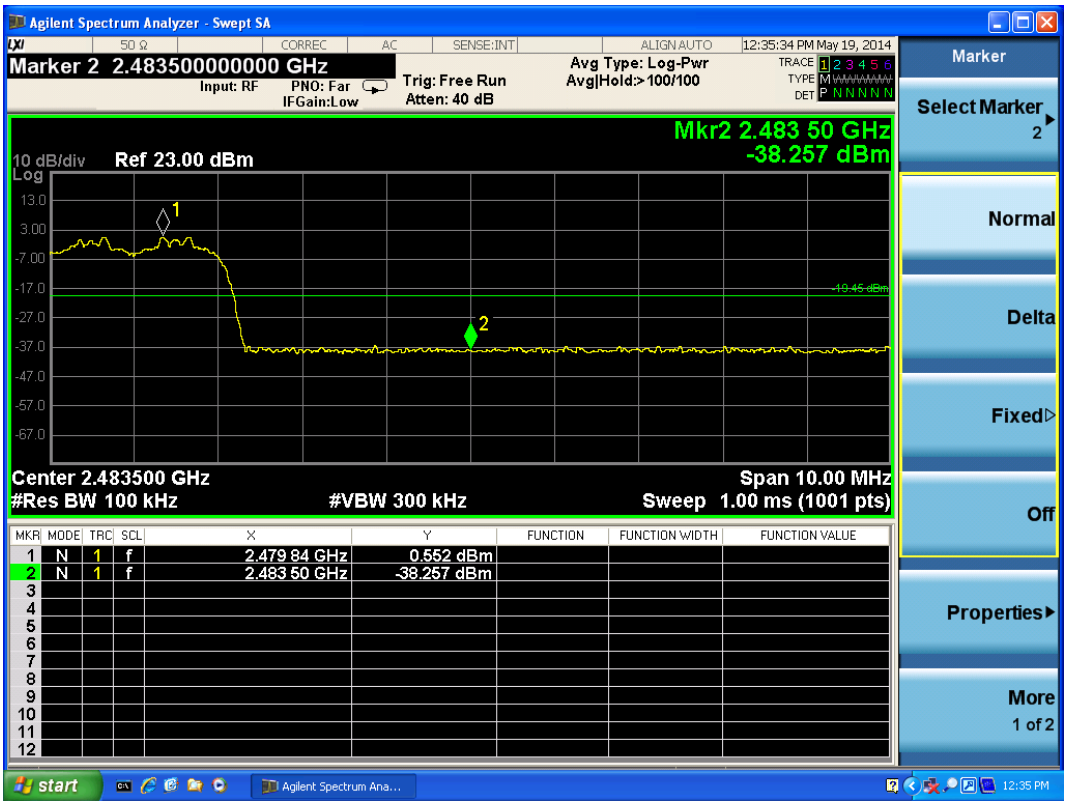
Channel No.:78

Hopping On-2DH5



Carrier frequency (MHz): 2402

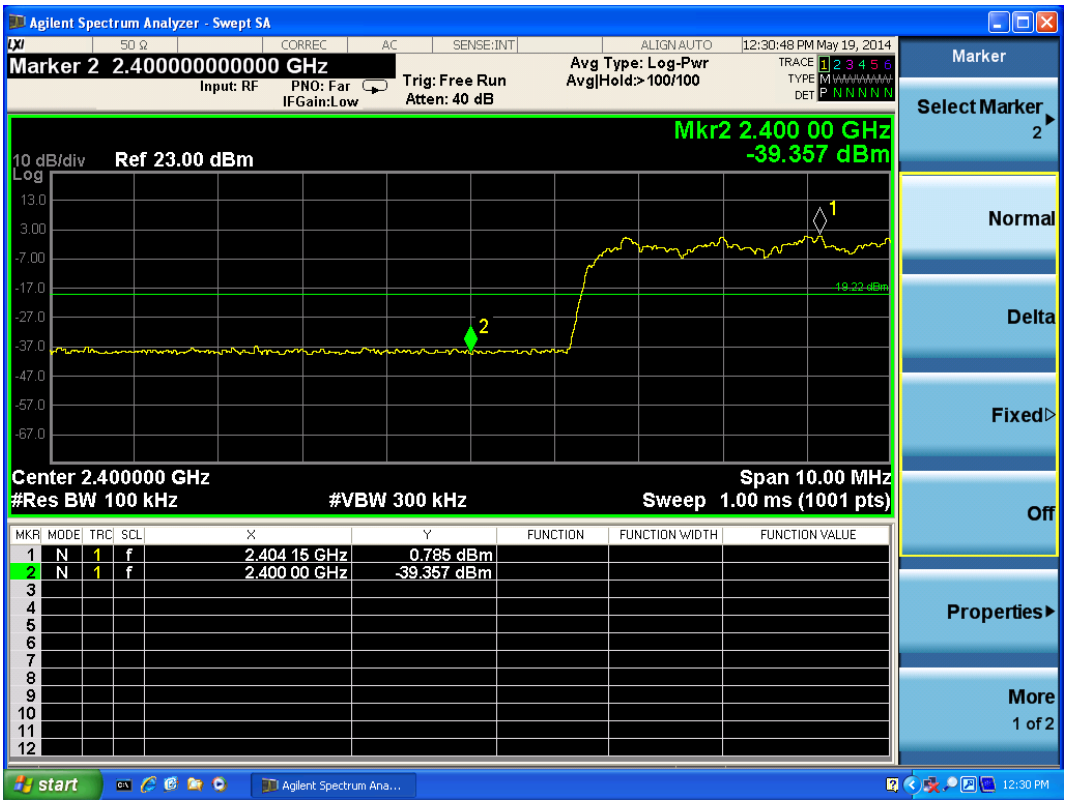
Channel No.:0



Carrier frequency (MHz): 2480

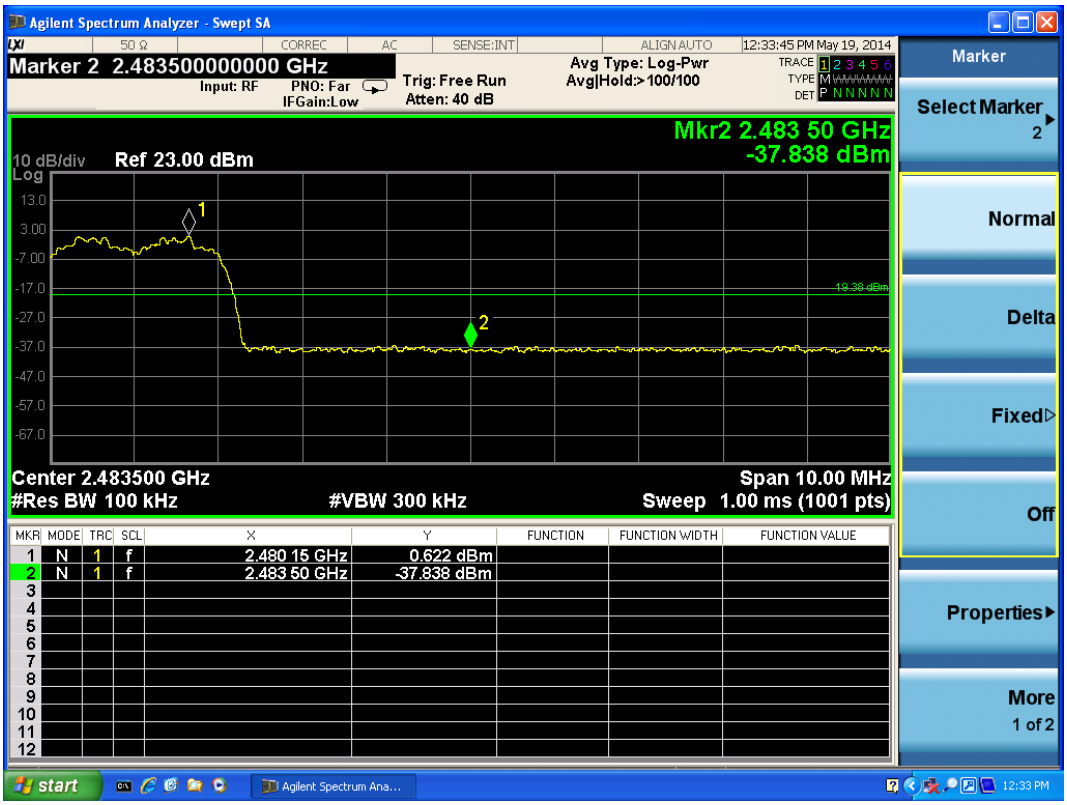
Channel No.:78

Hopping On-3DH5



Carrier frequency (MHz): 2402

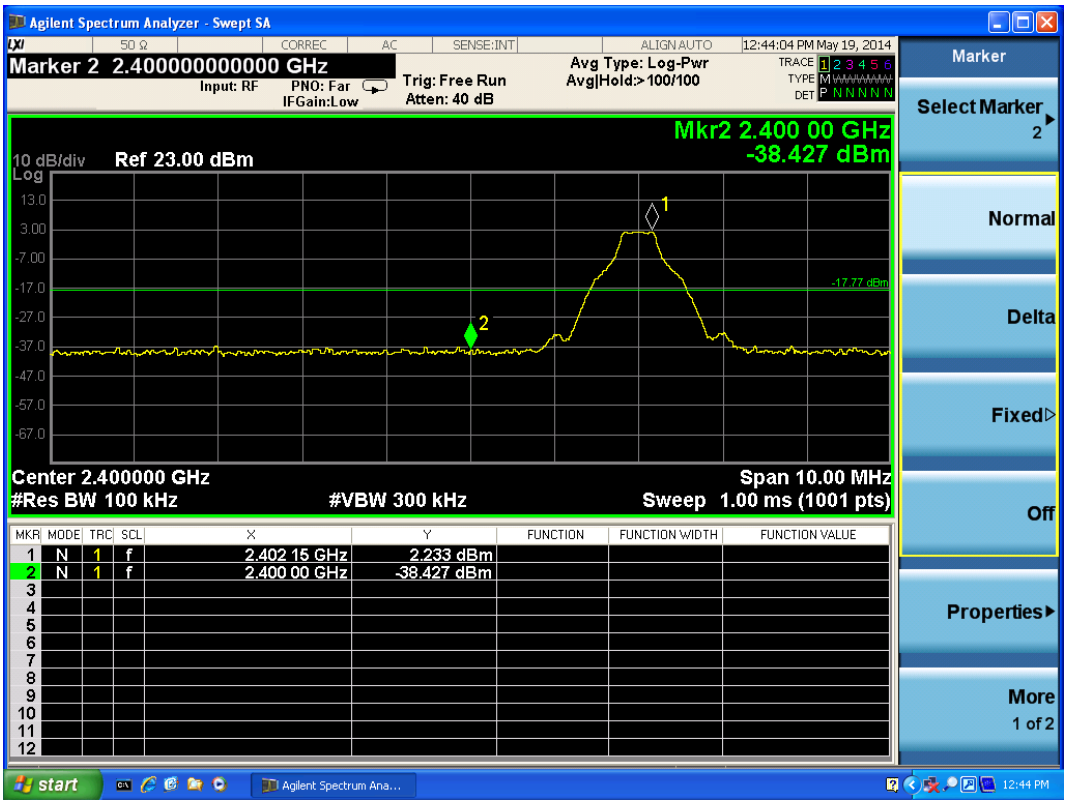
Channel No.:0



Carrier frequency (MHz): 2480

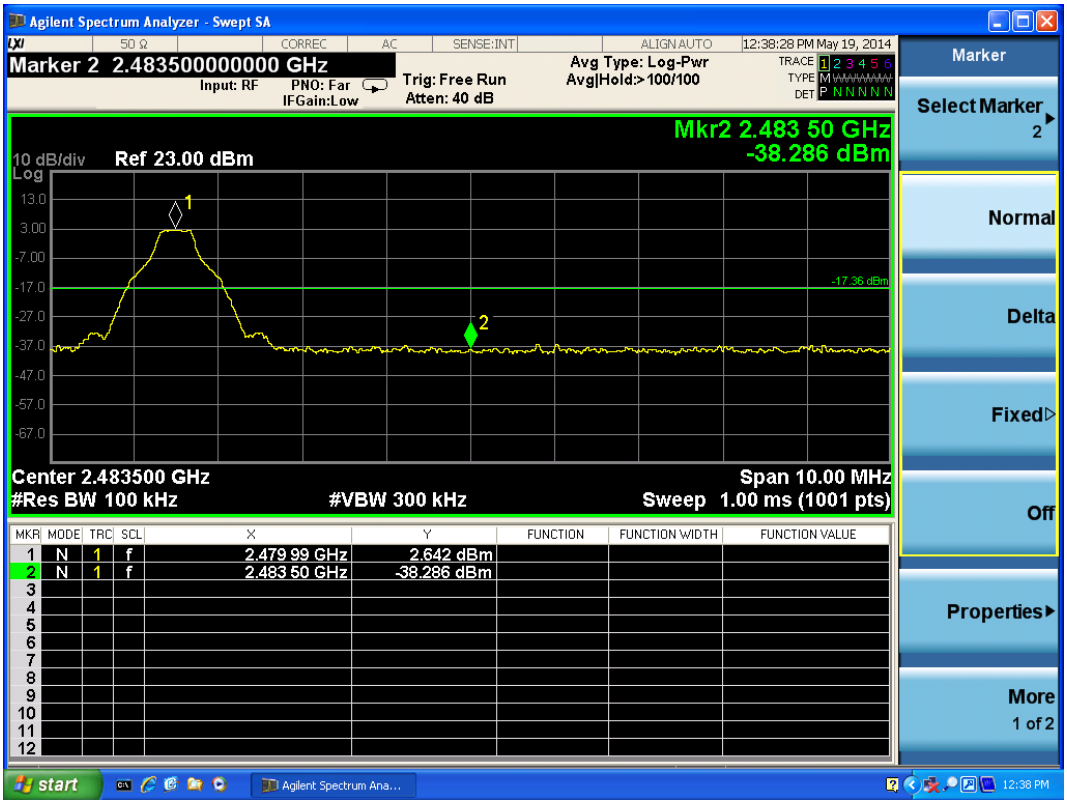
Channel No.:78

Hopping Off-DH5



Carrier frequency (MHz): 2402

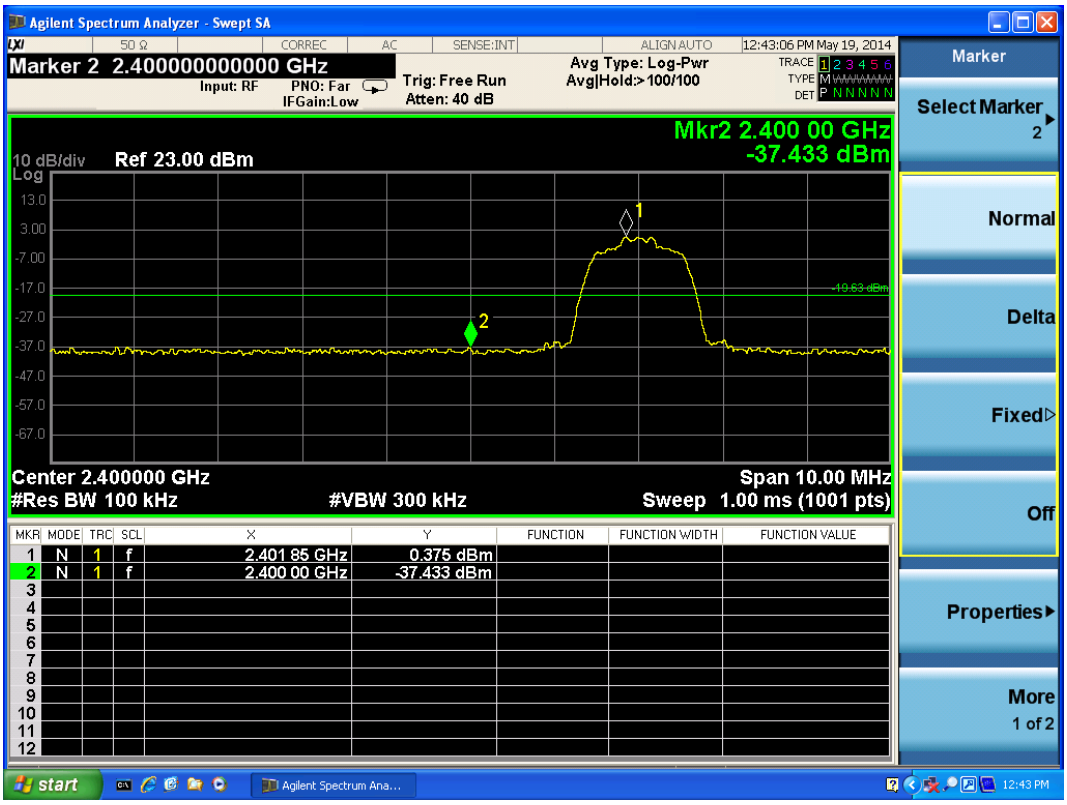
Channel No.:0



Carrier frequency (MHz): 2480

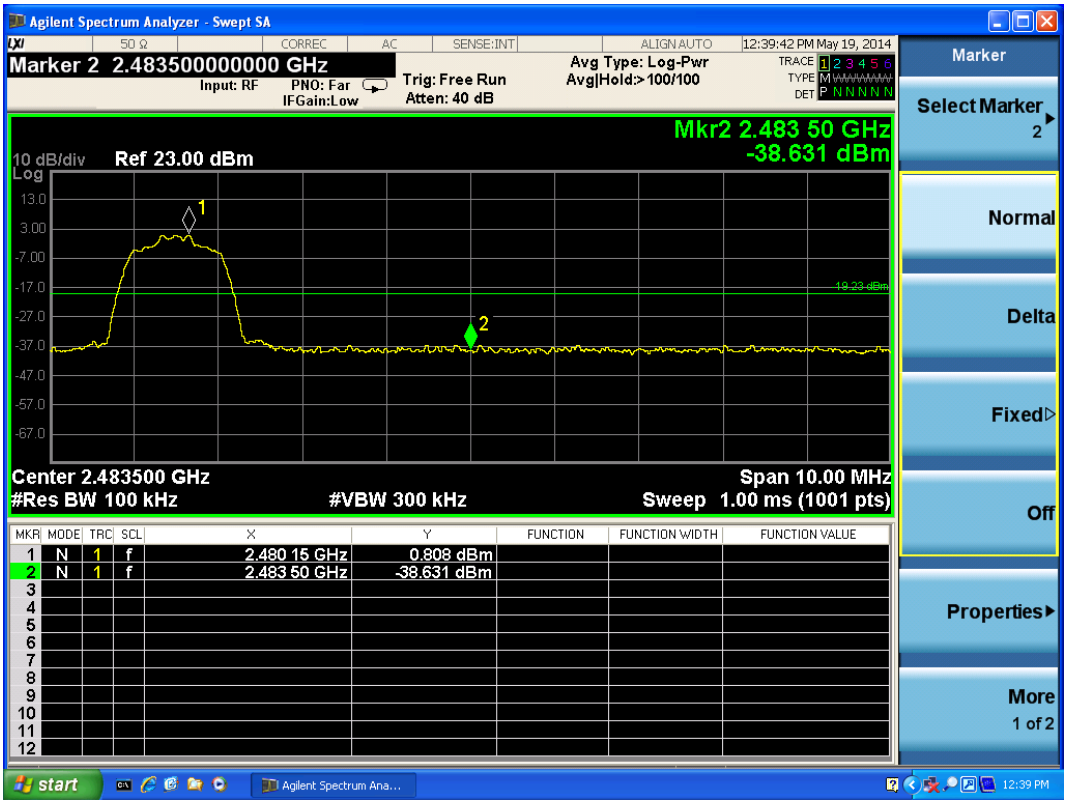
Channel No.:78

Hopping Off-2DH5



Carrier frequency (MHz): 2402

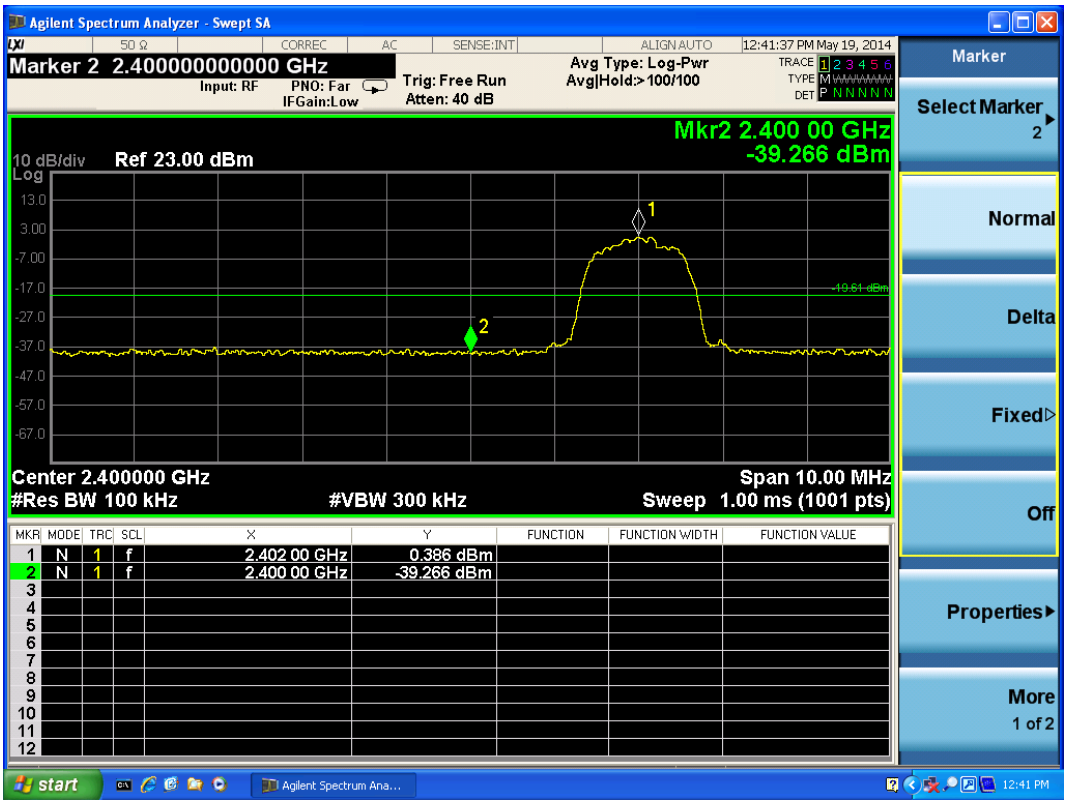
Channel No.:0



Carrier frequency (MHz): 2480

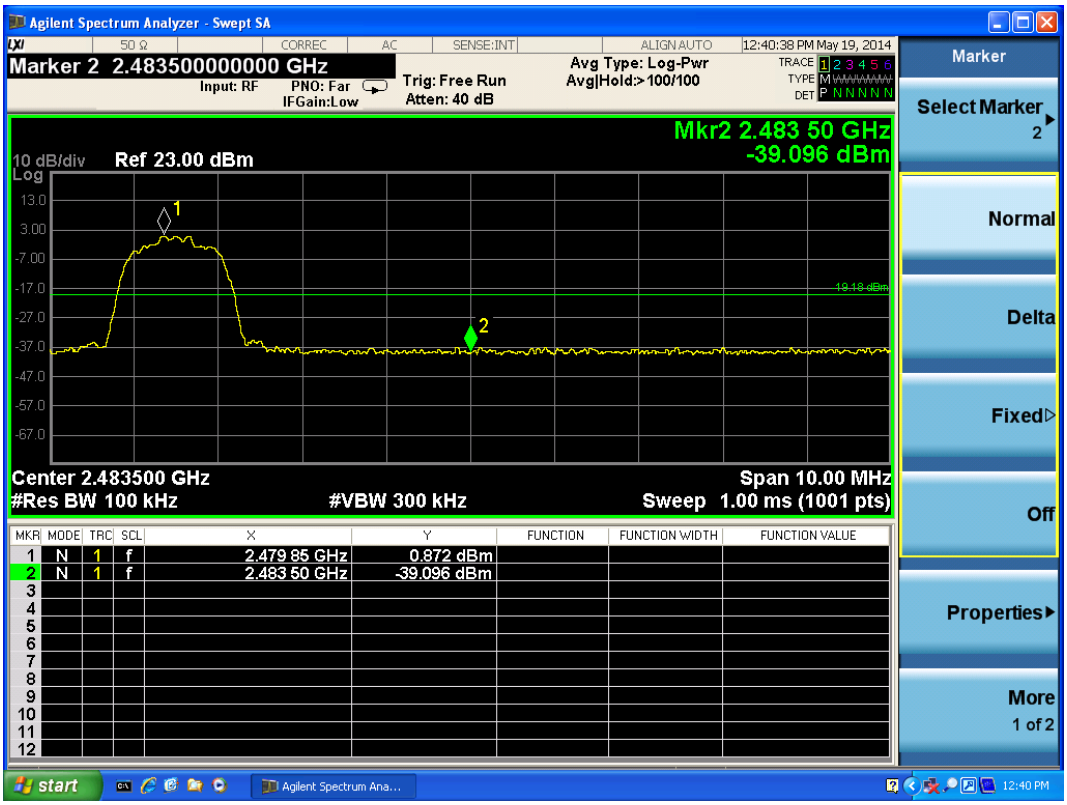
Channel No.:78

Hopping Off-3DH5



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

3.8. Spurious Radiated Emissions in the Restricted Band

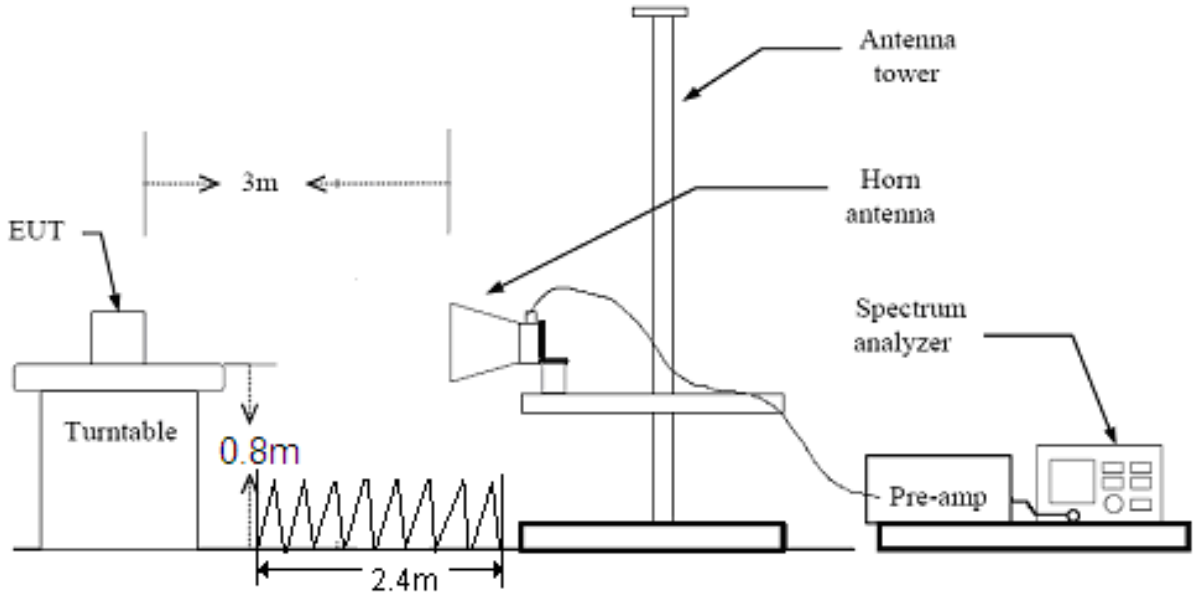
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.
Set the spectrum analyzer in the following:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.
If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak- average correction factor, derived form the appropriate duty cycle calculation.
This setting method can refer to **DA00-705.**

The test is in transmitting mode. The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and docking mode. The worst emission was found in stand-up position (Y axis) and the worst case was recorded.

Test setup



Note: Area side:2.4mX3.6m

Limits

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	[2]
13.36 - 13.41			

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dBuV/m

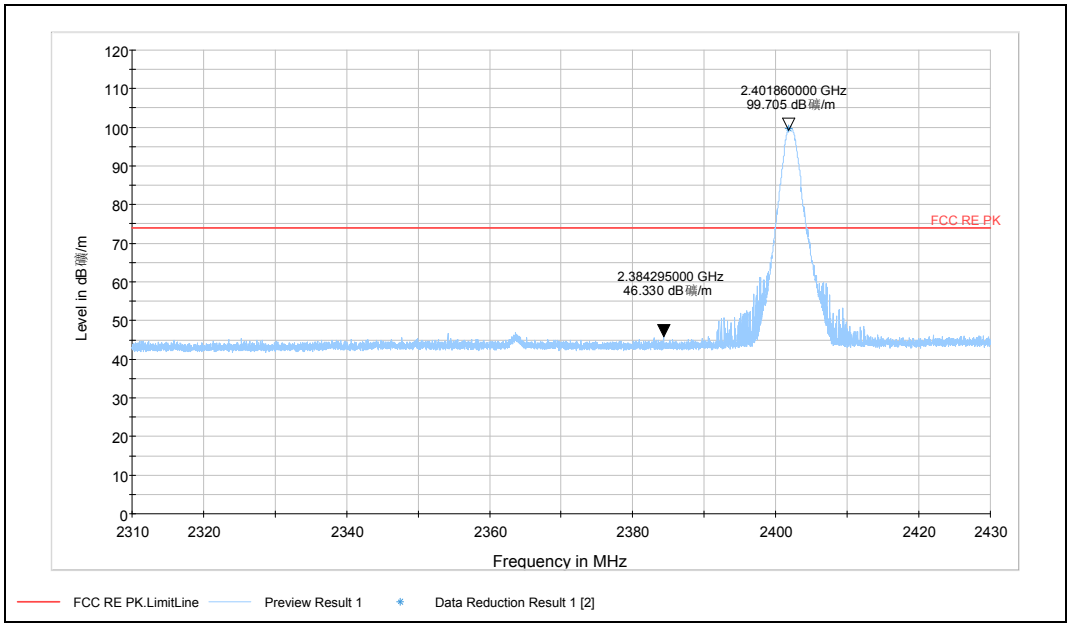
Average Limit=54 dBuV/m

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 3.55 dB.

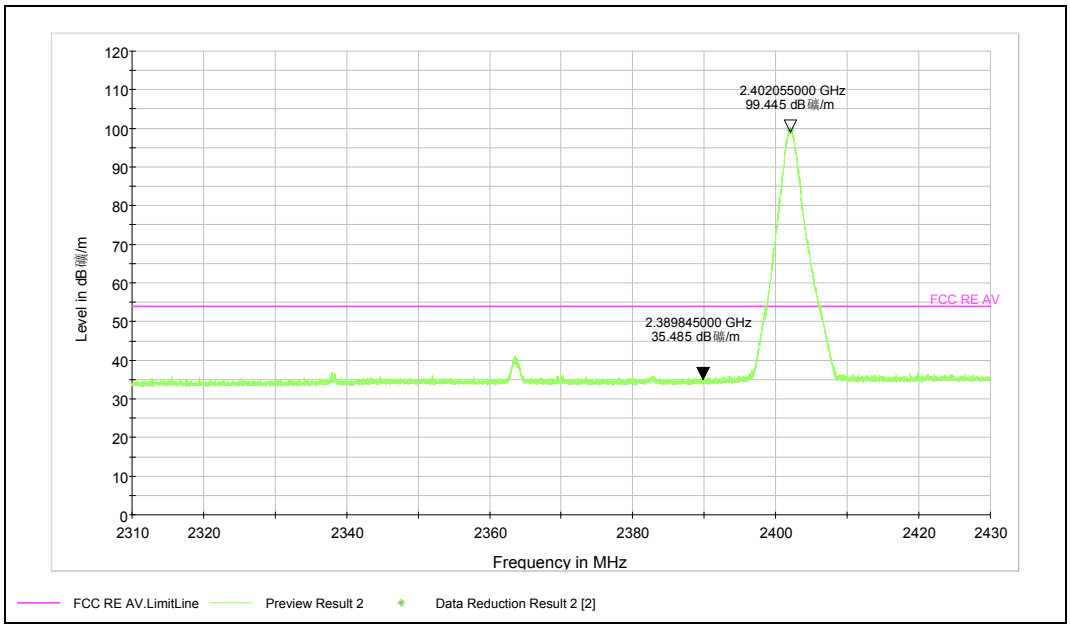
Test Results:

DH5- Channel 0



lower band edge Peak-CH 0

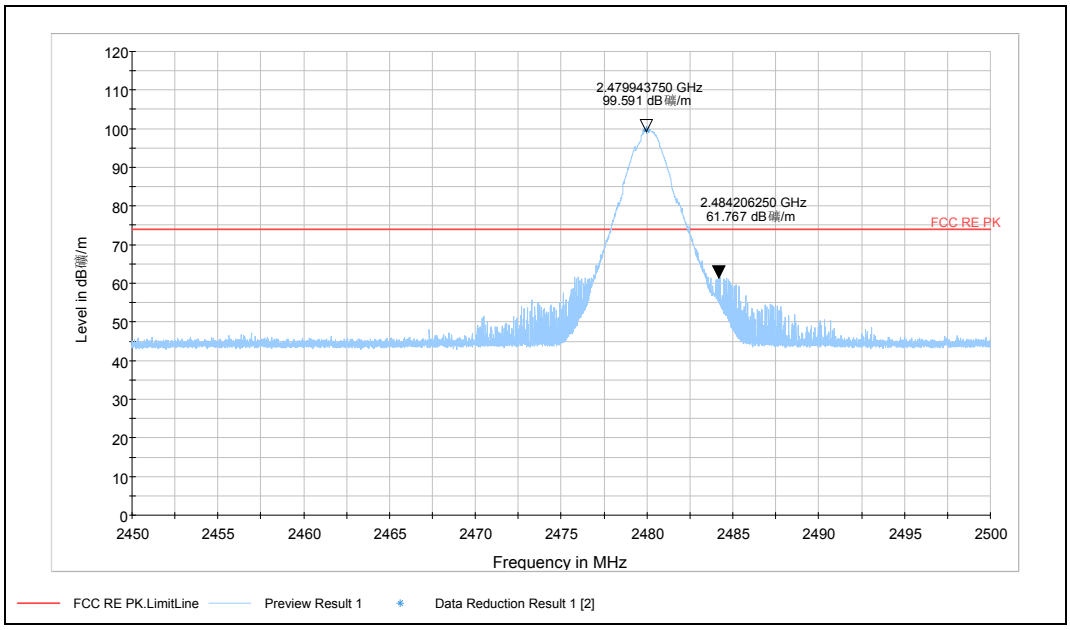
Note: The signal beyond the limit is carrier, a font (Level in dB磺/m) in the test plot =(level in dBuV/m)



lower band edge average-CH 0

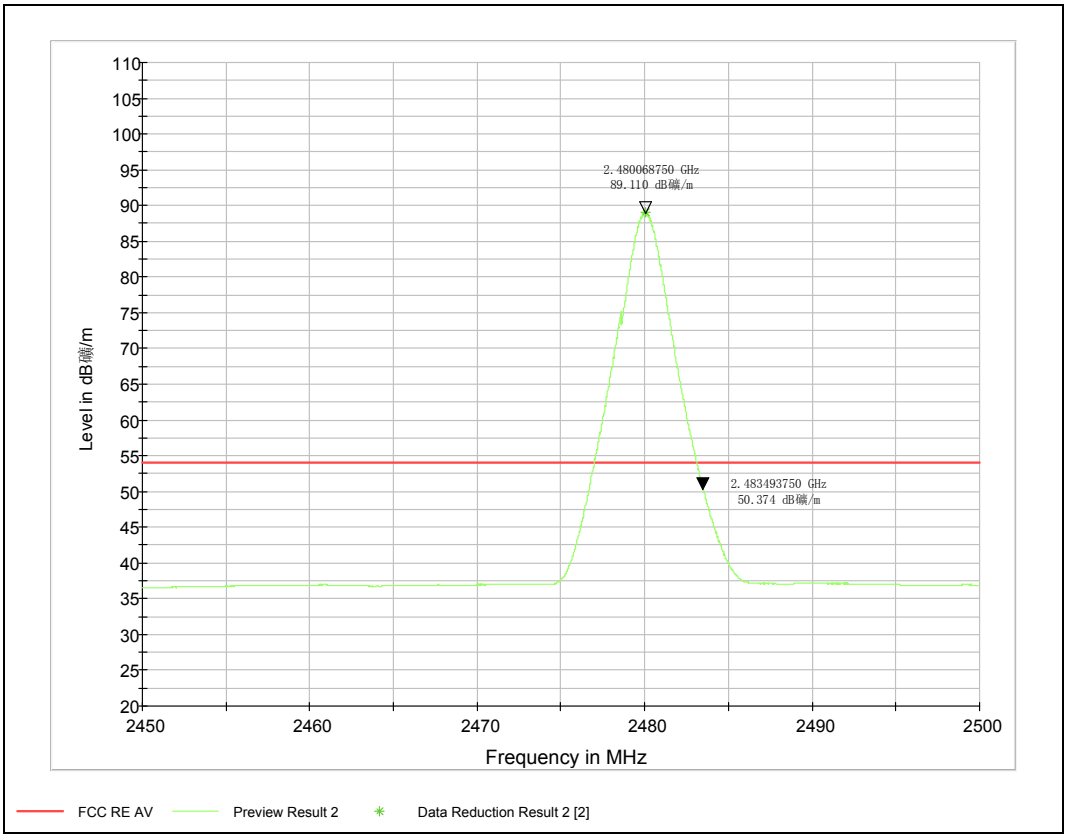
Note: The signal beyond the limit is carrier, a font (Level in dB磺/m) in the test plot =(level in dBuV/m)

DH5- Channel 78



Higher band edge Peak-CH 78

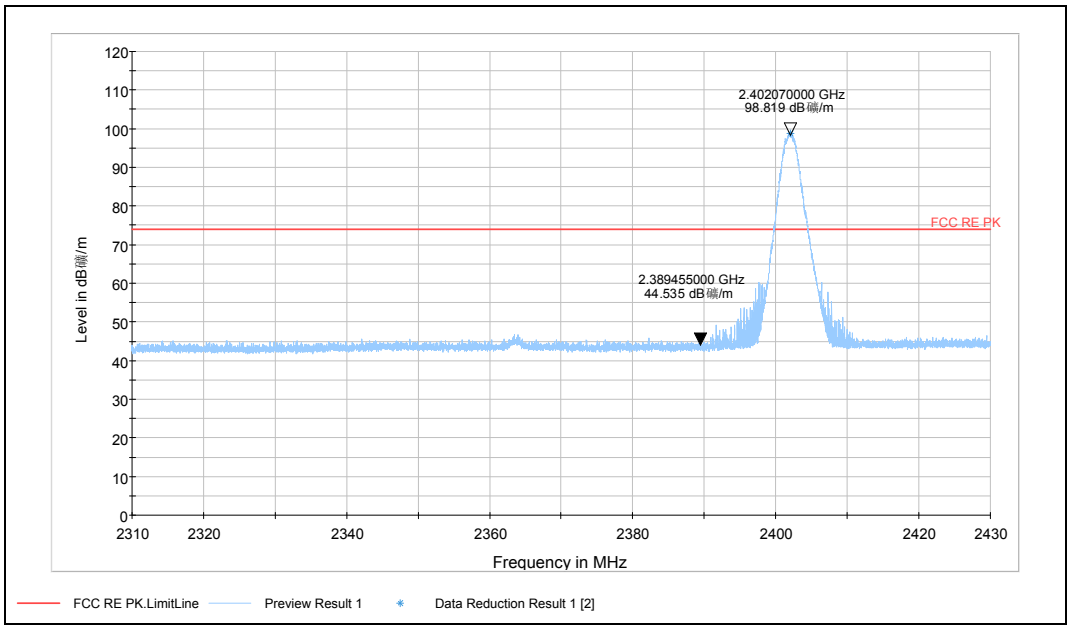
Note: The signal beyond the limit is carrier, a font (Level in dBµV/m) in the test plot =(level in dBuV/m)



Higher band edge average-CH 78

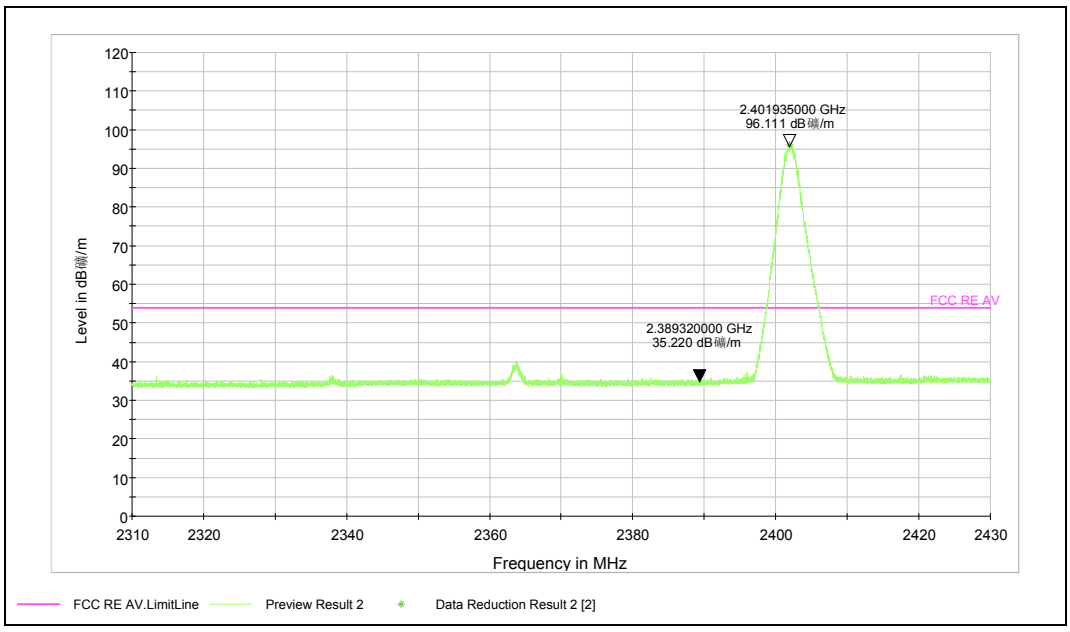
Note: The signal beyond the limit is carrier, a font (Level in dBµV/m) in the test plot =(level in dBuV/m)

3DH5- Channel 0



lower band edge Peak-CH 0

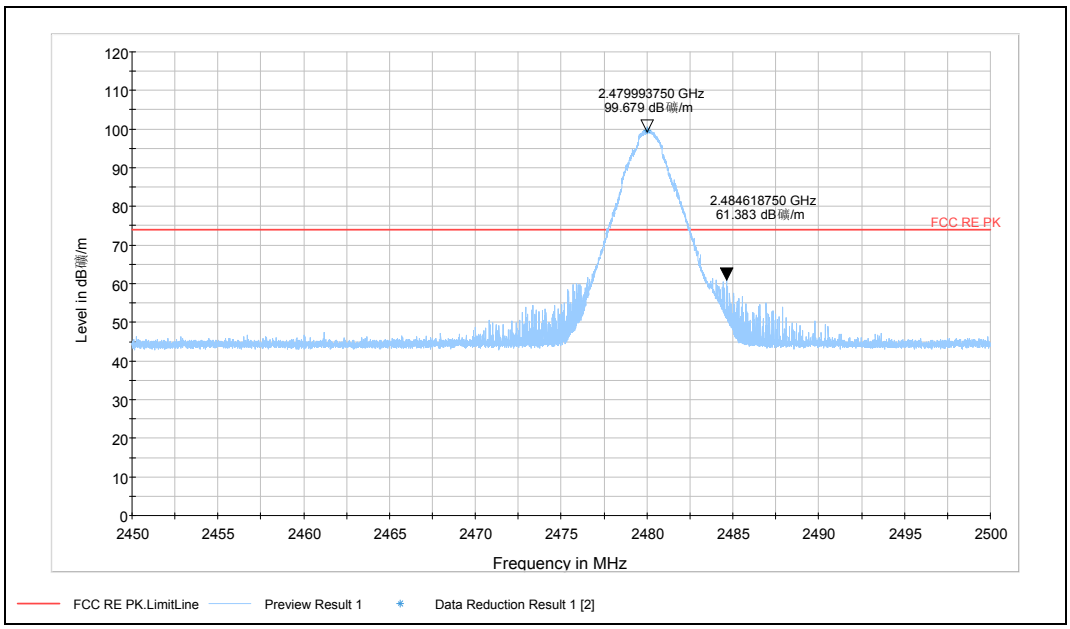
Note: The signal beyond the limit is carrier, a font (Level in dBµV/m) in the test plot =(level in dBuV/m)



lower band edge average-CH 0

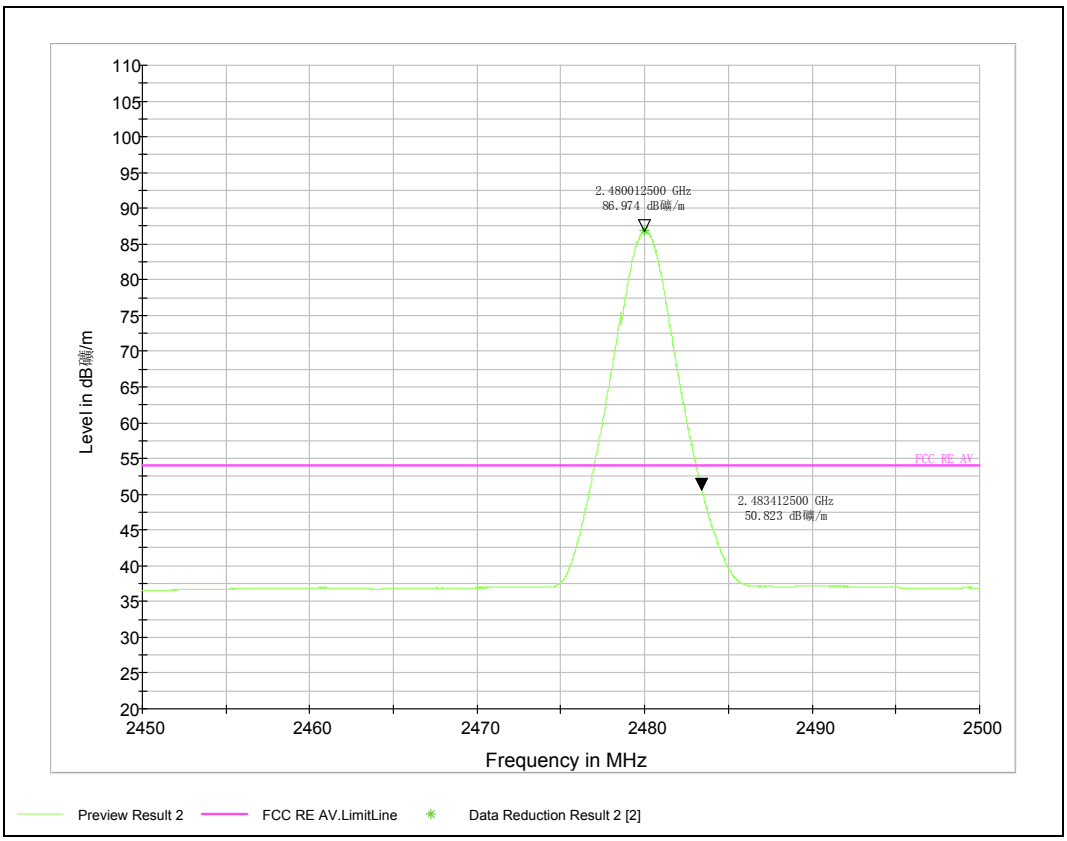
Note: The signal beyond the limit is carrier, a font (Level in dBµV/m) in the test plot =(level in dBuV/m)

3DH5- Channel 78



Higher band edge Peak-CH 78

Note: The signal beyond the limit is carrier, a font (Level in dBu磁/m) in the test plot =(level in dBuV/m)



Higher band edge average-CH 78

Note: The signal beyond the limit is carrier, a font (Level in dBu磁/m) in the test plot =(level in dBuV/m)

3.9. Number of hopping Frequency

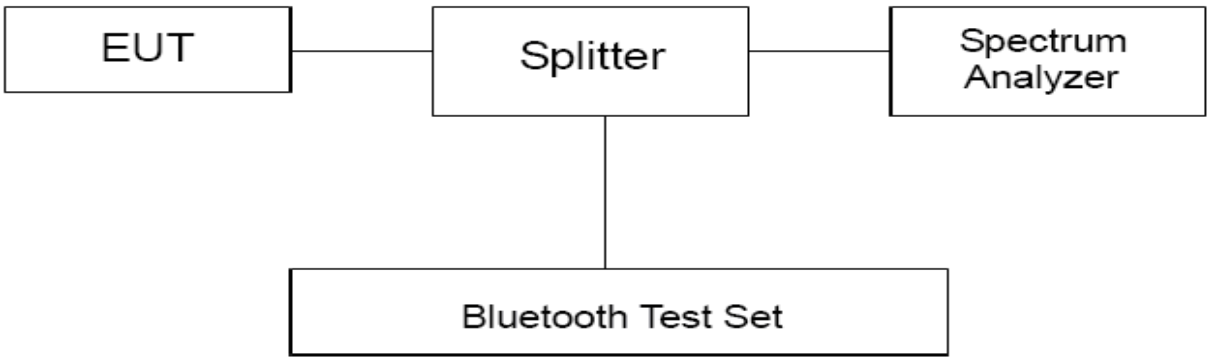
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 300 kHz and VBW is set to 300 kHz on spectrum analyzer. Set EUT on Hopping on mode.

Test setup



Limits

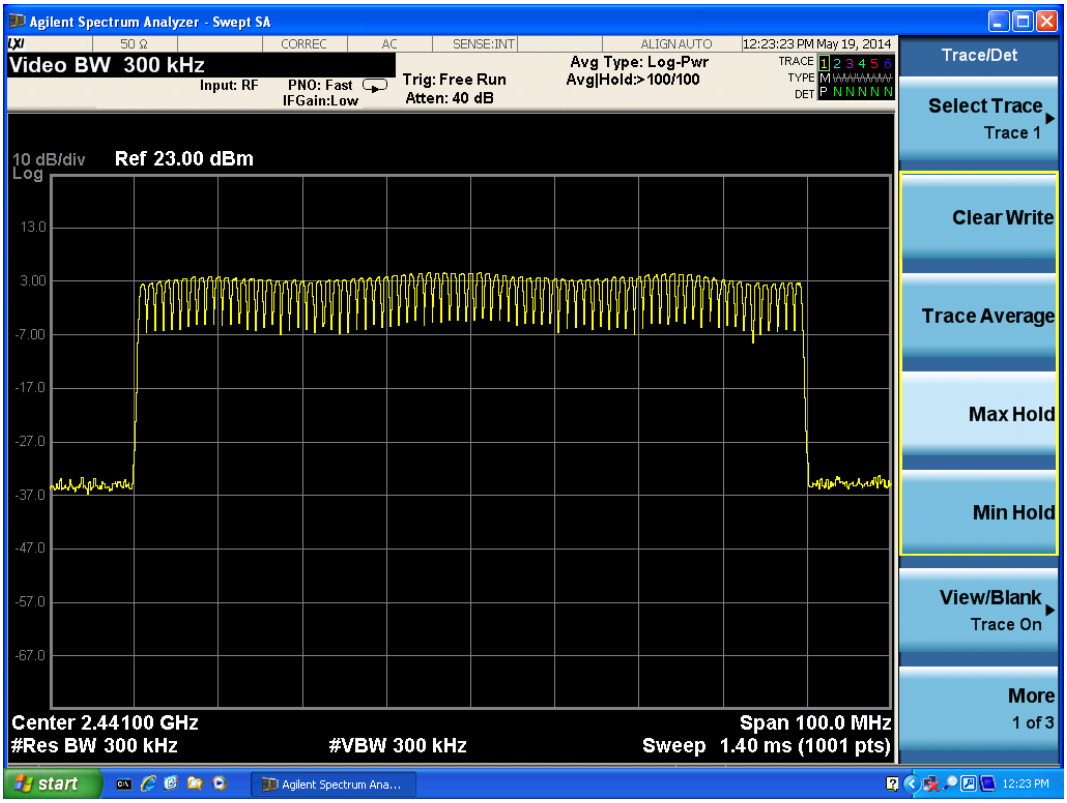
Rule Part 15.247(a) (1) (iii) specifies that" Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels..".

Limits	⩾ 15 channels

Test Results:

DH5

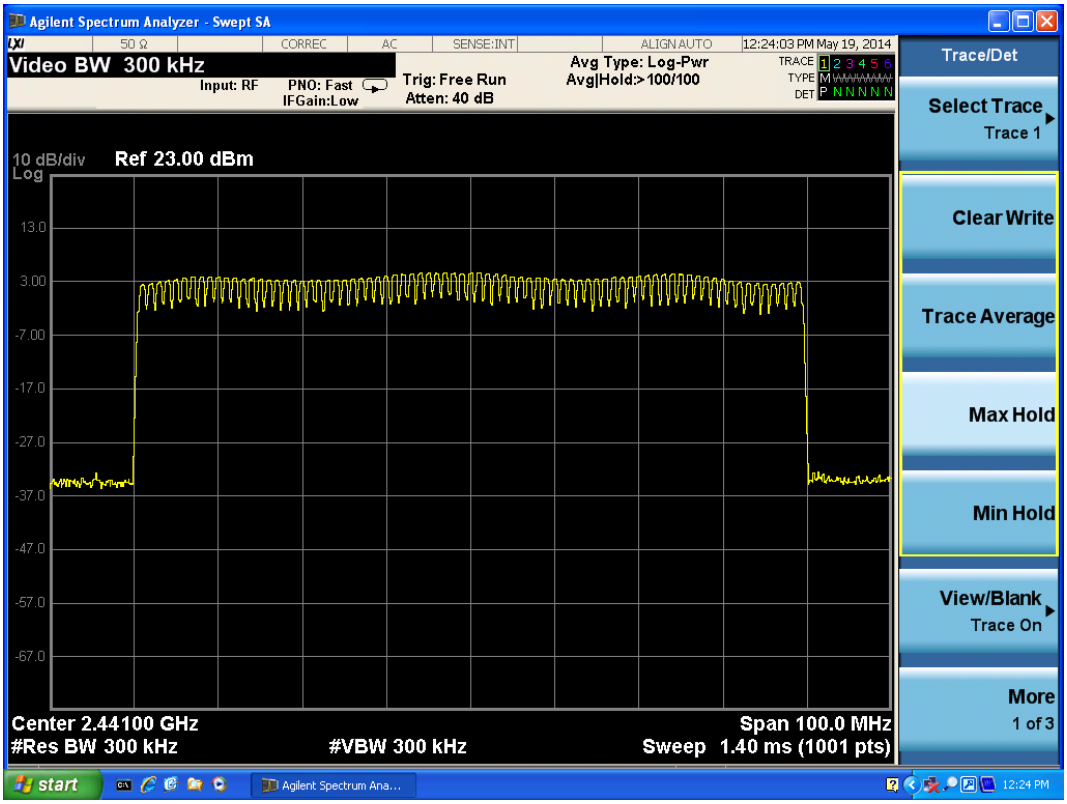
Number of hopping channels	conclusion
79	PASS



2400 MHz – 2483.5 MHz

2DH5

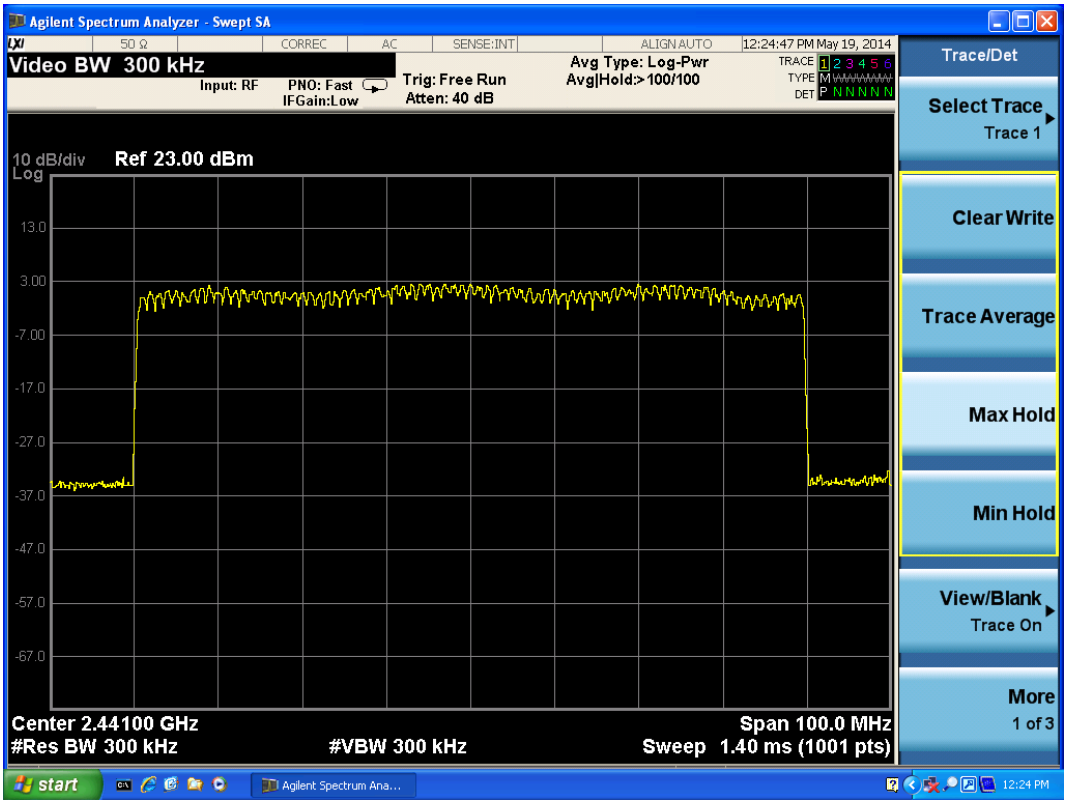
Number of hopping channels	conclusion
79	PASS



2400 MHz – 2483.5 MHz

3DH5

Number of hopping channels	conclusion
79	PASS



2400 MHz – 2483.5 MHz

3.10. Spurious RF Conducted Emissions

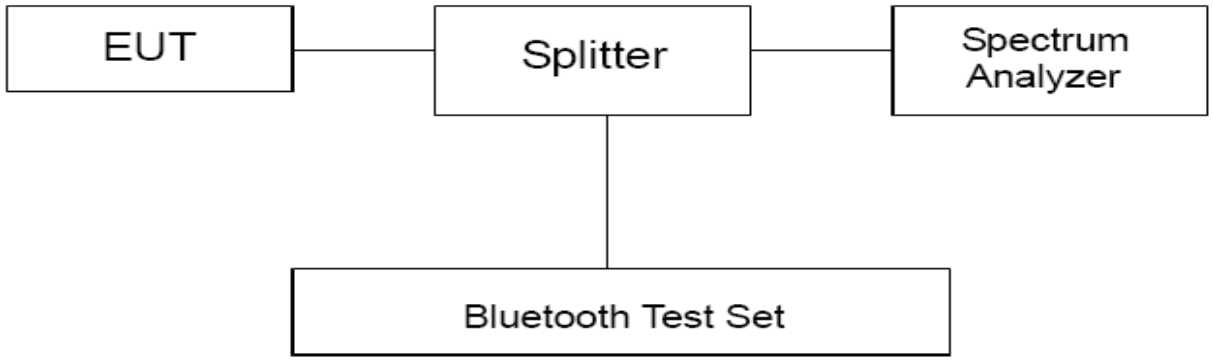
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz, Sweep is set to ATUO.
The test is in transmitting mode.

Test setup



Limits

Rule Part 15.247(d) pacifies that “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.”

Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit
BT(GFSK)	2402	2.598	≤-17.402
	2440	4.626	≤-15.374
	2480	2.928	≤-17.072
BT (EDR)	2402	2.803	≤-17.197
	2440	4.979	≤-15.021
	2480	3.196	≤-16.804

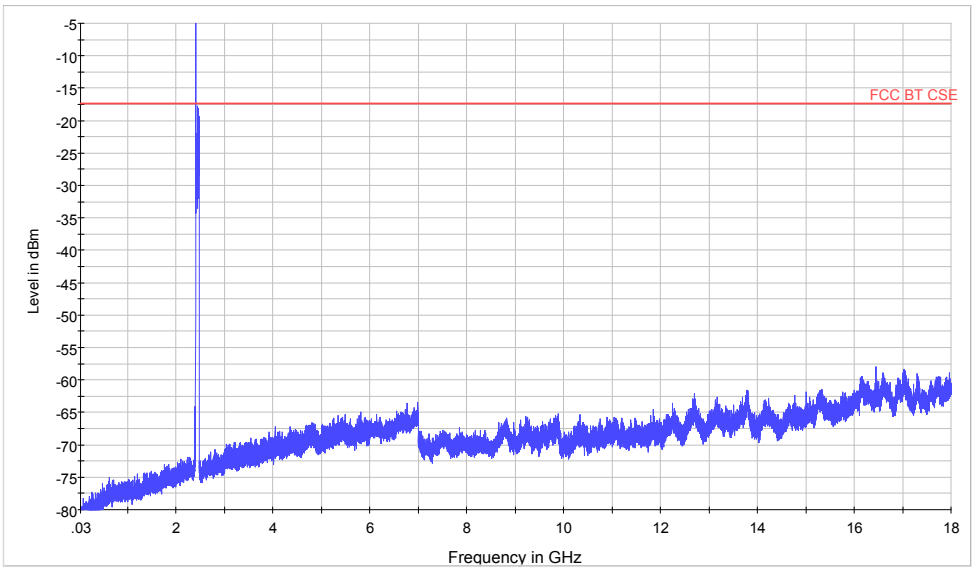
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

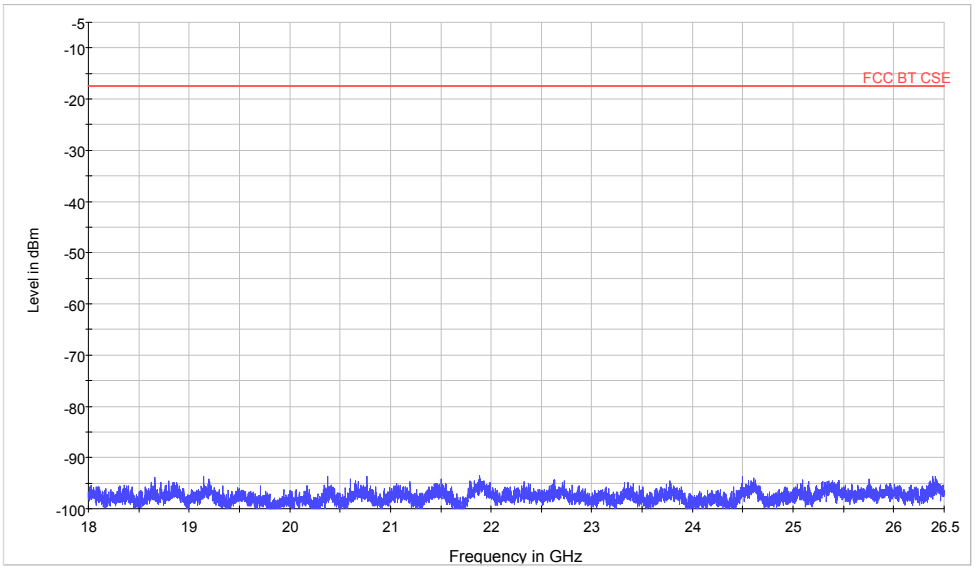
Test Results:

Basic Rate-CH0：



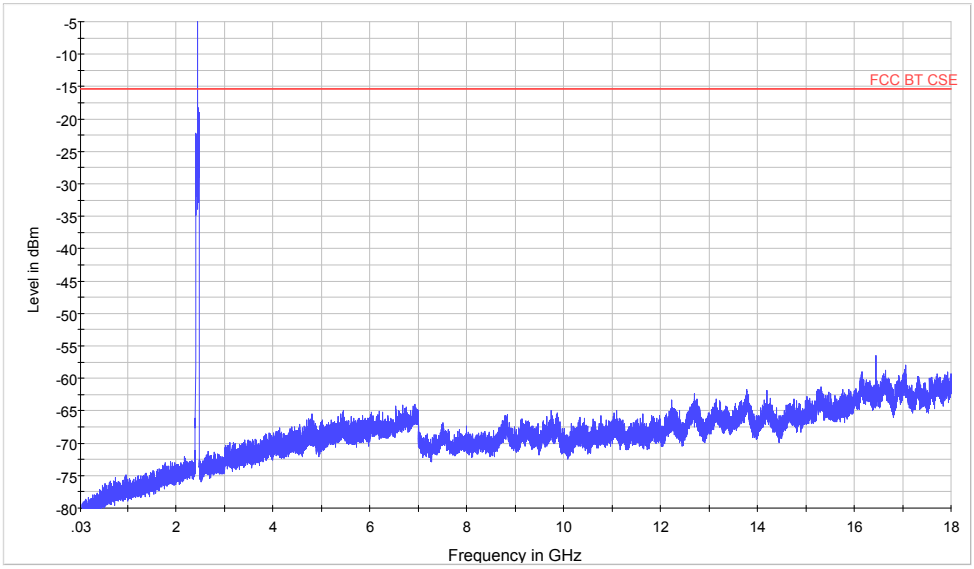
Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2402

Spurious RF conducted emissions from 30MHz to 18GHz

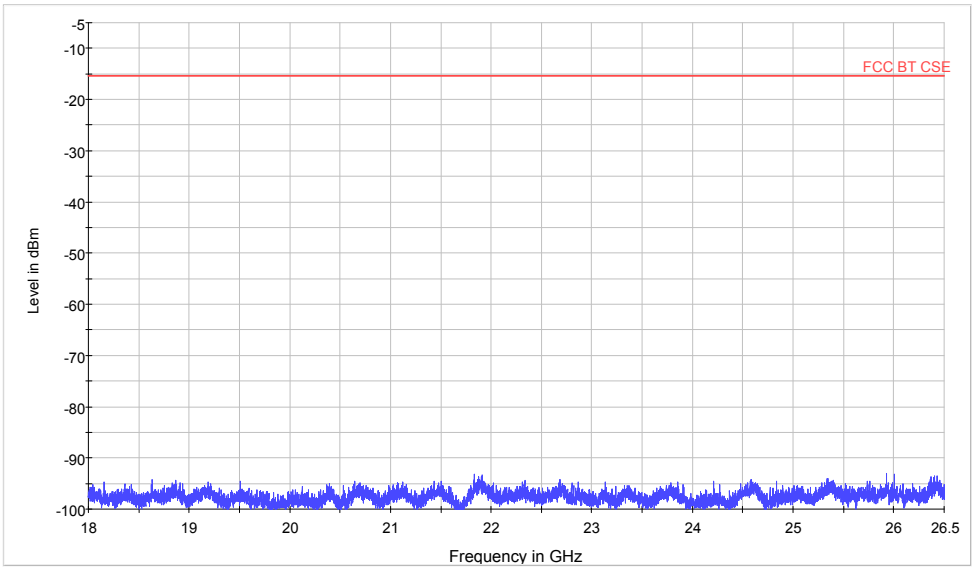


Spurious RF conducted emissions from 18GHz to 26.5GHz

Basic Rate-CH39：

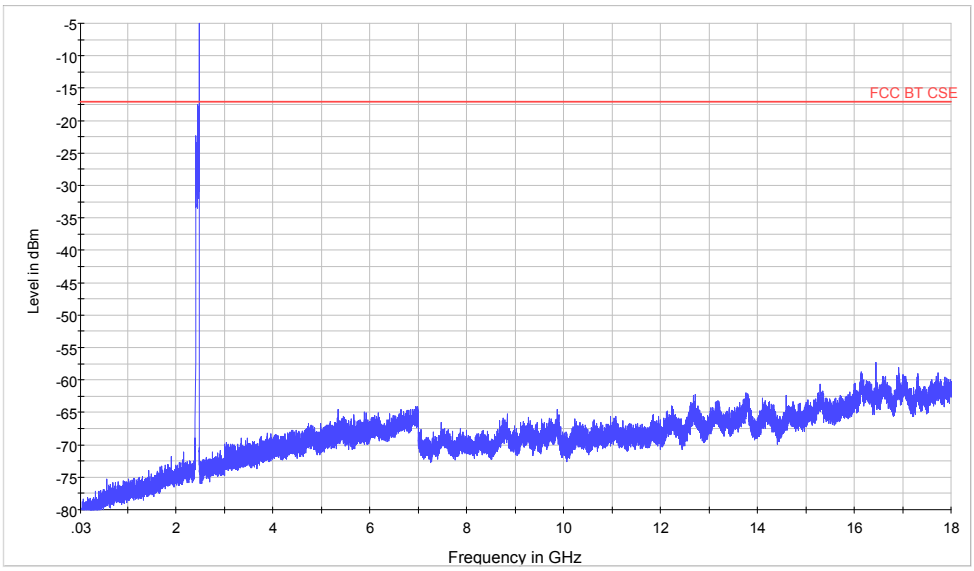


Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2441
Spurious RF conducted emissions from 30MHz to 18GHz

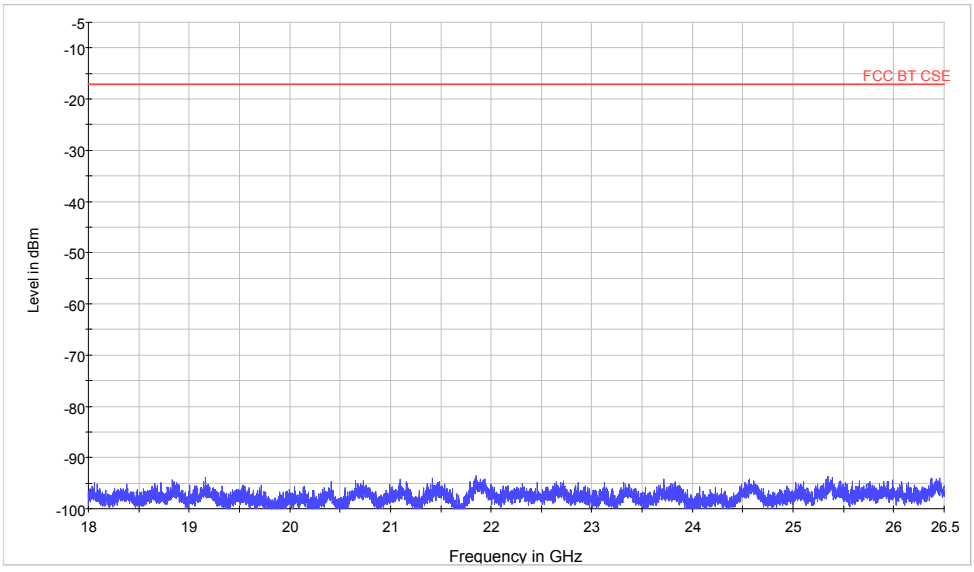


Spurious RF conducted emissions from 18GHz to 26.5GHz

Basic Rate-CH78：

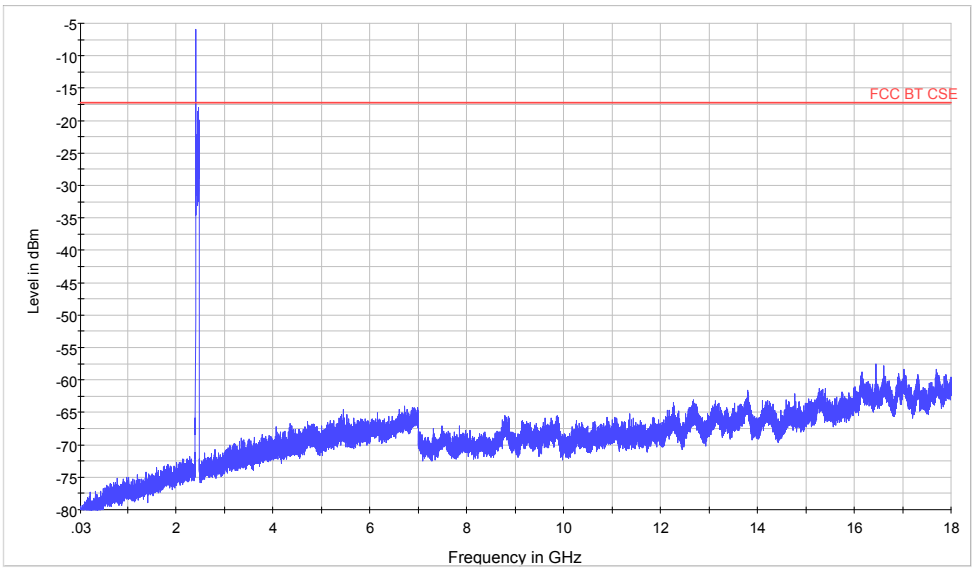


Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2480
Spurious RF conducted emissions from 30MHz to 18GHz

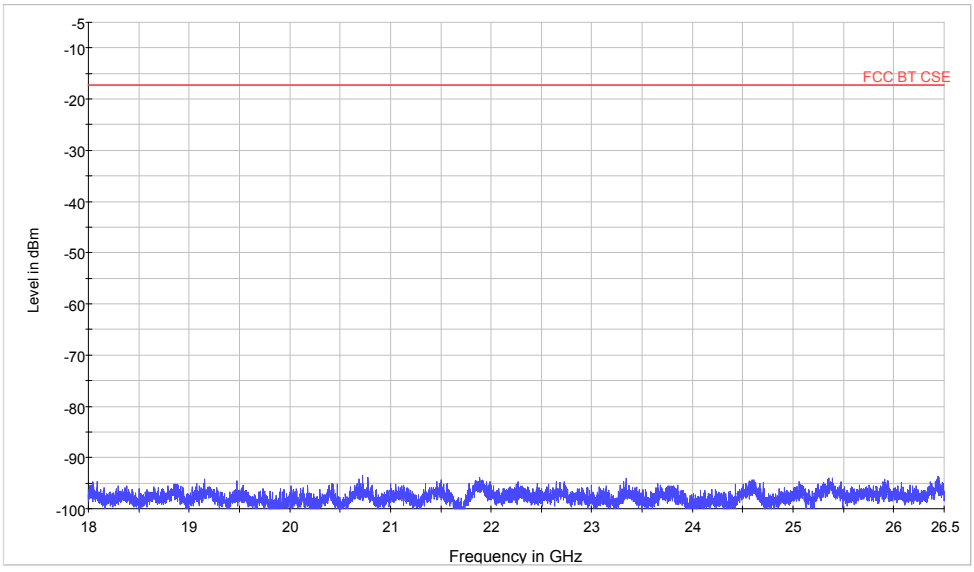


Spurious RF conducted emissions from 18GHz to 26.5GHz

EDR-CH0：

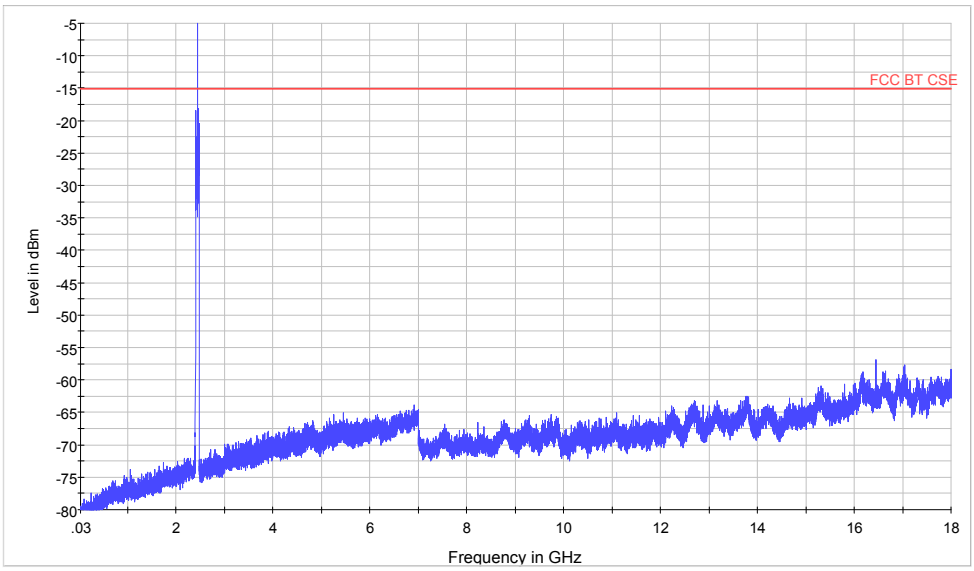


Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2402
Spurious RF conducted emissions from 30MHz to 18GHz

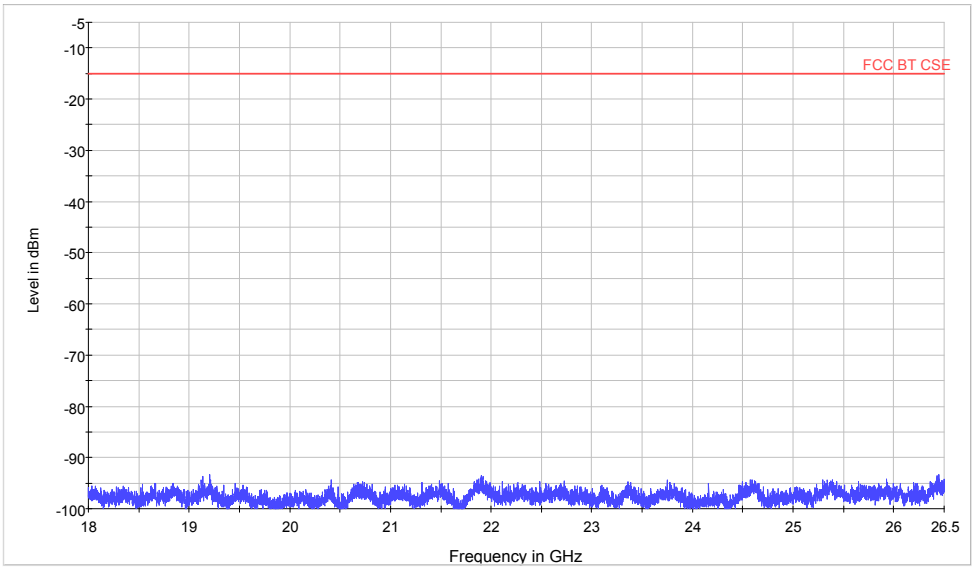


Spurious RF conducted emissions from 18GHz to 26.5GHz

EDR-CH39：

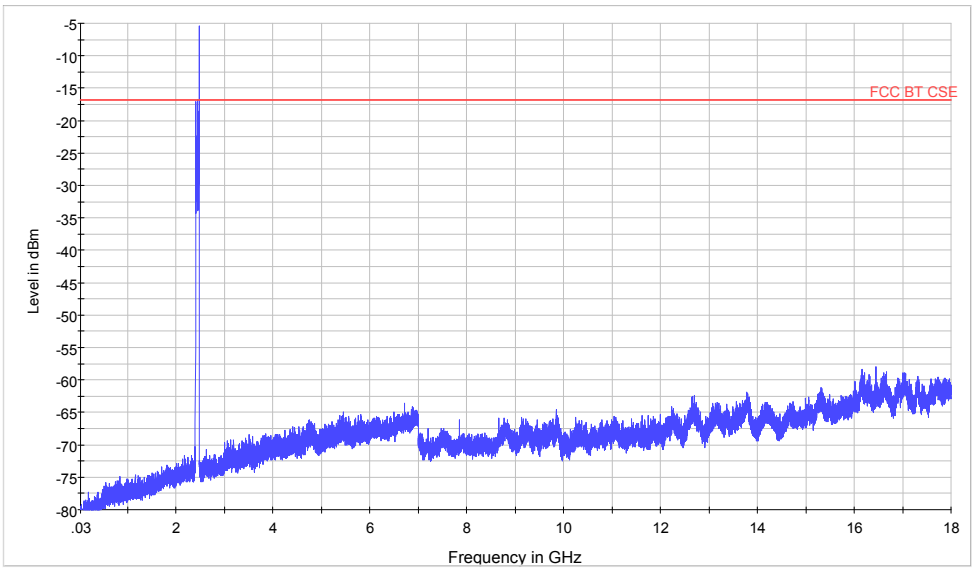


Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2441
Spurious RF conducted emissions from 30MHz to 18GHz

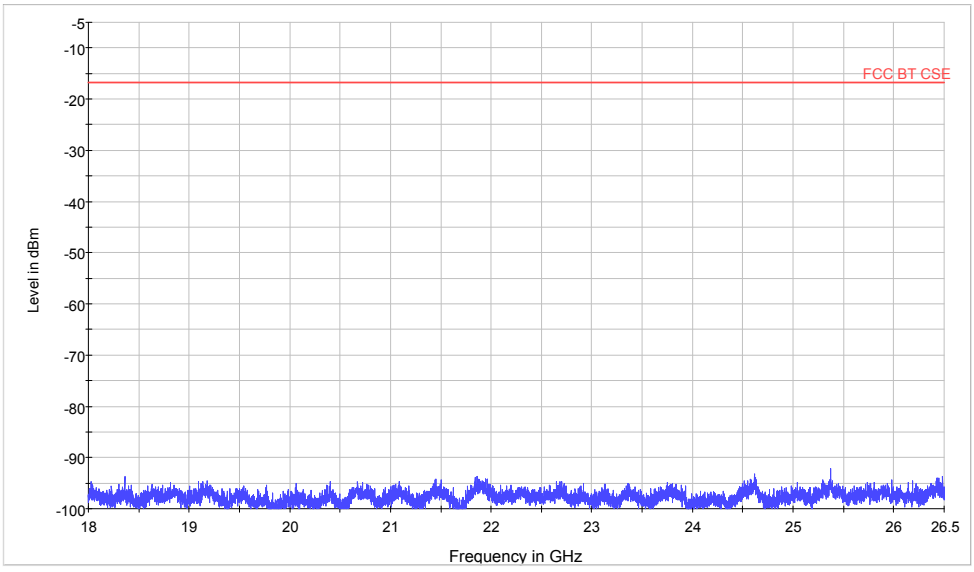


Spurious RF conducted emissions from 18GHz to 26.5GHz

EDR-CH78：



Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2480
Spurious RF conducted emissions from 30MHz to 18GHz



Spurious RF conducted emissions from 18GHz to 26.5GHz

3.11. Radiates Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	102.5kPa

Method of Measurement

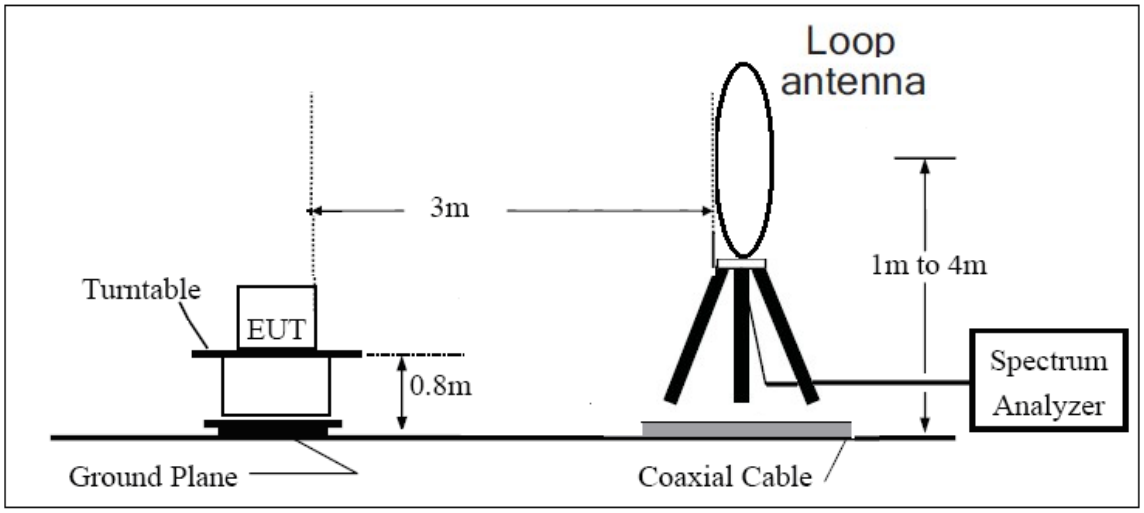
The test set-up was made in accordance to the general provisions of ANSI C63.4-2009.The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.
Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.
During the test, The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.
Set the spectrum analyzer in the following:
Below 1GHz (detector: Peak and Quasi-Peak)
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz(detector: Peak):
(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded. Then this mode was measured in the following mode: EUT with cradle and EUT without cradle. The worst emission was found in EUT with cradle mode and the worst case was recorded.

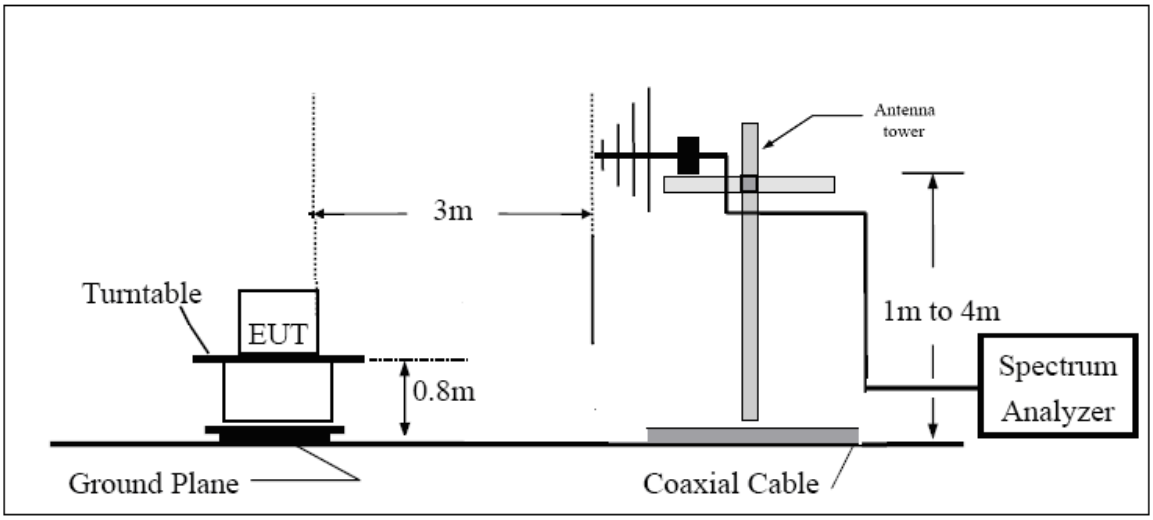
The test is in transmitting mode.

Test setup

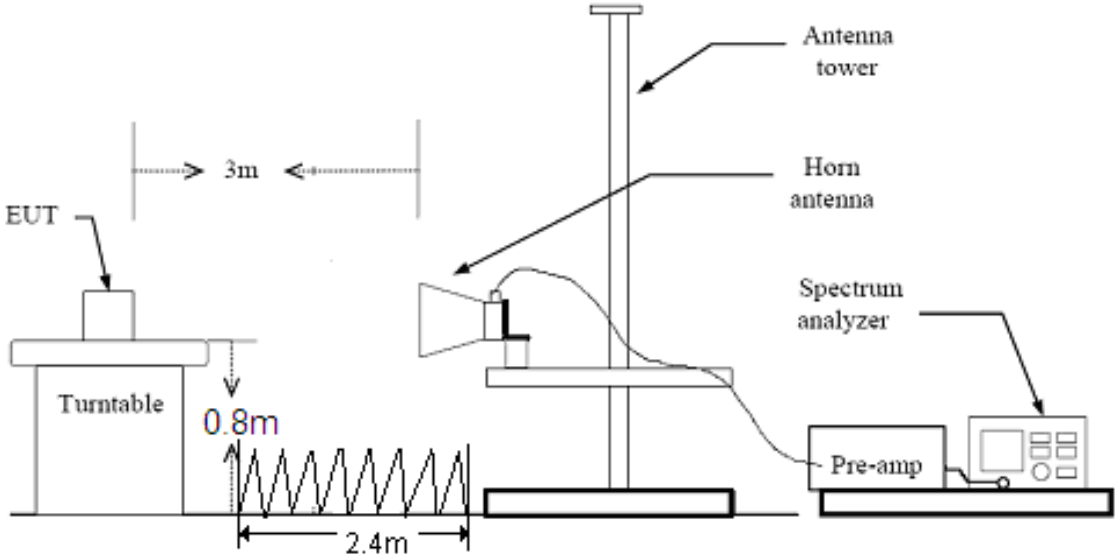
9KHz~~~ 30MHz



30MHz~~~ 1GHz



Above 1GHz



Limits

Rule Part 15.247(d) specifies that “In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).”

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Measurement Uncertainty

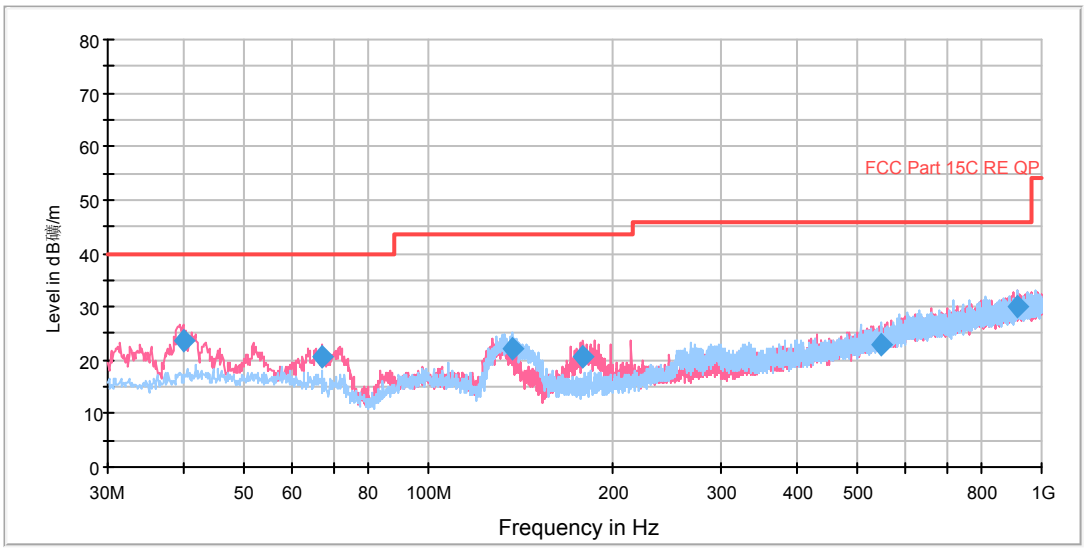
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB

Test result

Basic Rate-Channel 0

RE 0.03-1GHz QP Class B



Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Radiates Emission from 30MHz to 1GHz

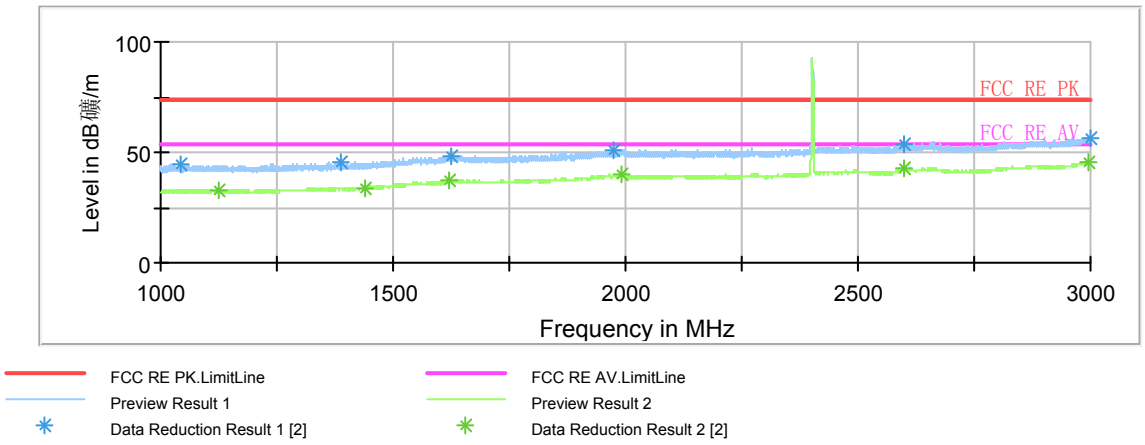
Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.821250	23.7	100.0	V	71.0	10.5	13.2	16.3	40.0
67.102500	20.8	100.0	V	84.0	11.1	9.7	19.2	40.0
136.821250	22.2	100.0	H	84.0	13.1	9.1	21.3	43.5
179.137500	20.7	100.0	V	89.0	9.9	10.8	22.8	43.5
548.465000	22.9	100.0	H	4.0	1.9	21.0	23.1	46.0
915.003750	30.2	100.0	H	6.0	4.4	25.8	15.8	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

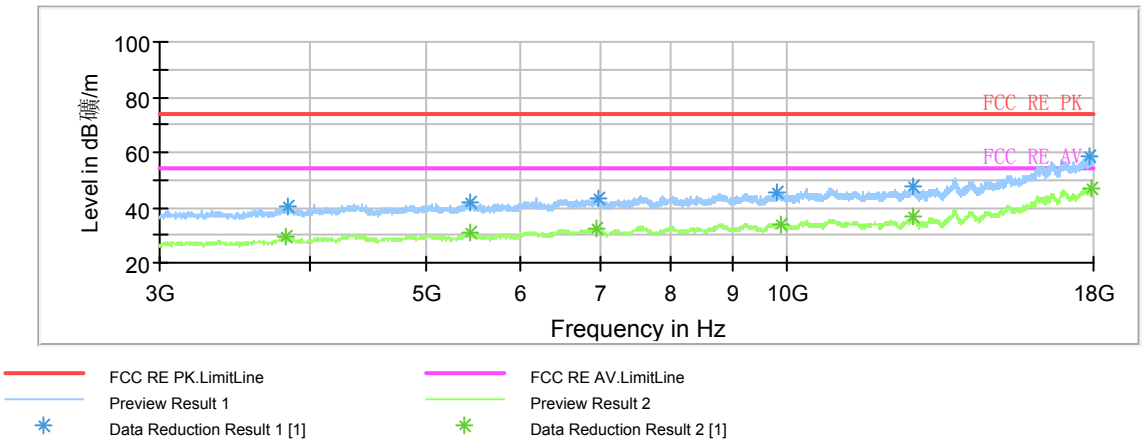
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1043.250000	44.4	100.0	H	22.0	54.3	-9.9	29.6	74
1387.750000	45.6	100.0	H	1.0	53.9	-8.3	28.4	74
1626.000000	48.2	100.0	H	154.0	53.3	-5.1	25.8	74
1976.250000	51.3	100.0	V	0.0	54.8	-3.5	22.7	74
2598.750000	53.4	100.0	H	16.0	53.6	-0.2	20.6	74
2998.500000	56.5	100.0	V	0.0	55.1	1.4	17.5	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1124.000000	33.0	100.0	V	211.0	42.7	-9.7	21.0	54
1438.000000	34.0	100.0	V	180.0	42.0	-8.0	20.0	54
1621.500000	37.5	100.0	H	330.0	42.6	-5.1	16.5	54
1991.750000	39.8	100.0	H	230.0	42.8	-3.0	14.2	54
2599.000000	42.4	100.0	V	276.0	42.6	-0.2	11.6	54
2995.250000	45.8	100.0	H	59.0	44.4	1.4	8.2	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

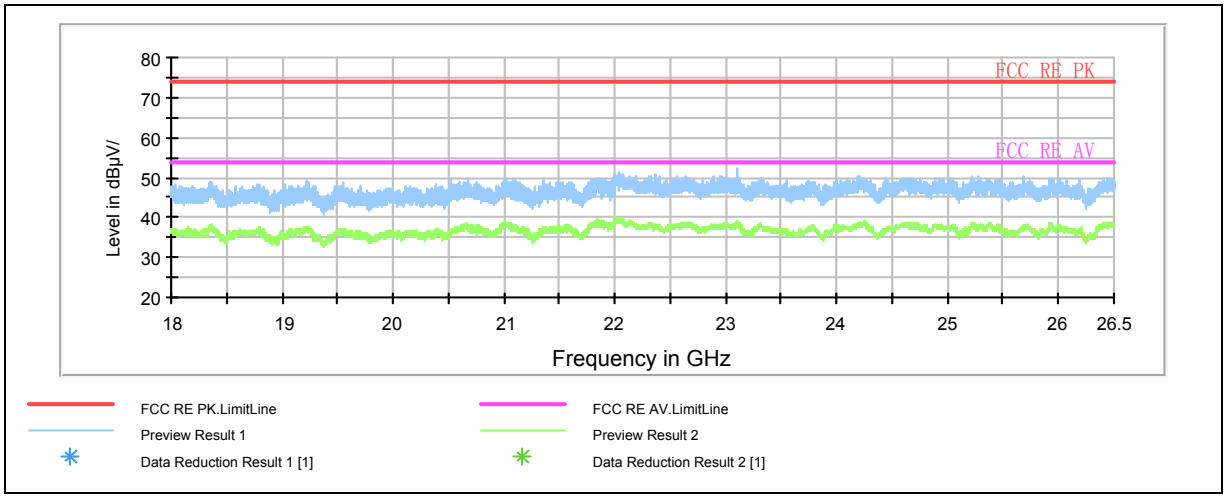
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3832.500000	40.5	100.0	H	0.0	40.6	-0.1	33.5	74
5437.500000	41.7	100.0	V	180.0	38.9	2.8	32.3	74
6950.625000	43.6	100.0	V	225.0	38.8	4.8	30.4	74
9806.250000	45.1	100.0	H	55.0	35.6	9.5	28.9	74
12753.750000	47.3	100.0	H	7.0	34.7	12.6	26.7	74
17853.750000	58.3	100.0	H	20.0	35.1	23.2	15.7	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3821.250000	29.1	100.0	H	135.0	29.2	-0.1	24.9	54
5435.625000	30.6	100.0	V	215.0	27.8	2.8	23.4	54
6928.125000	32.1	100.0	H	0.0	27.3	4.8	21.9	54
9898.125000	34.1	100.0	V	117.0	24.3	9.8	19.9	54
12746.250000	36.4	100.0	V	60.0	23.8	12.6	17.6	54
17941.875000	46.8	100.0	H	82.0	23.4	23.4	7.2	54

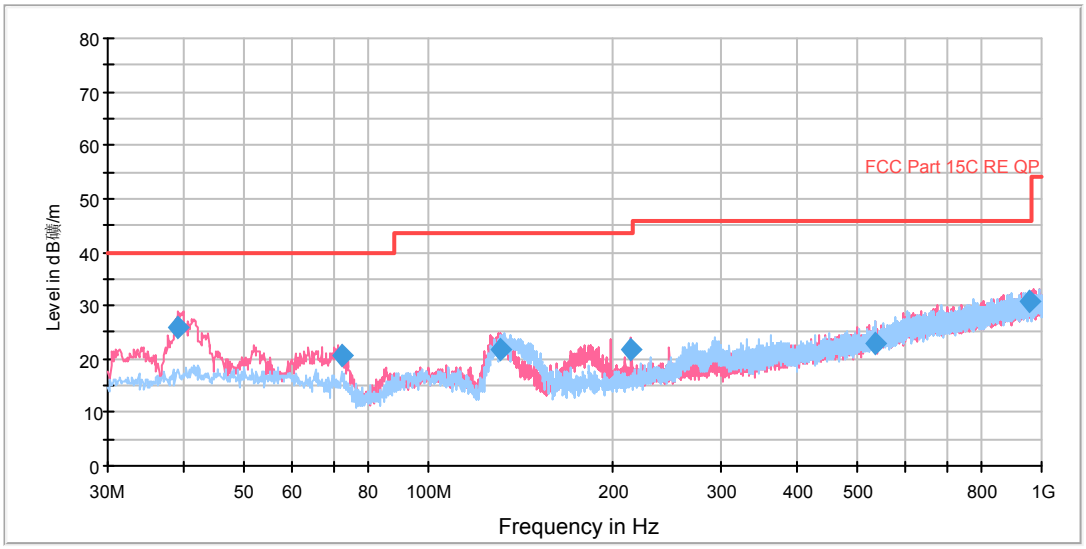
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

Basic Rate-Channel 39

RE 0.03-1GHz QP Class B

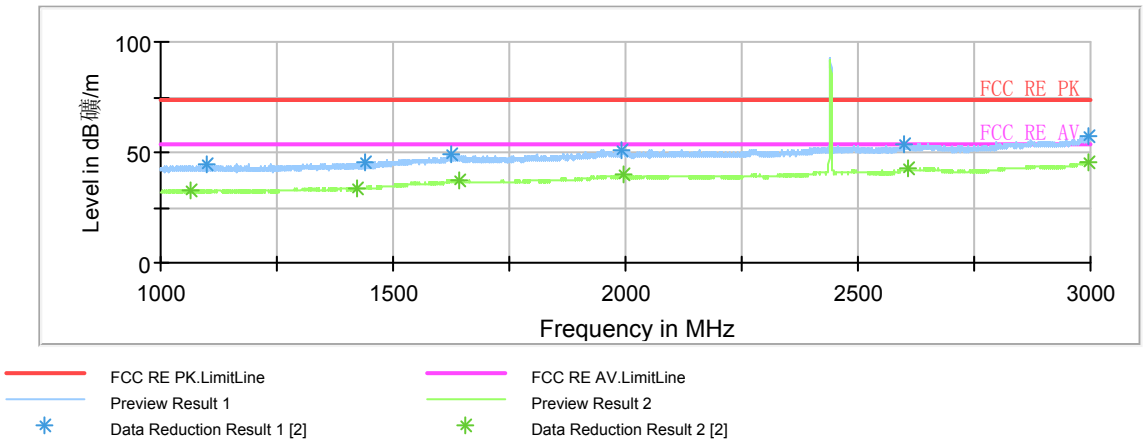


Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.093750	25.8	100.0	V	64.0	12.8	13.0	14.2	40.0
72.316250	20.7	100.0	V	88.0	12.2	8.5	19.3	40.0
131.243750	21.7	100.0	V	14.0	12.4	9.3	21.8	43.5
214.542500	21.9	100.0	V	81.0	9.3	12.6	21.6	43.5
534.278750	23.0	100.0	H	76.0	2.3	20.7	23.0	46.0
954.531250	30.8	100.0	H	1.0	4.7	26.1	15.2	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor
2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

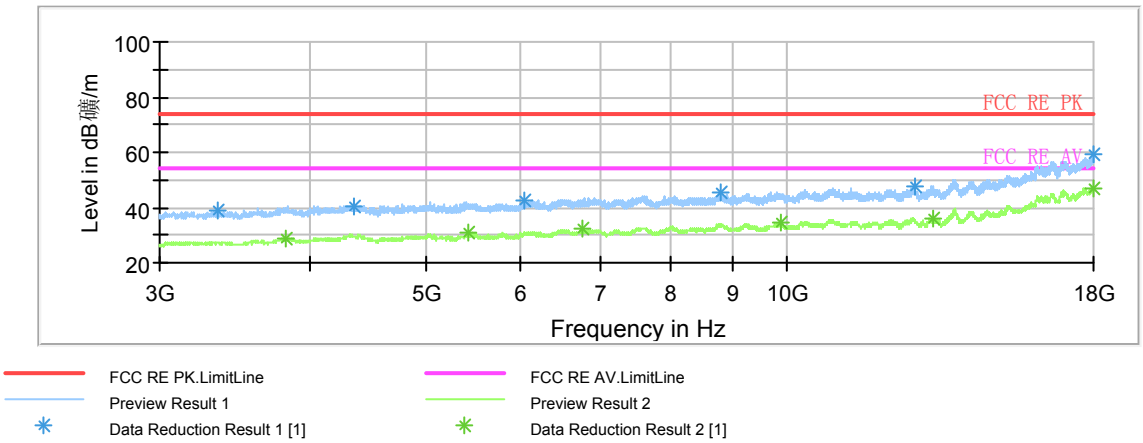
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1098.500000	44.9	100.0	V	0.0	54.9	-10.0	29.1	74
1441.250000	45.3	100.0	V	0.0	53.2	-7.9	28.7	74
1625.500000	48.6	100.0	V	209.0	53.7	-5.1	25.4	74
1993.250000	50.8	100.0	V	202.0	53.8	-3.0	23.2	74
2599.500000	53.7	100.0	H	108.0	53.9	-0.2	20.3	74
2997.250000	57.1	100.0	H	12.0	55.7	1.4	16.9	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1065.750000	32.9	100.0	H	100.0	42.7	-9.8	21.1	54
1423.000000	33.9	100.0	H	70.0	42.0	-8.1	20.1	54
1640.500000	37.4	100.0	V	282.0	42.5	-5.1	16.6	54
1997.500000	39.8	100.0	H	0.0	42.8	-3.0	14.2	54
2607.000000	42.4	100.0	H	34.0	42.7	-0.3	11.6	54
2994.250000	45.9	100.0	V	0.0	44.5	1.4	8.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

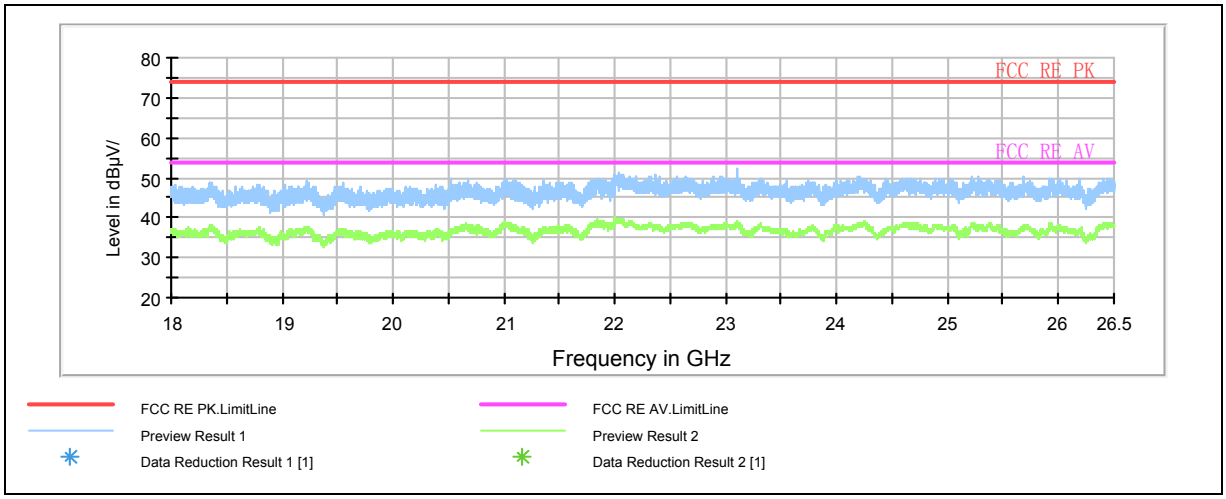
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3358.125000	39.0	100.0	H	0.0	40.9	-1.9	35.0	74
4348.125000	40.6	100.0	V	0.0	39.1	1.5	33.4	74
6031.875000	42.6	100.0	H	93.0	38.8	3.8	31.4	74
8790.000000	45.6	100.0	H	222.0	37.5	8.1	28.4	74
12783.750000	47.5	100.0	V	0.0	34.8	12.7	26.5	74
17992.500000	58.9	100.0	V	98.0	35.4	23.5	15.1	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3819.375000	28.9	100.0	V	143.0	29.1	-0.2	25.1	54
5424.375000	30.9	100.0	H	0.0	28.2	2.7	23.1	54
6753.750000	32.2	100.0	H	39.0	27.7	4.5	21.8	54
9870.000000	34.5	100.0	H	84.0	24.6	9.9	19.5	54
13211.250000	36.0	100.0	V	331.0	23.3	12.7	18.0	54
17992.500000	47.2	100.0	V	98.0	23.7	23.5	6.8	54

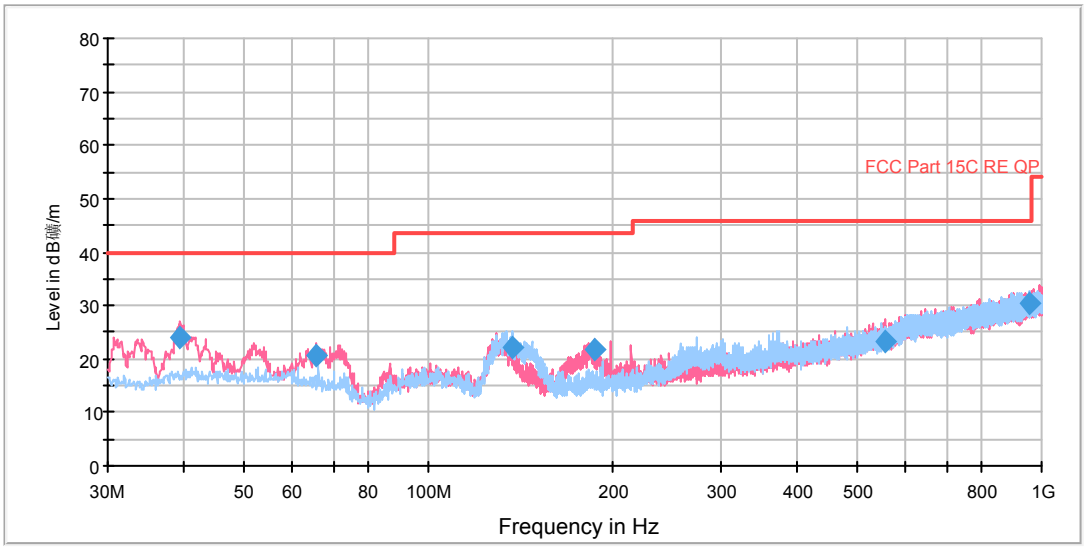
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

Basic Rate-Channel 78

RE 0.03-1GHz QP Class B

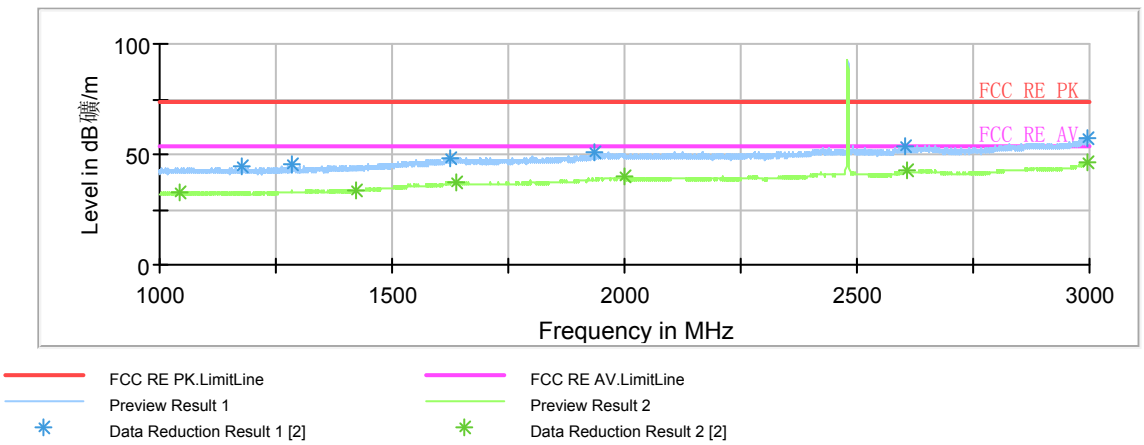


Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.457500	24.0	100.0	V	83.0	10.9	13.1	16.0	40.0
65.526250	20.8	100.0	V	85.0	10.5	10.3	19.2	40.0
137.063750	22.2	100.0	H	84.0	13.2	9.0	21.3	43.5
187.261250	21.8	100.0	V	25.0	10.5	11.3	21.7	43.5
554.770000	23.2	100.0	V	6.0	2.0	21.2	22.8	46.0
955.501250	30.6	100.0	H	46.0	4.5	26.1	15.4	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor
2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

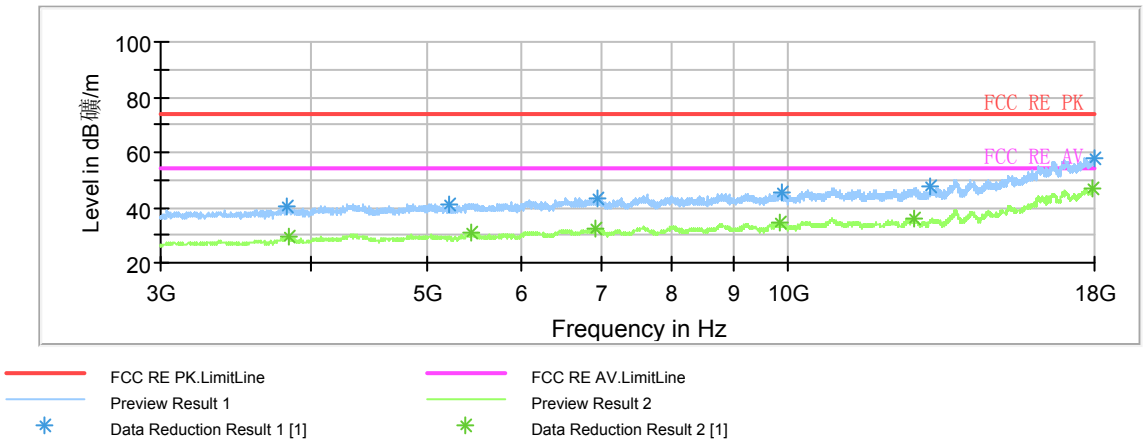
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1177.000000	44.3	100.0	H	96.0	53.7	-9.4	29.7	74
1282.500000	45.3	100.0	V	318.0	54.4	-9.1	28.7	74
1623.000000	48.5	100.0	H	137.0	53.6	-5.1	25.5	74
1933.500000	50.5	100.0	V	240.0	54.4	-3.9	23.5	74
2602.250000	53.4	100.0	V	333.0	53.6	-0.2	20.6	74
2996.000000	57.2	100.0	V	0.0	55.8	1.4	16.8	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1045.000000	33.0	100.0	V	318.0	42.9	-9.9	21.0	54
1420.750000	34.0	100.0	V	326.0	42.1	-8.1	20.0	54
1638.000000	37.4	100.0	H	0.0	42.5	-5.1	16.6	54
1998.500000	39.7	100.0	H	62.0	42.7	-3.0	14.3	54
2607.000000	42.7	100.0	H	267.0	43.0	-0.3	11.3	54
2997.000000	45.9	100.0	H	70.0	44.5	1.4	8.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

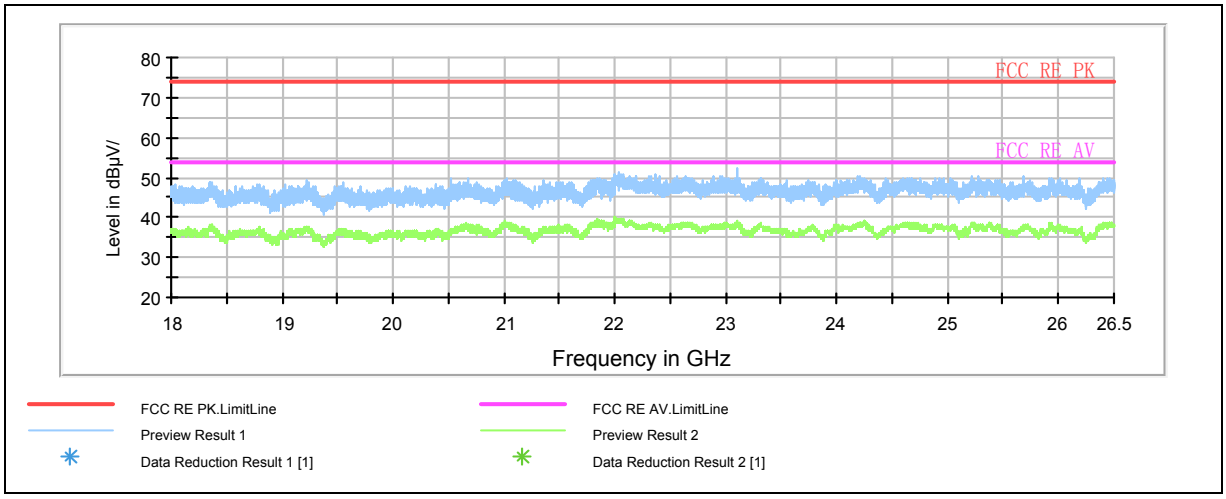
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3823.125000	40.0	100.0	V	125.0	40.1	-0.1	34.0	74
5210.625000	41.0	100.0	V	324.0	39.5	1.5	33.0	74
6935.625000	43.4	100.0	V	0.0	38.6	4.8	30.6	74
9877.500000	45.1	100.0	H	47.0	35.2	9.9	28.9	74
13153.125000	47.5	100.0	V	134.0	34.8	12.7	26.5	74
17998.125000	58.0	100.0	V	134.0	34.5	23.5	16.0	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3838.125000	29.3	100.0	H	320.0	29.5	-0.2	24.7	54
5448.750000	31.0	100.0	H	29.0	28.2	2.8	23.0	54
6918.750000	32.3	100.0	H	29.0	27.6	4.7	21.7	54
9828.750000	34.5	100.0	H	271.0	24.7	9.8	19.5	54
12755.625000	36.0	100.0	H	135.0	23.4	12.6	18.0	54
17949.375000	46.9	100.0	V	225.0	23.5	23.4	7.1	54

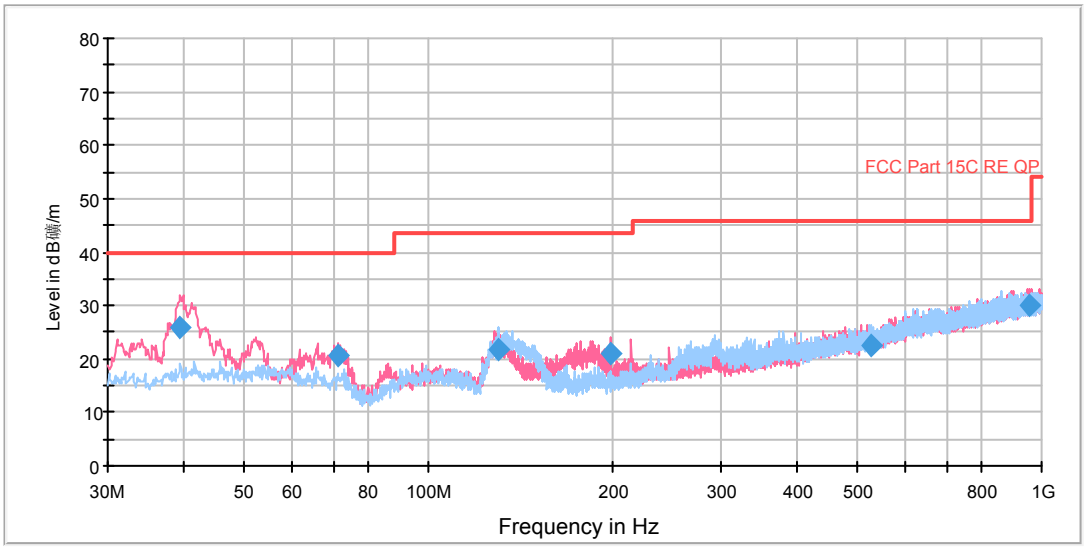
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

EDR-Channel 0

RE 0.03-1GHz QP Class B



Radiates Emission from 30MHz to 1GHz

Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

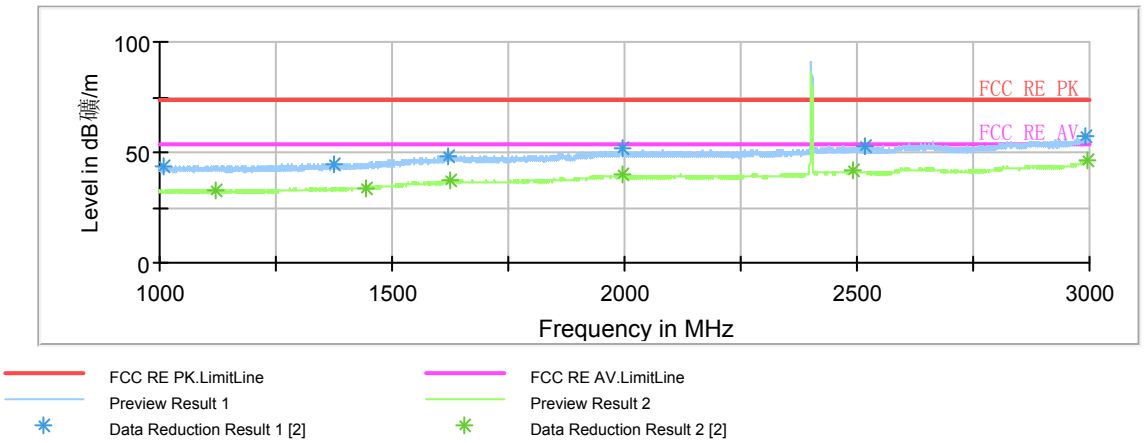
Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.457500	25.9	100.0	V	180.0	12.8	13.1	14.1	40.0
71.346250	20.8	100.0	V	84.0	12.2	8.6	19.2	40.0
129.910000	21.8	100.0	H	94.0	12.5	9.3	21.7	43.5
197.931250	20.9	100.0	V	160.0	9.0	11.9	22.6	43.5
527.973750	22.5	100.0	H	125.0	2.0	20.5	23.5	46.0
959.138750	30.2	100.0	V	144.0	4.0	26.2	15.8	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

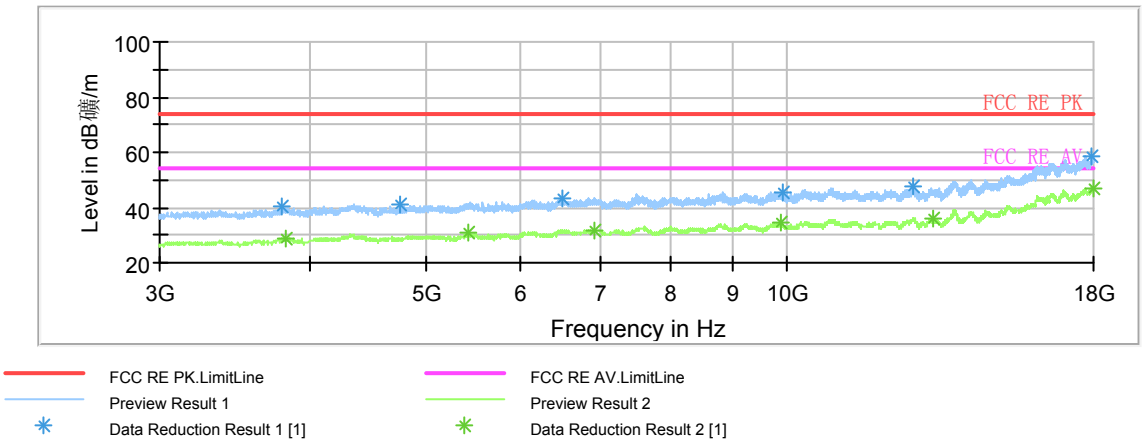
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1009.250000	44.1	100.0	H	21.0	54.3	-10.2	29.9	74
1376.250000	44.8	100.0	H	111.0	53.2	-8.4	29.2	74
1621.000000	48.3	100.0	H	13.0	53.4	-5.1	25.7	74
1996.750000	51.6	100.0	V	0.0	54.6	-3.0	22.4	74
2515.250000	52.3	100.0	V	248.0	53.2	-0.9	21.7	74
2992.000000	56.8	100.0	H	0.0	55.4	1.4	17.2	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1121.000000	33.0	100.0	H	207.0	42.7	-9.7	21.0	54
1442.000000	34.0	100.0	H	120.0	41.9	-7.9	20.0	54
1627.000000	37.4	100.0	V	271.0	42.5	-5.1	16.6	54
1995.750000	39.9	100.0	V	225.0	42.8	-2.9	14.1	54
2489.750000	41.7	100.0	V	294.0	42.1	-0.4	12.3	54
2997.000000	46.0	100.0	H	64.0	44.6	1.4	8.0	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

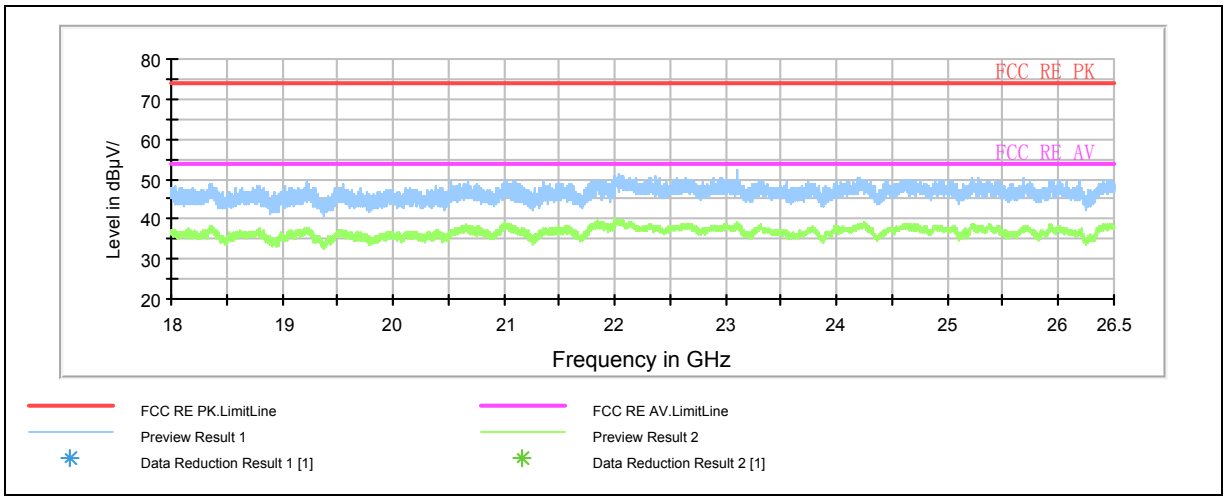
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3787.500000	40.6	100.0	H	34.0	41.1	-0.5	33.4	74
4764.375000	40.9	100.0	H	79.0	40.1	0.8	33.1	74
6496.875000	43.1	100.0	V	0.0	38.5	4.6	30.9	74
9900.000000	45.6	100.0	H	17.0	35.8	9.8	28.4	74
12755.625000	47.4	100.0	V	261.0	34.8	12.6	26.6	74
17956.875000	58.5	100.0	V	0.0	35.1	23.4	15.5	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3819.375000	28.9	100.0	H	52.0	29.1	-0.2	25.1	54
5433.750000	30.6	100.0	H	177.0	27.8	2.8	23.4	54
6913.125000	32.0	100.0	V	173.0	27.3	4.7	22.0	54
9866.250000	34.2	100.0	H	8.0	24.3	9.9	19.8	54
13226.250000	35.9	100.0	H	150.0	23.2	12.7	18.1	54
17986.875000	47.0	100.0	H	0.0	23.5	23.5	7.0	54

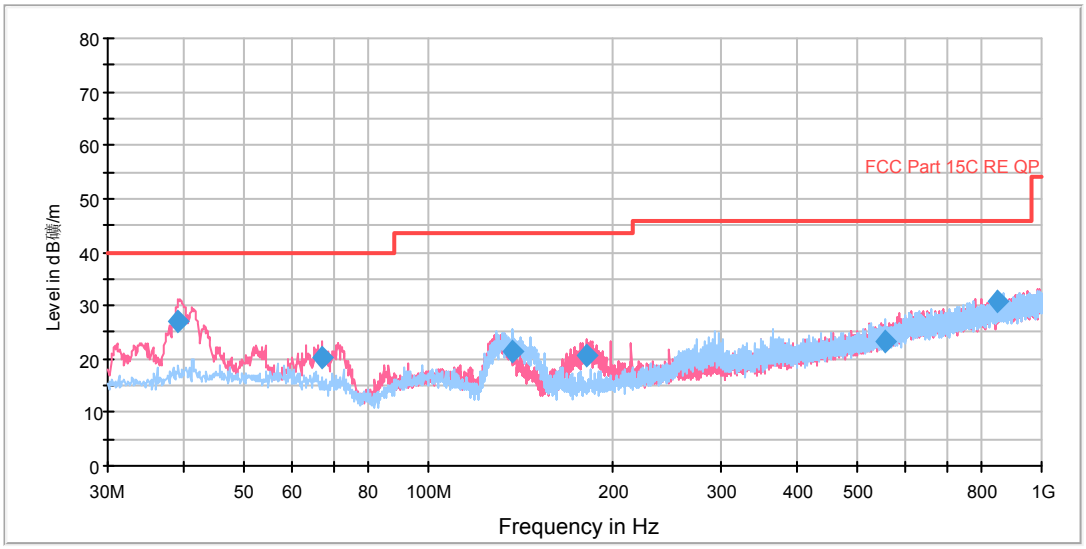
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

EDR-Channel 39

RE 0.03-1GHz QP Class B



Radiates Emission from 30MHz to 1GHz

Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

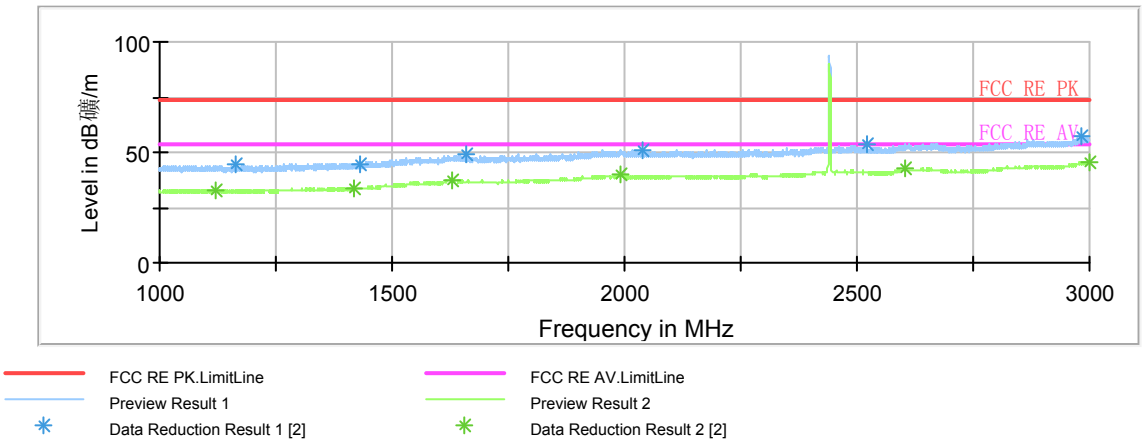
Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.093750	27.1	100.0	V	71.0	14.1	13.0	12.9	40.0
66.981250	20.4	100.0	V	87.0	10.7	9.7	19.6	40.0
137.185000	21.4	100.0	H	84.0	12.4	9.0	22.1	43.5
181.320000	20.6	100.0	V	87.0	9.7	10.9	22.9	43.5
556.831250	23.3	100.0	H	3.0	2.1	21.2	22.7	46.0
847.225000	30.7	100.0	H	76.0	5.7	25.0	15.3	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

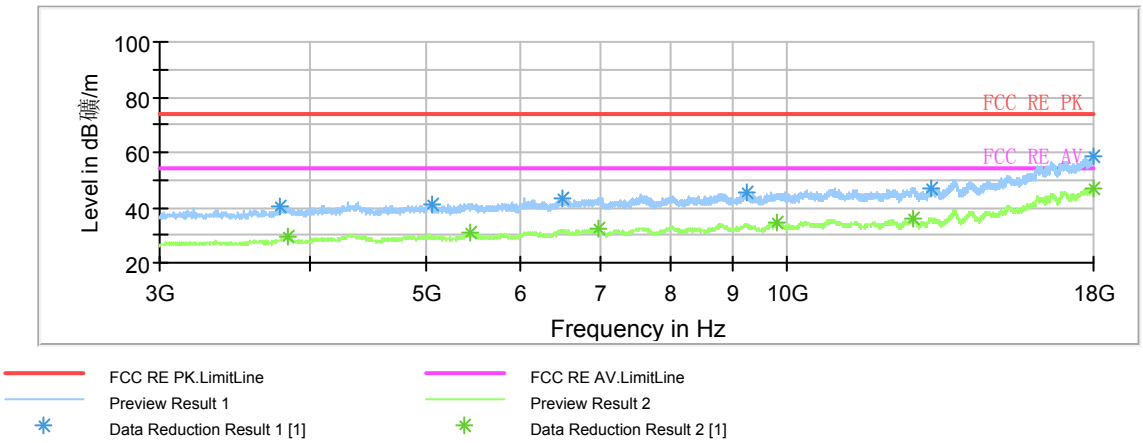
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1163.750000	44.1	100.0	H	153.0	53.7	-9.6	29.9	74
1431.750000	44.7	100.0	V	119.0	52.8	-8.1	29.3	74
1657.500000	48.7	100.0	V	154.0	54.3	-5.6	25.3	74
2038.500000	50.8	100.0	V	0.0	53.8	-3.0	23.2	74
2520.250000	53.5	100.0	H	138.0	54.4	-0.9	20.5	74
2981.000000	57.3	100.0	V	0.0	56.0	1.3	16.7	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1119.750000	33.1	100.0	V	223.0	42.8	-9.7	20.9	54
1418.250000	33.9	100.0	V	0.0	42.0	-8.1	20.1	54
1630.000000	37.4	100.0	V	200.0	42.5	-5.1	16.6	54
1992.750000	39.8	100.0	V	282.0	42.8	-3.0	14.2	54
2603.000000	42.3	100.0	H	175.0	42.5	-0.2	11.7	54
2998.750000	45.8	100.0	H	190.0	44.4	1.4	8.2	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

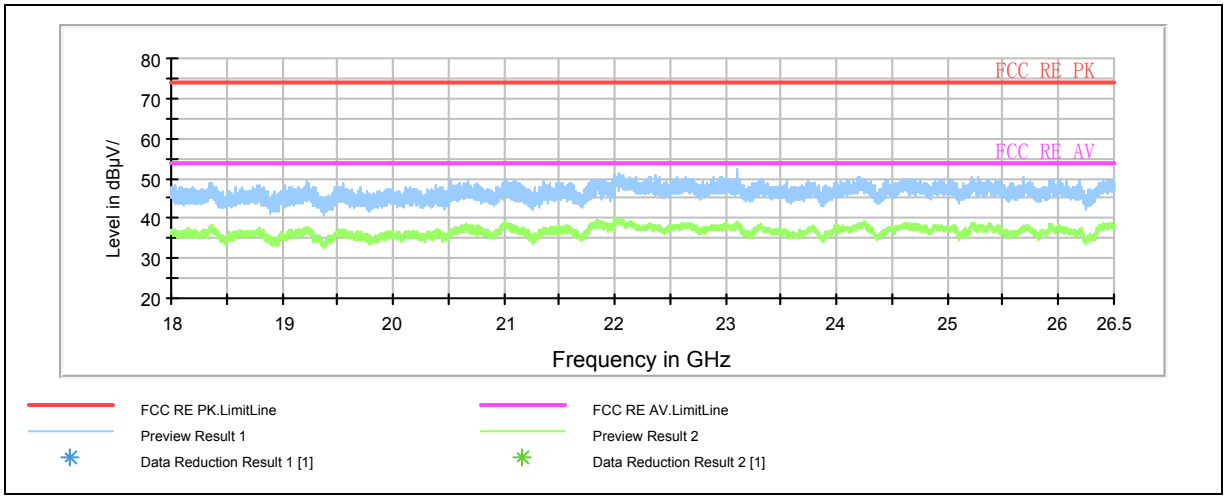
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3776.250000	40.1	100.0	V	246.0		-0.6		74
5053.125000	41.1	100.0	V	334.0		1.9		74
6496.875000	43.2	100.0	V	165.0		4.6		74
9258.750000	45.3	100.0	V	229.0		8.7		74
13166.250000	47.3	100.0	H	312.0		12.7		74
17979.375000	58.3	100.0	V	350.0		23.4		74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3841.875000	29.4	100.0	V	308.0	29.6	-0.2	24.6	54
5446.875000	30.6	100.0	V	77.0	27.8	2.8	23.4	54
6963.750000	32.3	100.0	H	0.0	27.5	4.8	21.7	54
9819.375000	34.3	100.0	V	342.0	24.6	9.7	19.7	54
12750.000000	36.1	100.0	V	317.0	23.5	12.6	17.9	54
17975.625000	46.8	100.0	H	120.0	23.4	23.4	7.2	54

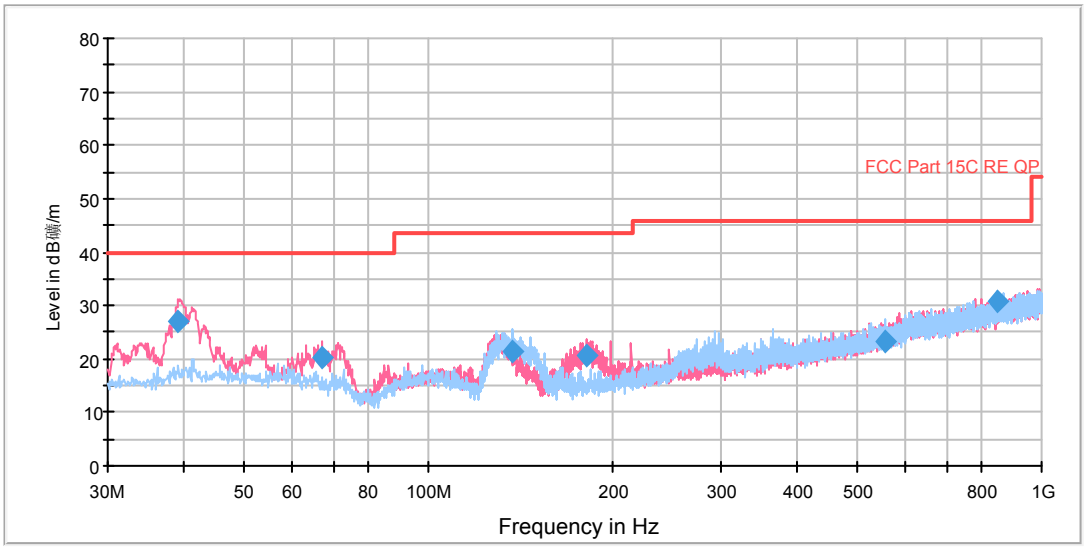
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

EDR-Channel 78

RE 0.03-1GHz QP Class B



Radiates Emission from 30MHz to 1GHz

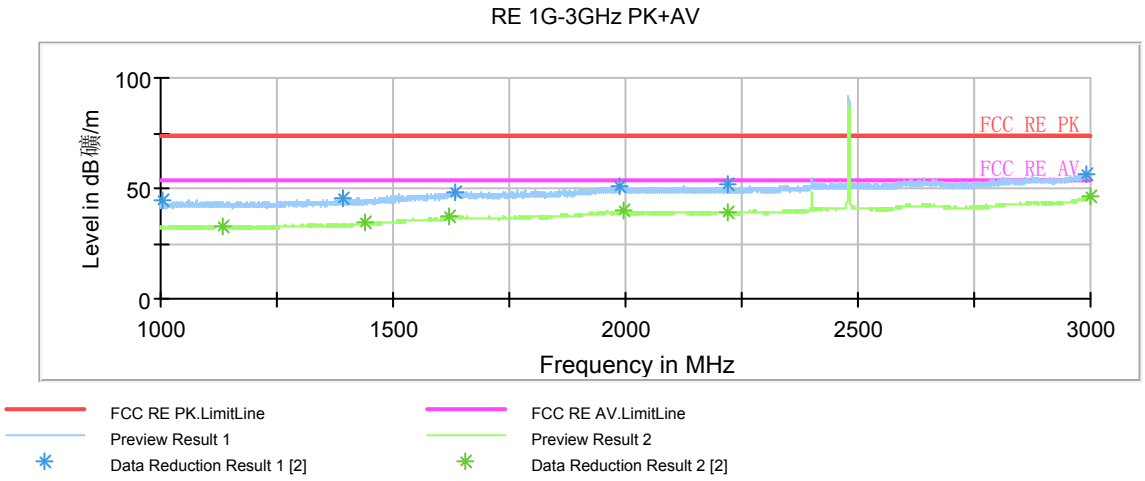
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
39.093750	27.1	100.0	V	71.0	14.1	13.0	12.9	40.0
66.981250	20.4	100.0	V	87.0	10.7	9.7	19.6	40.0
137.185000	21.4	100.0	H	84.0	12.4	9.0	22.1	43.5
181.320000	20.6	100.0	V	87.0	9.7	10.9	22.9	43.5
556.831250	23.3	100.0	H	3.0	2.1	21.2	22.7	46.0
847.225000	30.7	100.0	H	76.0	5.7	25.0	15.3	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak



Radiates Emission from 1GHz to 3GHz

Note: The signal beyond the limit is carrier. a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

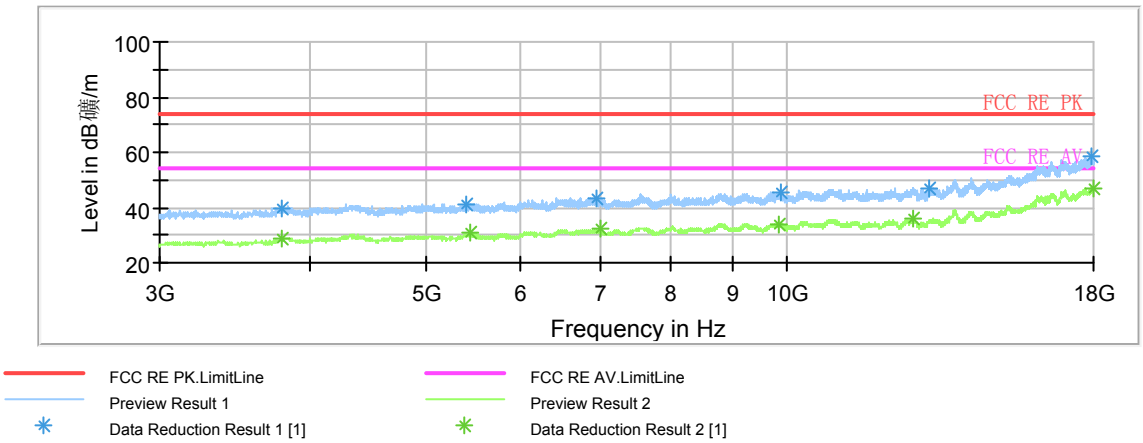
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1006.250000	44.3	100.0	V	295.0	54.5	-10.2	29.7	74
1391.250000	45.3	100.0	H	98.0	53.6	-8.3	28.7	74
1631.750000	48.4	100.0	V	184.0	53.5	-5.1	25.6	74
1987.000000	50.7	100.0	H	61.0	54.1	-3.4	23.3	74
2218.500000	51.4	100.0	V	0.0	54.4	-3.0	22.6	74
2991.250000	56.5	100.0	V	0.0	55.1	1.4	17.5	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1132.000000	33.0	100.0	H	0.0	42.6	-9.6	21.0	54
1439.000000	34.3	100.0	H	156.0	42.3	-8.0	19.7	54
1620.500000	37.4	100.0	H	0.0	42.6	-5.2	16.6	54
1995.500000	39.7	100.0	V	310.0	42.6	-2.9	14.3	54
2219.750000	39.4	100.0	V	0.0	42.4	-3.0	14.6	54
2998.000000	46.0	100.0	V	0.0	44.6	1.4	8.0	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

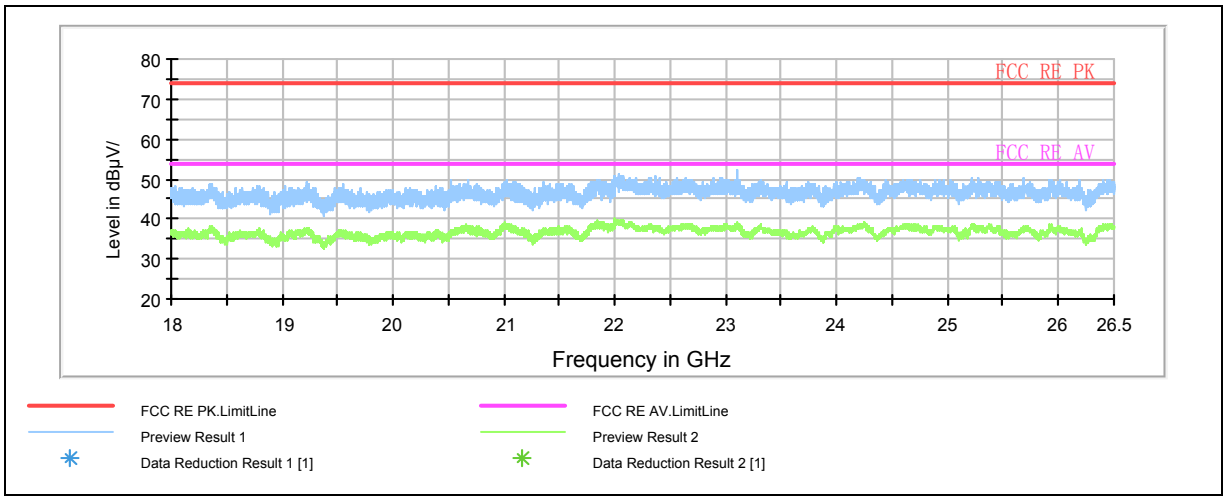
Note: a font (Level in dBµV/m)in the test plot =(level in dBuv/m)

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3789.375000	39.5	100.0	H	0.0	40.0	-0.5	34.5	74
5398.125000	41.3	100.0	V	0.0	38.8	2.5	32.7	74
6933.750000	43.6	100.0	H	236.0	38.8	4.8	30.4	74
9873.750000	45.7	100.0	H	16.0	35.8	9.9	28.3	74
13153.125000	47.2	100.0	V	39.0	34.5	12.7	26.8	74
17934.375000	58.3	100.0	V	354.0	34.9	23.4	15.7	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3791.250000	29.0	100.0	V	197.0	29.5	-0.5	25.0	54
5448.750000	30.6	100.0	H	103.0	27.8	2.8	23.4	54
6995.625000	32.0	100.0	H	33.0	27.0	5.0	22.0	54
9843.750000	34.1	100.0	H	0.0	24.3	9.8	19.9	54
12729.375000	35.9	100.0	V	0.0	23.3	12.6	18.1	54
18000.000000	47.0	100.0	H	94.0	23.5	23.5	7.0	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



Radiates Emission from 18GHz to 26.5GHz

3.12. Conducted Emission

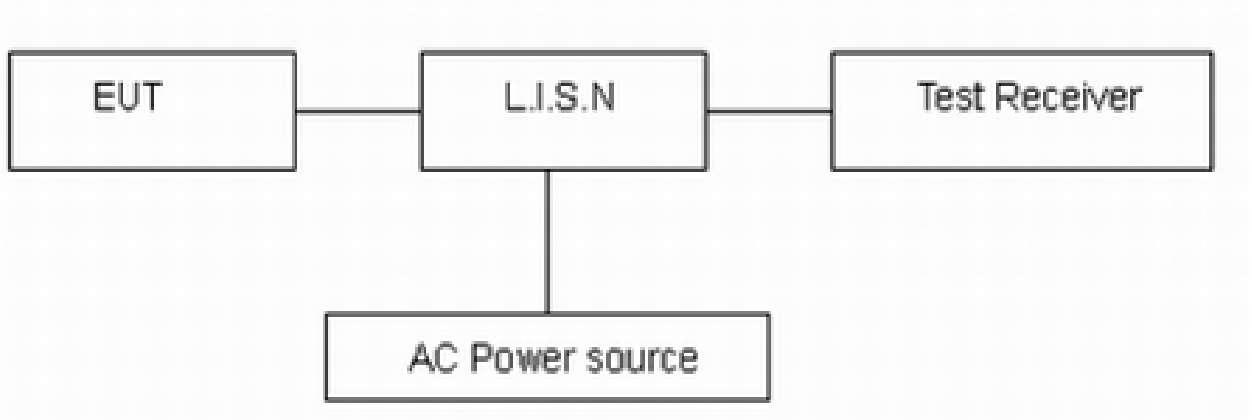
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2009. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz.The measurement result should include both L line and N line.
The test is in transmitting mode.

Test Setup



Note: AC Power source is used to change the voltage from 220V/50Hz to 110V/60Hz.

Limits

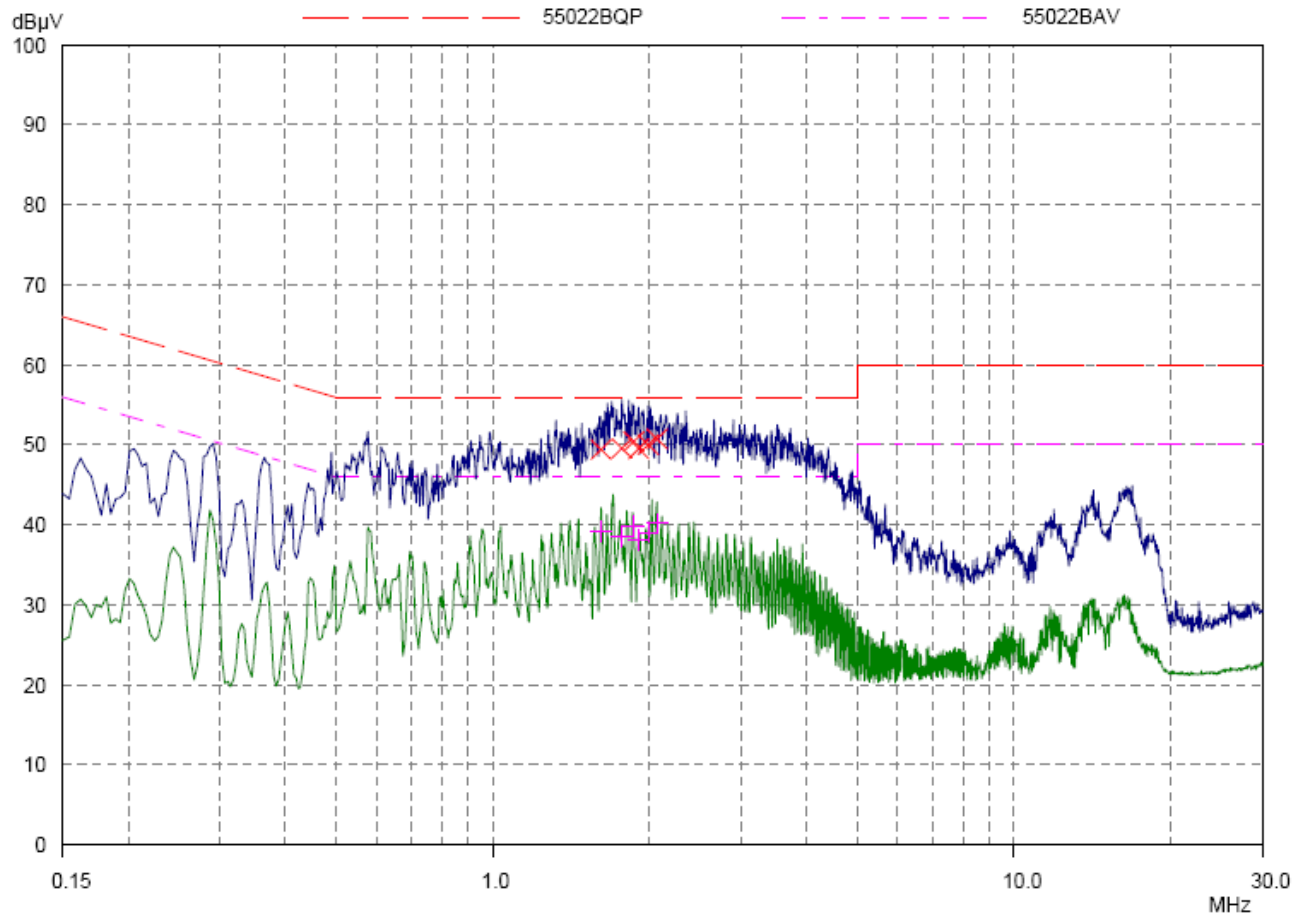
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 2.69 dB.

Test Results:

Basic Rate-CH39

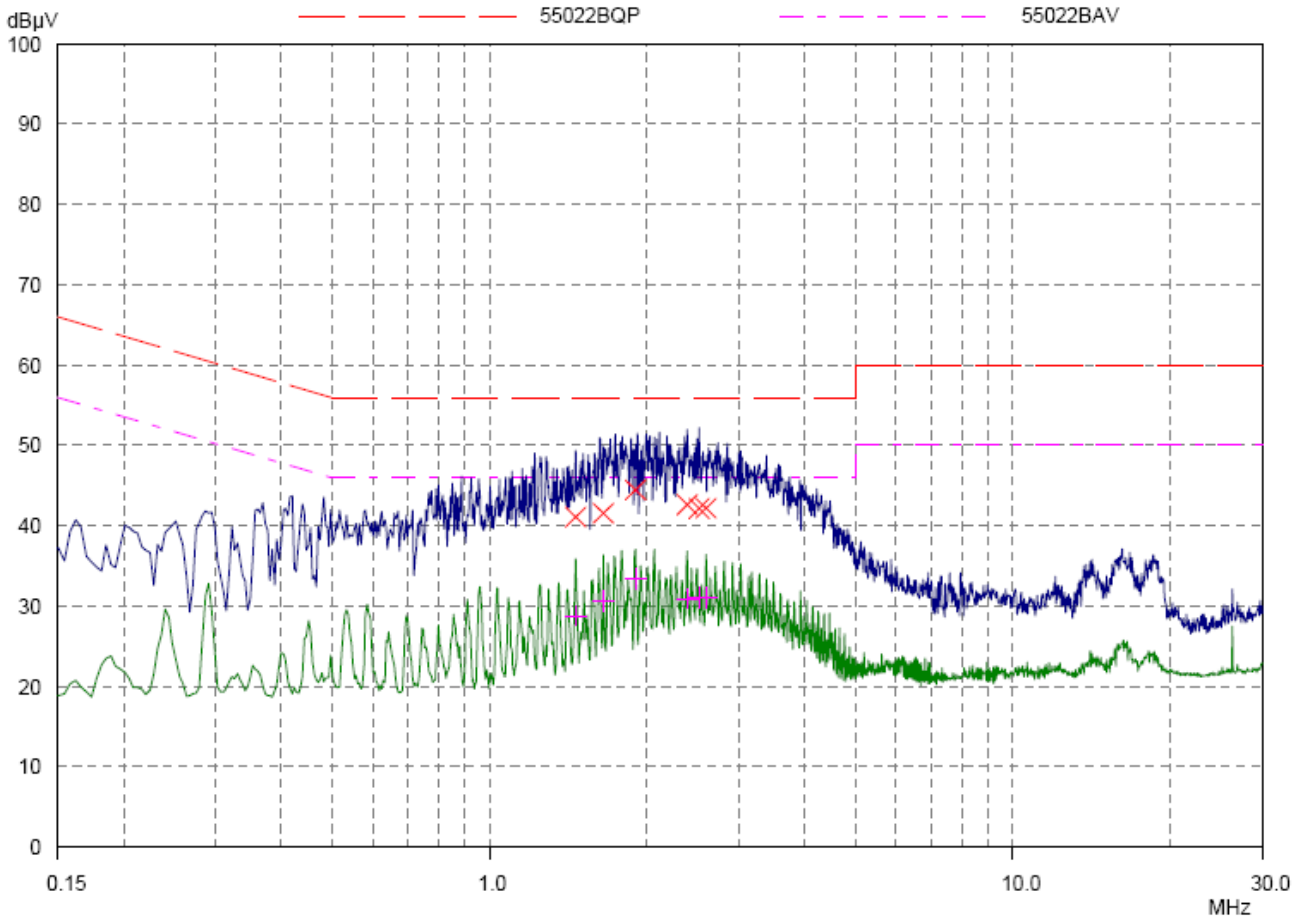


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
1.61484	49.39	56.00	6.61	L1	gnd
1.76718	49.56	56.00	6.44	L1	gnd
1.86484	50.46	56.00	5.54	L1	gnd
1.90781	49.53	56.00	6.47	L1	gnd
1.98593	50.06	56.00	5.94	L1	gnd
2.06406	50.75	56.00	5.25	L1	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
1.61484	39.24	46.00	6.76	L1	gnd
1.76718	38.57	46.00	7.43	L1	gnd
1.86484	39.81	46.00	6.19	L1	gnd
1.90781	38.15	46.00	7.85	L1	gnd
1.98593	39.04	46.00	6.96	L1	gnd
2.06406	40.16	46.00	5.84	L1	gnd

L Line



Final Measurement Results

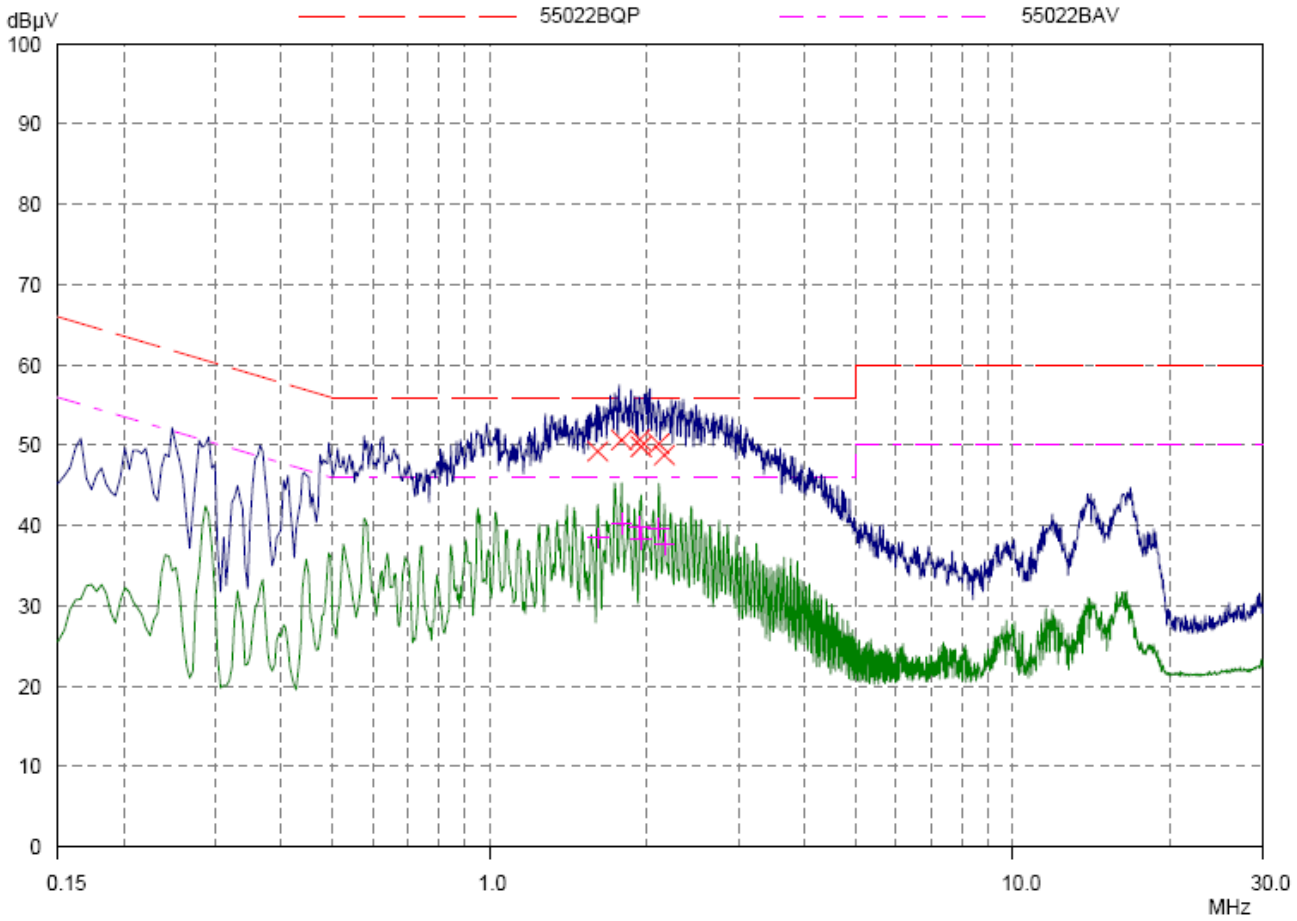
Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
1.4625	41.11	56.00	14.89	N	gnd
1.65	41.56	56.00	14.44	N	gnd
1.9	44.45	56.00	11.55	N	gnd
2.38437	42.63	56.00	13.37	N	gnd
2.51718	42.15	56.00	13.85	N	gnd
2.59531	42.20	56.00	13.80	N	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
1.4625	28.78	46.00	17.22	N	gnd
1.65	30.71	46.00	15.29	N	gnd
1.9	33.42	46.00	12.58	N	gnd
2.38437	30.89	46.00	15.11	N	gnd
2.51718	31.08	46.00	14.92	N	gnd
2.59531	31.01	46.00	14.99	N	gnd

N Line

Conducted Emission from 150 KHz to 30 MHz

EDR-CH39

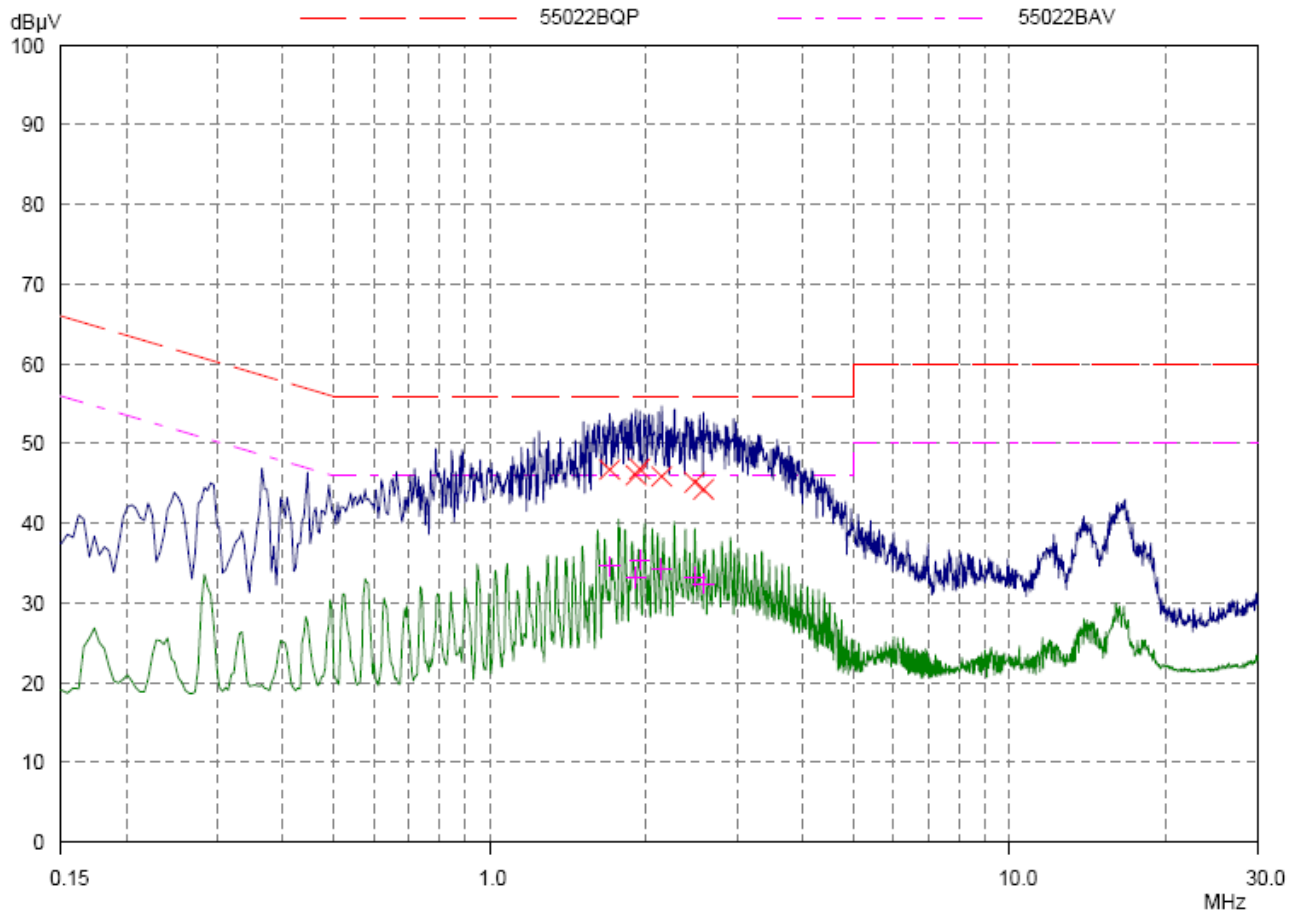


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
1.61093	49.23	56.00	6.77	L1	gnd
1.78671	50.68	56.00	5.32	L1	gnd
1.93906	50.71	56.00	5.29	L1	gnd
1.94687	49.83	56.00	6.17	L1	gnd
2.10703	50.20	56.00	5.80	L1	gnd
2.15781	48.81	56.00	7.19	L1	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
1.61093	38.47	46.00	7.53	L1	gnd
1.78671	40.23	46.00	5.77	L1	gnd
1.93906	39.82	46.00	6.18	L1	gnd
1.94687	38.38	46.00	7.62	L1	gnd
2.10703	39.60	46.00	6.40	L1	gnd
2.15781	37.72	46.00	8.28	L1	gnd

L Line



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
1.70078	46.73	56.00	9.27	N	gnd
1.91171	46.05	56.00	9.95	N	gnd
1.94296	46.87	56.00	9.13	N	gnd
2.14218	45.87	56.00	10.13	N	gnd
2.48203	45.15	56.00	10.85	N	gnd
2.57578	44.28	56.00	11.72	N	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
1.70078	34.61	46.00	11.39	N	gnd
1.91171	33.21	46.00	12.79	N	gnd
1.94296	35.42	46.00	10.58	N	gnd
2.14218	34.28	46.00	11.72	N	gnd
2.48203	33.31	46.00	12.69	N	gnd
2.57578	32.47	46.00	13.53	N	gnd

N Line

Conducted Emission from 150 KHz to 30 MHz

4. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	BT Base Station Simulator	CBT	R&S	100271	2013-06-29	One year
02	Loop Antenna	FMZB1516	SCHWARZBECK	237	2013-06-29	Two years
03	EMI Test Receiver	ESCS30	R&S	100138	2014-01-14	One year
04	LISN	ENV216	R&S	101171	2014-04-11	One year
05	EMI Test Receiver	ESCI	R&S	100948	2013-06-29	One year
06	TRILOG Broadband Antenna	VULB 9163	Schwarzbeck	9163-201	2013-06-19	Three years
07	Signal Analyzer	FSV30	R&S	100815	2013-06-29	One year
08	Double Ridged Waveguide Horn Antenna	HF907	R&S	100126	2012-07-02	Three years
09	Standard Gain Horn	3160-09	ETS-Lindgren	00102644	2012-05-20	Three years
10	PSG Analog Signal Generator	E8257D	Agilent	MY49281101	2013-06-29	One year
11	ESG Vector Signal Generator	E4438C	Agilent	MY49070900	2013-06-29	One year
12	Spectrum Analyzer	E4445A	Agilent	MY46181146	2013-06-29	One year
13	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
14	MOB COMMS DC SUPPLY	66319D	Agilent	MY43004105	2013-06-29	One year
15	Power Sensor	E9304A	Agilent	MY50220022	2013-06-29	One year
16	Power Meter	E4418B	Agilent	MY50000623	2013-06-29	One year
17	Vibration table	ESS-050-120	dongling	D1007126	2013-08-22	Three years

*******END OF REPORT *******

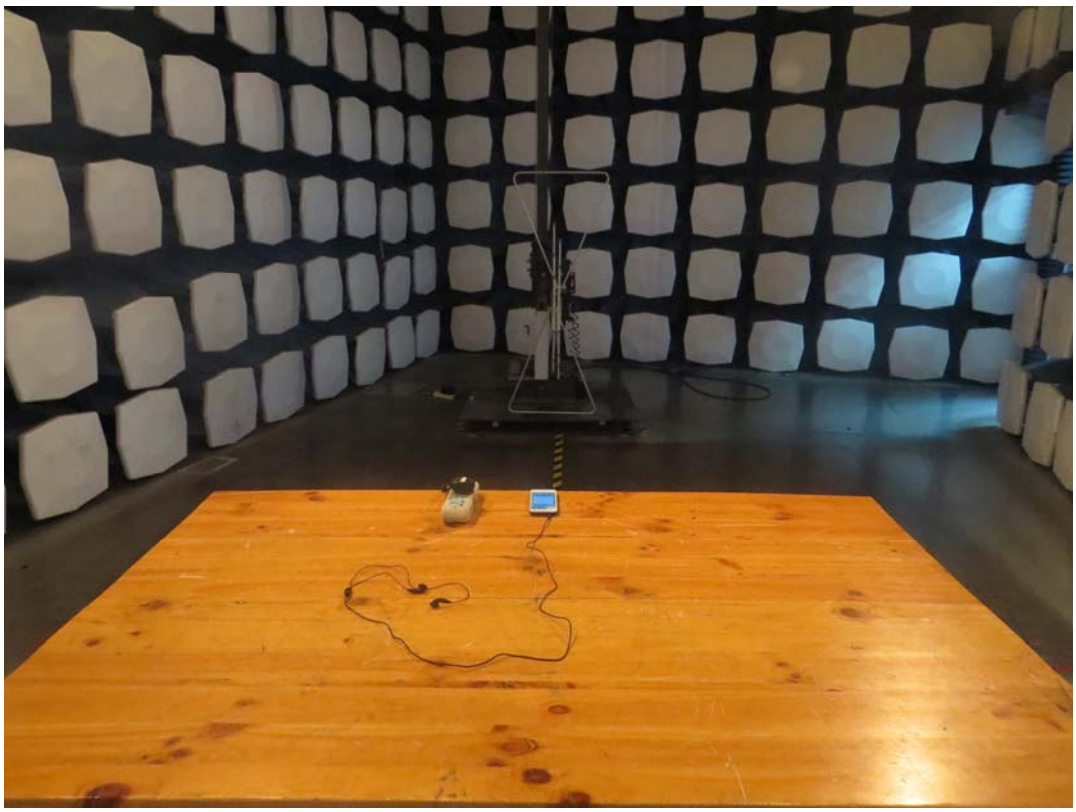
ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance

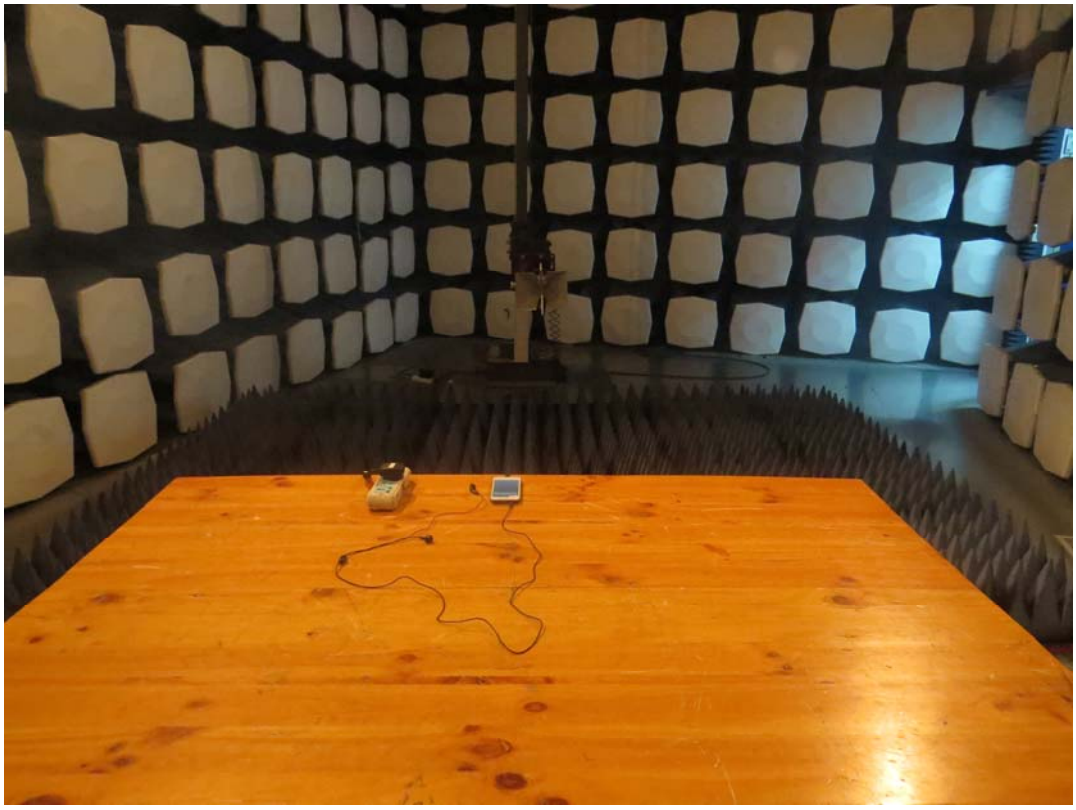
a: EUT

Picture 1 EUT

A.2 Test Setup



30M Hz-1GHz



Above 1GHz

Picture 2 Radiated Emission Test Setup

Picture 3 Conducted Emission Test Setup