



Part 15C

TEST REPORT

Product Name	3G Quad Band HSDPA/HSUPA PoC enabled mobile phone
Model Name	Sonim XP5520-A-R1, Sonim XP5520-A-R2, Sonim XP5530-A-R1, Sonim XP5560-A-R1, Sonim XP5560-A-R2, Sonim XP5560-A-R3, Sonim XP5570-A-R1 (P35F008AA)
Marketing Name	Sonim XP5520 BOLT
FCC ID	WYPP35F008AA
IC	8090A-P35F008AA
Client	Sonim Technologies, Inc.

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GENERAL SUMMARY

Product Name	3G Quad Band HSDPA/HSUPA PoC enabled mobile phone	Marketing Name	Sonim XP5520 BOLT
Model Name	Sonim XP5520-A-R1, Sonim XP5520-A-R2, Sonim XP5530-A-R1, Sonim XP5560-A-R1, Sonim XP5560-A-R2, Sonim XP5560-A-R3, Sonim XP5570-A-R1 (P35F008AA)		
FCC ID	WYPP35F008AA	IC	8090A-P35F008AA
Report No.	RZA1109-1686RF01R1		
Client	Sonim Technologies, Inc.		
Manufacturer	Sonim Technologies, Inc.		
Reference Standard(s)	<p>FCC CFR47 Part 15C (2010-12) Radio Frequency Devices</p> <p>15.205 Restricted bands of operation;</p> <p>15.207 Conducted limits;</p> <p>15.209 Radiated emission limits; general requirements;</p> <p>15.247 Operation within the bands 902-928 MHz,2400-2483.5 MHz, and 5725-5850MHz.</p> <p>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. (2003)</p> <p>DA00-705 Filing and Frequency Measurement Guidelines For Frequency Hopping Spread Spectrum System.(2000)</p> <p>RSS-210 Issue 7 June 2007 Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment</p>		
Conclusion	<p>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.</p> <p>General Judgment: Pass</p> <p align="right">(Stamp)</p> <p align="right">Date of issue: November 25th,2011</p>		
Comment	The test result only responds to the measured sample.		

Approved by 徐伟中
Director

Revised by 徐凯
RF Manager

Performed by 王
RF Engineer

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1. General Information

1.1. Notes of the test report

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. This report only refers to the item that has undergone the test.

This report standalone dose 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 electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing laboratory

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Yang Weizhong
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: yangweizhong@ta-shanghai.com

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1.3. Applicant Information

Company: Sonim Technologies, Inc.
Address: 1875 S. Grant Street, Suite 620
City: San Mateo
Postal Code: Ca 94420
Country: U.S.A
Contact: Sabrina Payonk
Telephone: +1 650 353 9851
Fax: +1 650 378 8190

1.4. Manufacturer Information

Company: Sonim Technologies, Inc.
Address: 875 S. Grant Street, Suite 620
City: San Mateo
Postal Code: Ca 94420
Country: U.S.A
Telephone: +1 650 353 9851
Fax: +1 650 378 8190

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1.5. Information of EUT

General information

Name of EUT:	3G Quad Band HSDPA/HSUPA PoC enabled mobile phone		
IMEI:	001080000529504		
Hardware Version:	A		
Software Version:	11.0.0-12.0.2-4100-00.0		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Mode	Basic Rate	Enhanced Data Rate(EDR)	
Modulation	Frequency Hopping Spread Spectrum (FHSS)		
	GFSK	π/4 DQPSK	8DQPSK
Packet Type:(Maximum Payload)	DH5	2DH5	3DH5
Max Conducted Power	3.62 dBm		
Power Supply:	Battery or Charger		
Rated Power Supply Voltage:	3.7 V		
Extreme Voltage:	Minimum: 3.5 V Maximum: 4.2 V		
Extreme Temperature:	Lowest: -10°C Highest: +55°C		
Operating Frequency Range(s)	2400 ~ 2483.5 MHz		

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Auxiliary equipment details

AE1: Battery

Model: BAT-01950-01S
Manufacturer: Sonim Technologies, Inc.
S/N: S1105000105

AE2: Charger

Model: 3202SM
Manufacturer: Salcomp
S/N: /

AE3: Earphone

Model: ME-816B5-C
Manufacturer: Sonim Technologies, Inc.
S/N: /

Equipment Under Test (EUT) is 3G Quad Band HSDPA/HSUPA PoC enabled mobile phone with internal antenna. The EUT supports Bluetooth.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from October 8, 2011 to October 12, 2011.

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2. Test Information

2.1. Summary of test results

Number	Summary of measurements of results	Clause in FCC rules	Clause in IC rules	Verdict
1	Peak Power Output -Conducted	15.247(b)(1)	RSS-210 A8.4(2)	PASS
2	Occupied Bandwidth (20dB)	15.247(a)(1)	RSS-210 A8.1(a)	PASS
3	Frequency Separation	15.247(a)(1)	RSS-210 A8.1(b)	PASS
4	Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	RSS-210 A8.1(d)	PASS
5	Band Edge Compliance	15.247(d)	/	PASS
6	Spurious Radiated Emissions in the restricted band	15.247(d),15.205,15.209	RSS-210 Clause2.6	PASS
7	Number of Hopping Frequency	15.247(a)(1)(iii)	RSS-210 A8.1(d)	PASS
8	Spurious RF Conducted Emissions	15.247(d)	RSS-210 A8.5	PASS
9	Radiates Emission	15.247(d),15.205,15.209	RSS-GEN Clause 6	PASS
10	AC Power Line Conducted Emission	15.207	/	PASS

2.2. Peak Power Output –Conducted

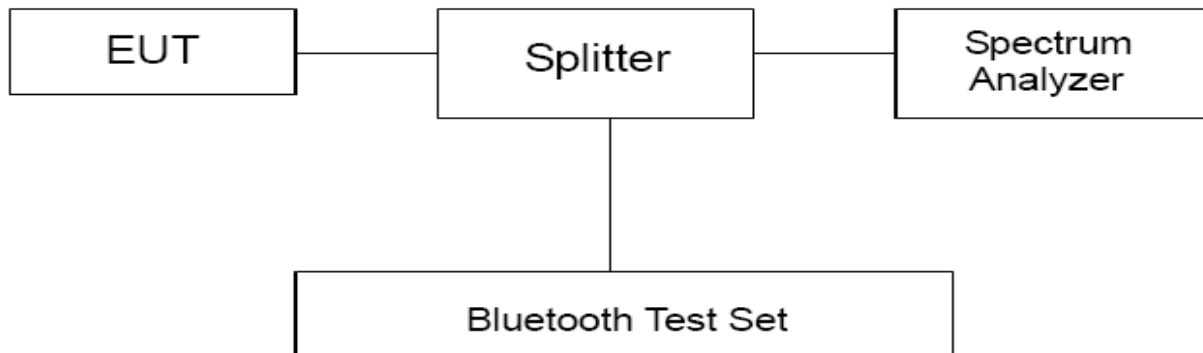
Ambient condition

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 1MHz, VBW is set to 3MHz. 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	$\leq 0.125W$ (21dBm)
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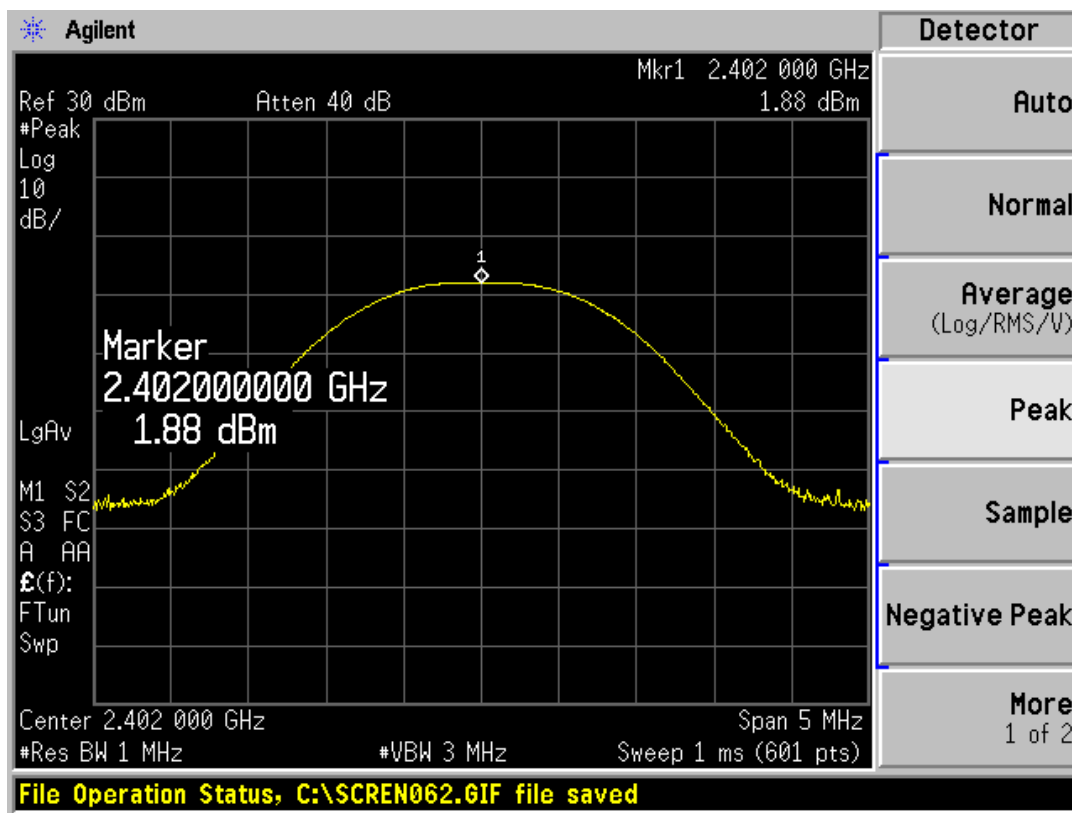
Measurement Uncertainty

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	1.88	0.82	1.06	PASS
39	2441	2.81	1.95	2.13	PASS
78	2480	3.62	2.77	3.14	PASS

DH5



Carrier frequency (MHz): 2402

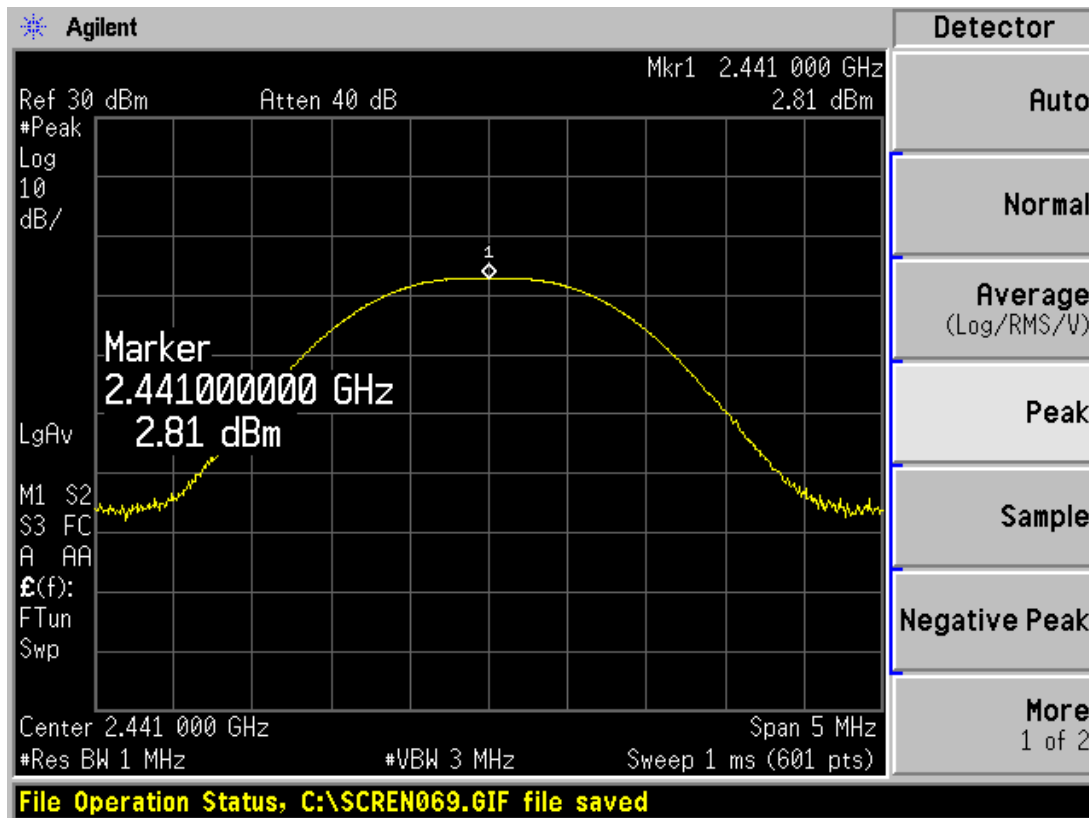
Channel No.:0

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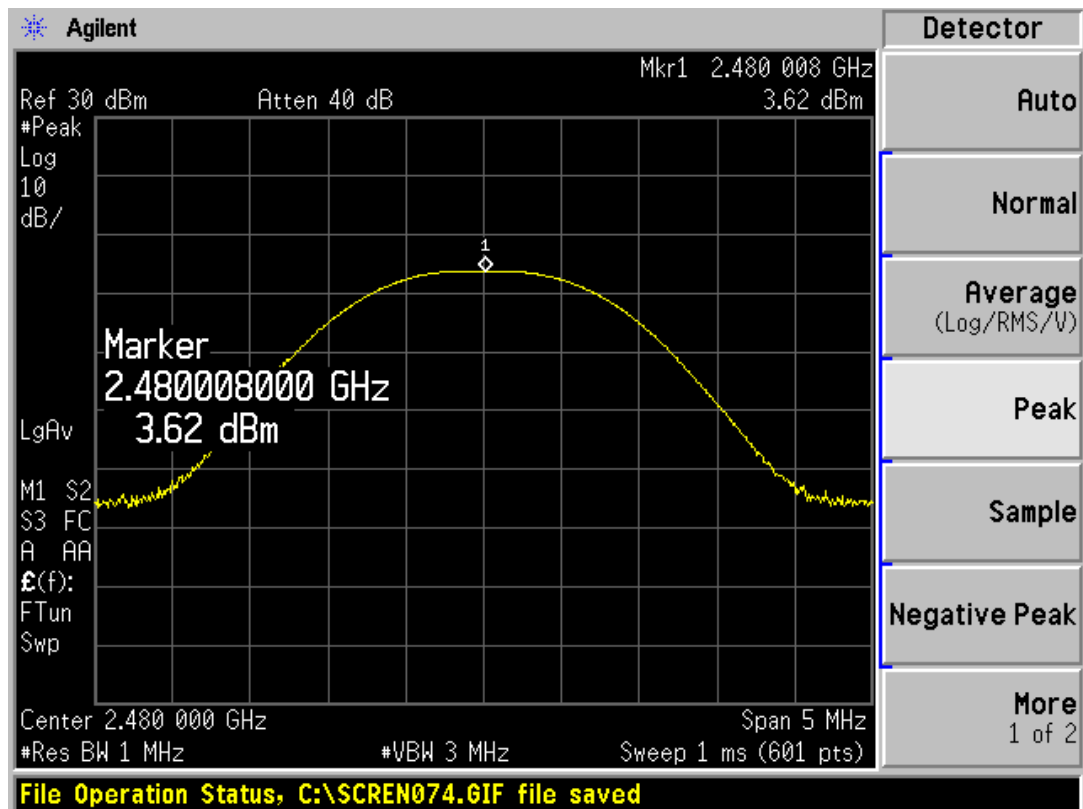
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Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

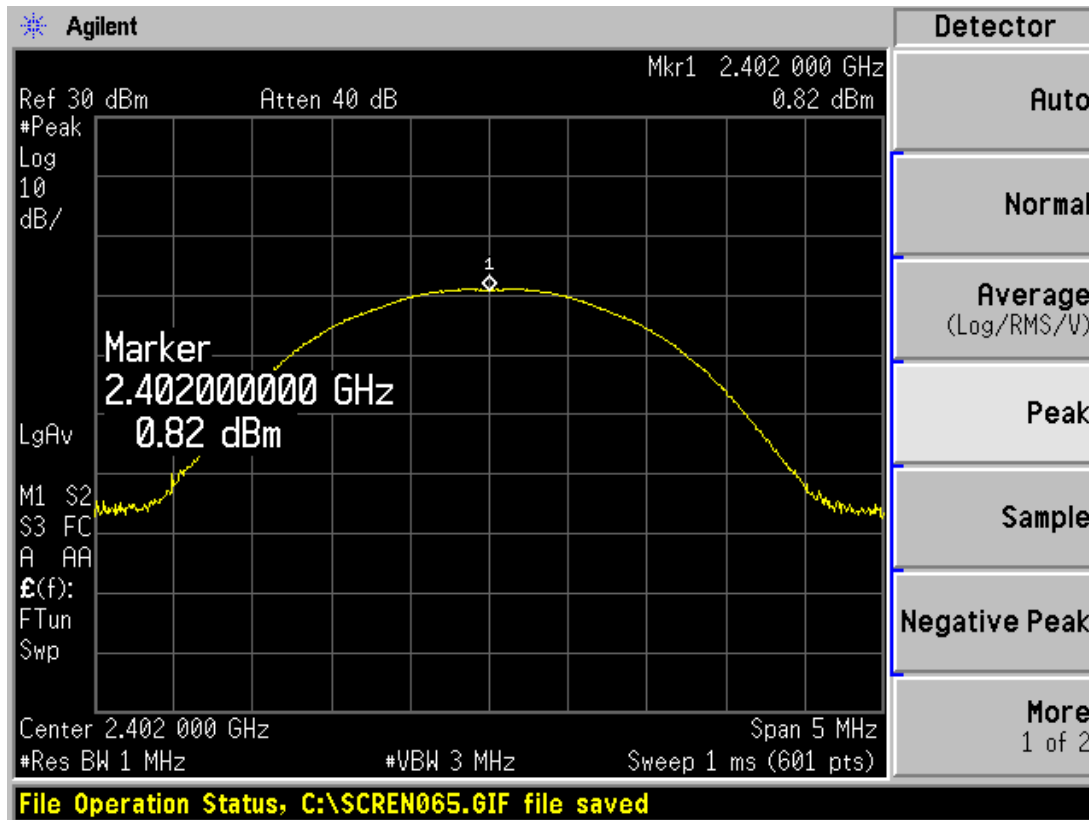
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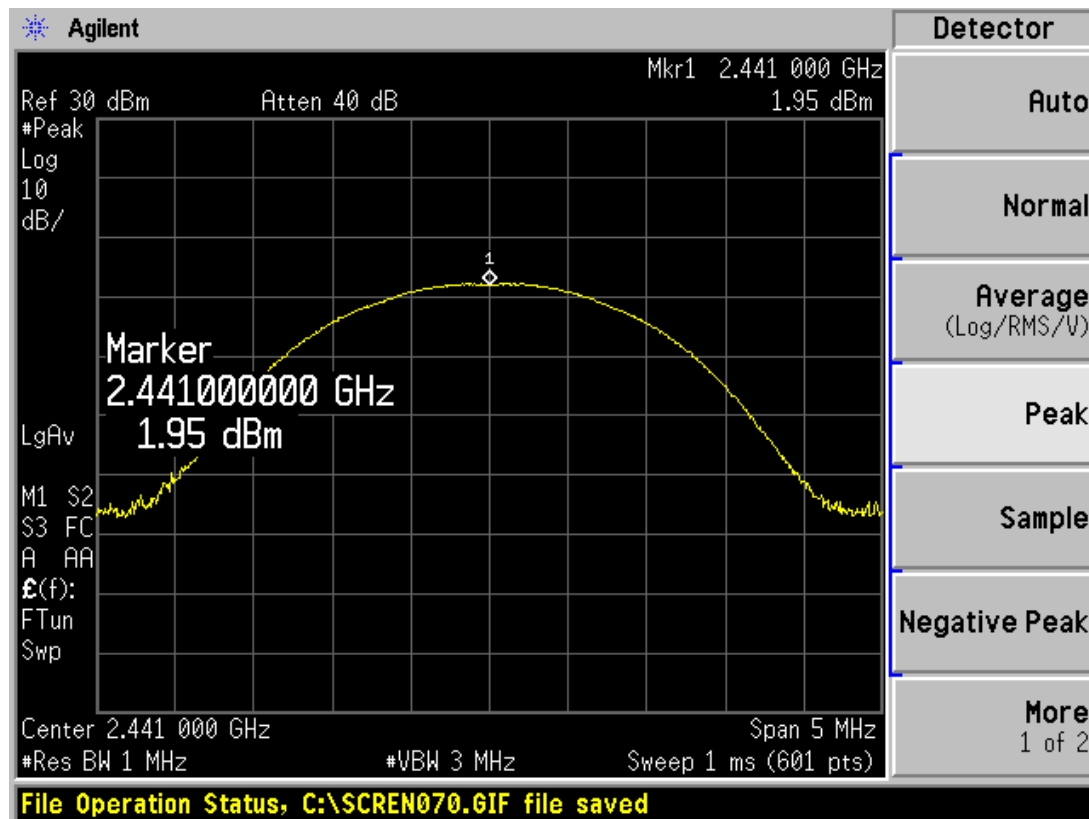
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2DH5



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2441

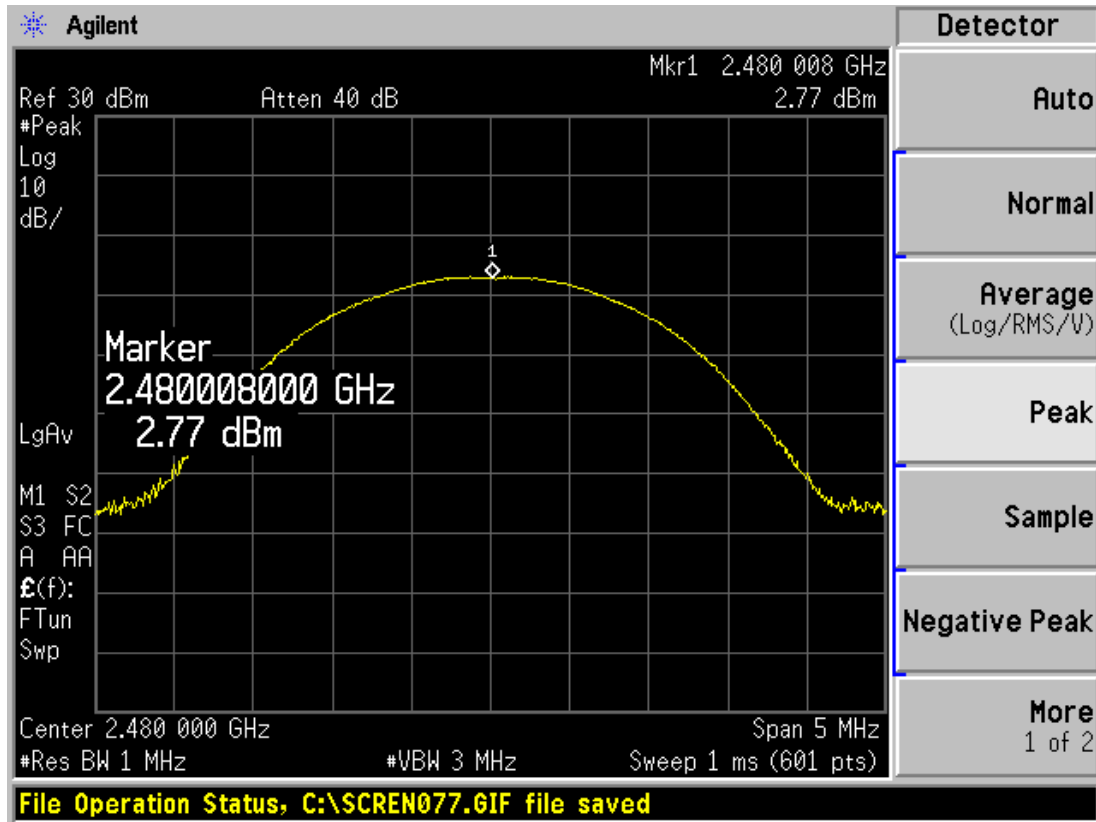
Channel No.:39

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Carrier frequency (MHz): 2480

Channel No.:78

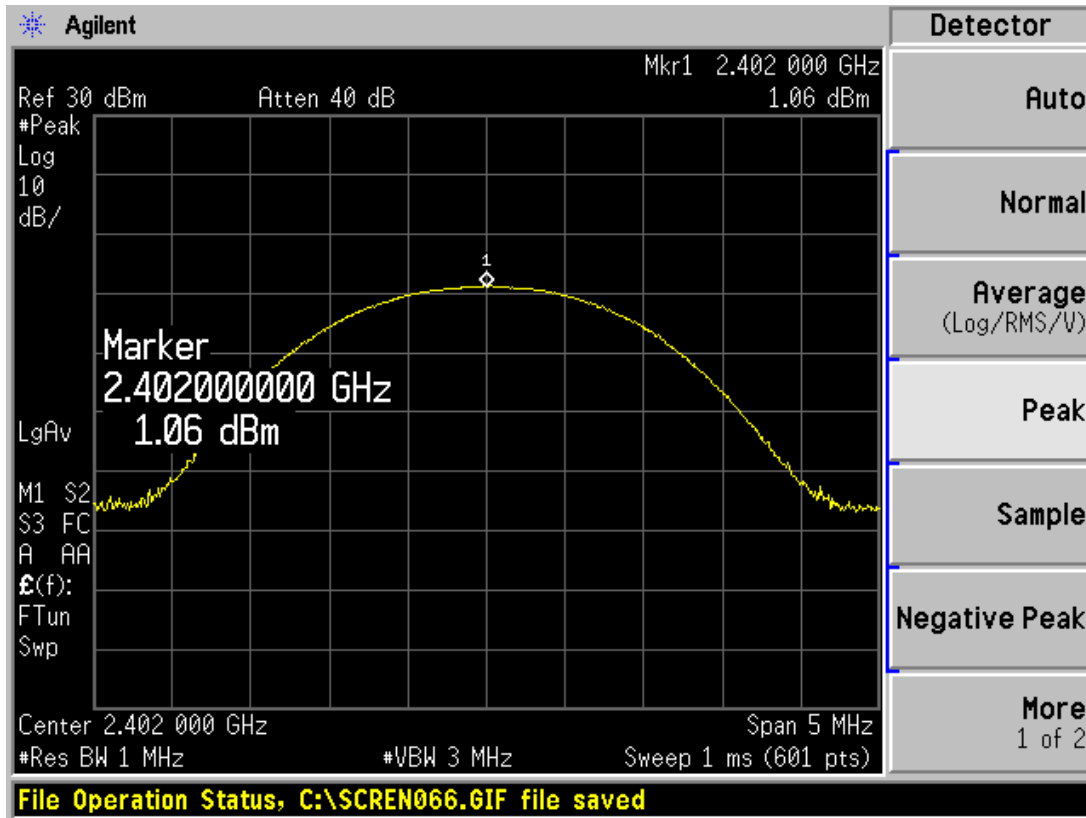
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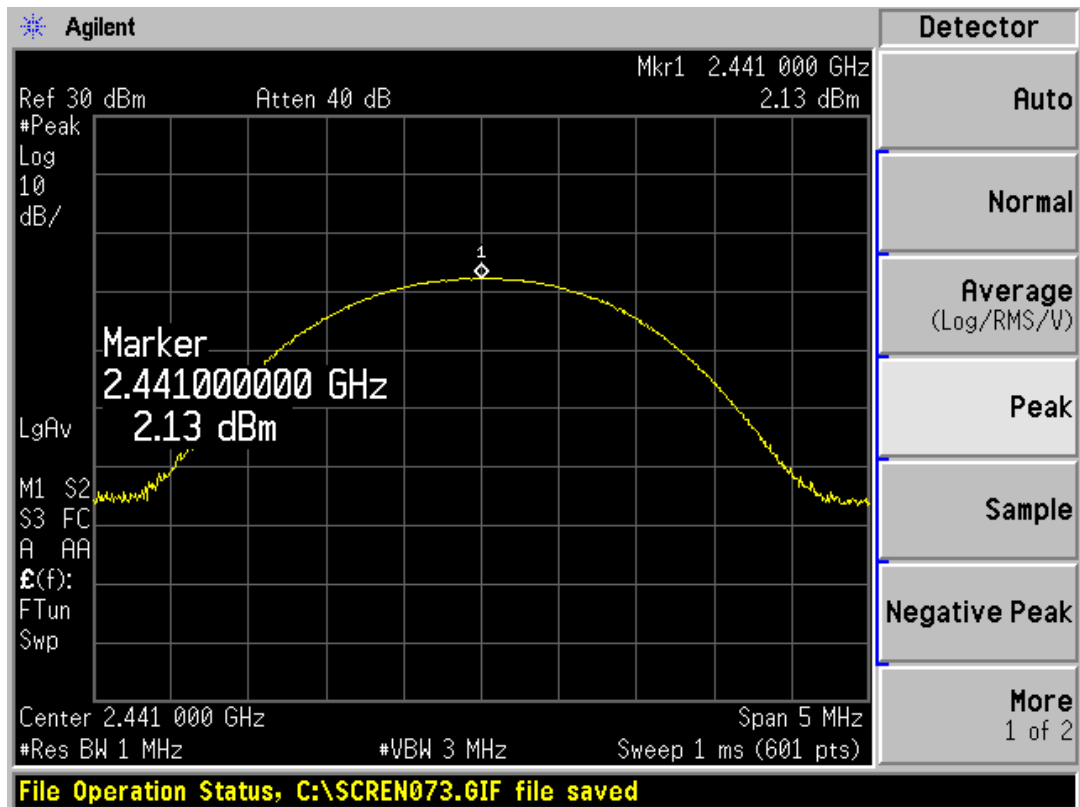
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3DH5



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2441

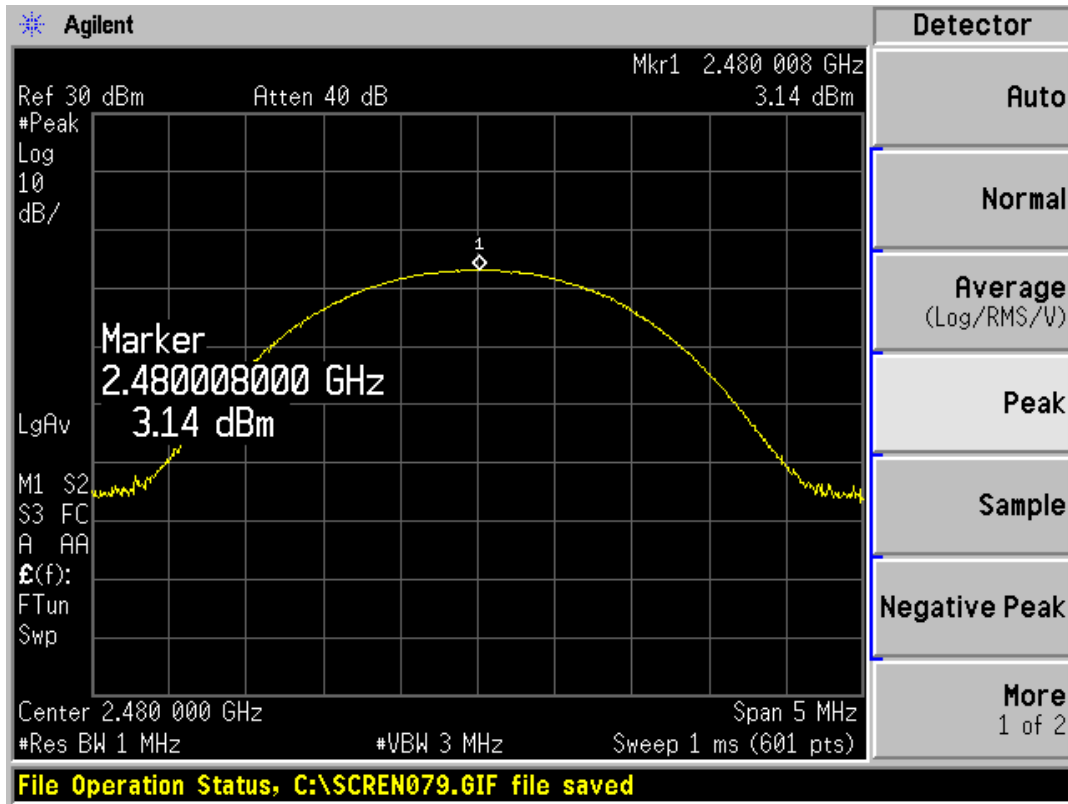
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Carrier frequency (MHz): 2480
Channel No.:78

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2.3. Occupied Bandwidth (20dB)

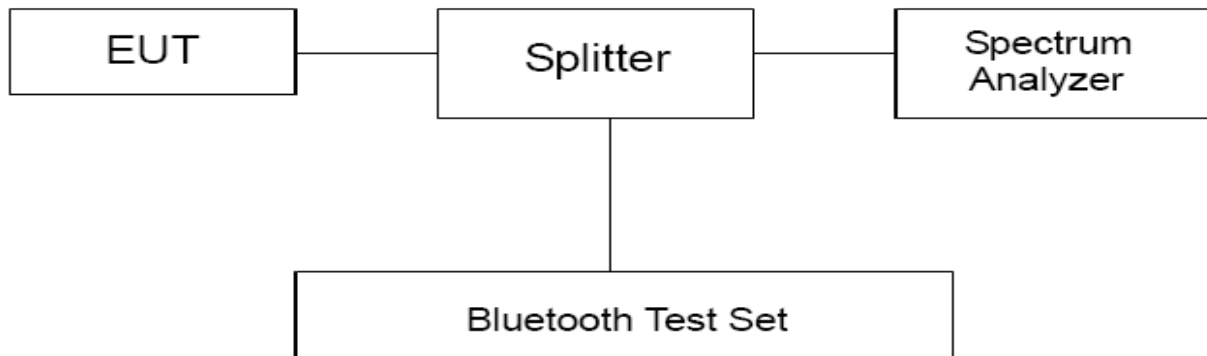
Ambient condition

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 10kHz and VBW is set to 30kHz 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.

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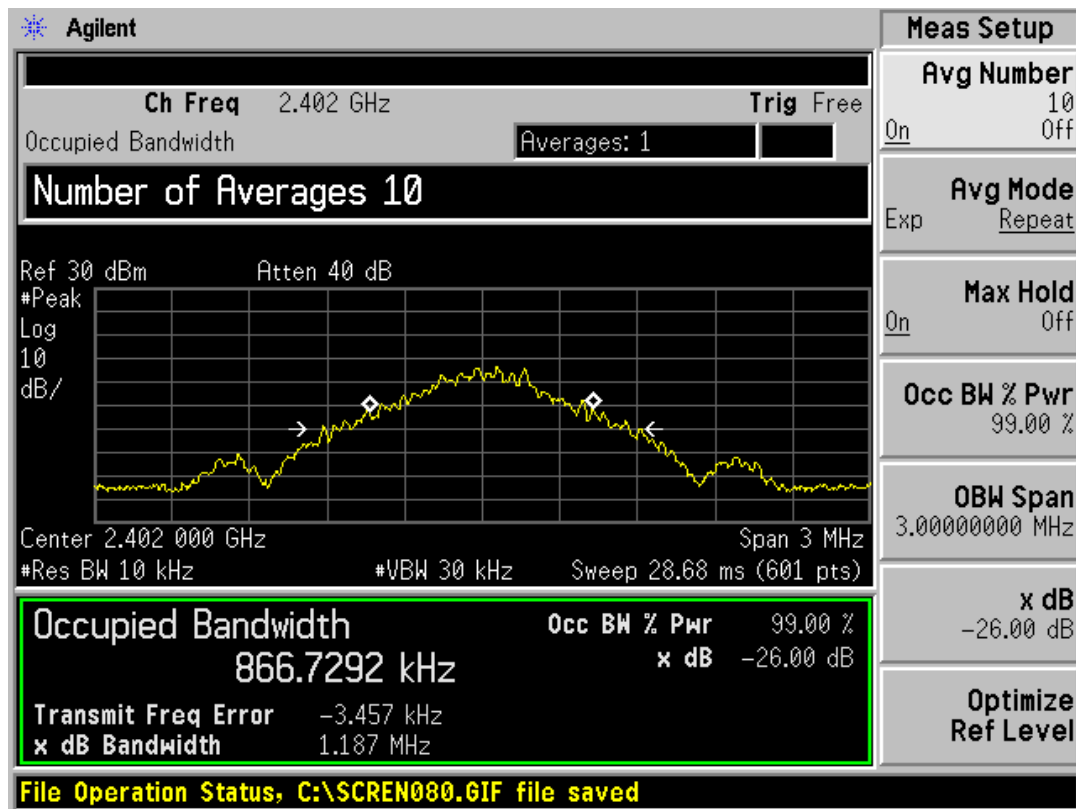
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Test Results

DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	866.7292
39	2441	872.2882
78	2480	868.6104



Carrier frequency (MHz): 2402

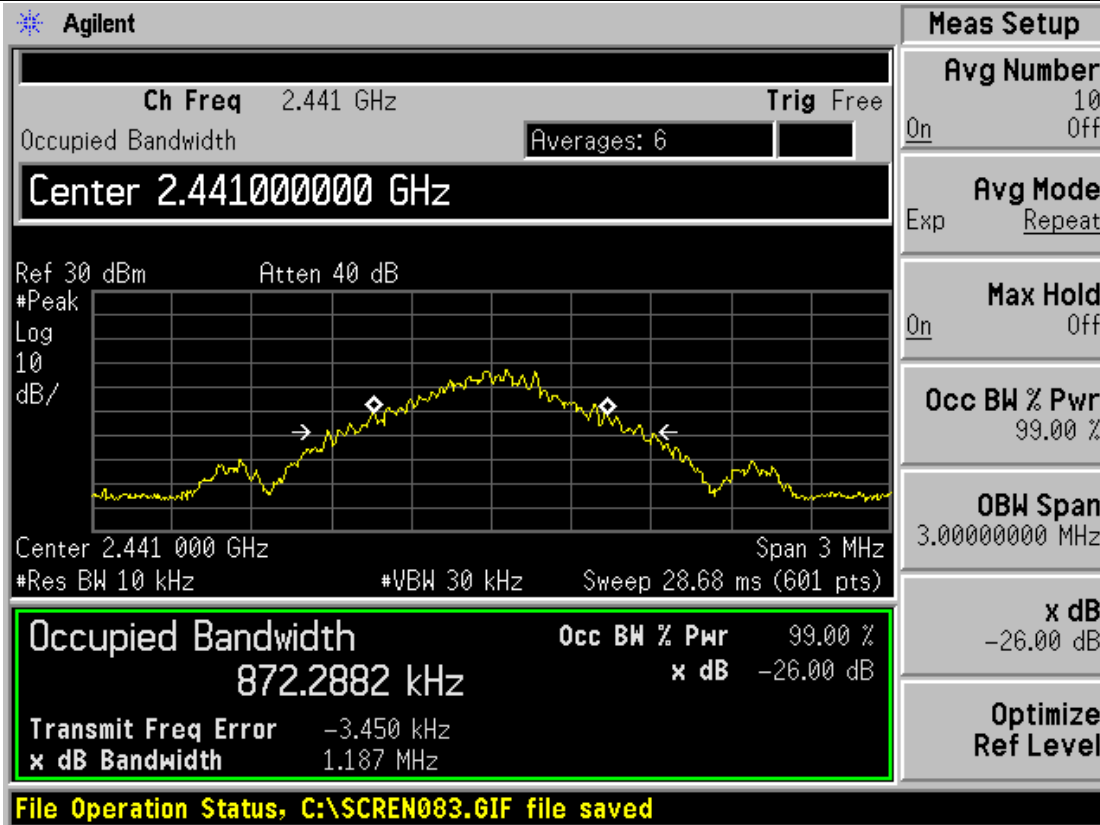
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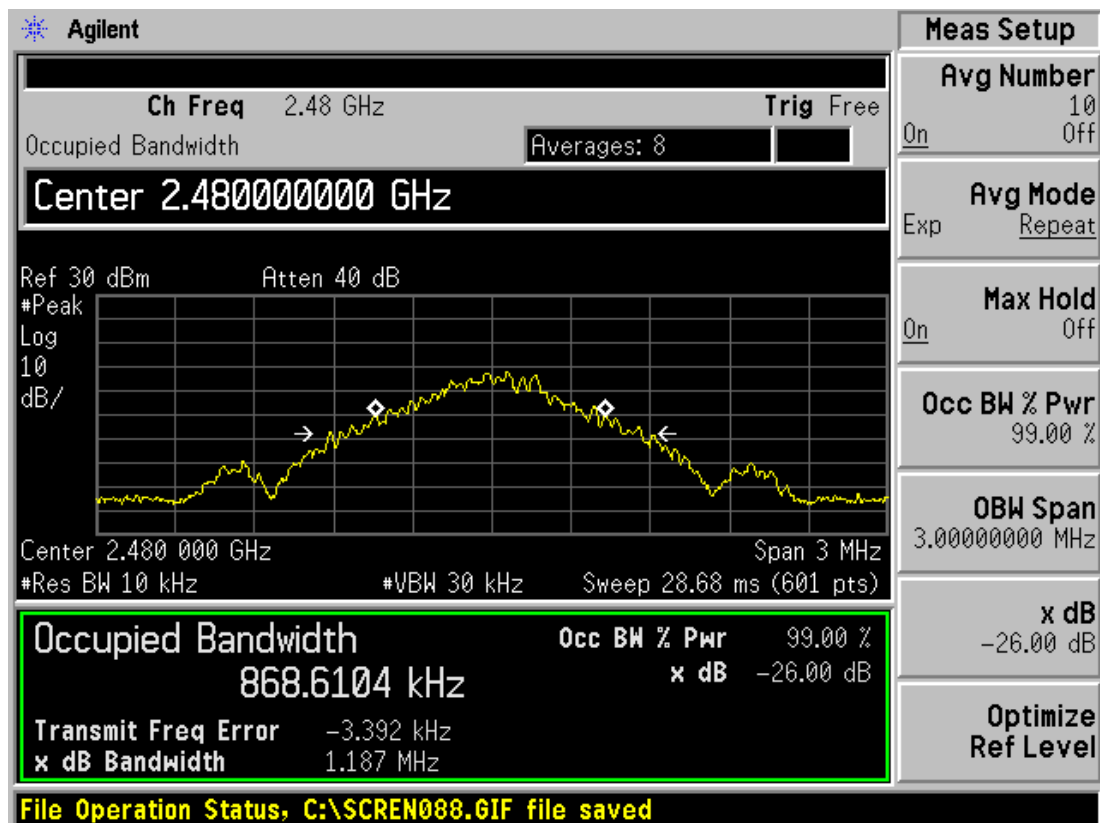
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Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

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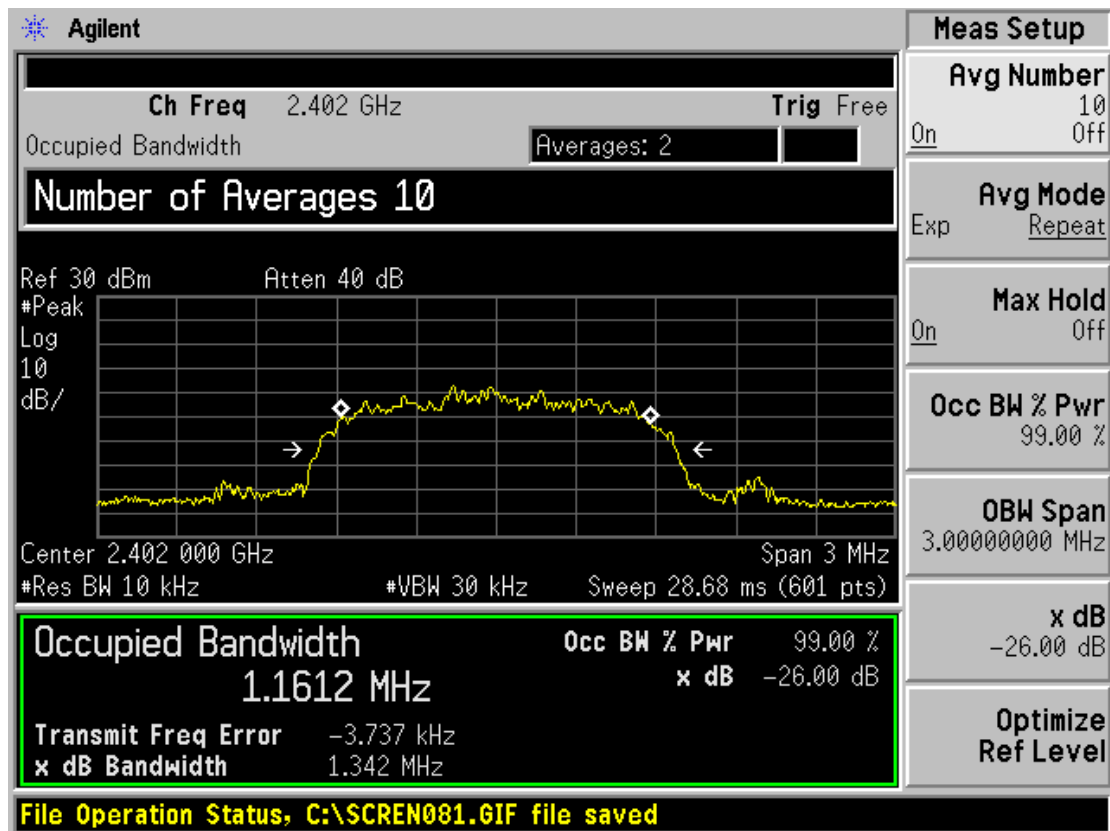
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2DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	1161.2
39	2441	1170.3
78	2480	1165.8



Carrier frequency (MHz): 2402

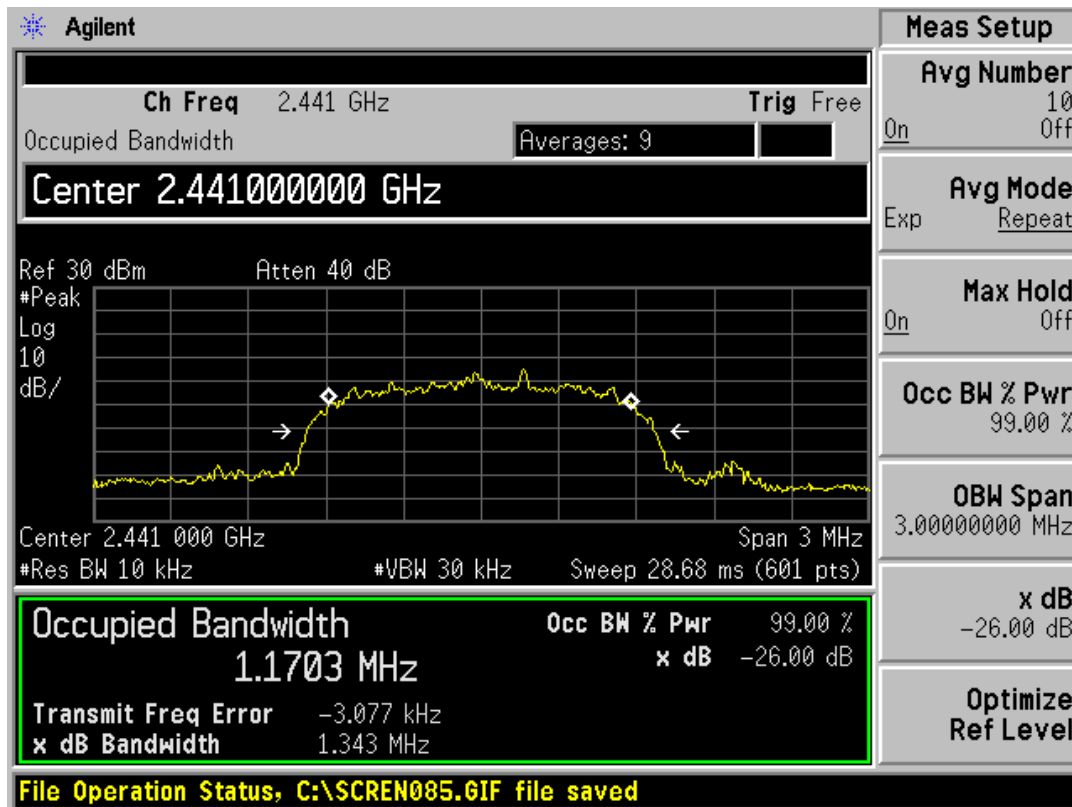
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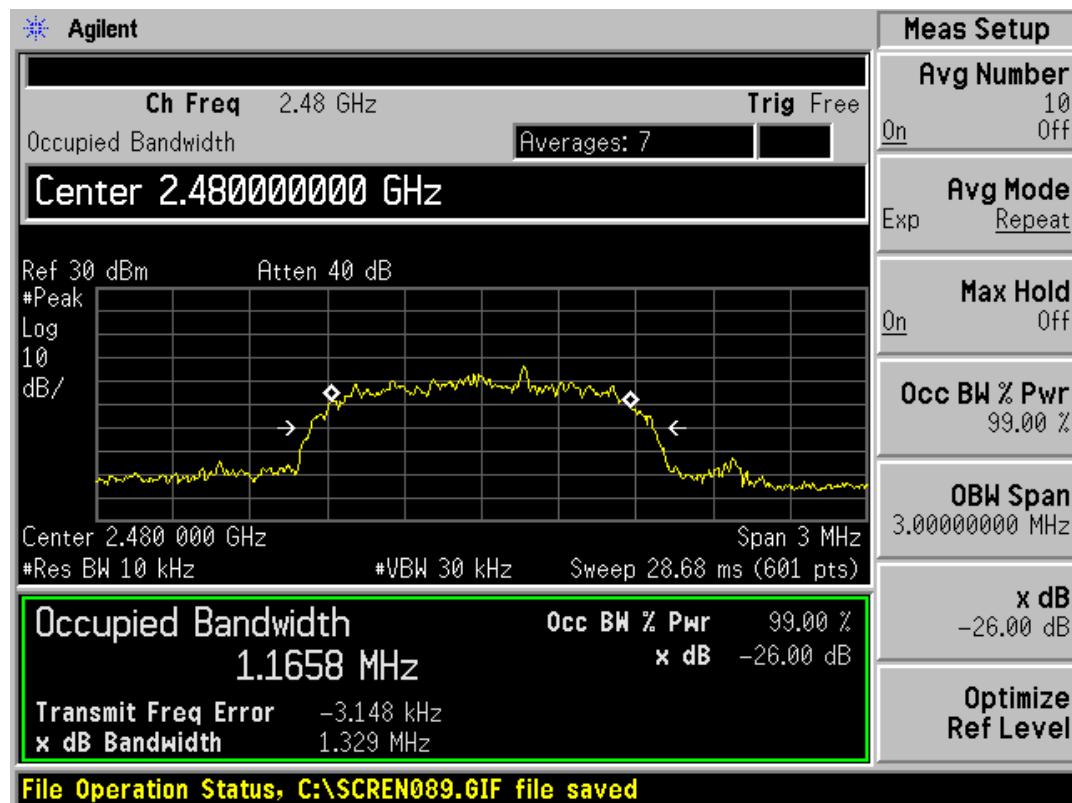
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Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

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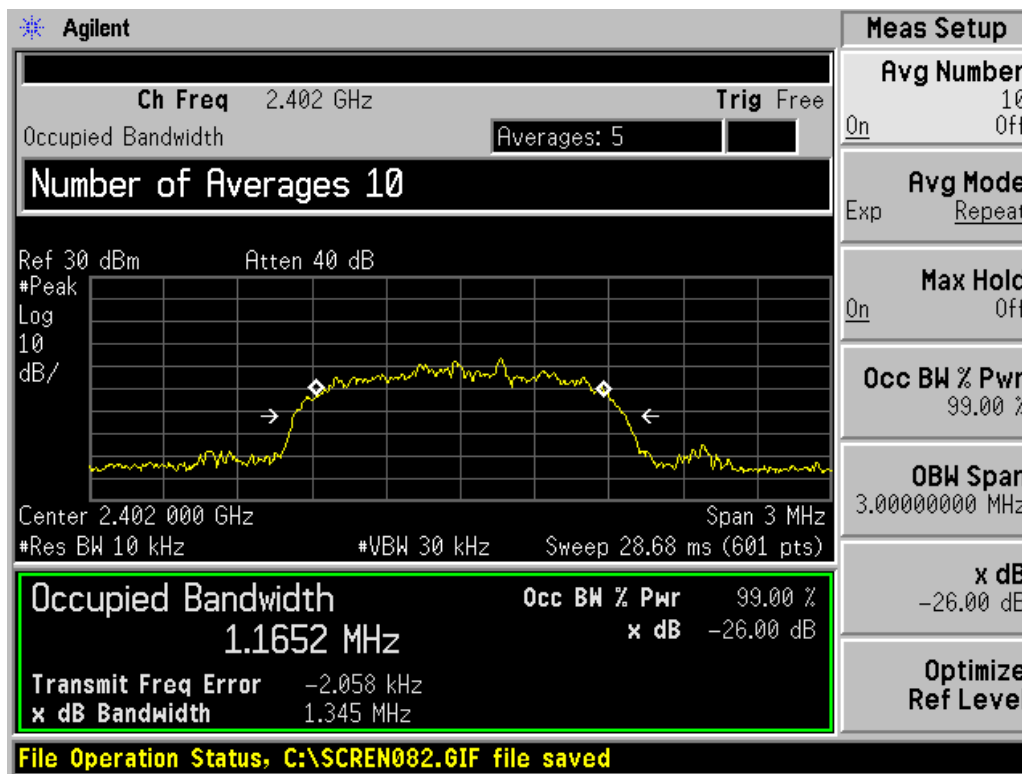
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3DH5

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
0	2402	1165.2
39	2441	1172.6
78	2480	1173.1



Carrier frequency (MHz): 2402

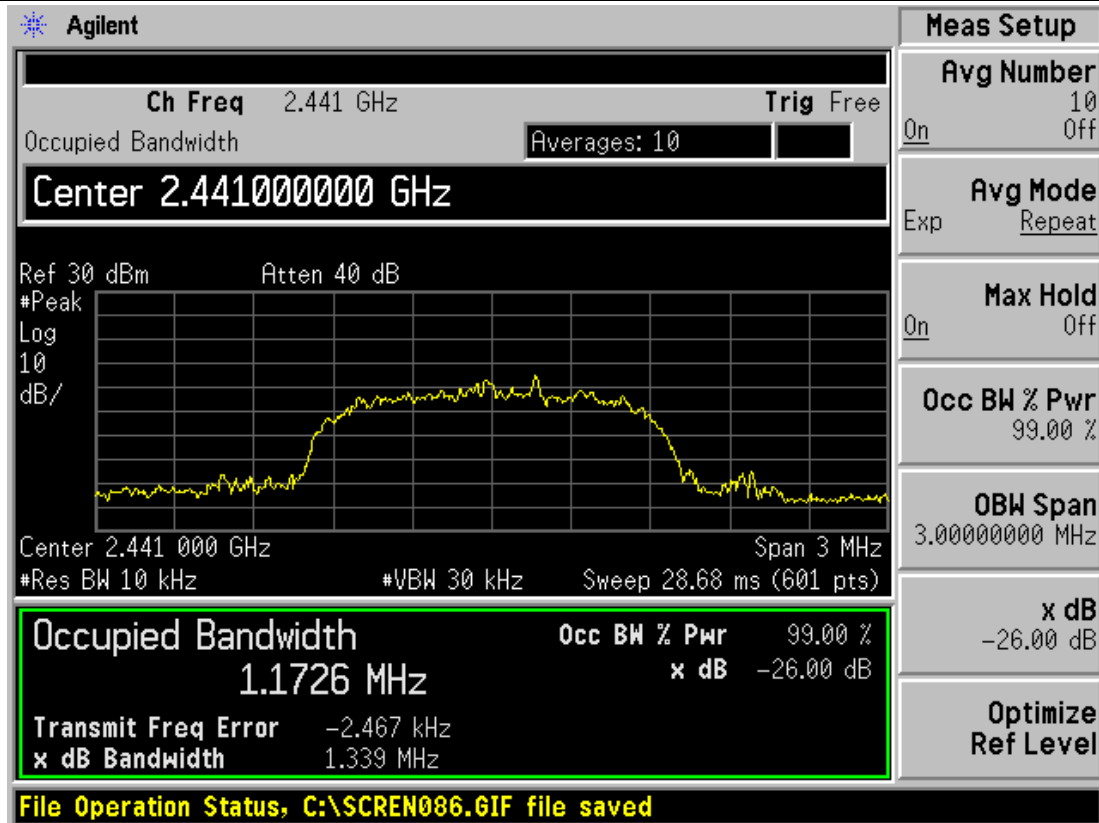
Channel No.:0

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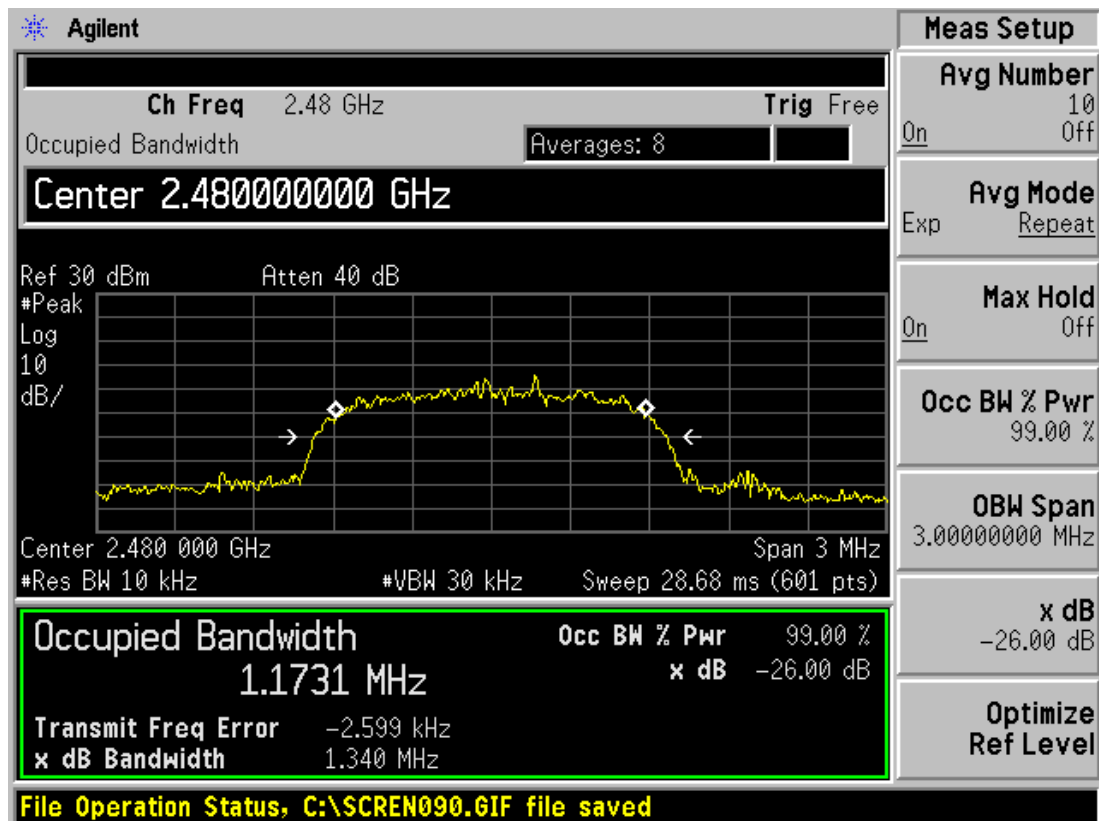
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Carrier frequency (MHz): 2441

Channel No.:39



Carrier frequency (MHz): 2480

Channel No.:78

2.4. Frequency Separation

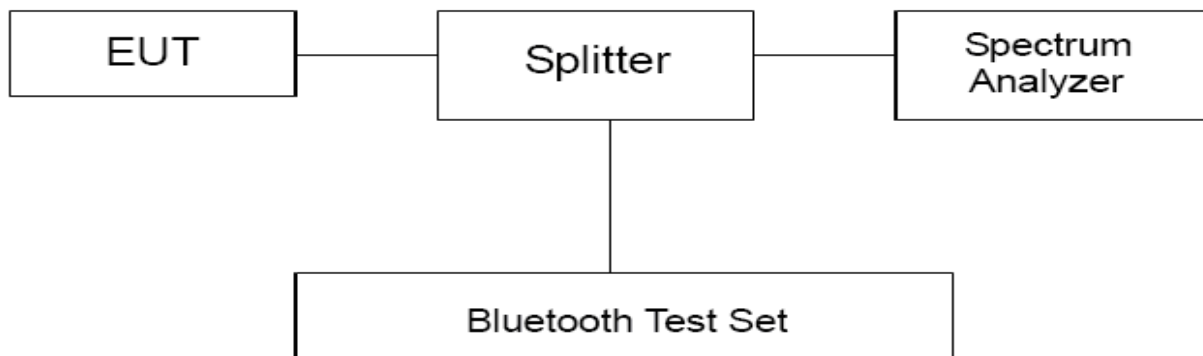
Ambient condition

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

Method of Measurement

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 300kHz 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.

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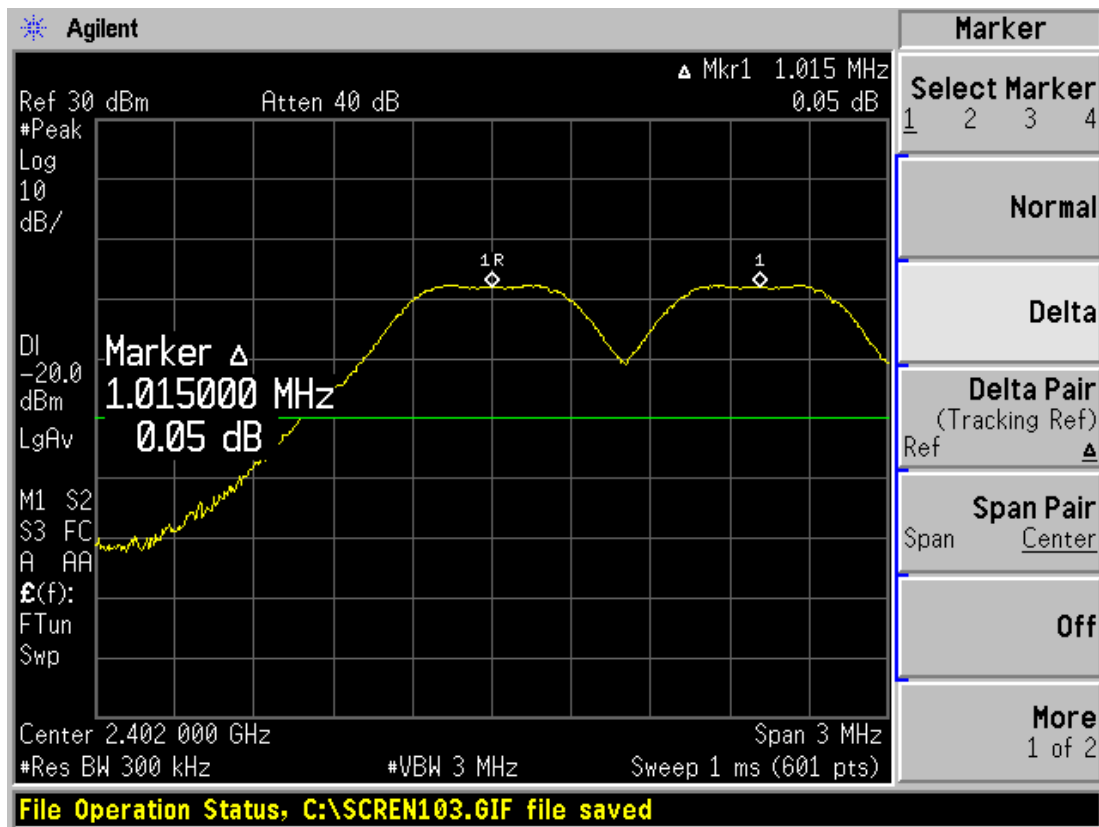
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Test Results:

DH5

Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	1015	866.7292	577.8195	PASS
2441	1010	872.2882	581.5255	PASS
2480	1015	868.6104	579.0736	PASS

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



Carrier frequency (MHz): 2402

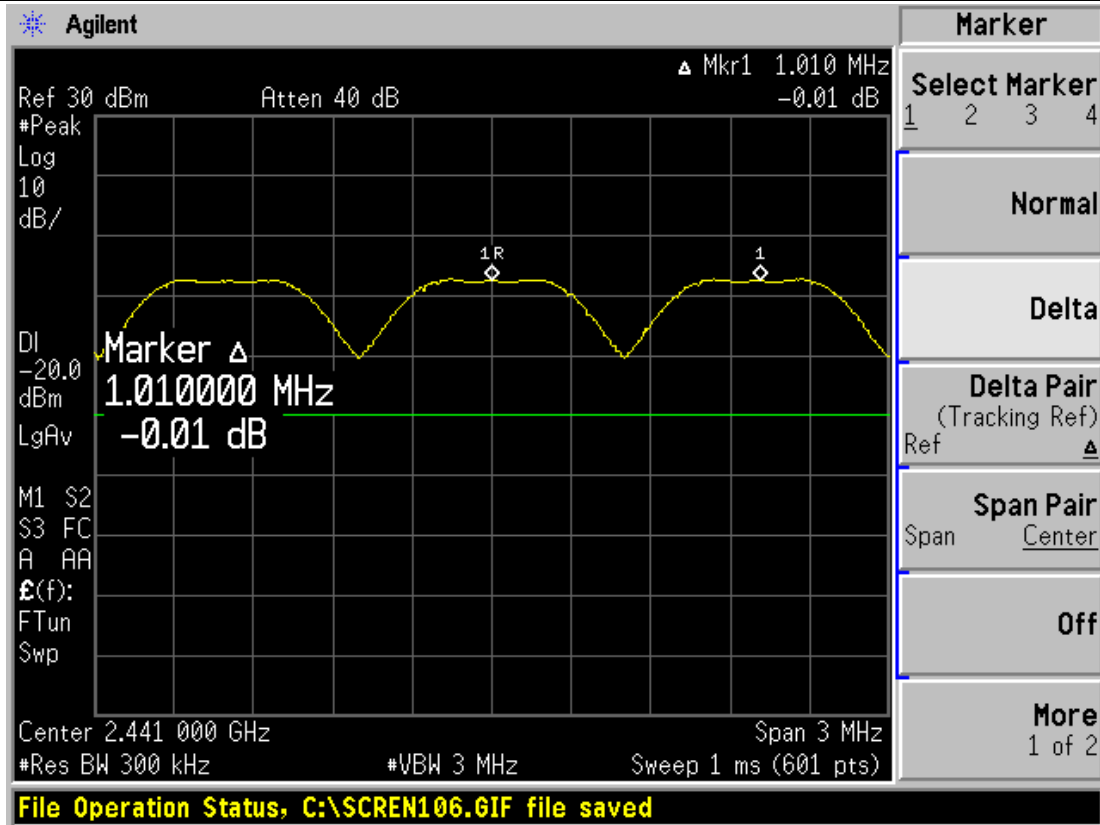
Channel No.:0

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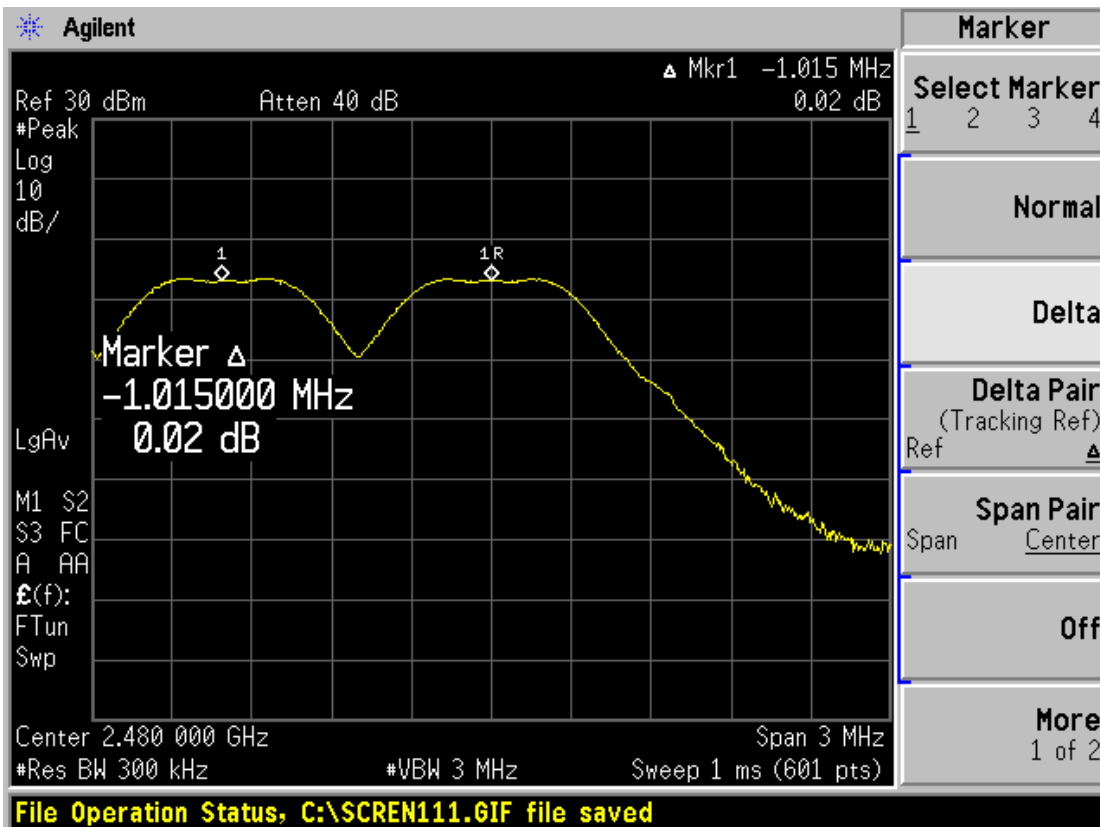
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Carrier frequency (MHz): 2441

Channel No.:39



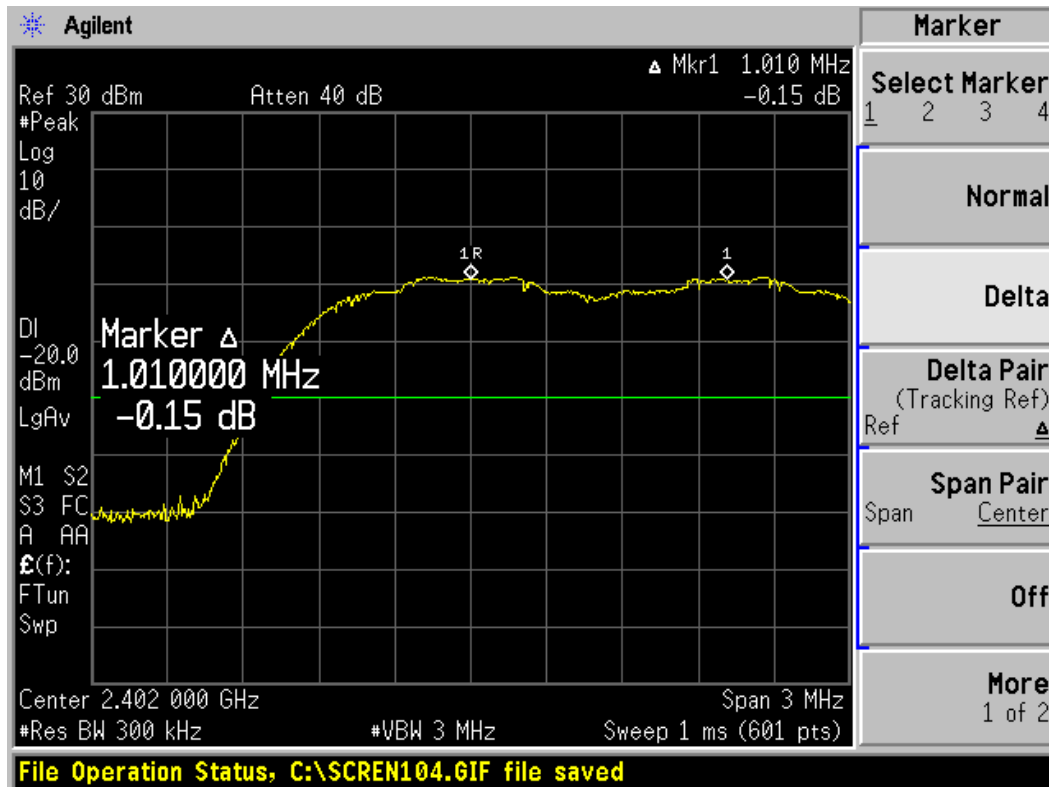
Carrier frequency (MHz): 2480

Channel No.:78

2DH5

Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	1010	1161.2	774.1333	PASS
2441	1015	1170.3	780.2	PASS
2480	1030	1165.8	777.2	PASS

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



Carrier frequency (MHz): 2402

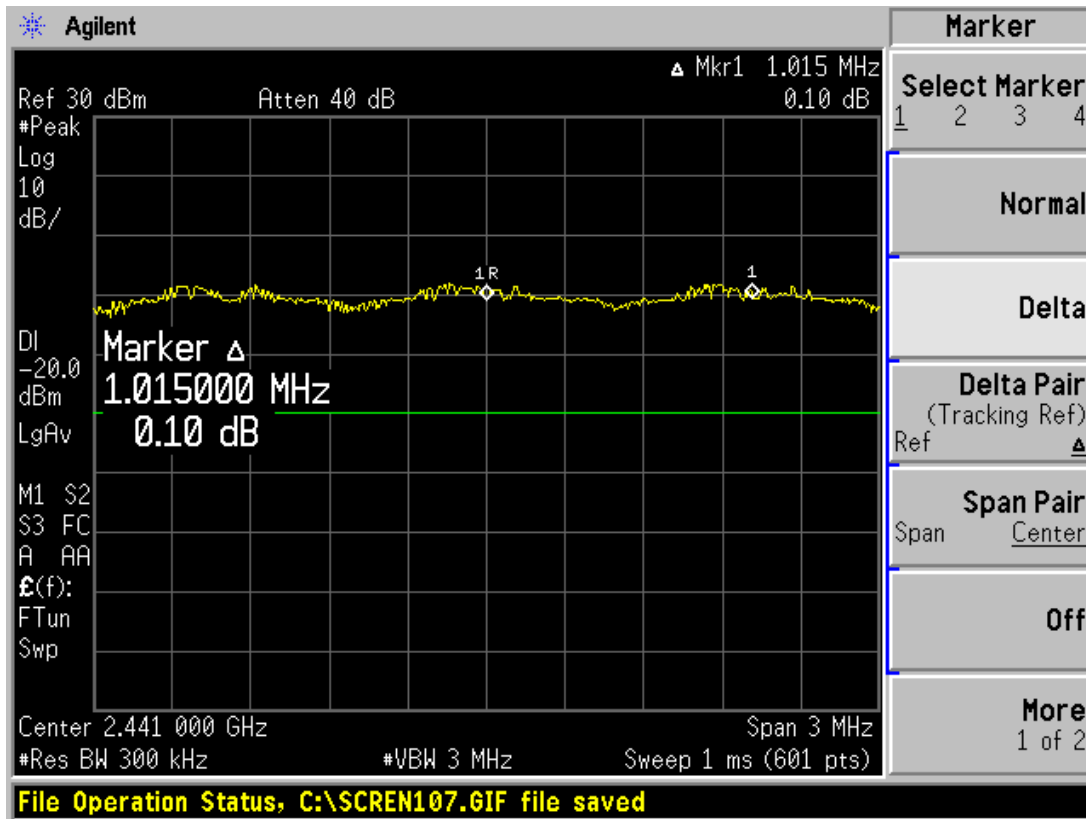
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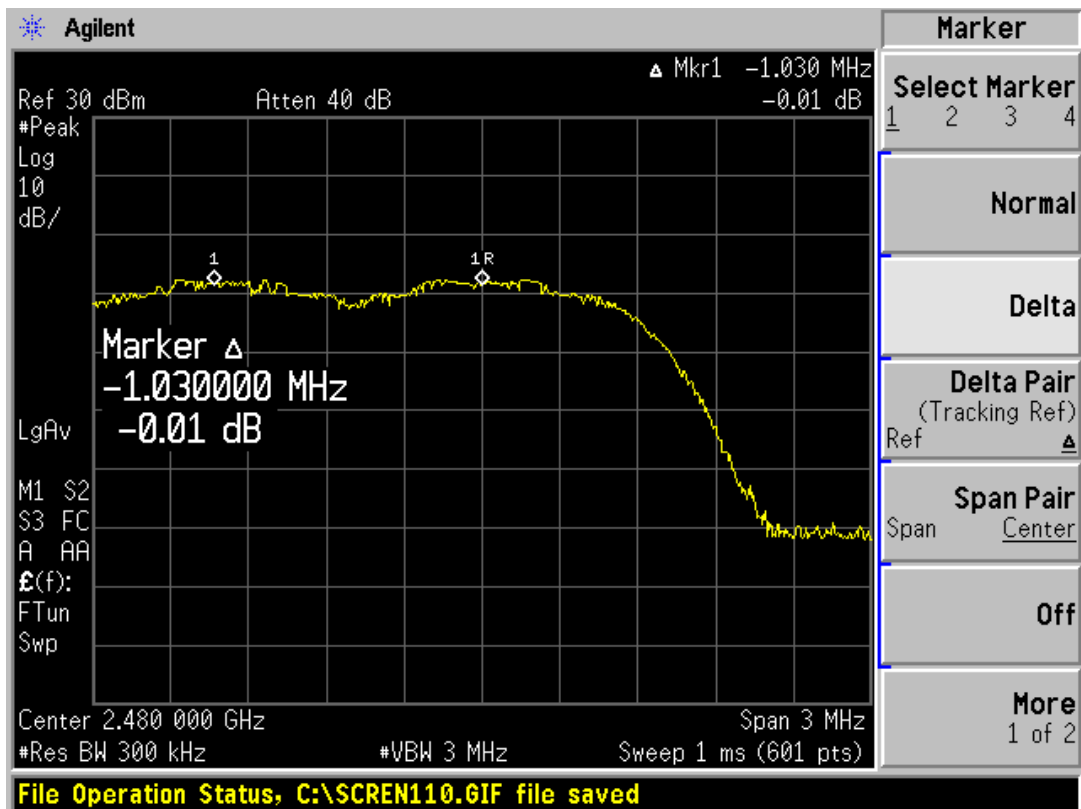
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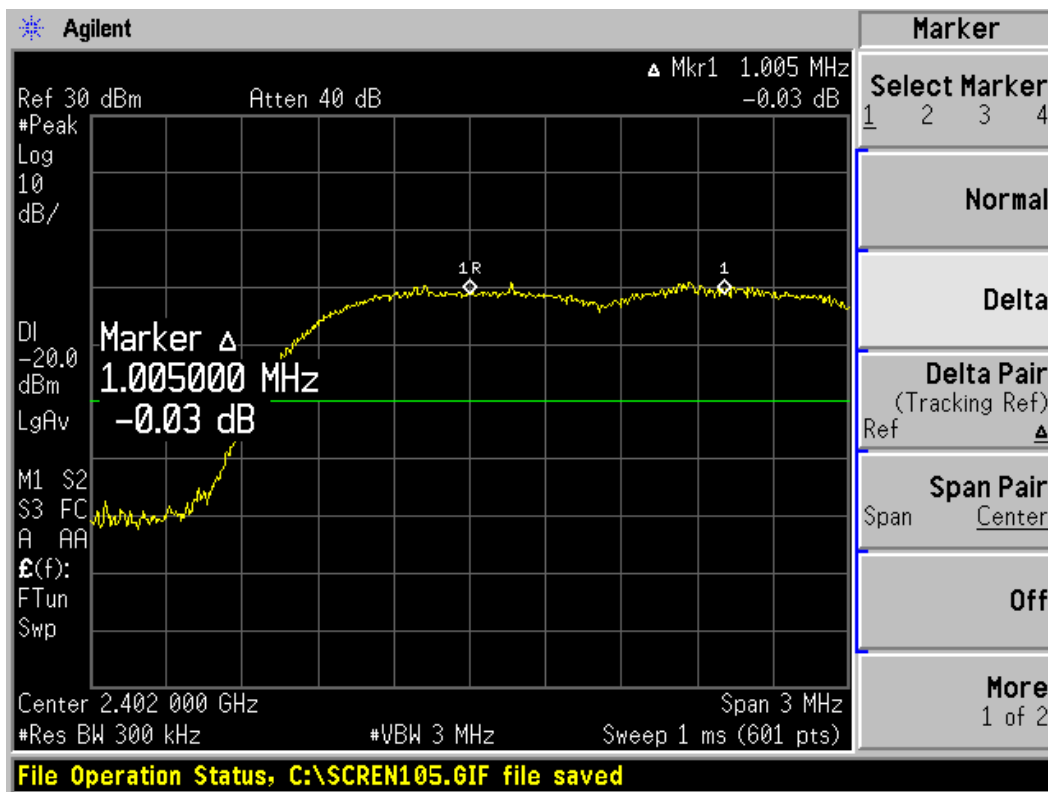
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3DH5

Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth (kHz)	Limit(kHz)	Conclusion
2402	1005	1165.2	776.8	PASS
2441	1020	1172.6	781.7333	PASS
2480	1020	1173.1	782.0667	PASS

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



Carrier frequency (MHz): 2402

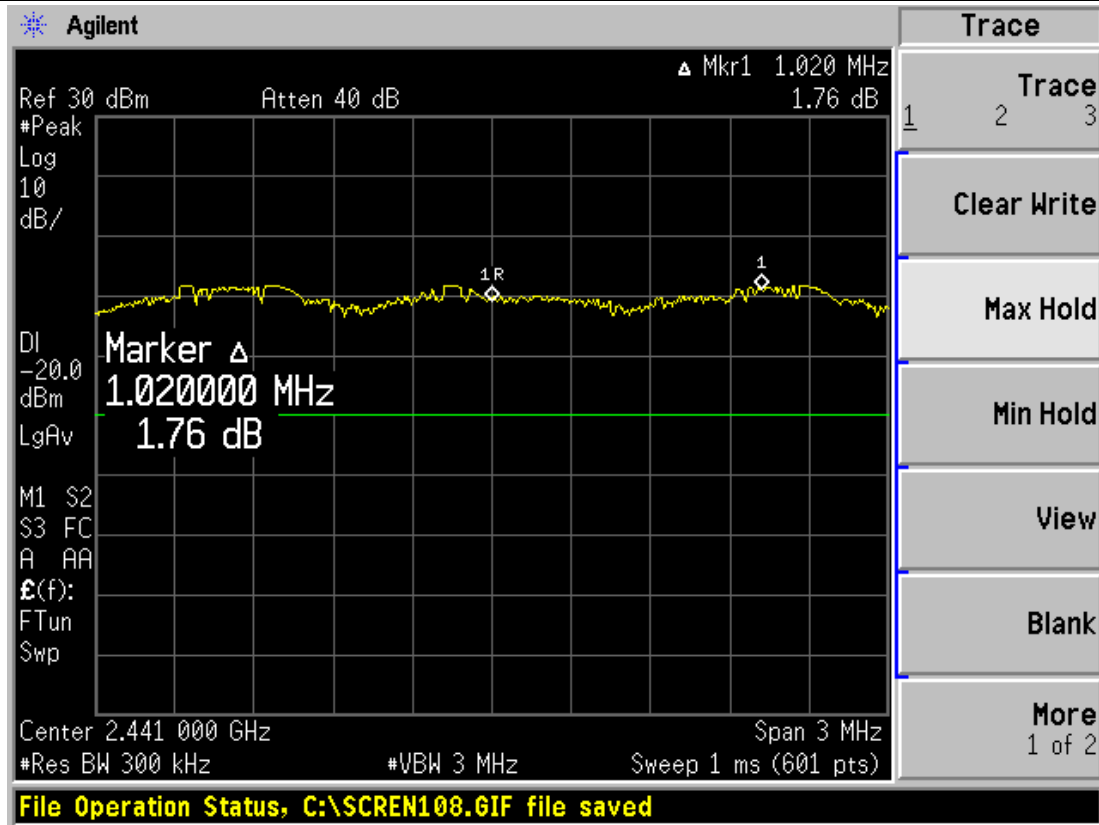
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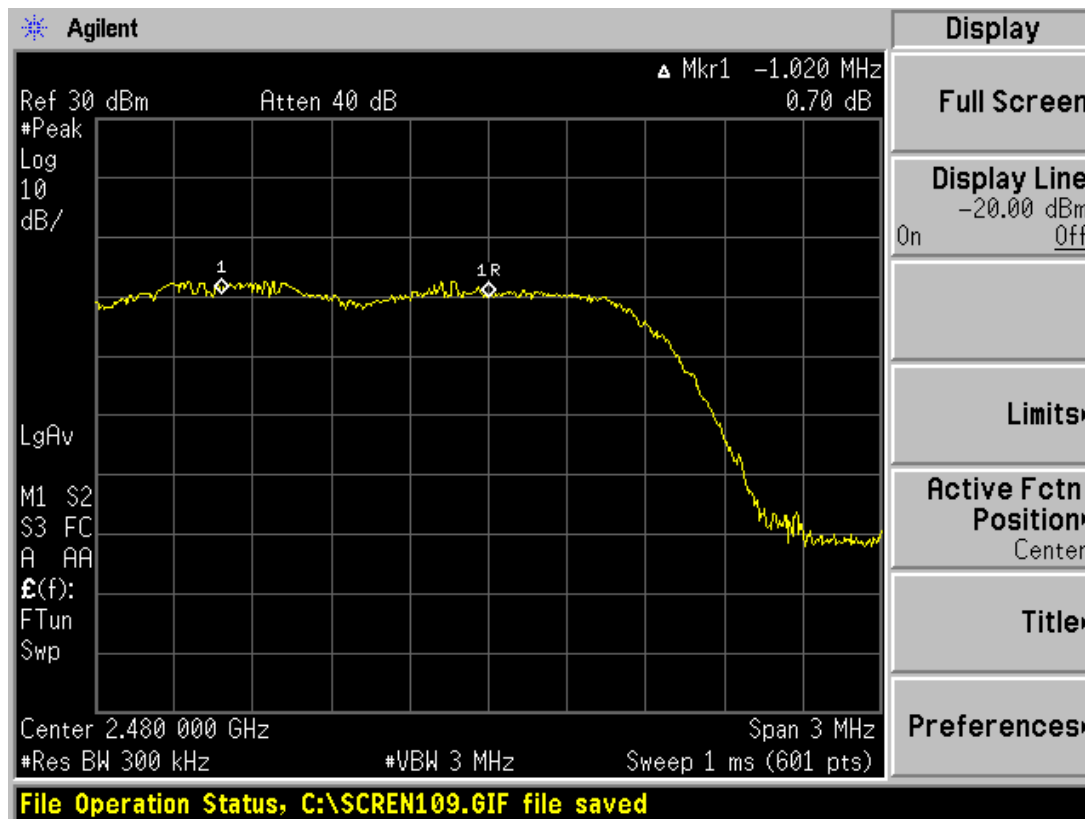
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2.5. Time of Occupancy (Dwell Time)

Ambient condition

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

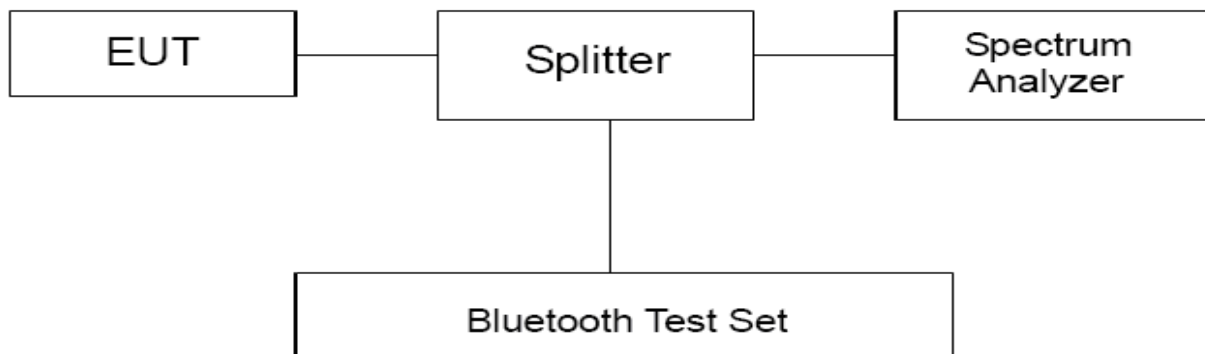
Methods of Measurement

The Equipment Under Test (EUT) was set up in a shielded room to perform the dwell time measurements. 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
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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	$U = 0.64\text{ms}$
	DH3	$U = 0.80\text{ms}$
	DH5	$U = 0.70\text{ms}$

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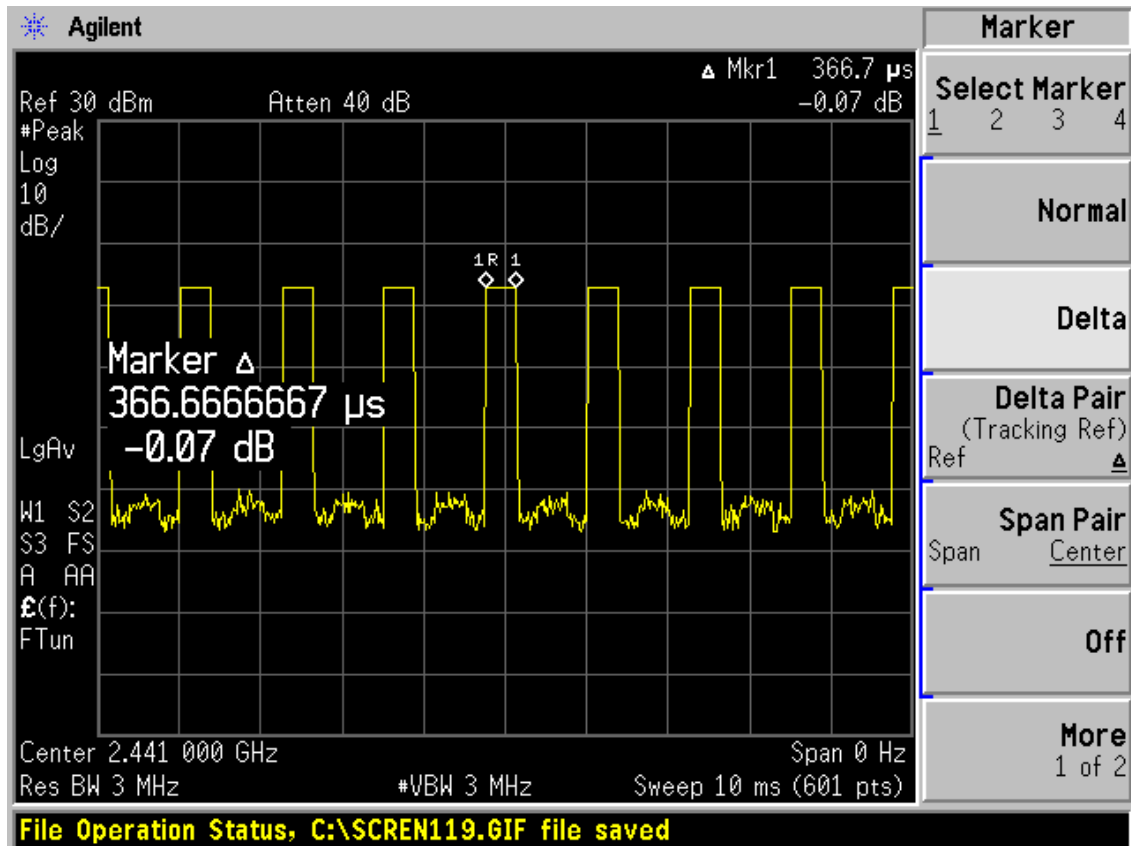
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Test Results:

CH 39

Packet type	hop rate (1/s)	Time slot length(ms)	Dwell time (ms)	Limit (ms)	Conclusion
DH1	1600	0.3667	234.688	400	PASS
DH3	533.33	1.633	348.3712	400	PASS
DH5	320	2.883	369.024	400	PASS
2DH1	1600	0.3667	234.688	400	PASS
2DH3	533.33	1.633	348.3712	400	PASS
2DH5	320	2.867	366.976	400	PASS
3DH1	1600	0.3667	234.688	400	PASS
3DH3	533.33	1.633	348.3712	400	PASS
3DH5	320	2.867	366.976	400	PASS

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



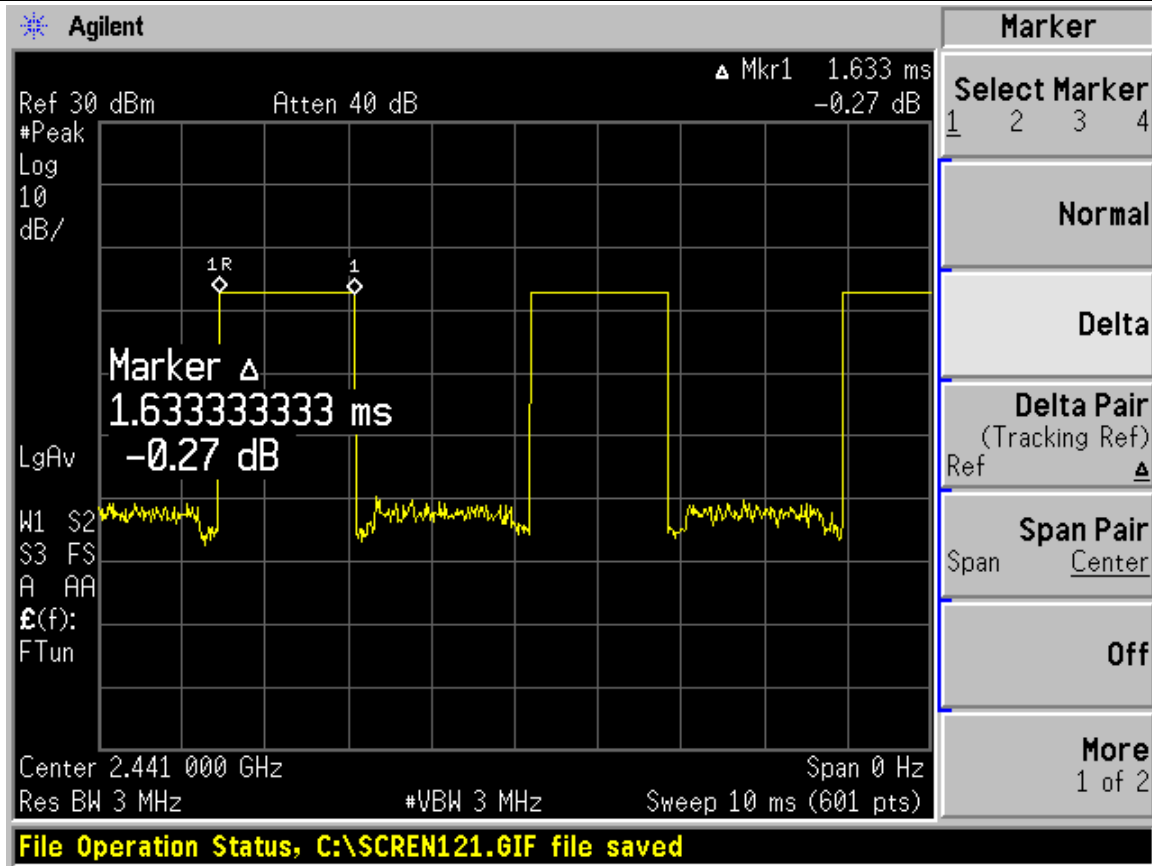
Carrier frequency (MHz): 2441,DH1

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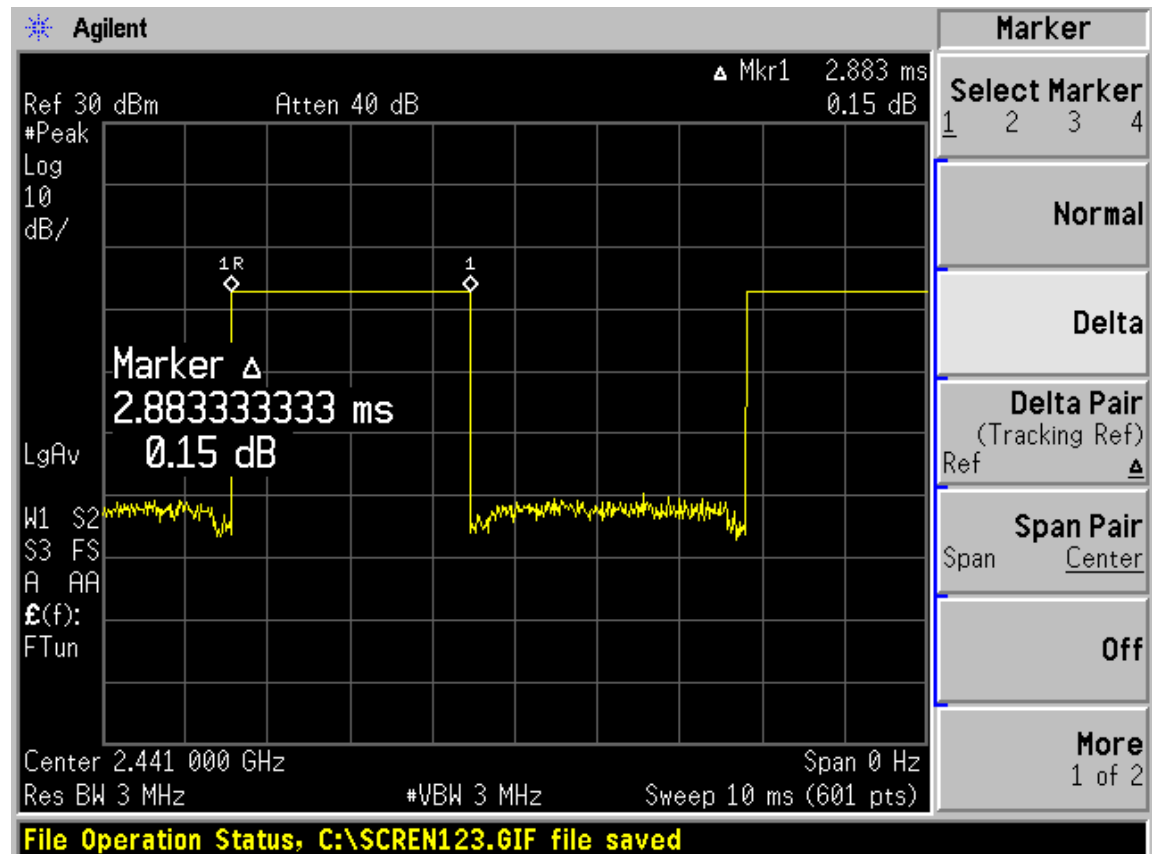
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Carrier frequency (MHz): 2441,DH3



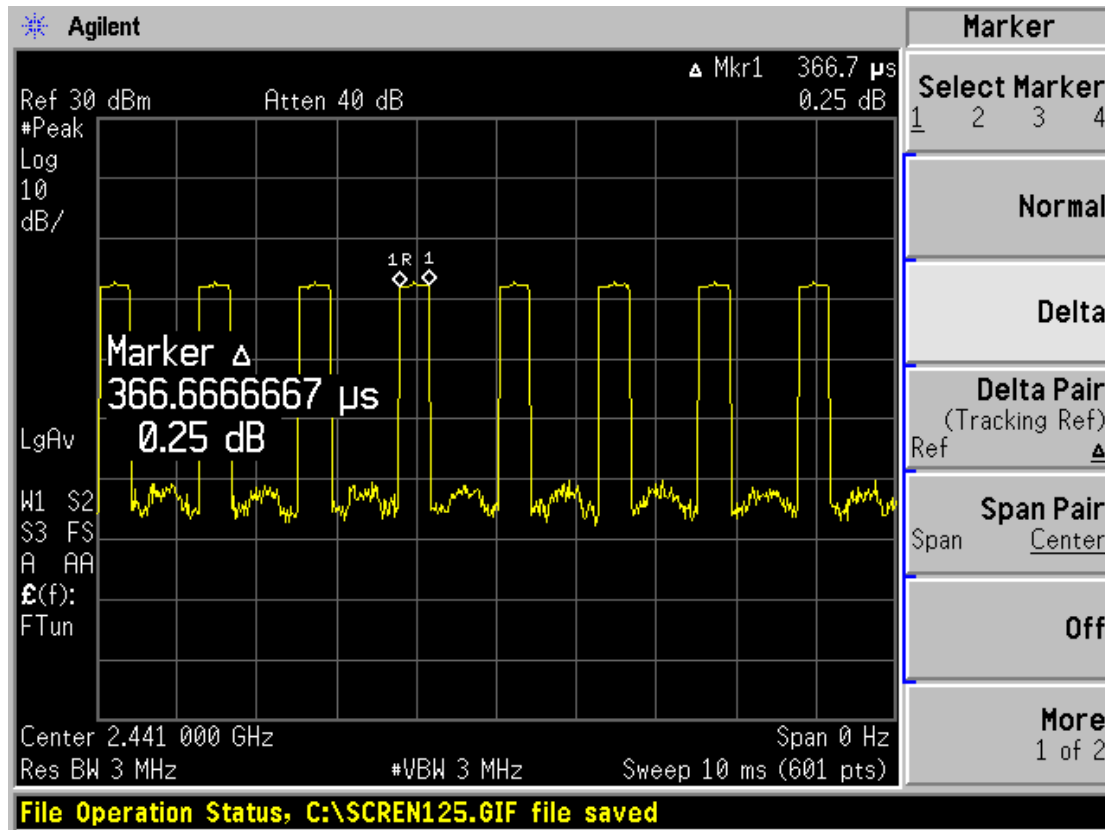
Carrier frequency (MHz): 2441,DH5

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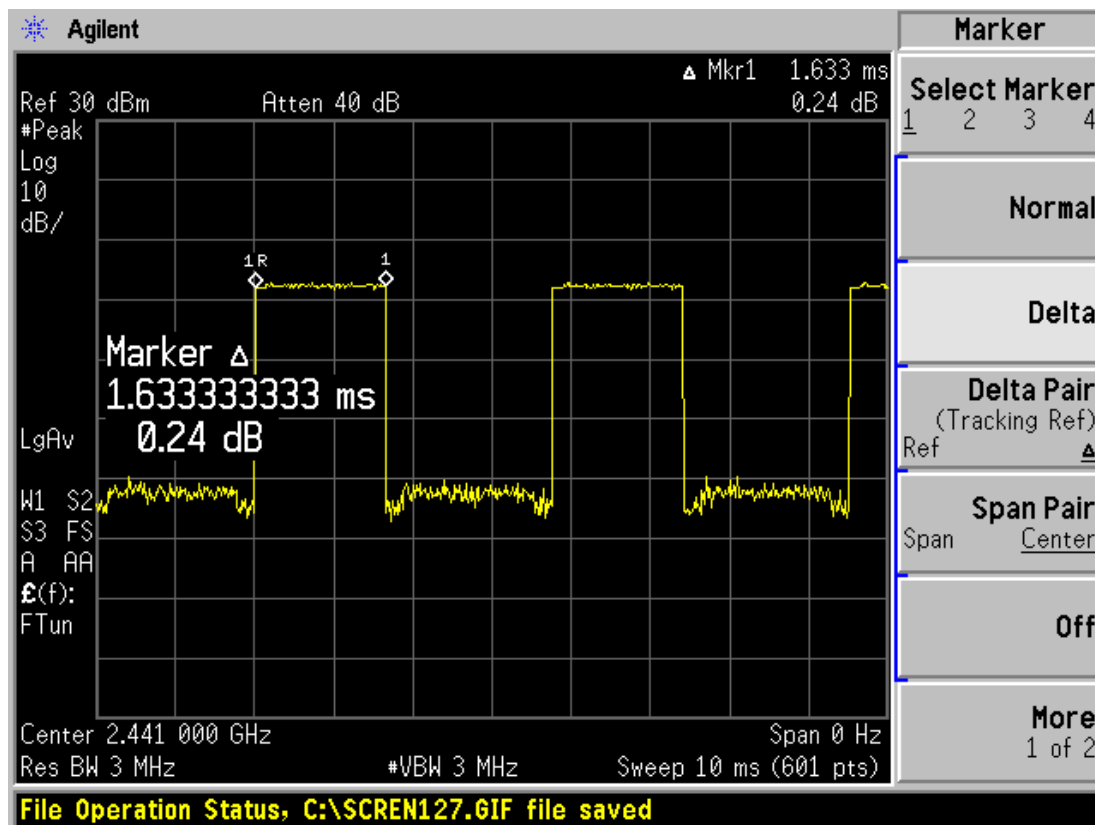
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Carrier frequency (MHz): 2441,2DH1



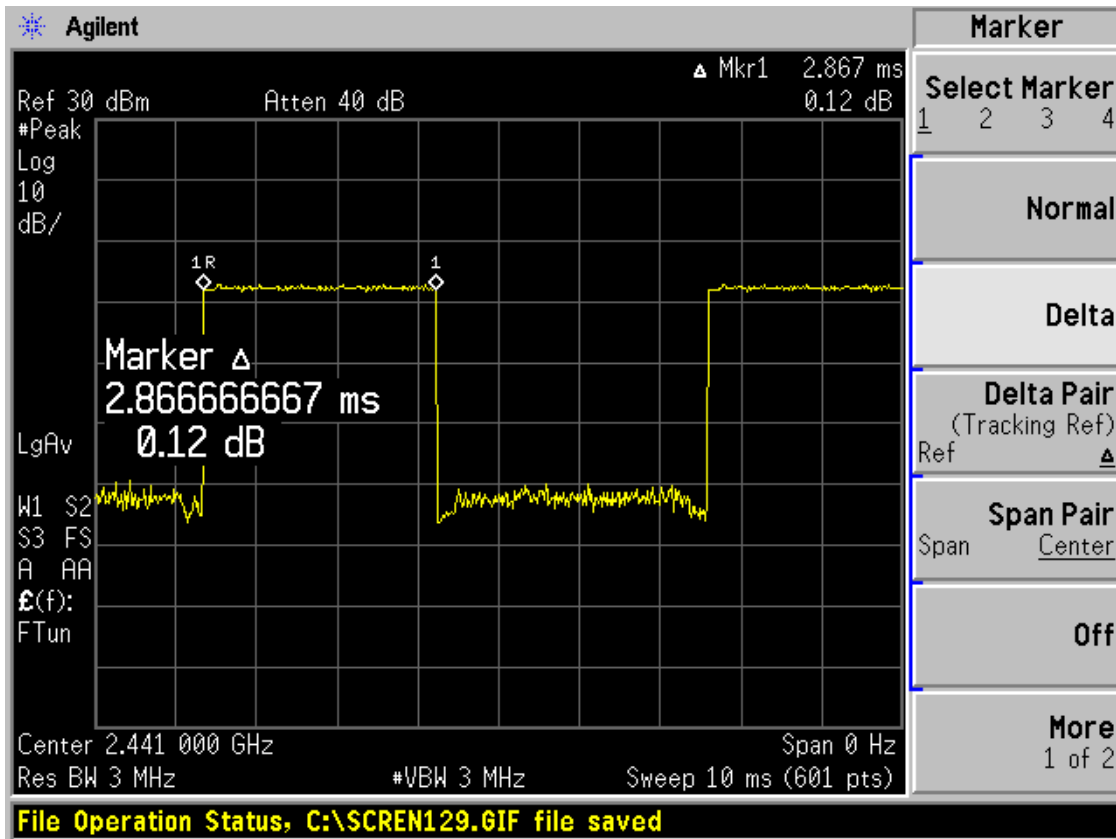
Carrier frequency (MHz): 2441,2DH3

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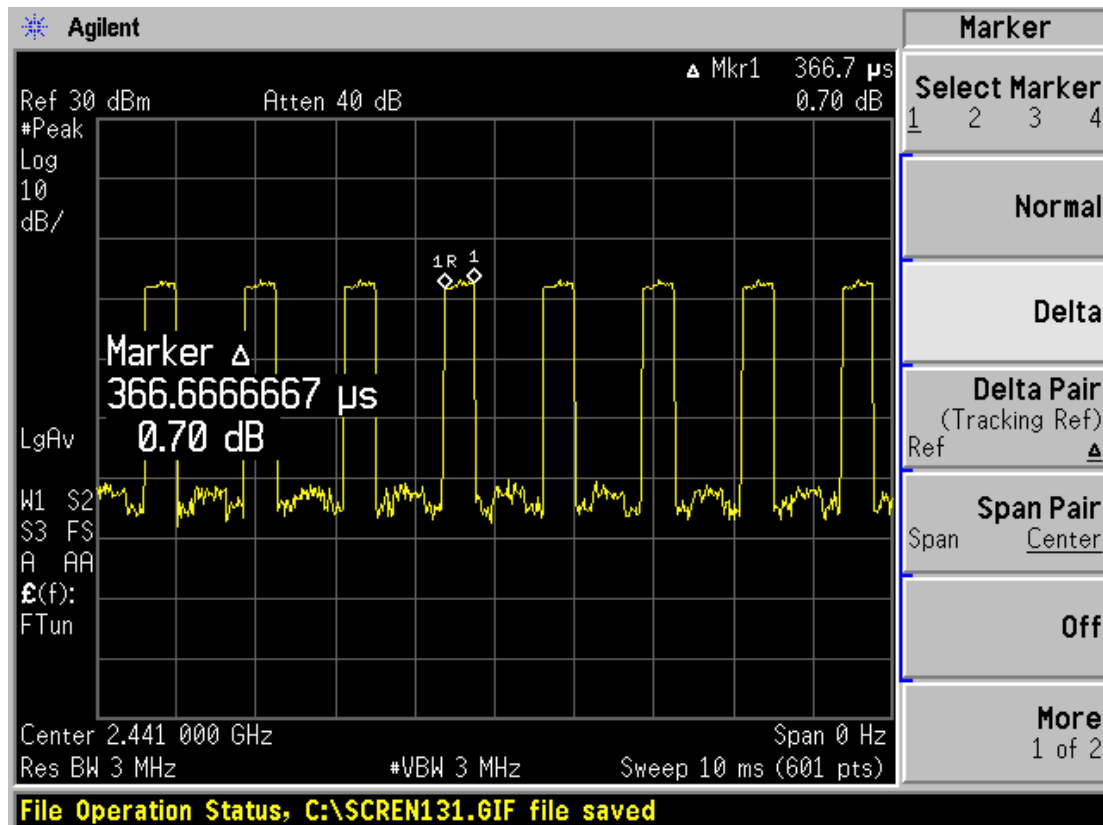
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Carrier frequency (MHz): 2441,2DH5



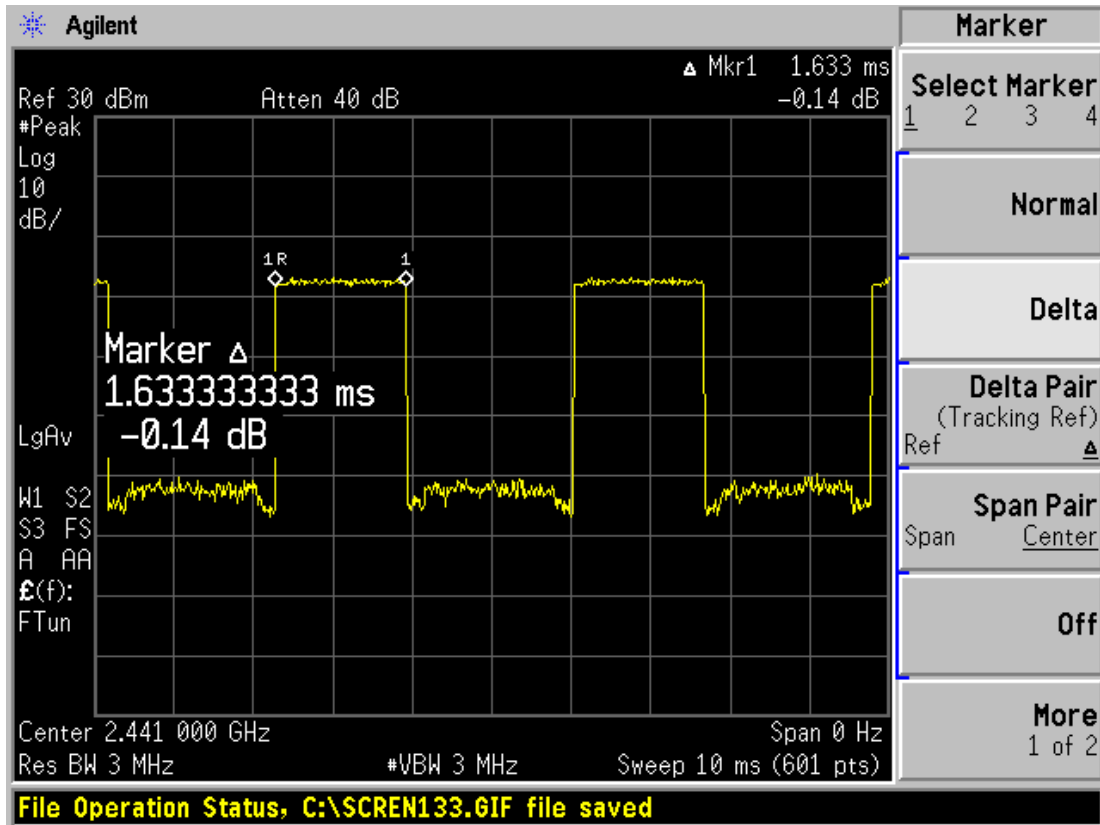
Carrier frequency (MHz): 2441,3DH1

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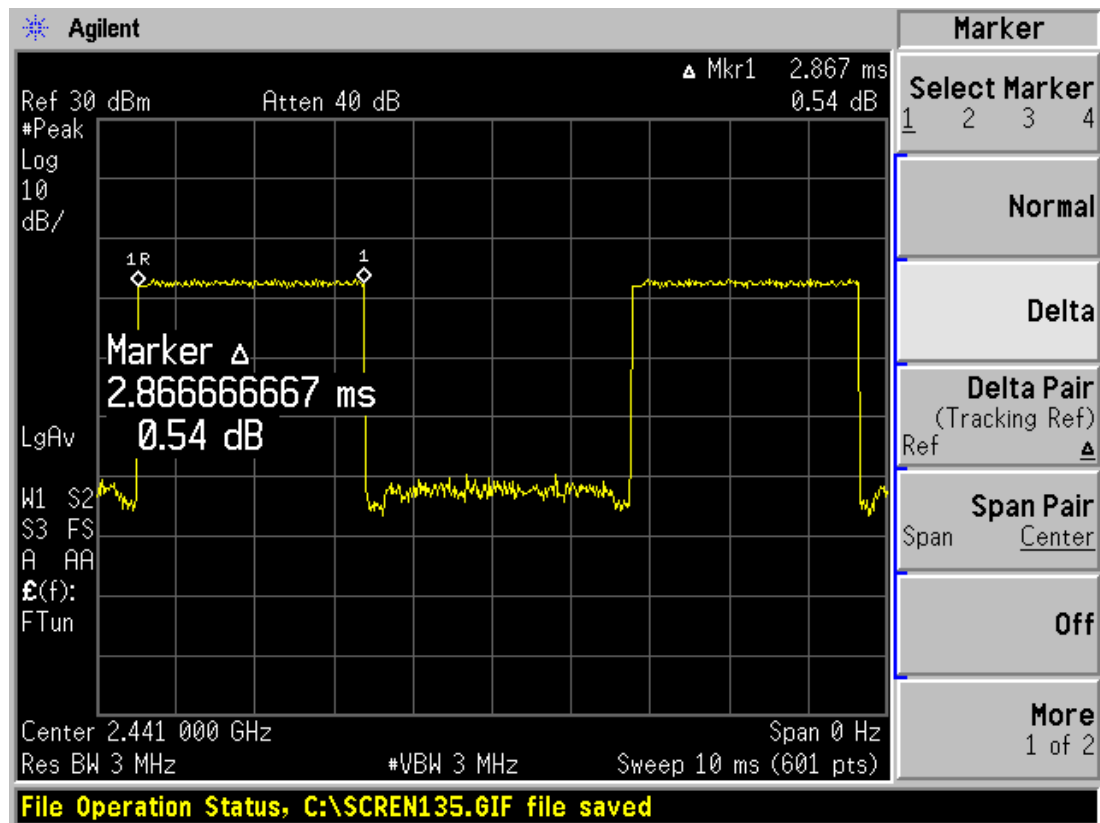
Registration Num:428261

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Carrier frequency (MHz): 2441,3DH3



Carrier frequency (MHz): 2441,3DH5

2.6. Band Edge Compliance

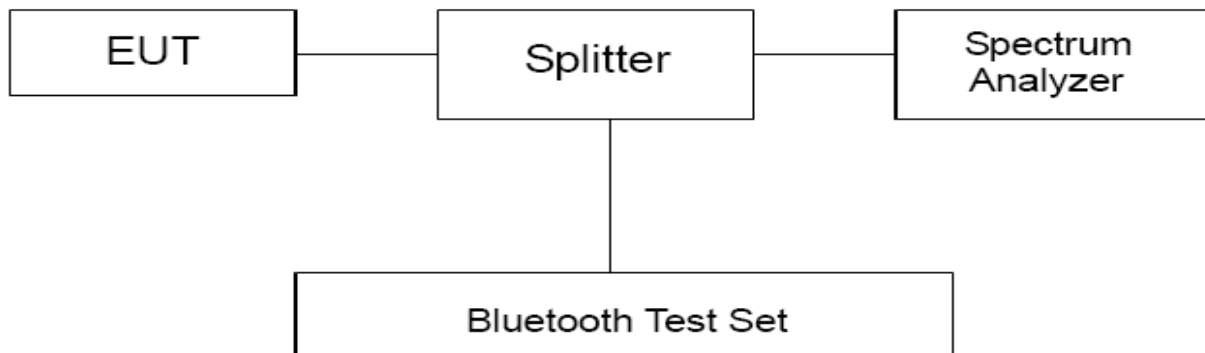
Ambient condition

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

Method of Measurement

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The band edge of the lowest and highest channels were measured. The peak detector is used. RBW is set to 1MHz and VBW is set to 3MHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages. 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.”

Limit	≥ 20 dB
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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

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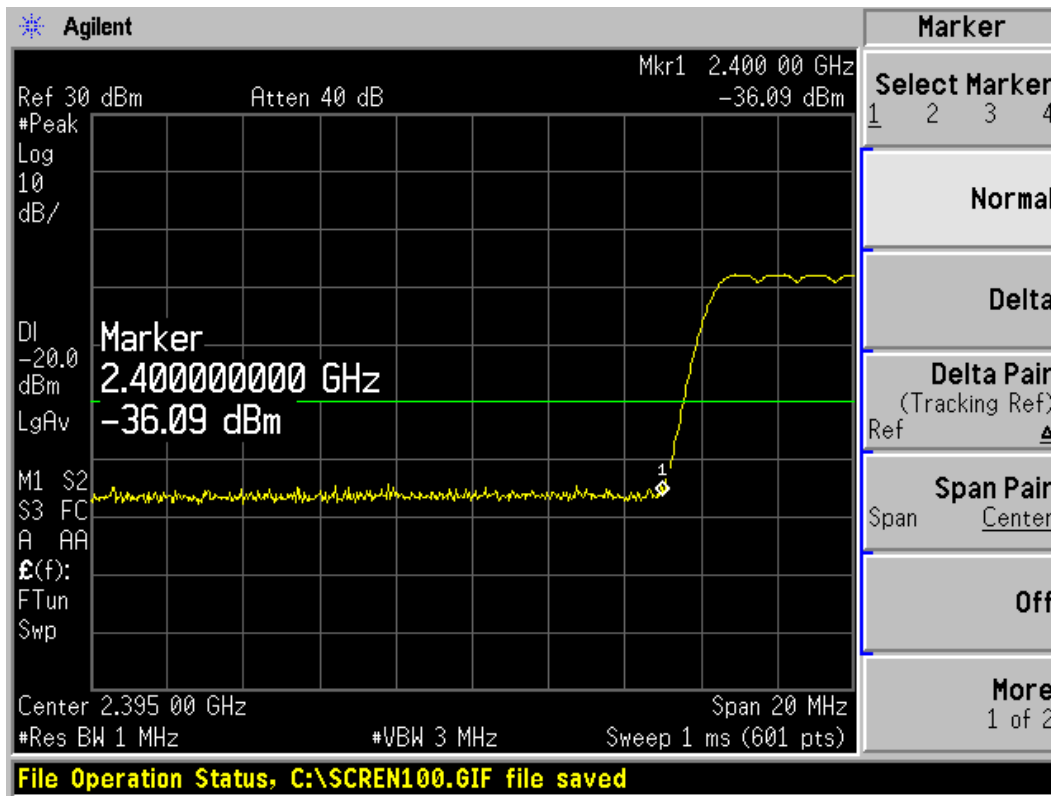
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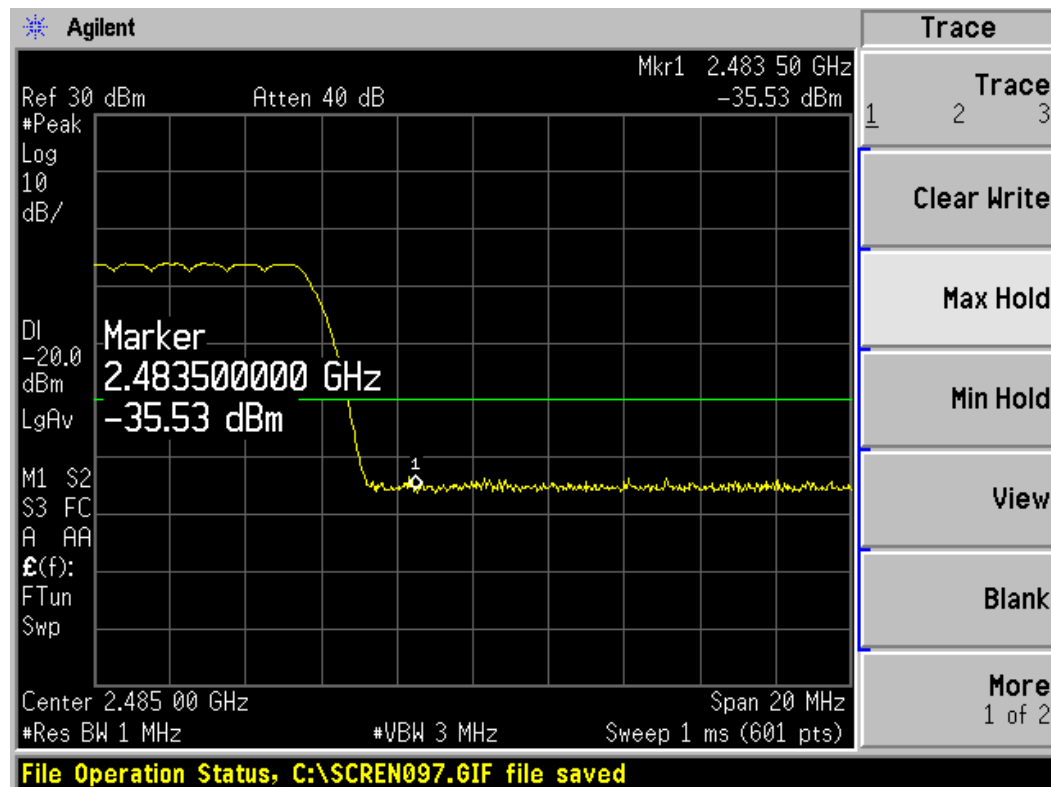
Test Results: PASS

Hopping On-DH5-



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

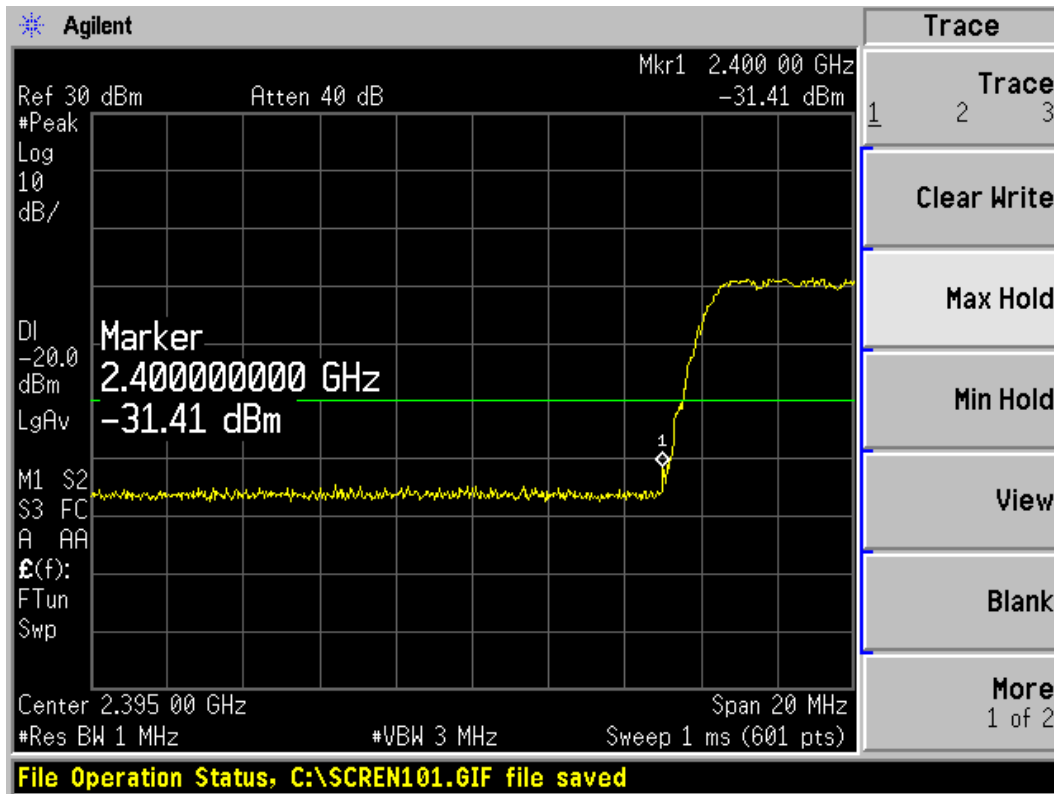
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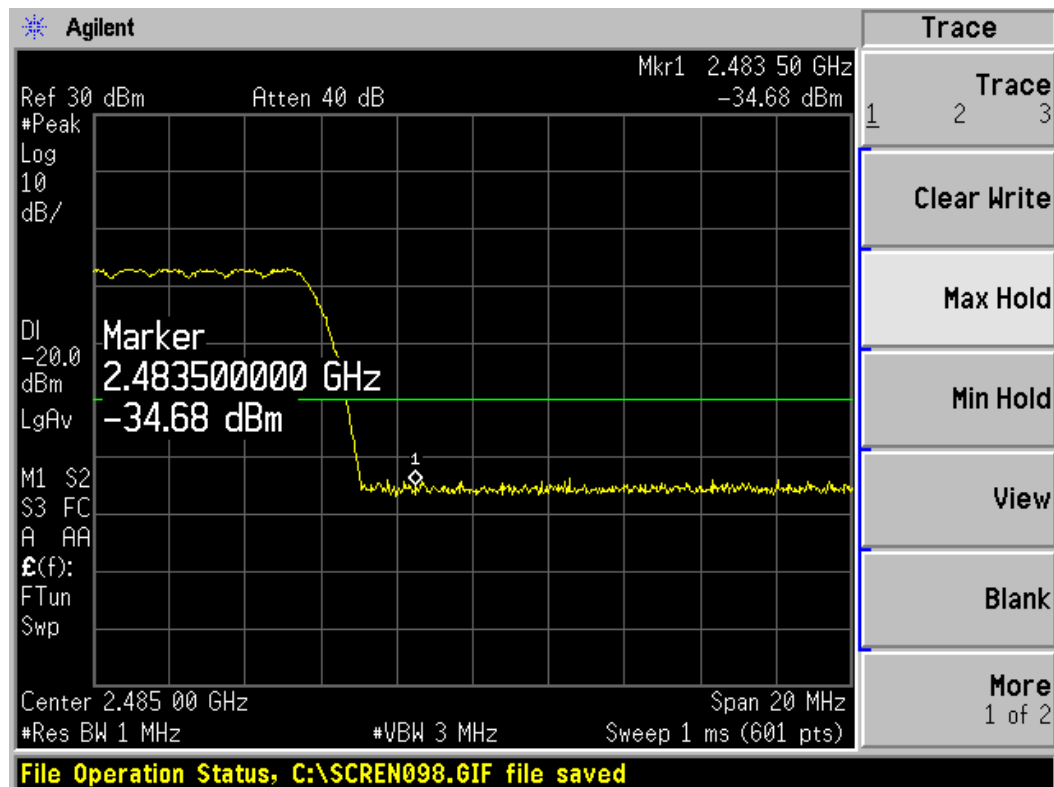
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Hopping On-2DH5-



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

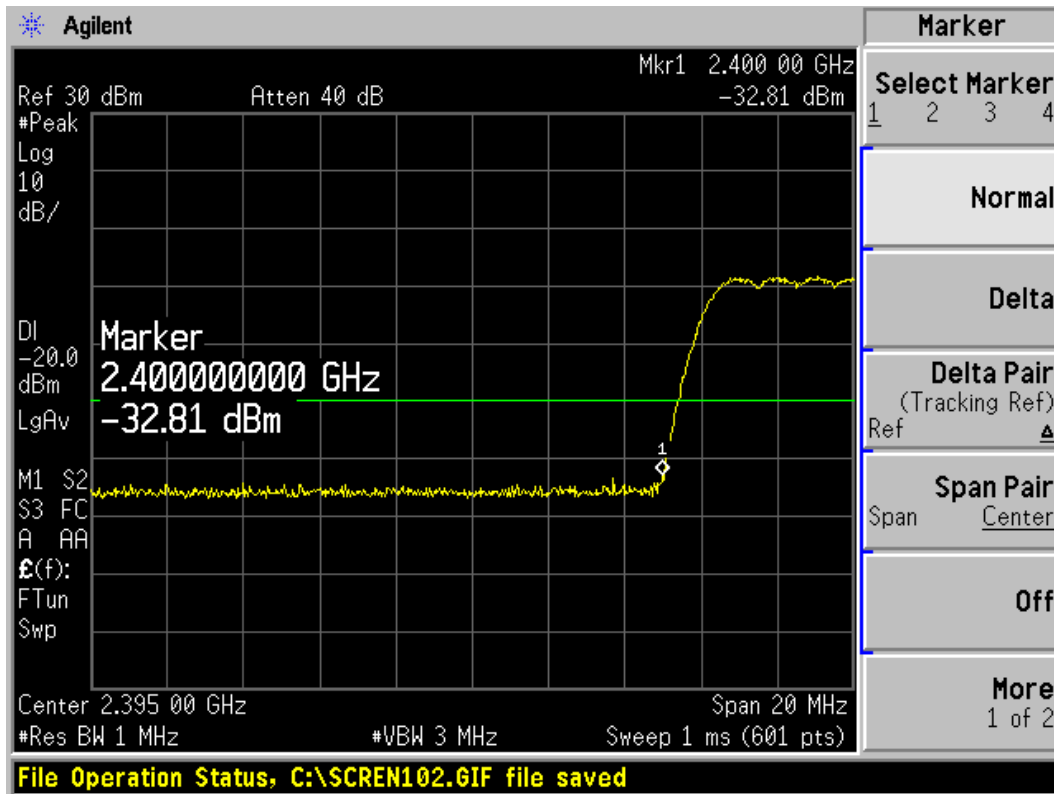
TA Technology (Shanghai) Co., Ltd. Test Report

Registration Num:428261

Report No.: RZA1109-1686RF01R1

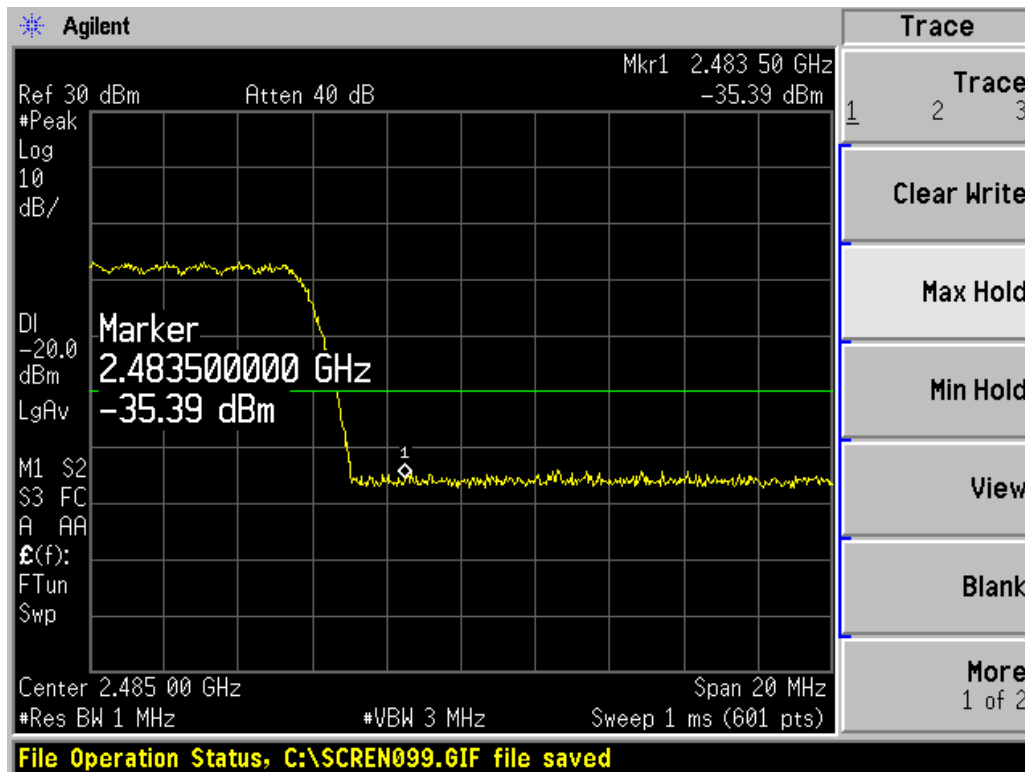
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Hopping On-3DH5



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

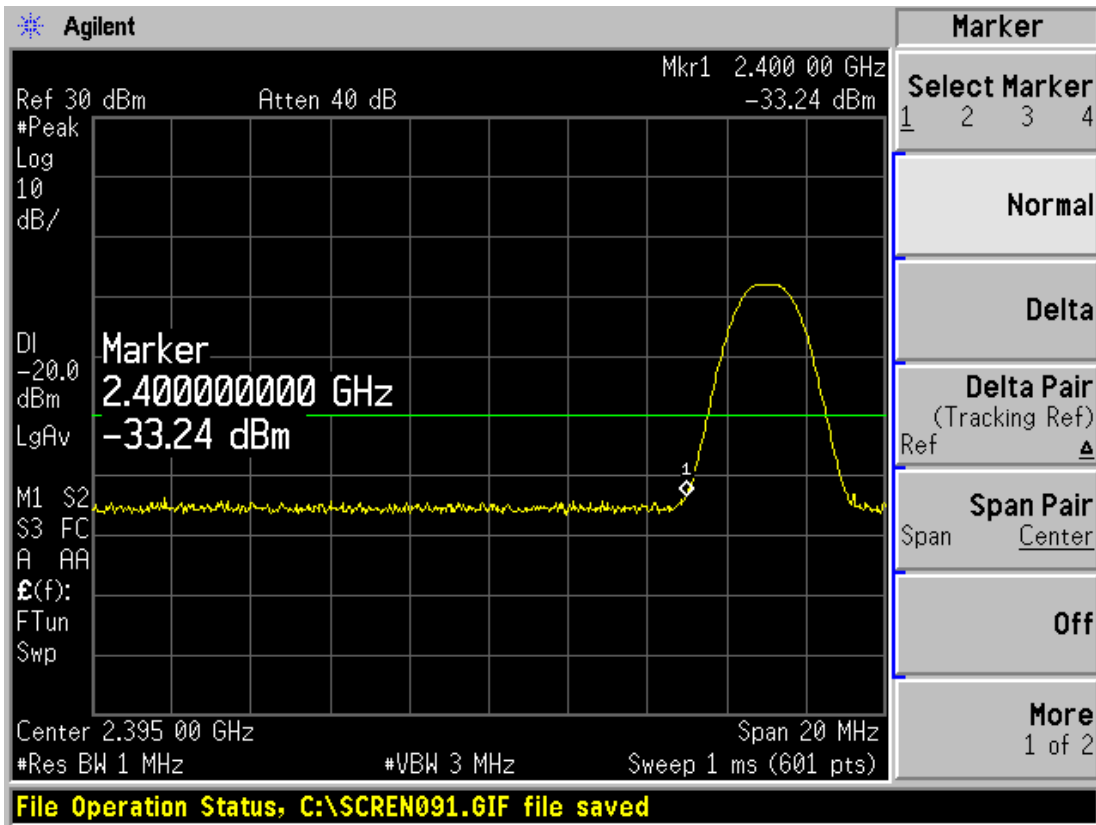
TA Technology (Shanghai) Co., Ltd. Test Report

Registration Num:428261

Report No.: RZA1109-1686RF01R1

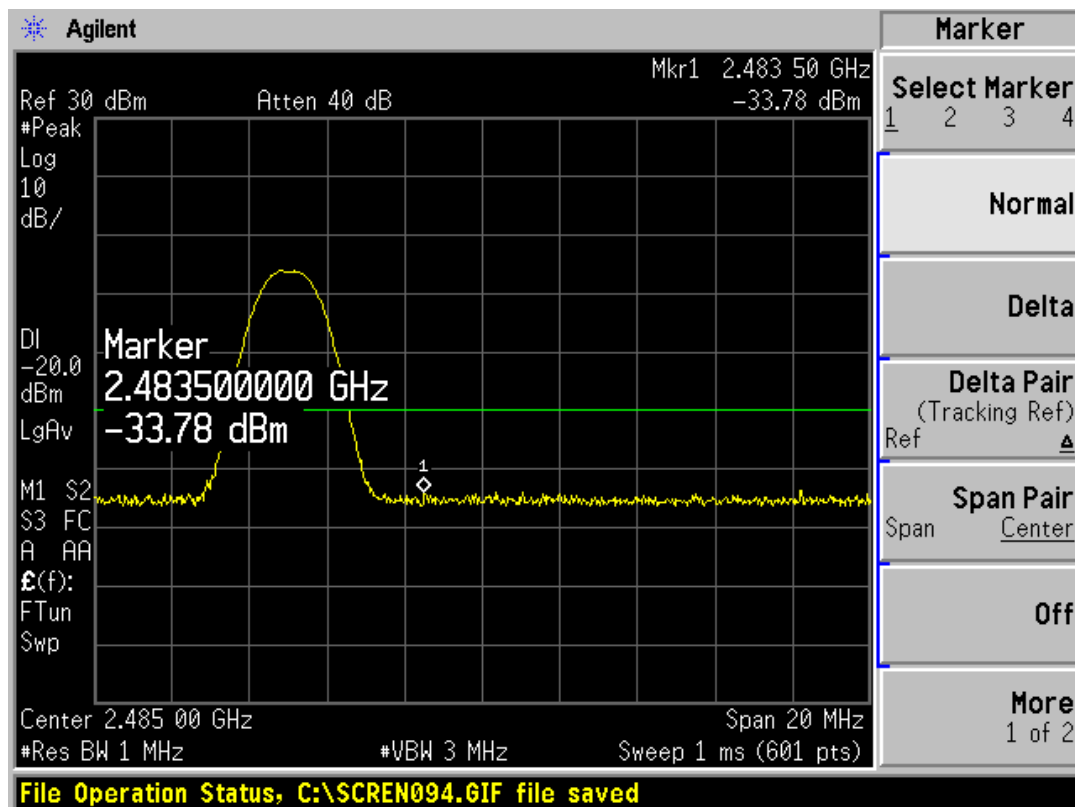
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Hopping Off-DH5-



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

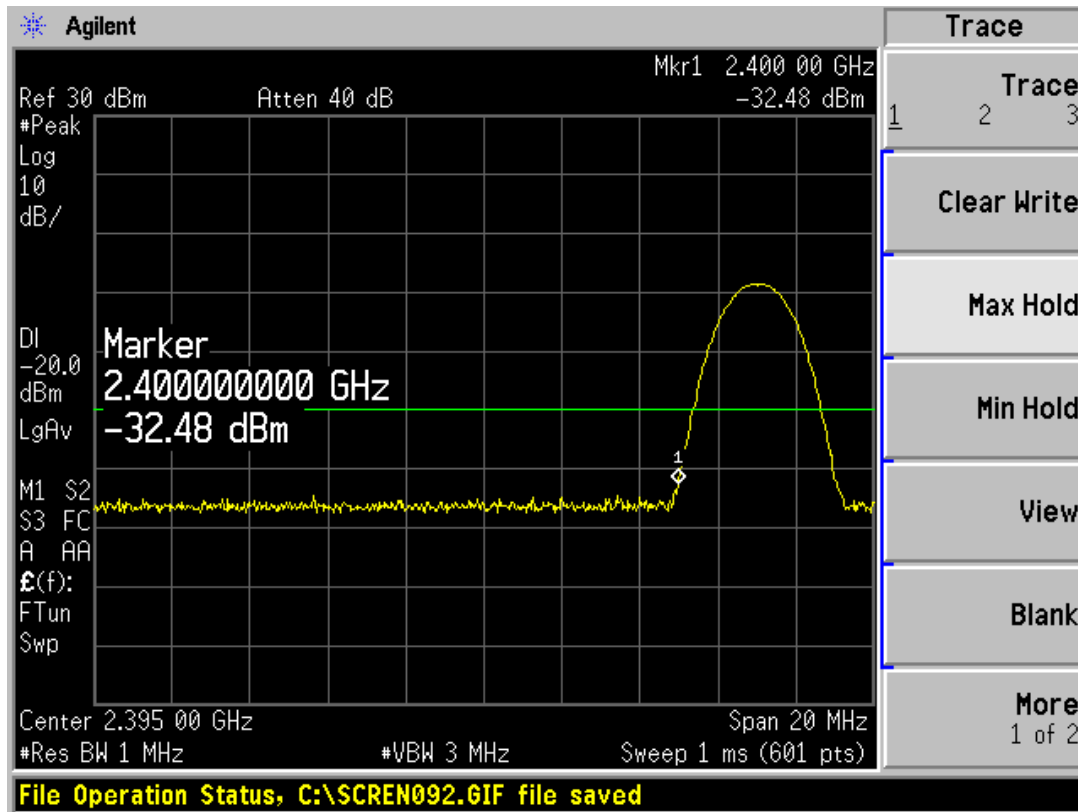
TA Technology (Shanghai) Co., Ltd. Test Report

Registration Num:428261

Report No.: RZA1109-1686RF01R1

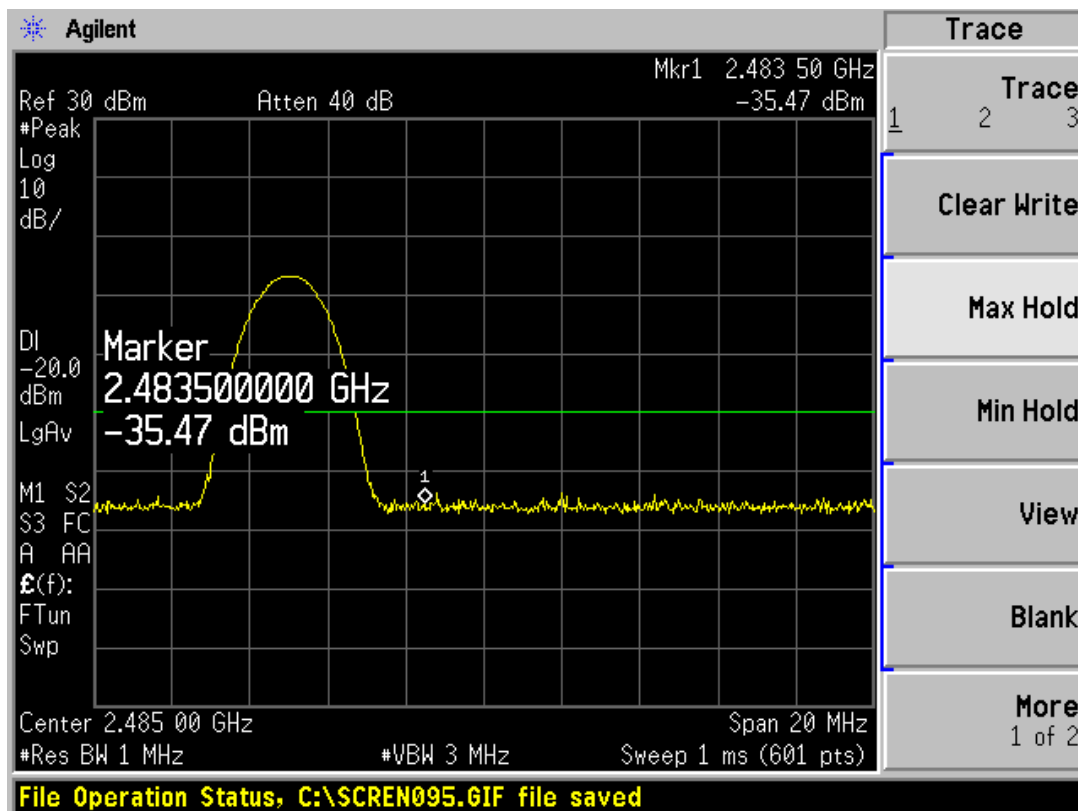
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Hopping Off-2DH5-



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

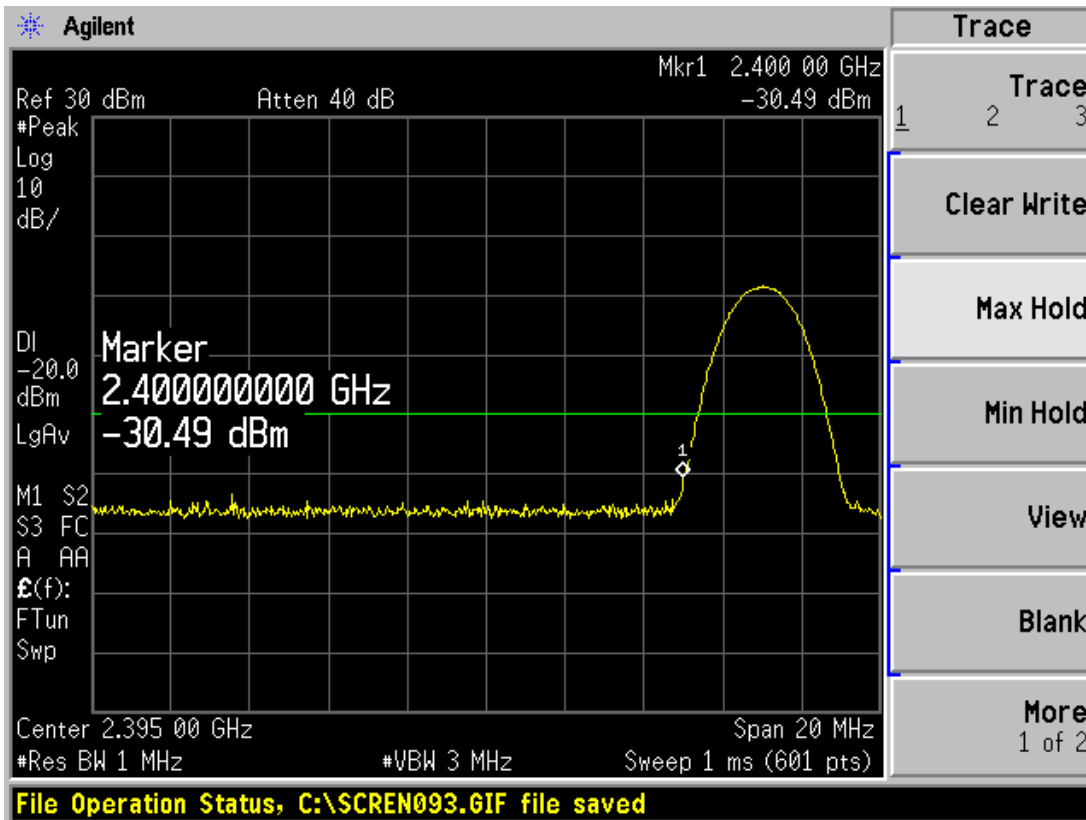
TA Technology (Shanghai) Co., Ltd. Test Report

Registration Num:428261

Report No.: RZA1109-1686RF01R1

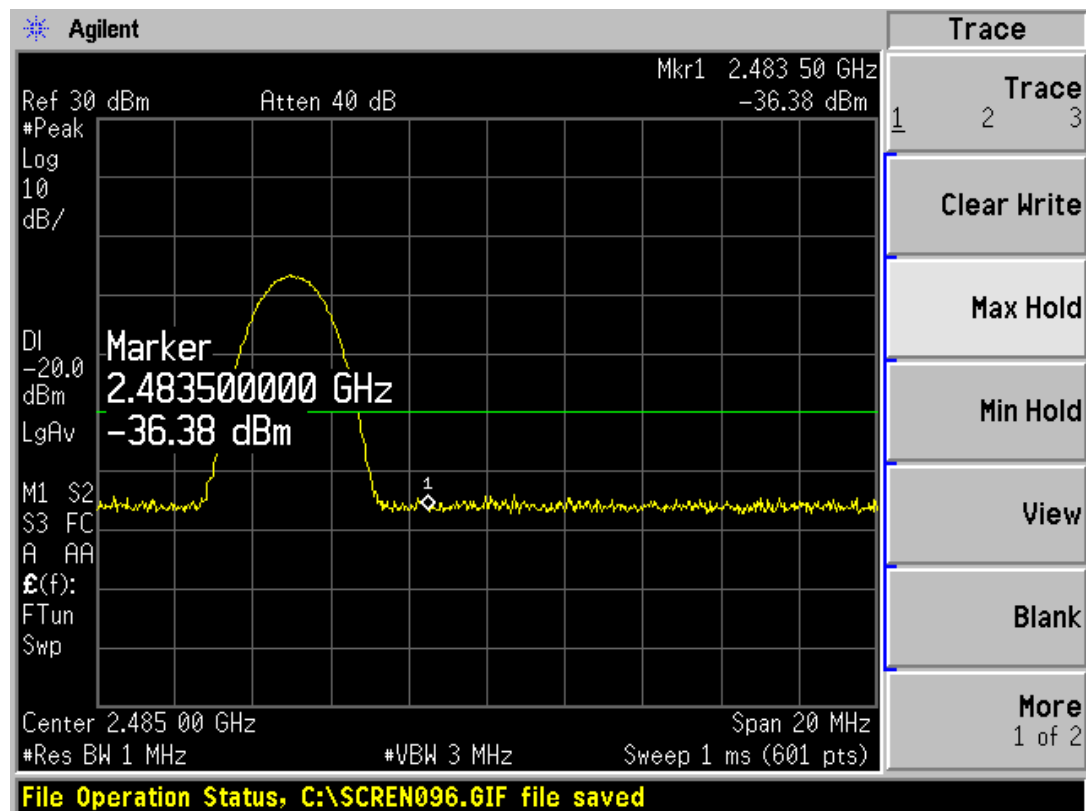
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Hopping Off-3DH5



Carrier frequency (MHz): 2402

Channel No.:0



Carrier frequency (MHz): 2480

Channel No.:78

2.7. 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:

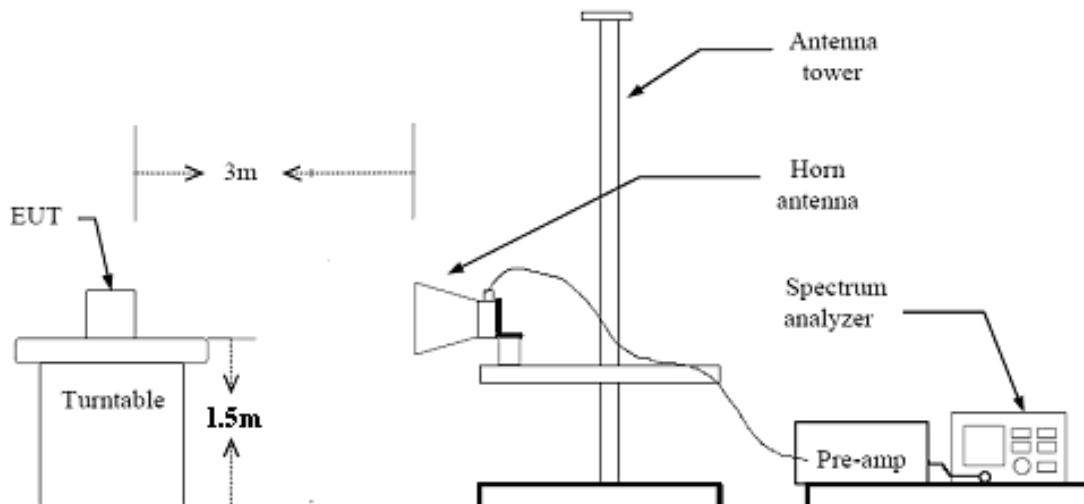
- (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
- (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

This setting method can refer to **DA00-705**.

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 lie-down position (X axis) and the worst case was recorded.

The test is in transmit mode.

Test setup



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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

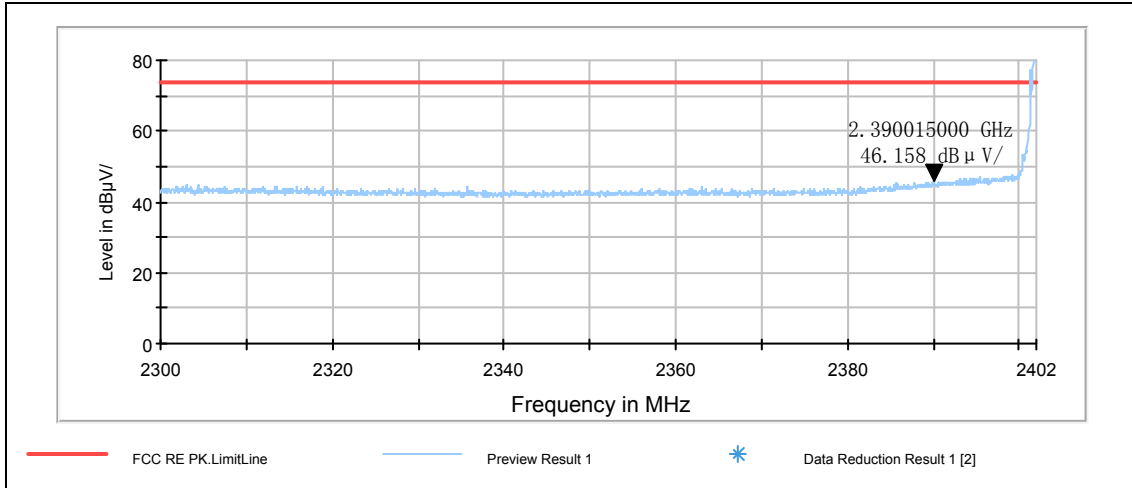
Measurement Uncertainty

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:

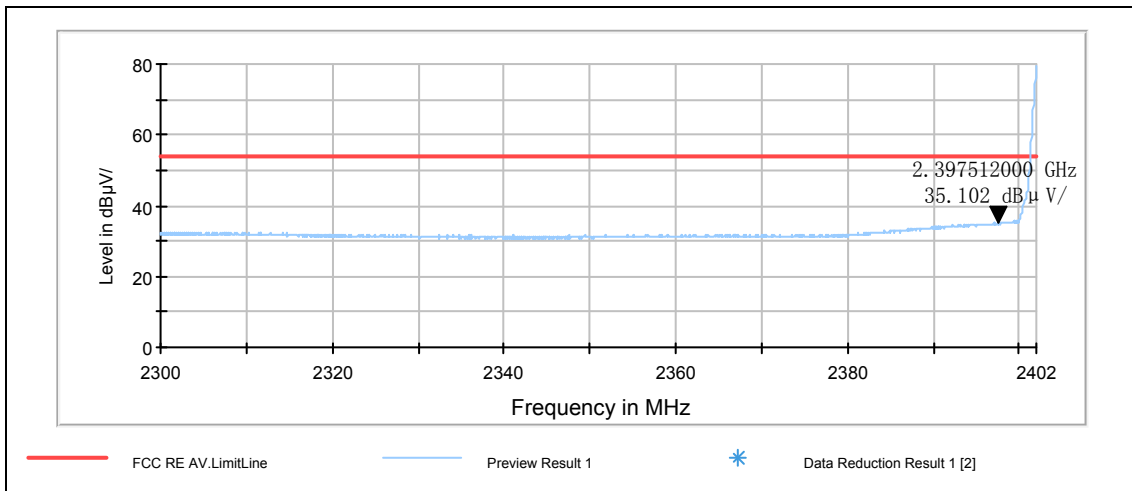
Basic Rate(DH5)- Channel 0

lower band edge Peak-CH 0



Note: The signal beyond the limit is carrier

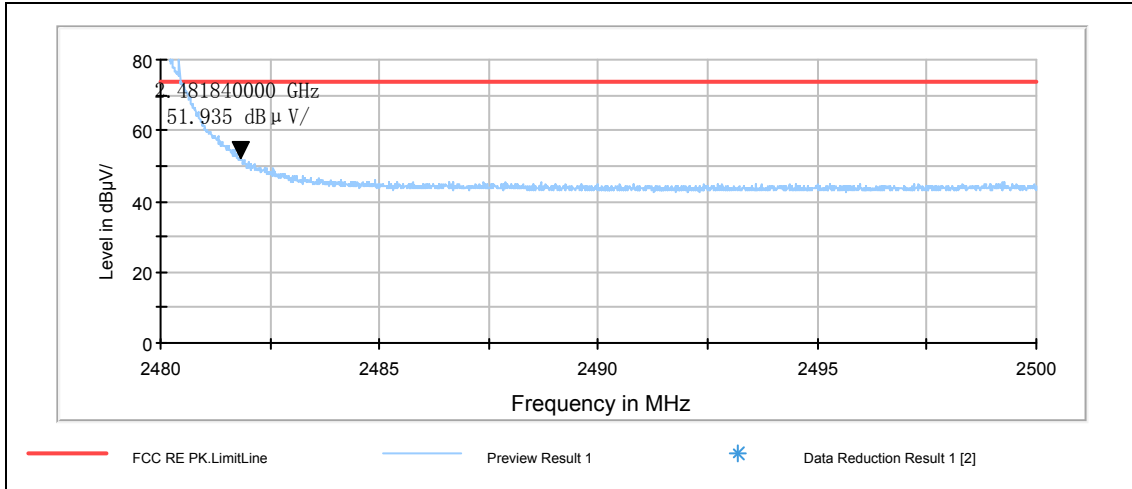
lower band edge average-CH 0



Note: The signal beyond the limit is carrier

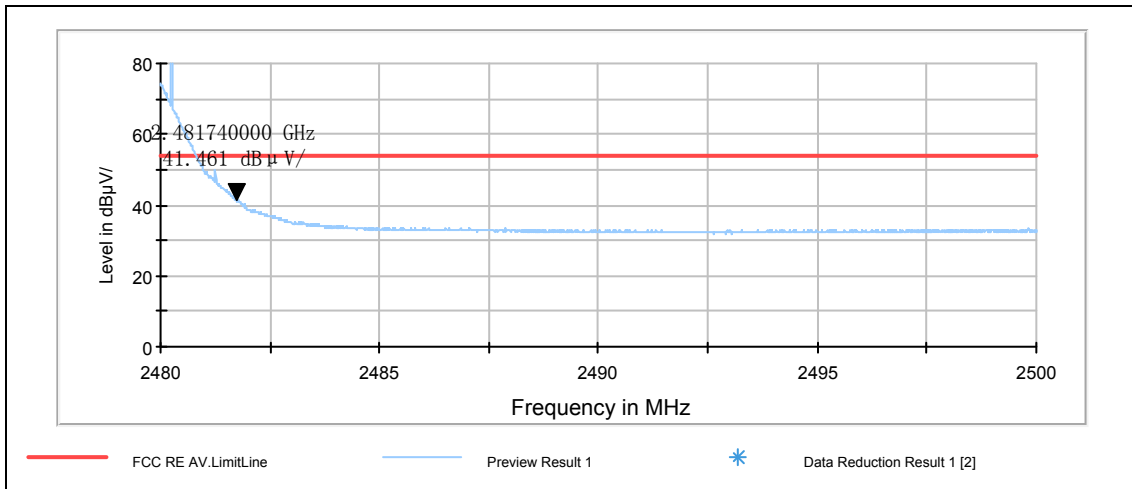
Basic Rate(DH5)- Channel 78

Higher band edge Peak-CH 78



Note: The signal beyond the limit is carrier

Higher band edge average-CH 78



Note: The signal beyond the limit is carrier

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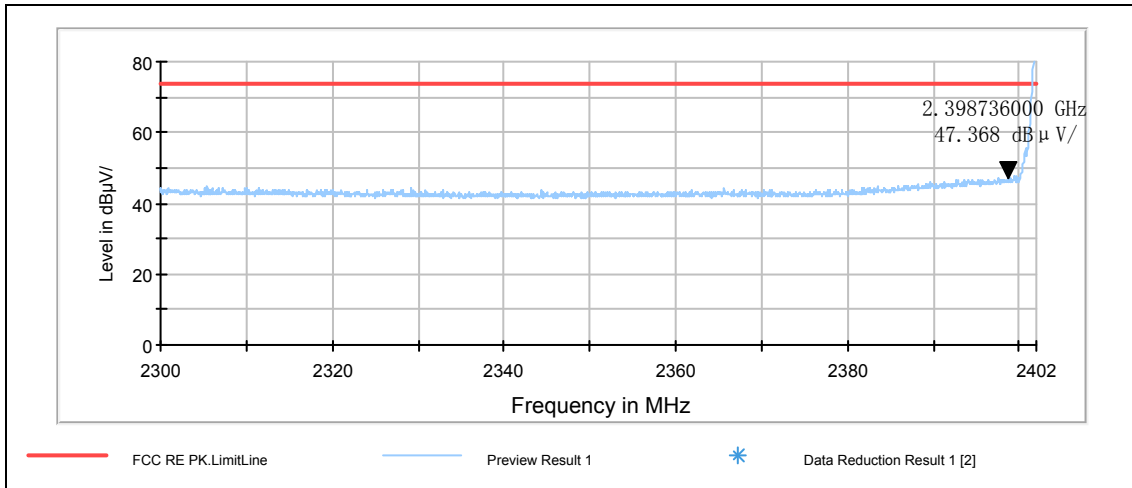
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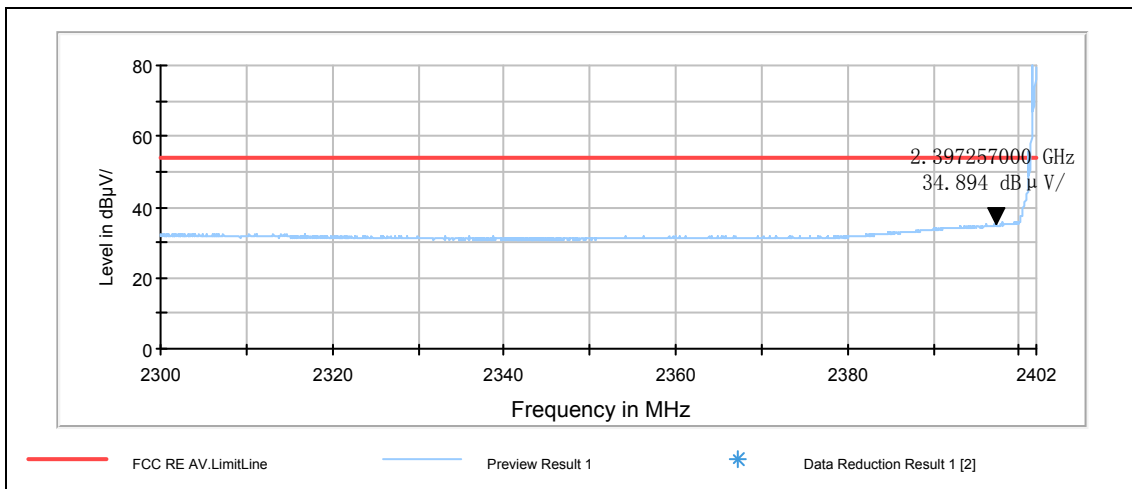
EDR(2DH5)- Channel 0

lower band edge Peak-CH 0



Note: The signal beyond the limit is carrier

lower band edge average-CH 0



Note: The signal beyond the limit is carrier

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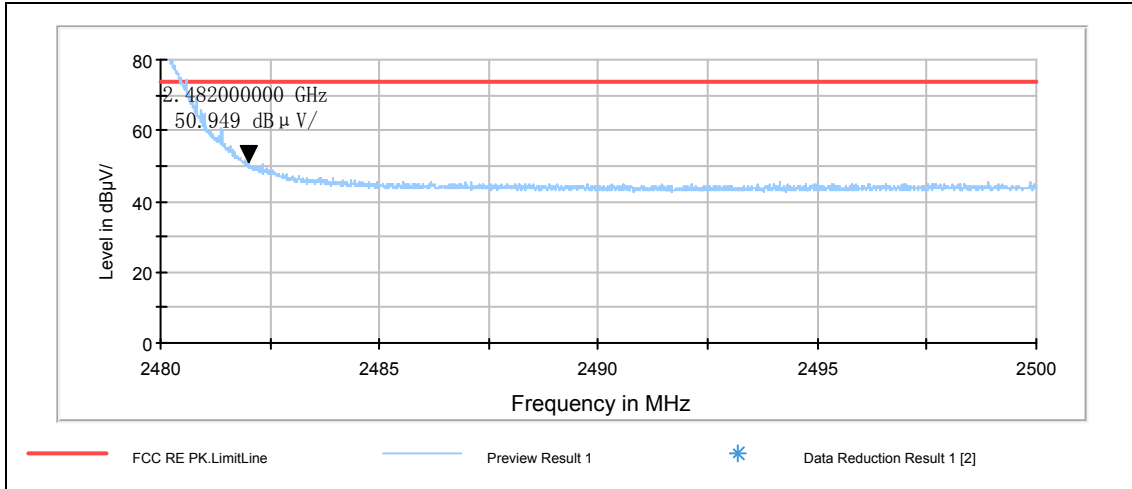
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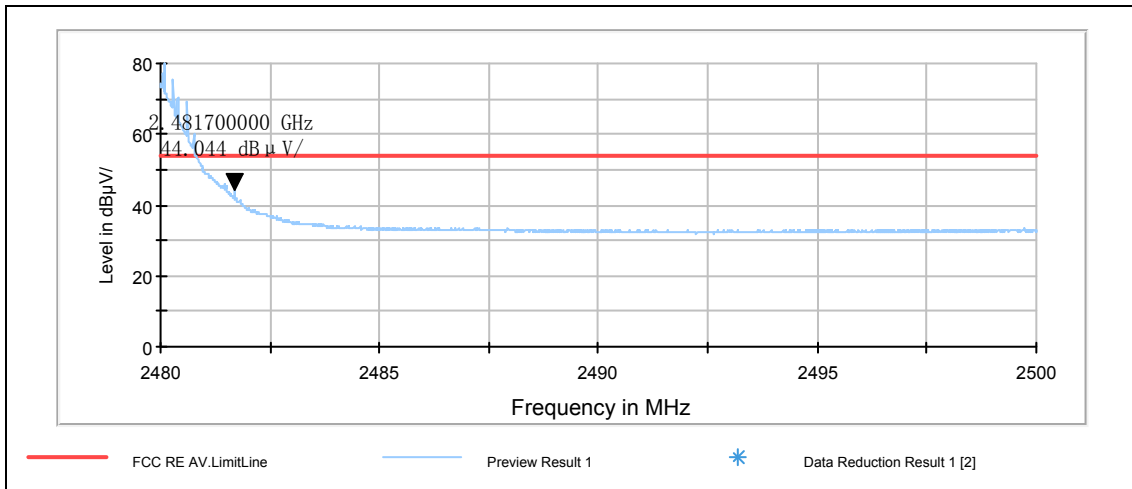
EDR(2DH5)- Channel 78

Higher band edge Peak-CH 78



Note: The signal beyond the limit is carrier

Higher band edge average-CH 78



Note: The signal beyond the limit is carrier

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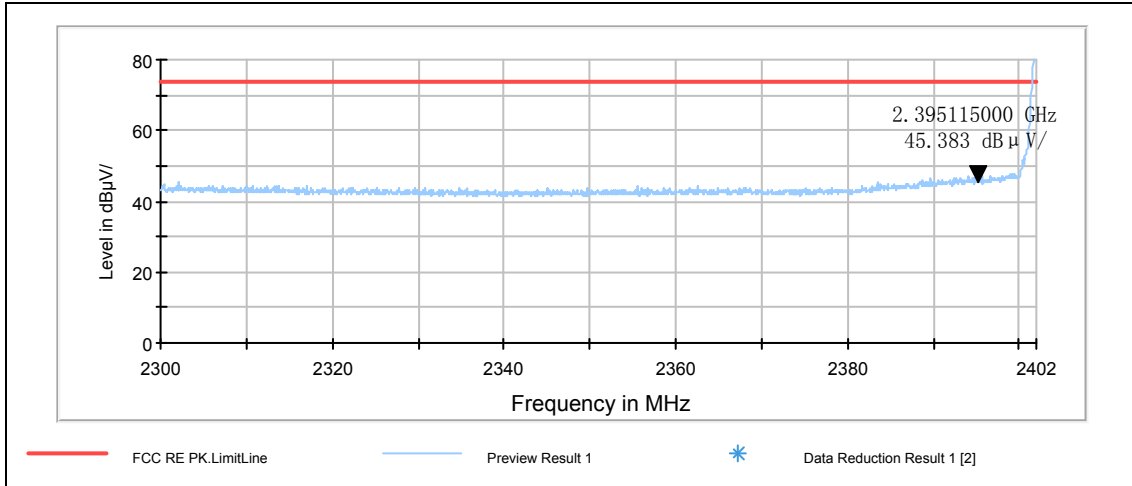
Registration Num:428261

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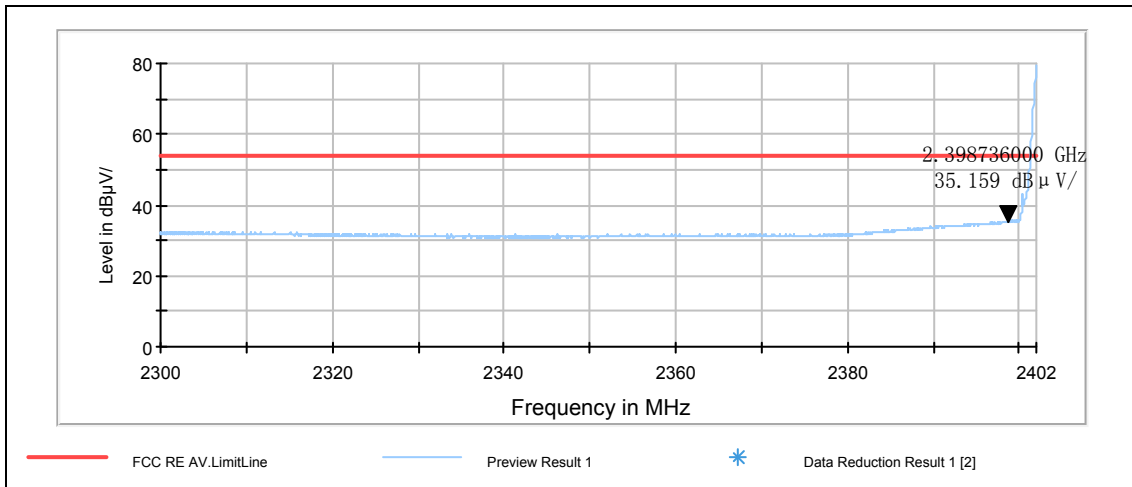
EDR(3DH5)- Channel 0

lower band edge Peak-CH 0



Note: The signal beyond the limit is carrier

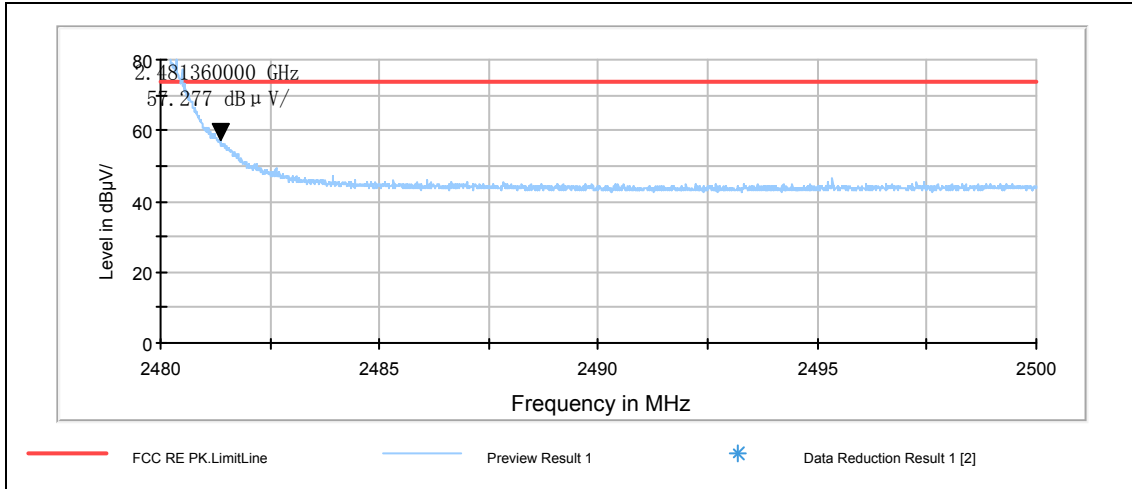
lower band edge average-CH 0



Note: The signal beyond the limit is carrier

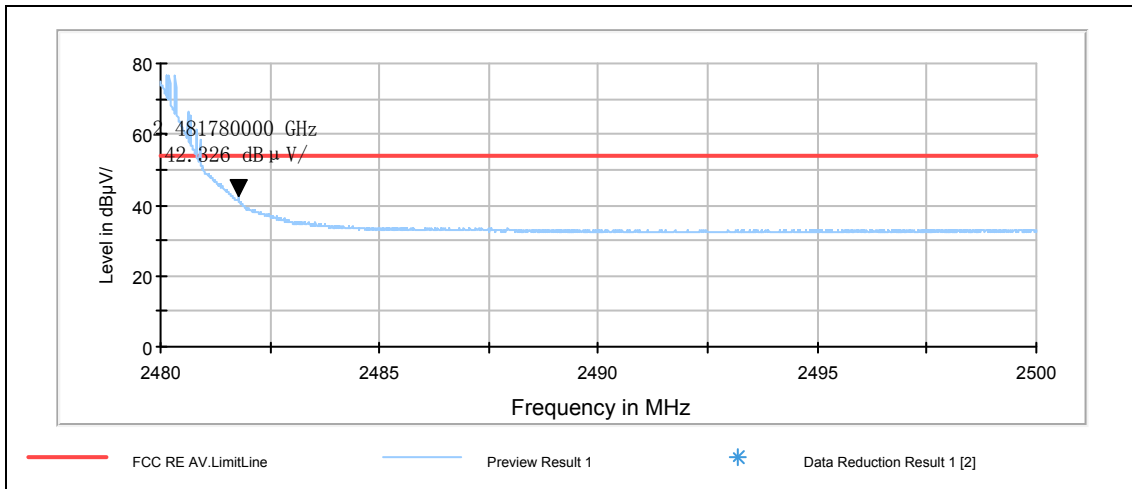
EDR(3DH5)- Channel 78

Higher band edge Peak-CH 78



Note: The signal beyond the limit is carrier

Higher band edge average-CH 78



Note: The signal beyond the limit is carrier

2.8. Number of hopping Frequency

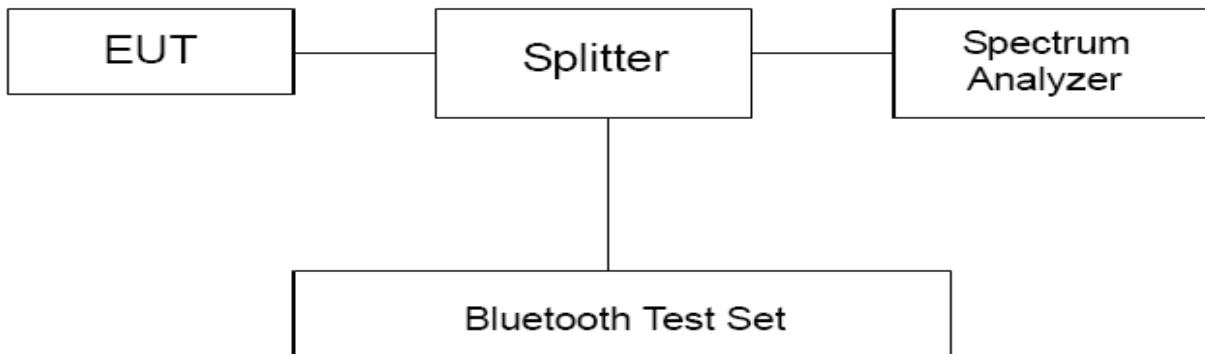
Ambient condition

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

Method of Measurement

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 300kHz and VBW is set to 3MHz 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	\geq 15 channels
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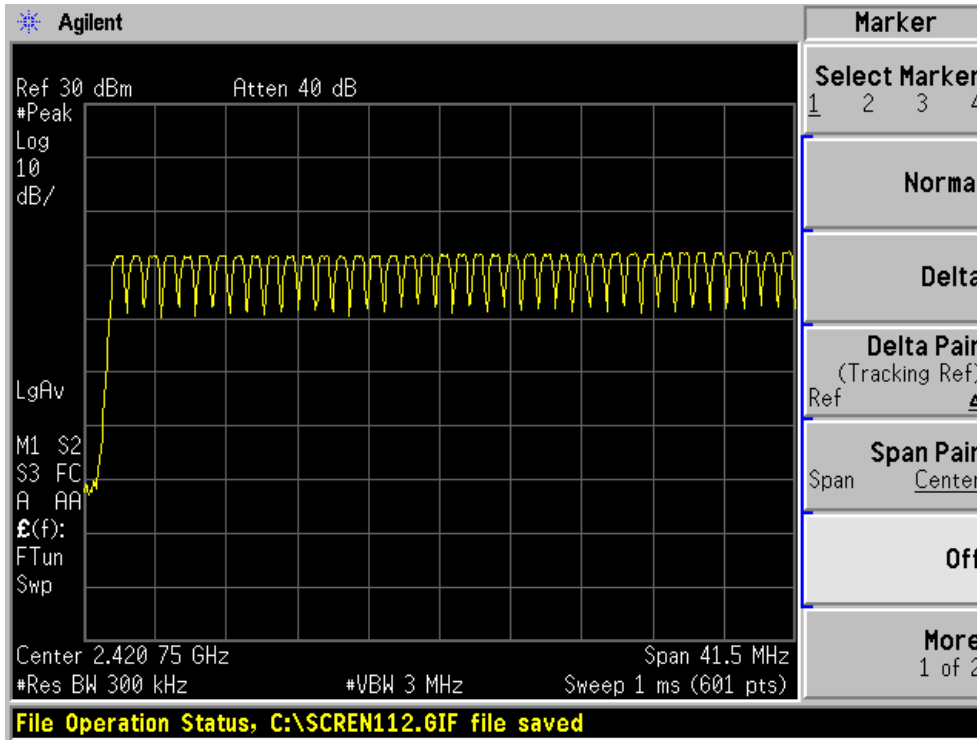
Report No.: RZA1109-1686RF01R1

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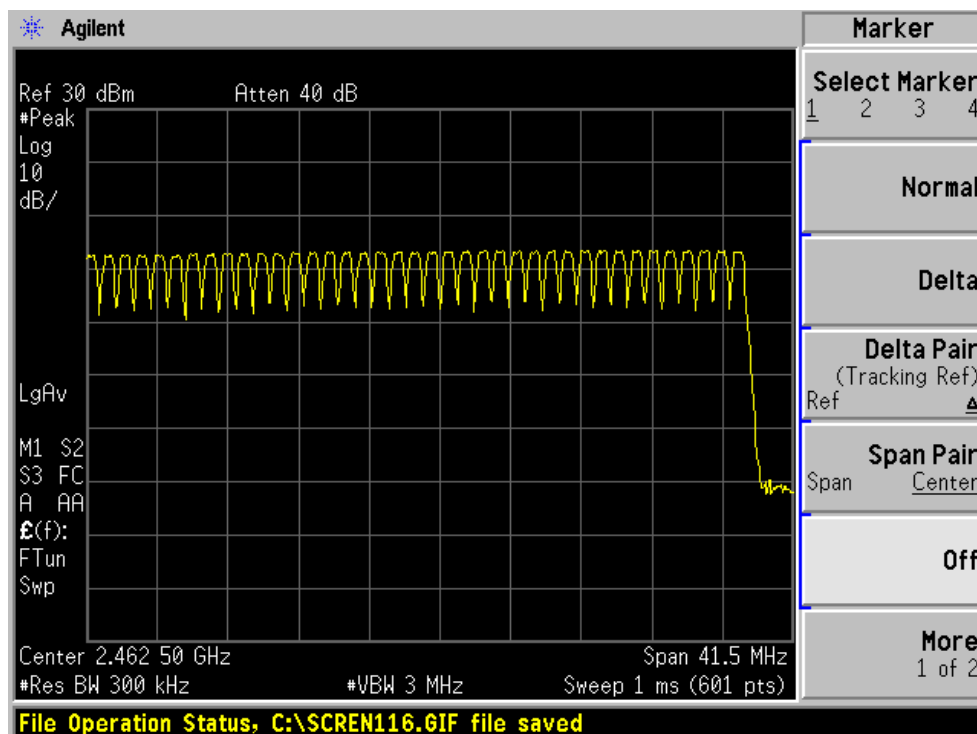
Test Results:

DH5

Number of hopping channels	conclusion
79	PASS



2400 MHz – 2441 MHz



2441 MHz – 2483.5 MHz

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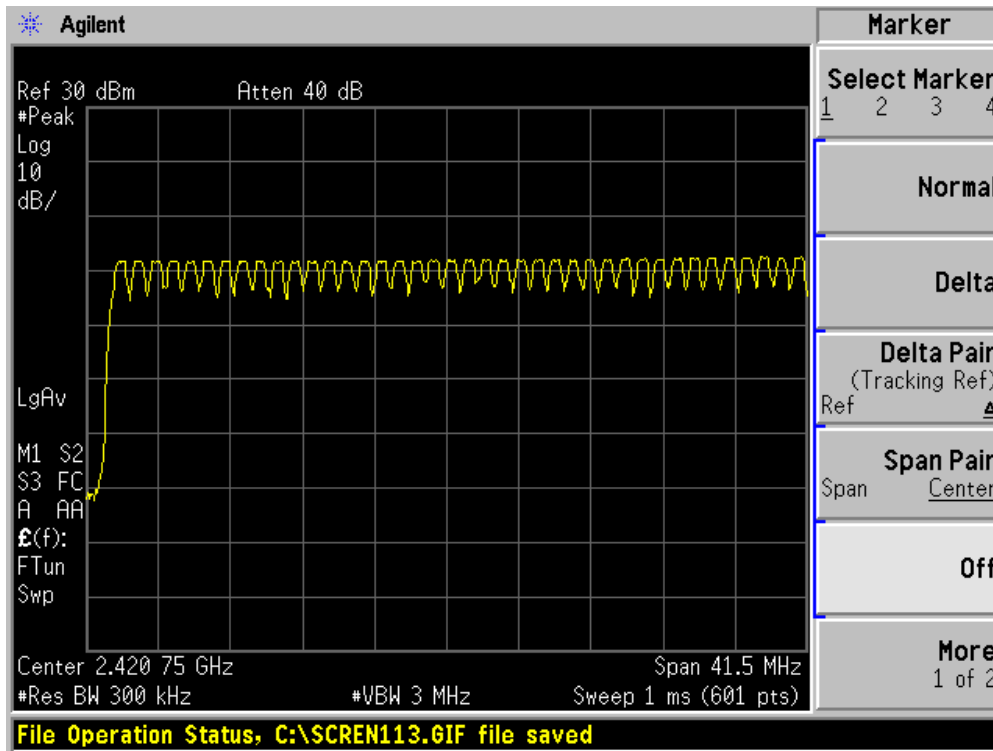
Registration Num:428261

Report No.: RZA1109-1686RF01R1

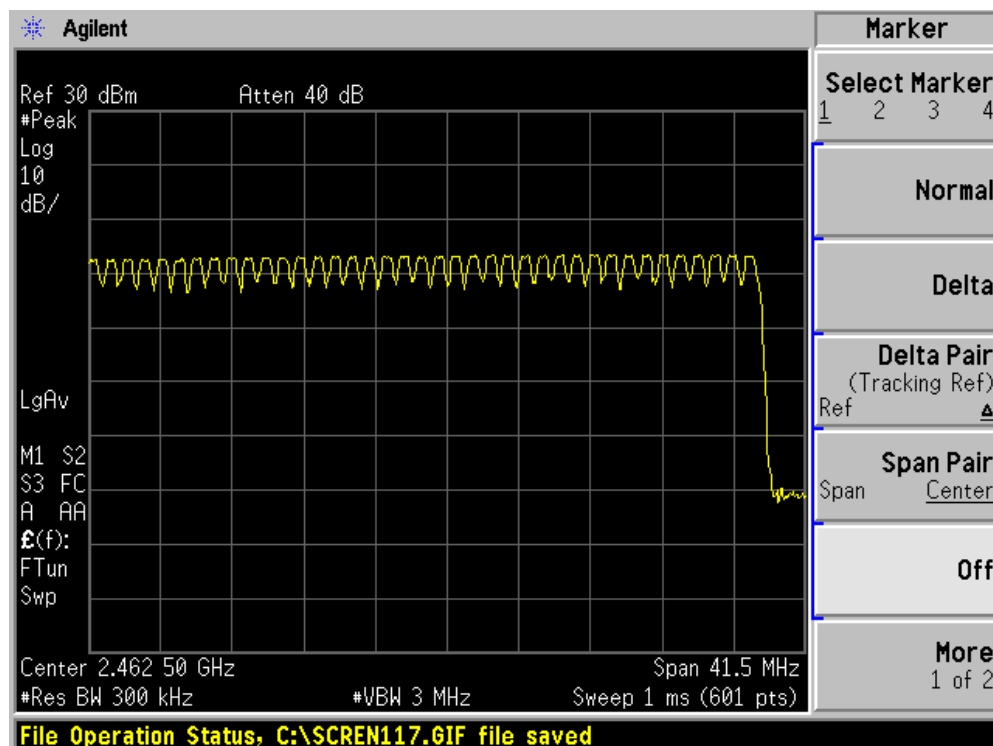
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2DH5

Number of hopping channels	conclusion
79	PASS



2400 MHz – 2441 MHz



2441 MHz – 2483.5 MHz

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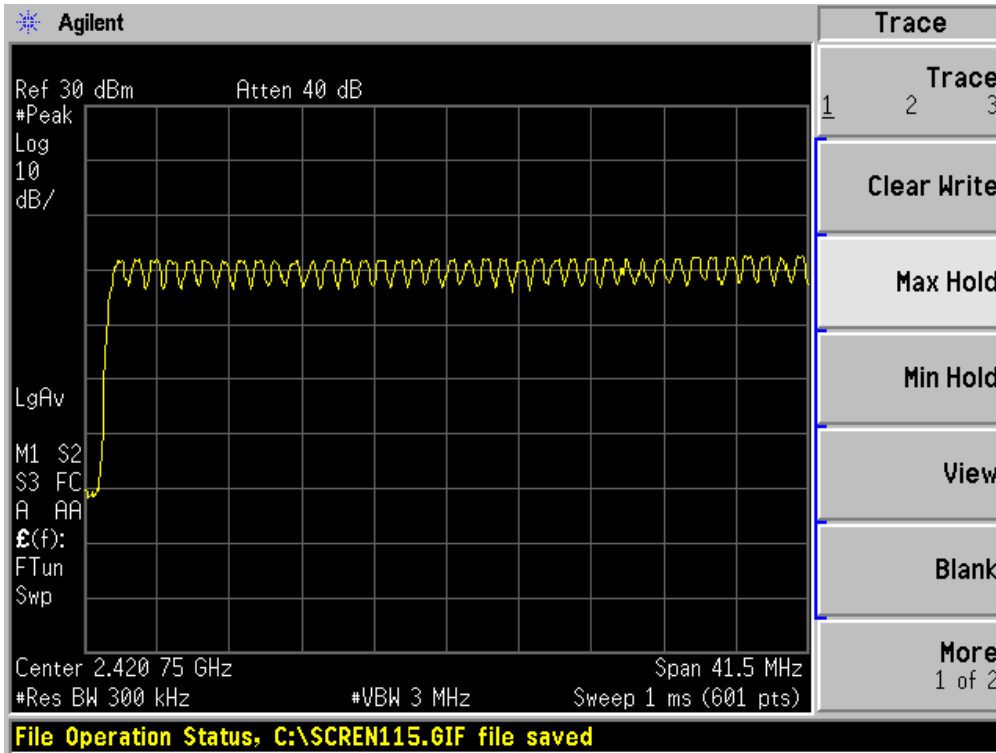
Registration Num:428261

Report No.: RZA1109-1686RF01R1

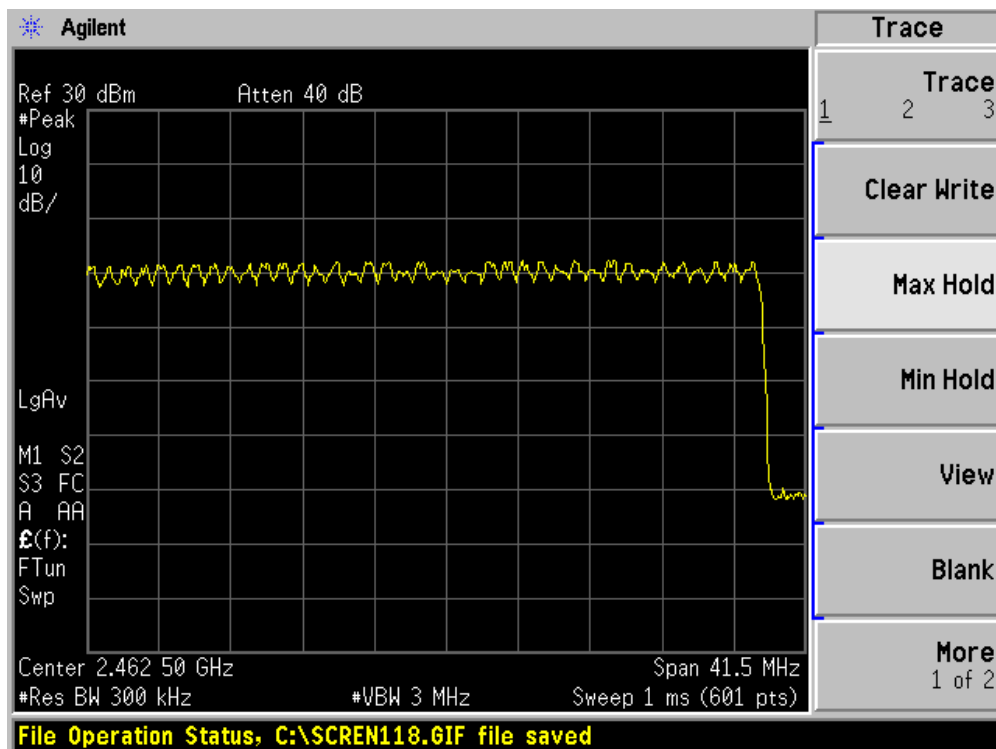
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3DH5

Number of hopping channels	conclusion
79	PASS



2400 MHz – 2441 MHz



2441 MHz – 2483.5 MHz

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2.9. Spurious RF Conducted Emissions

Ambient condition

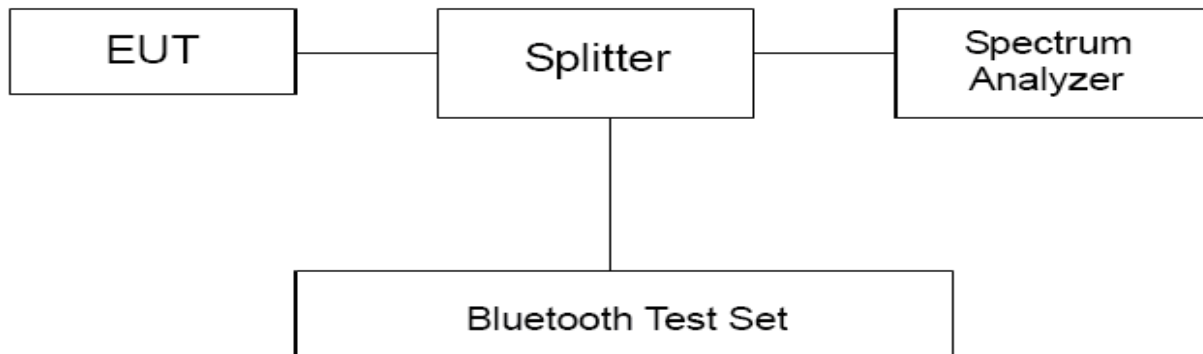
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 26GHz. The peak detector is used. RBW and VBW are set to 100 kHz, Sweep is set to ATUO.

The test is in transmit 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
Basic Rate(DH5)	2402	1.88	≤-18.12
	2441	2.81	≤-17.19
	2480	3.62	≤-16.38
EDR(2DH5)	2402	0.82	≤-19.18
	2441	1.95	≤-18.05
	2480	2.77	≤-17.23
EDR(3DH5)	2402	1.06	≤-18.94
	2441	2.13	≤-17.87
	2480	3.14	≤-16.86

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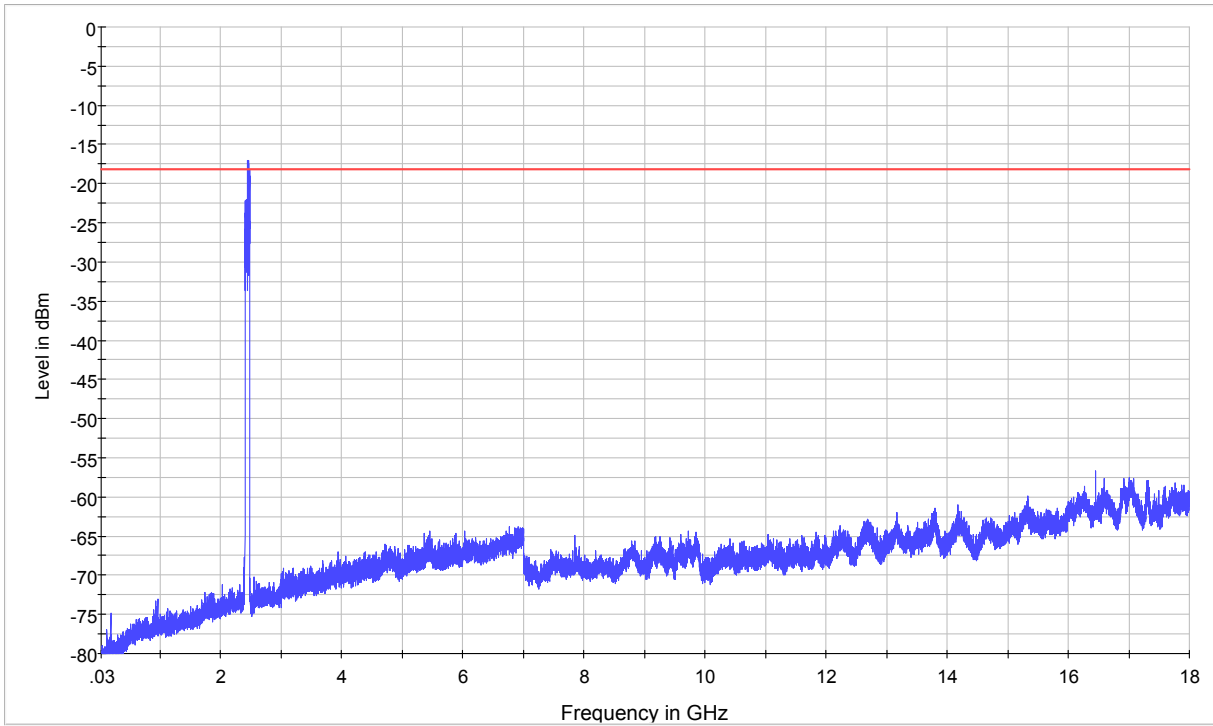
Measurement Uncertainty

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

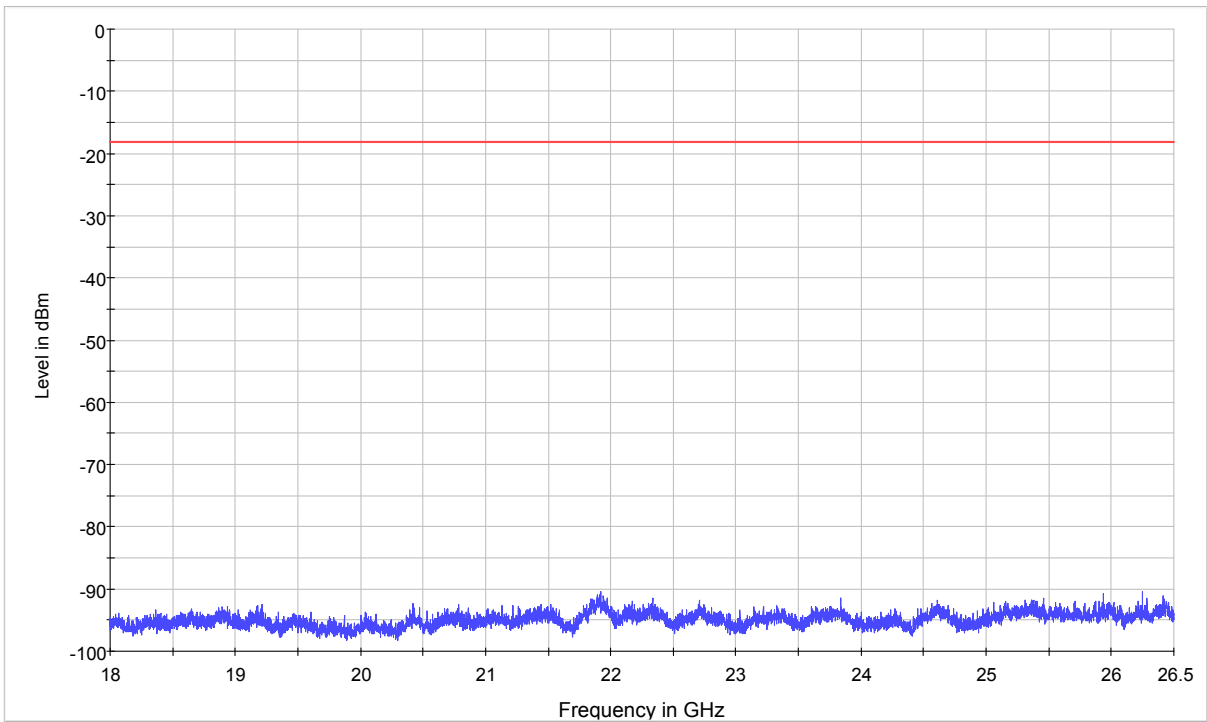
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

Test Results:

Basic Rate(DH5)-CH0:



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

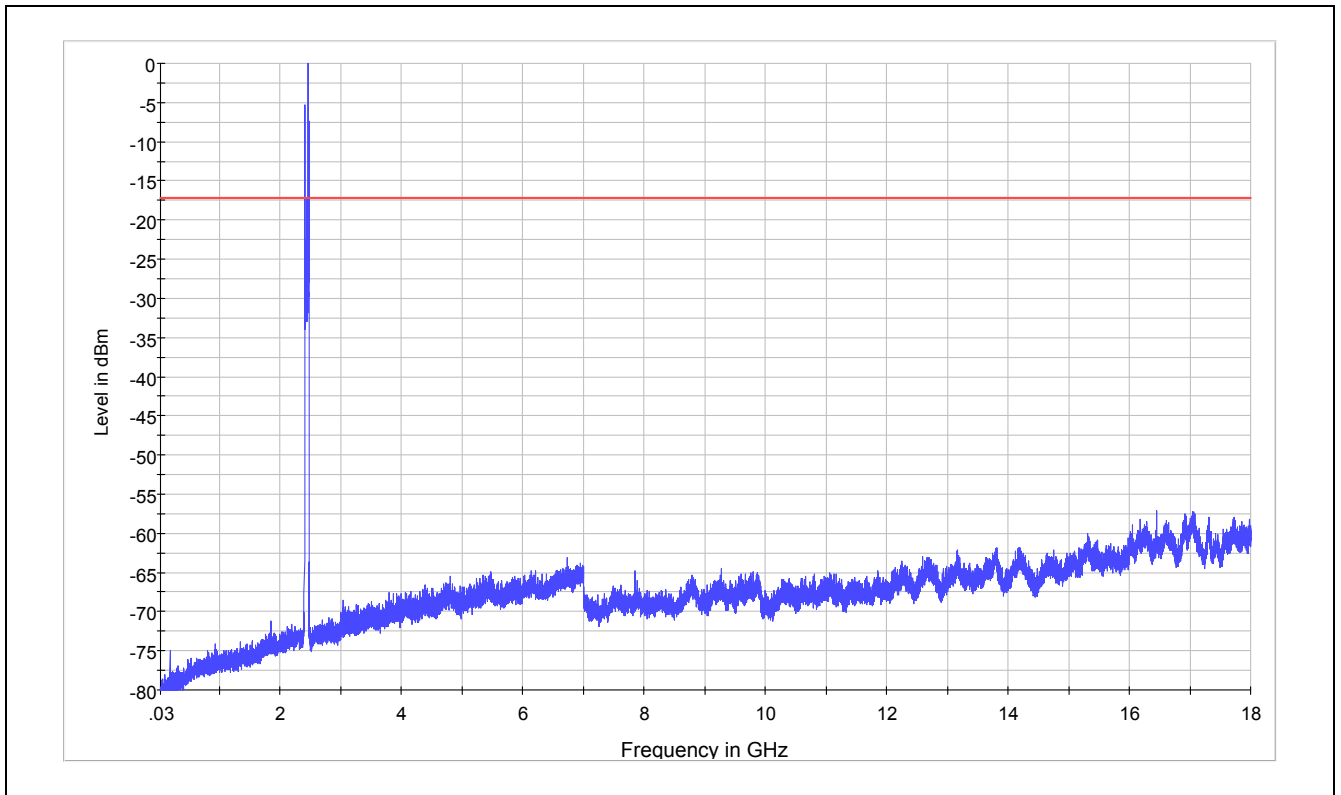


Spurious RF conducted emissions from 18GHz to 26.5GHz

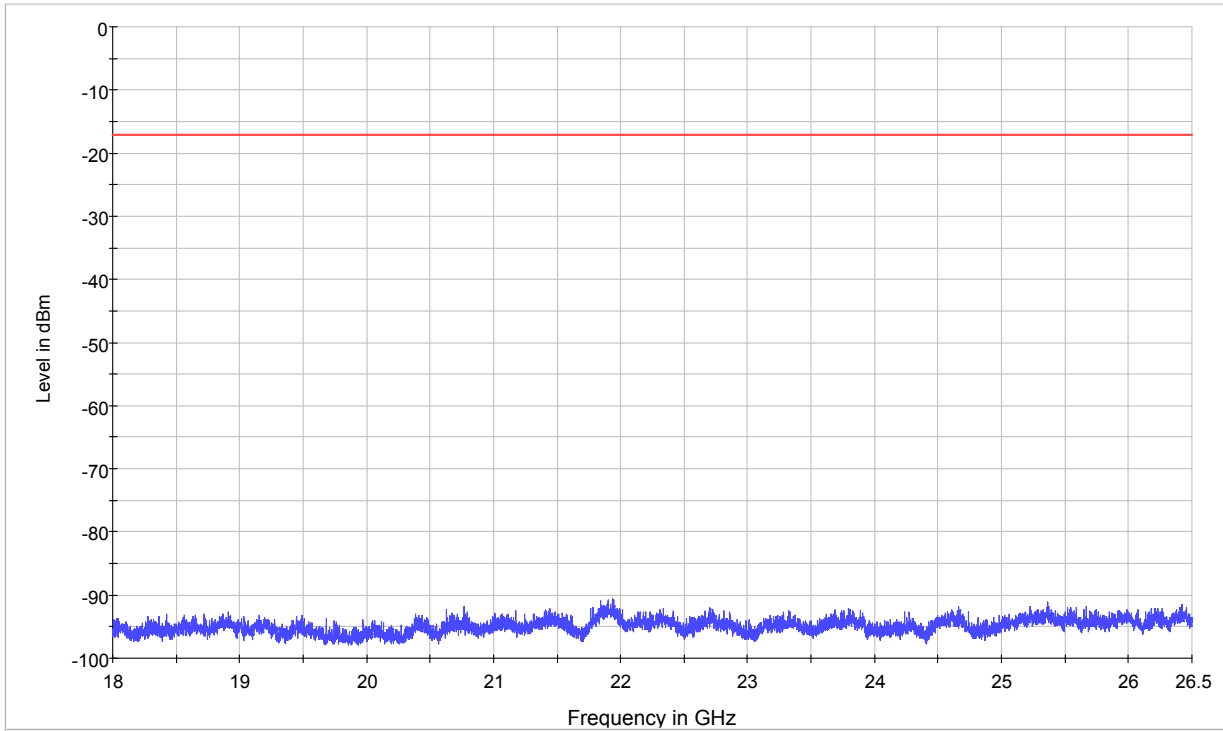
Harmonic	TX ch.0 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4804	Nf	-18.12
3	7206	Nf	-18.12
4	9608	Nf	-18.12
5	12010	Nf	-18.12
6	14412	Nf	-18.12
7	16814	Nf	-18.12
8	19216	Nf	-18.12
9	21618	Nf	-18.12
10	24020	Nf	-18.12
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

Basic Rate(DH5)-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

Harmonic	TX ch.39 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4882	Nf	-17.19
3	7323	Nf	-17.19
4	9764	Nf	-17.19
5	12205	Nf	-17.19
6	14646	Nf	-17.19
7	17087	Nf	-17.19
8	19528	Nf	-17.19
9	21969	Nf	-17.19
10	24410	Nf	-17.19

Nf: noise floor

Note: The other Spurious RF conducted emissions level is no more than noise floor.

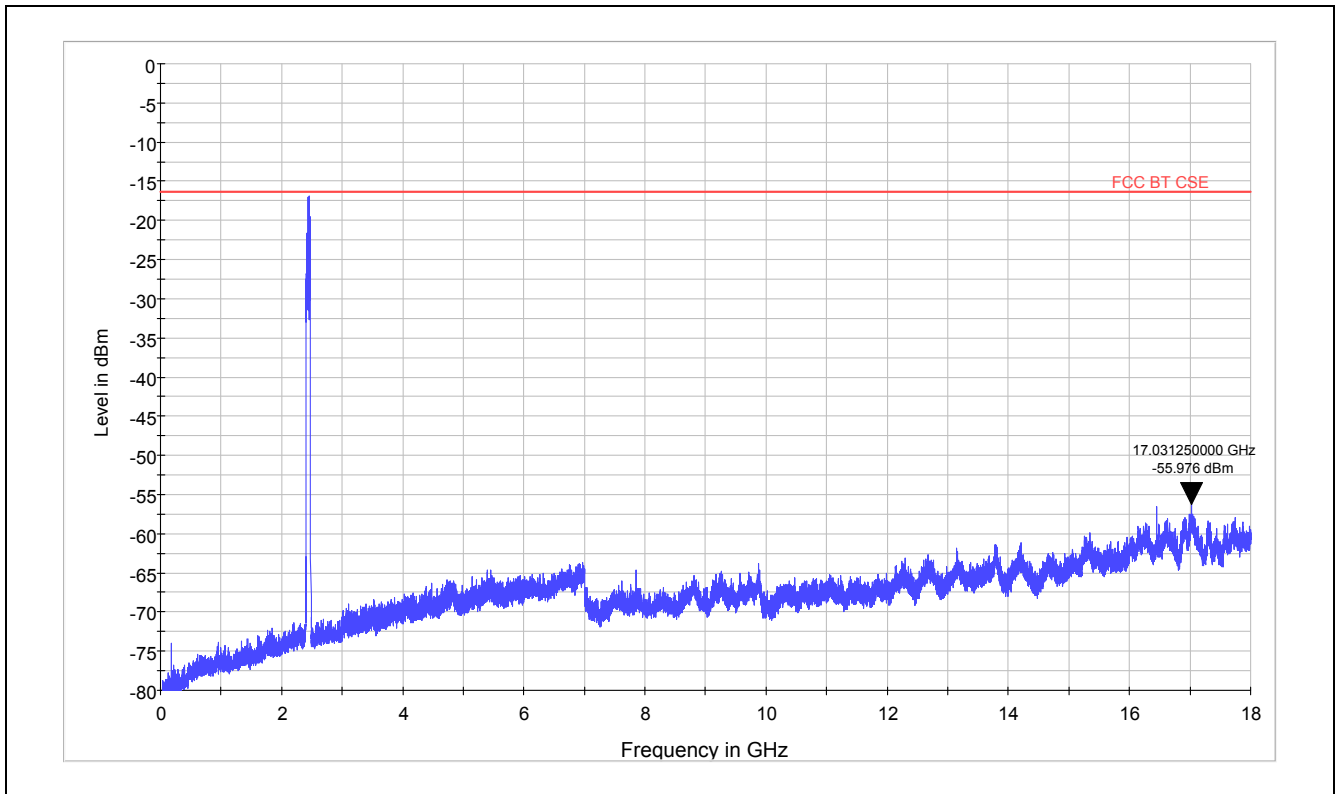
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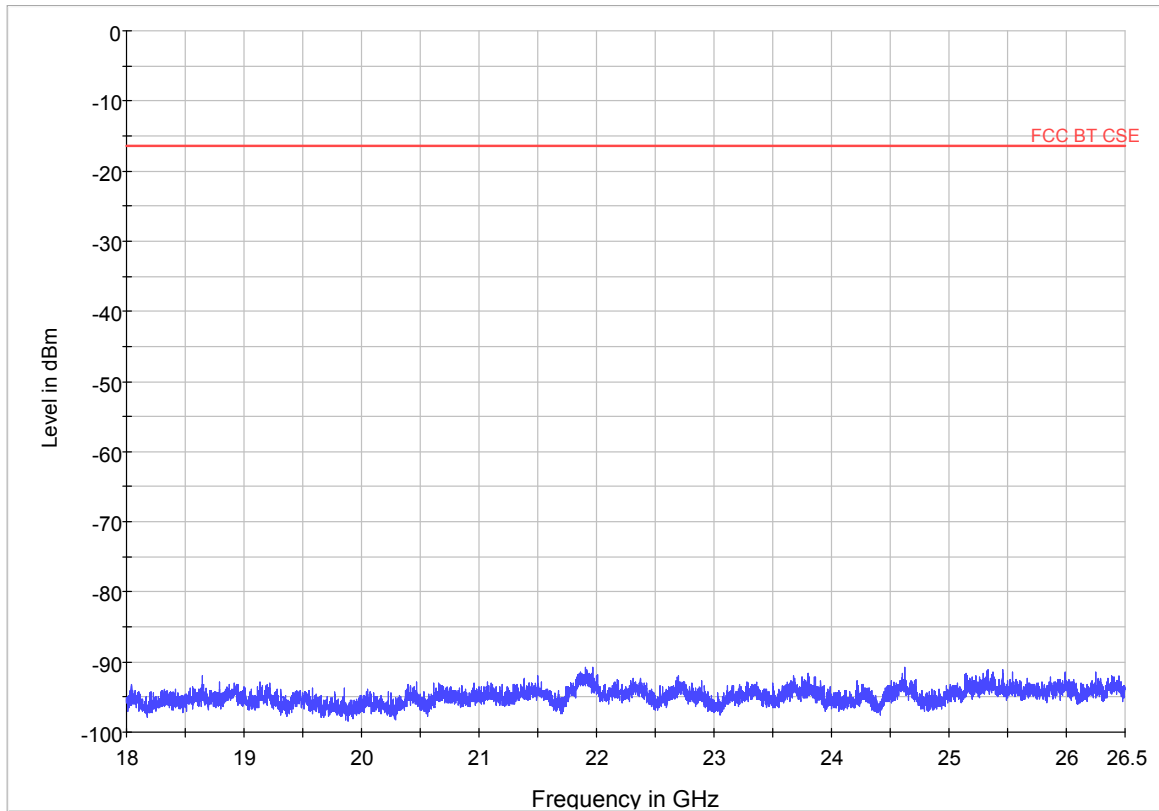
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Basic Rate(DH5)-CH78:



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

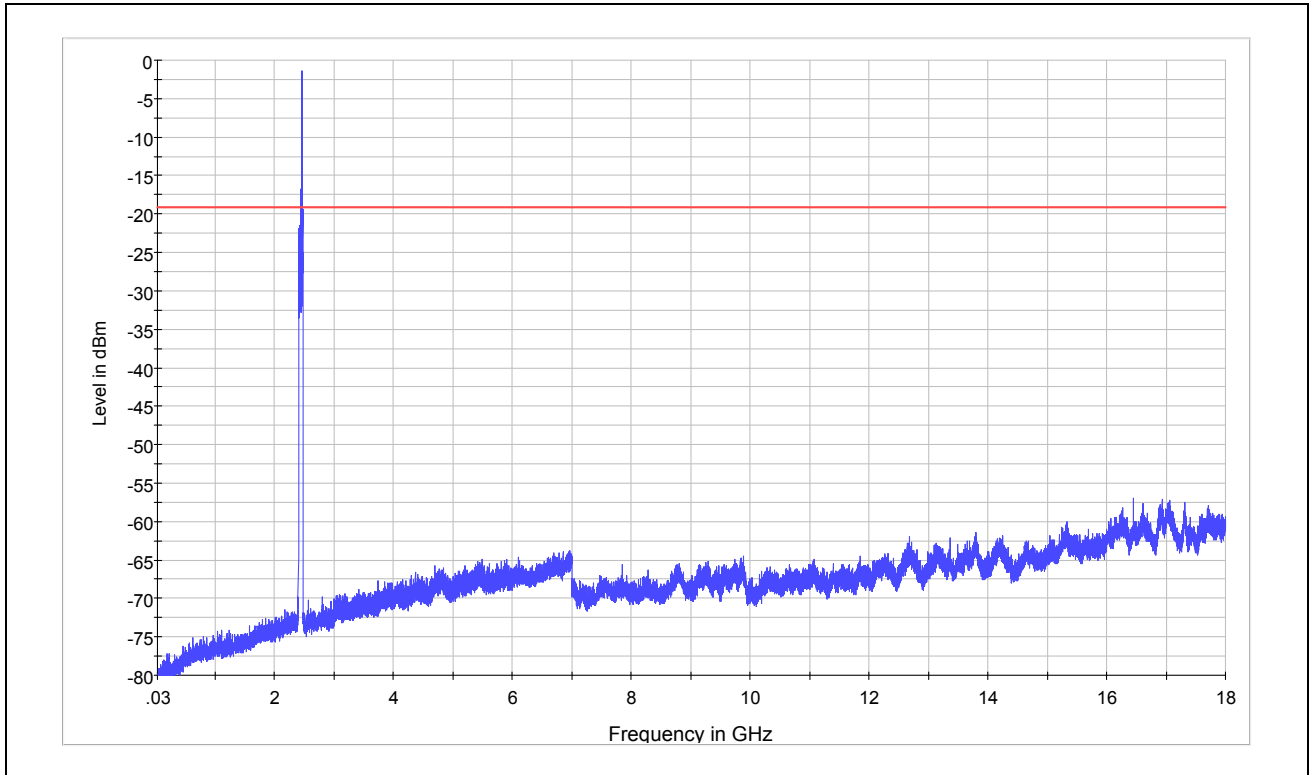


Spurious RF conducted emissions from 18GHz to 26.5GHz

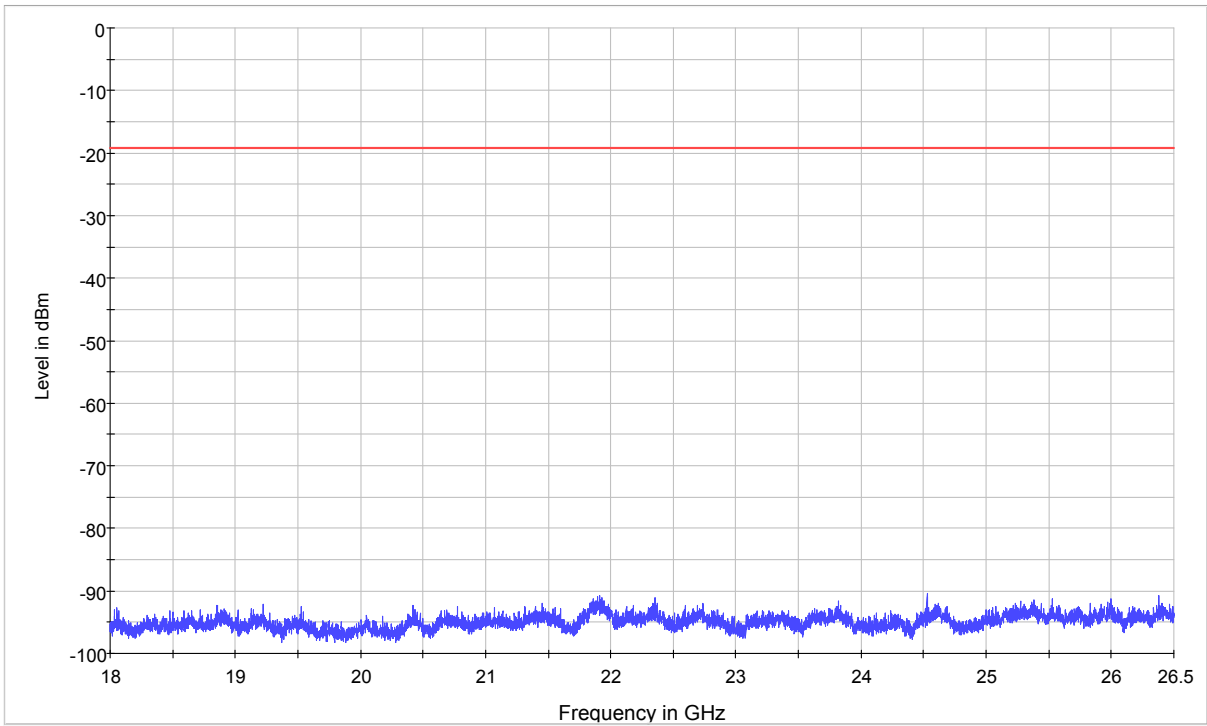
Harmonic	TX ch.78 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4960	Nf	-16.38
3	7440	Nf	-16.38
4	9920	Nf	-16.38
5	12400	Nf	-16.38
6	14880	Nf	-16.38
7	17360	Nf	-16.38
8	19840	Nf	-16.38
9	22320	Nf	-16.38
10	24800	Nf	-16.38
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

EDR(2DH5)-CH0:



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

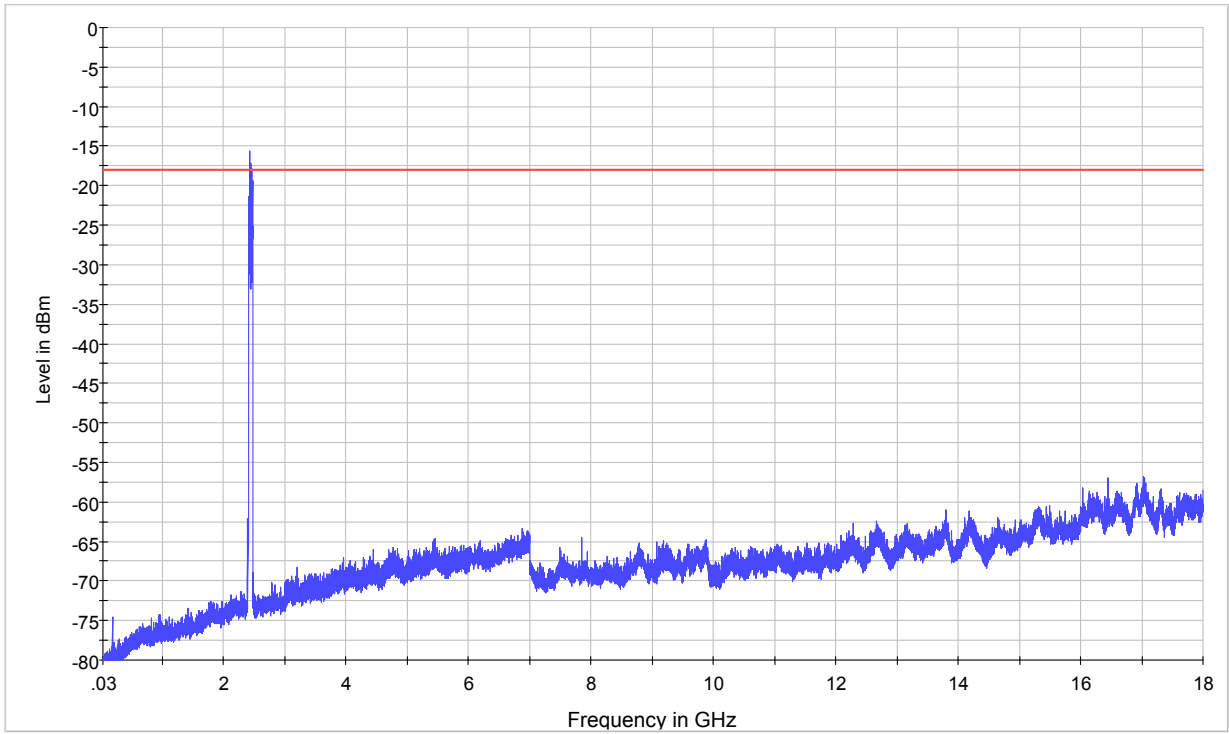


Spurious RF conducted emissions from 18GHz to 26.5GHz

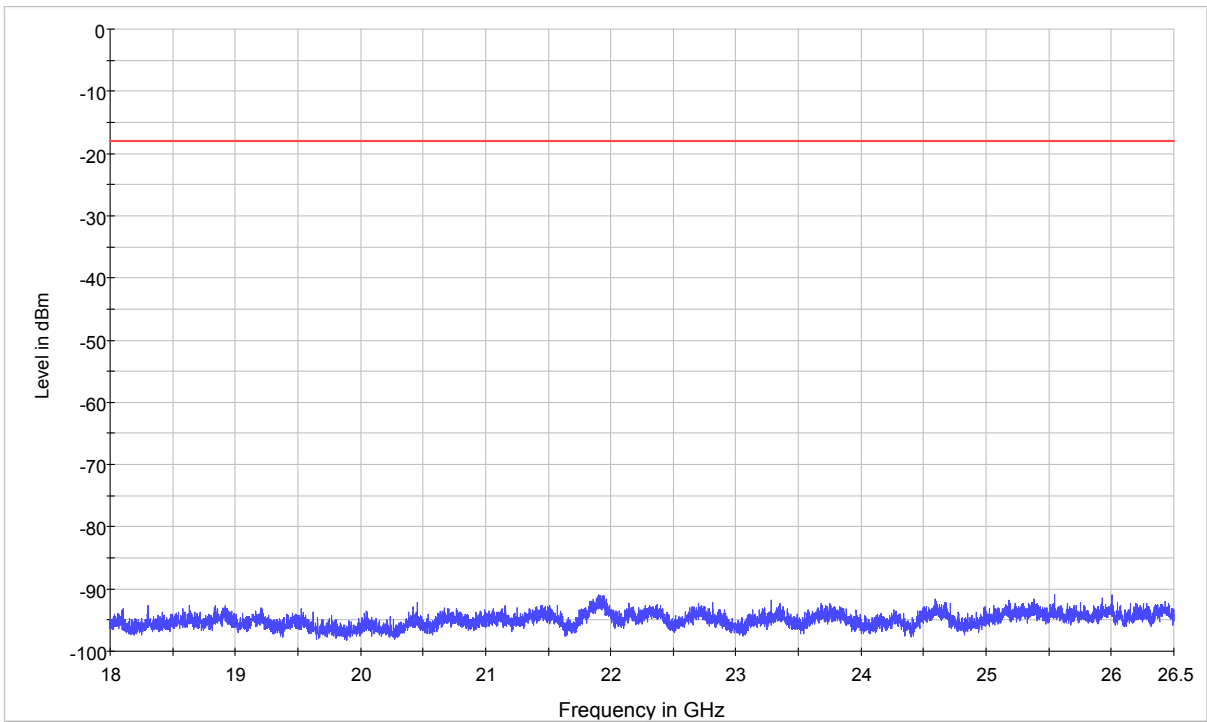
Harmonic	TX ch.0 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4804	Nf	-19.18
3	7206	Nf	-19.18
4	9608	Nf	-19.18
5	12010	Nf	-19.18
6	14412	Nf	-19.18
7	16814	Nf	-19.18
8	19216	Nf	-19.18
9	21618	Nf	-19.18
10	24020	Nf	-19.18
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

EDR(2DH5)-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

Harmonic	TX ch.39 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4882	Nf	-18.05
3	7323	Nf	-18.05
4	9764	Nf	-18.05
5	12205	Nf	-18.05
6	14646	Nf	-18.05
7	17087	Nf	-18.05
8	19528	Nf	-18.05
9	21969	Nf	-18.05
10	24410	Nf	-18.05
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

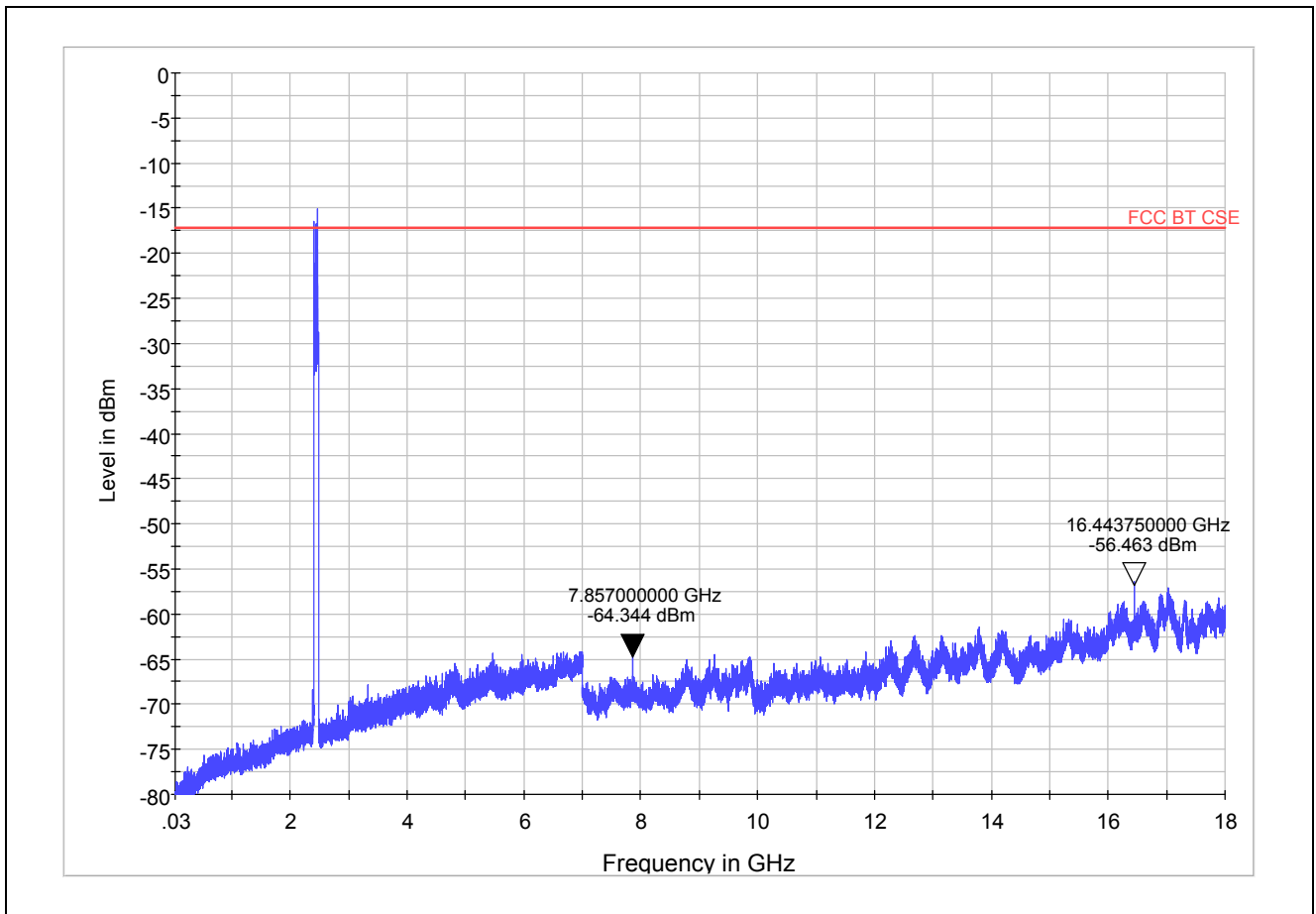
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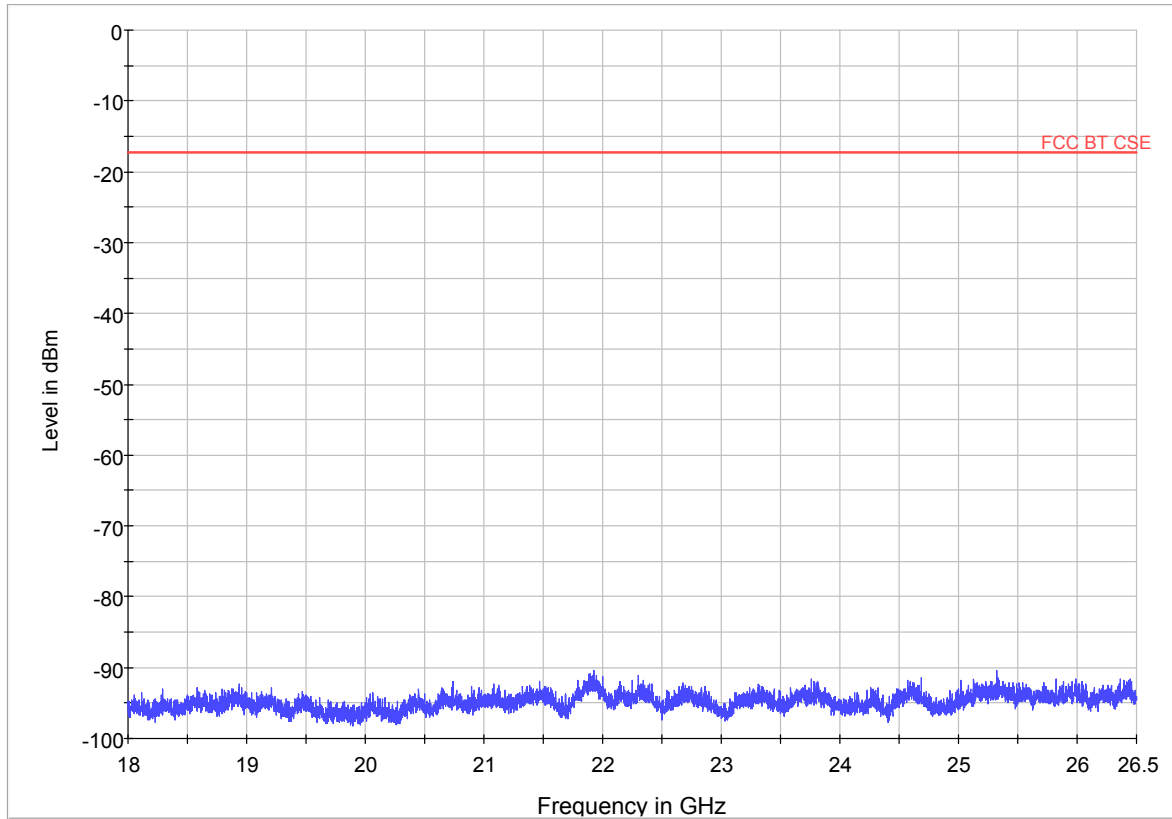
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EDR(2DH5)-CH78:



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

Harmonic	TX ch.78 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4960	Nf	-17.23
3	7857	-64.344	-17.23
4	9920	Nf	-17.23
5	12400	Nf	-17.23
6	14880	Nf	-17.23
7	16443.75	-56.463	-17.23
8	19840	Nf	-17.23
9	22320	Nf	-17.23
10	24800	Nf	-17.23
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

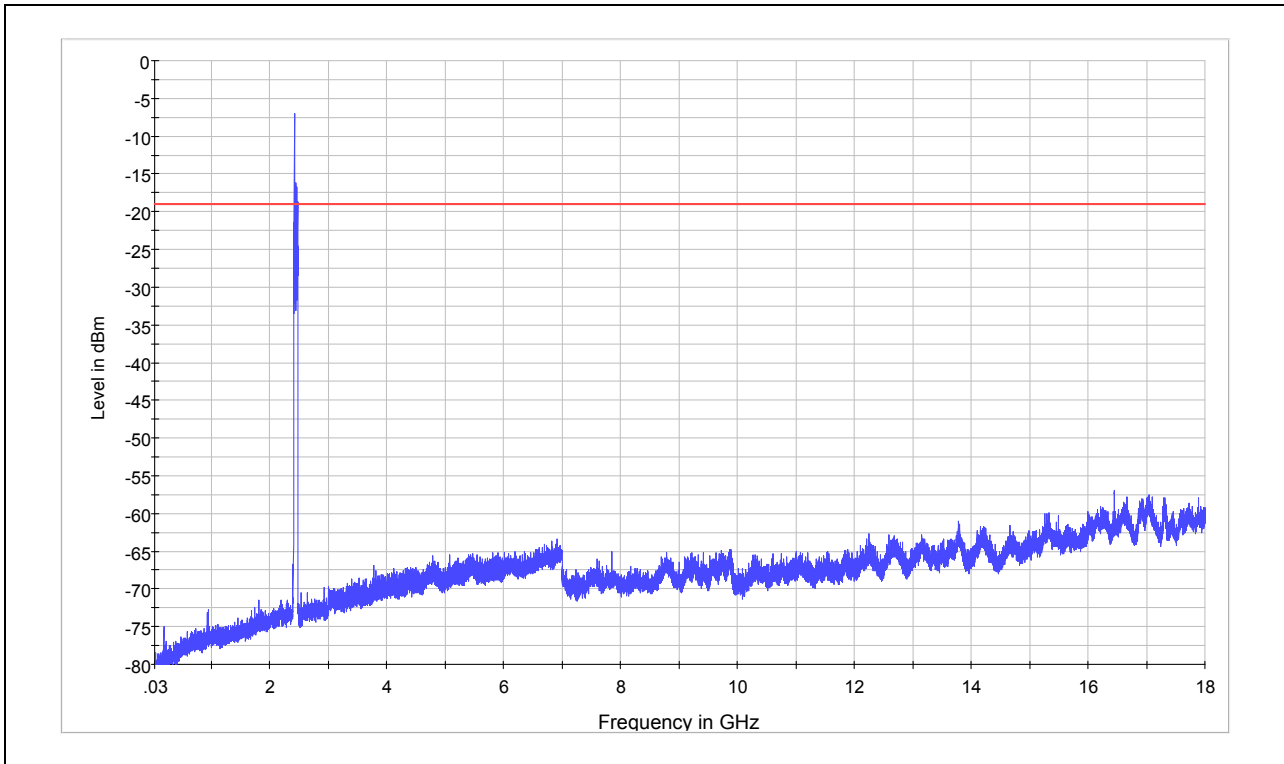
TA Technology (Shanghai) Co., Ltd.
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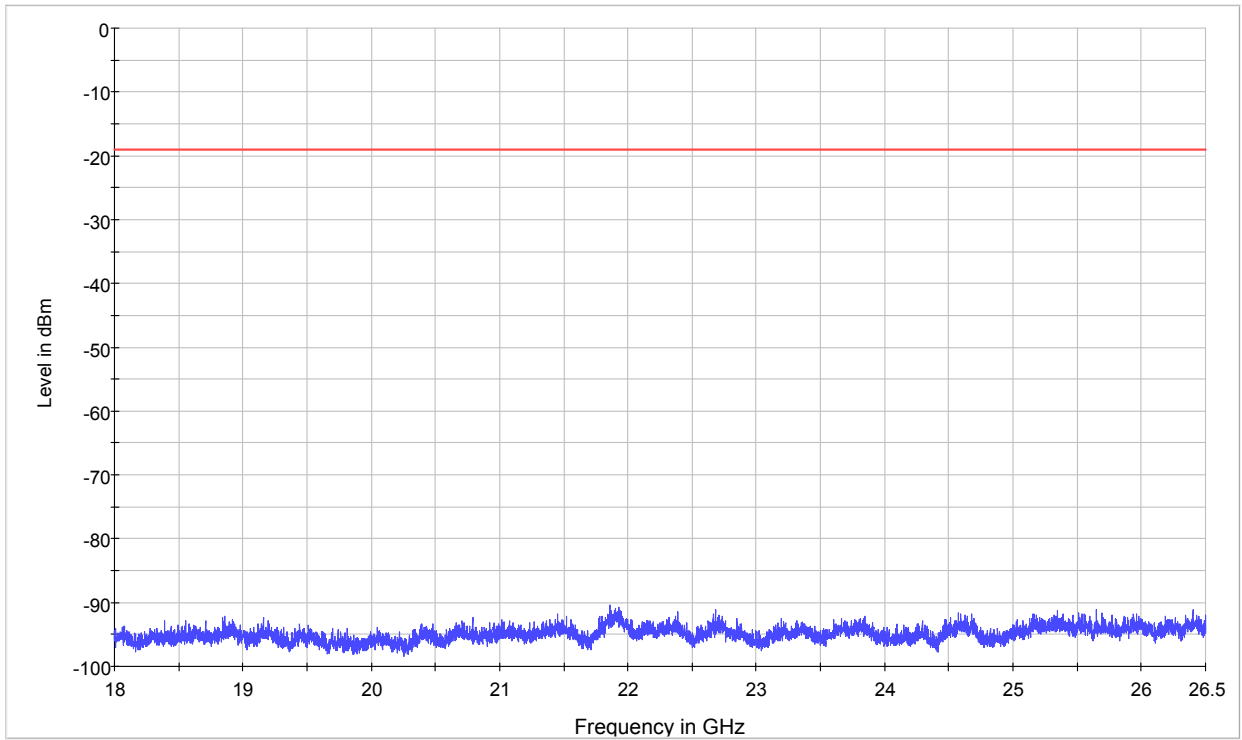
Report No.: RZA1109-1686RF01R1

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EDR(3DH5)-CH0:



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

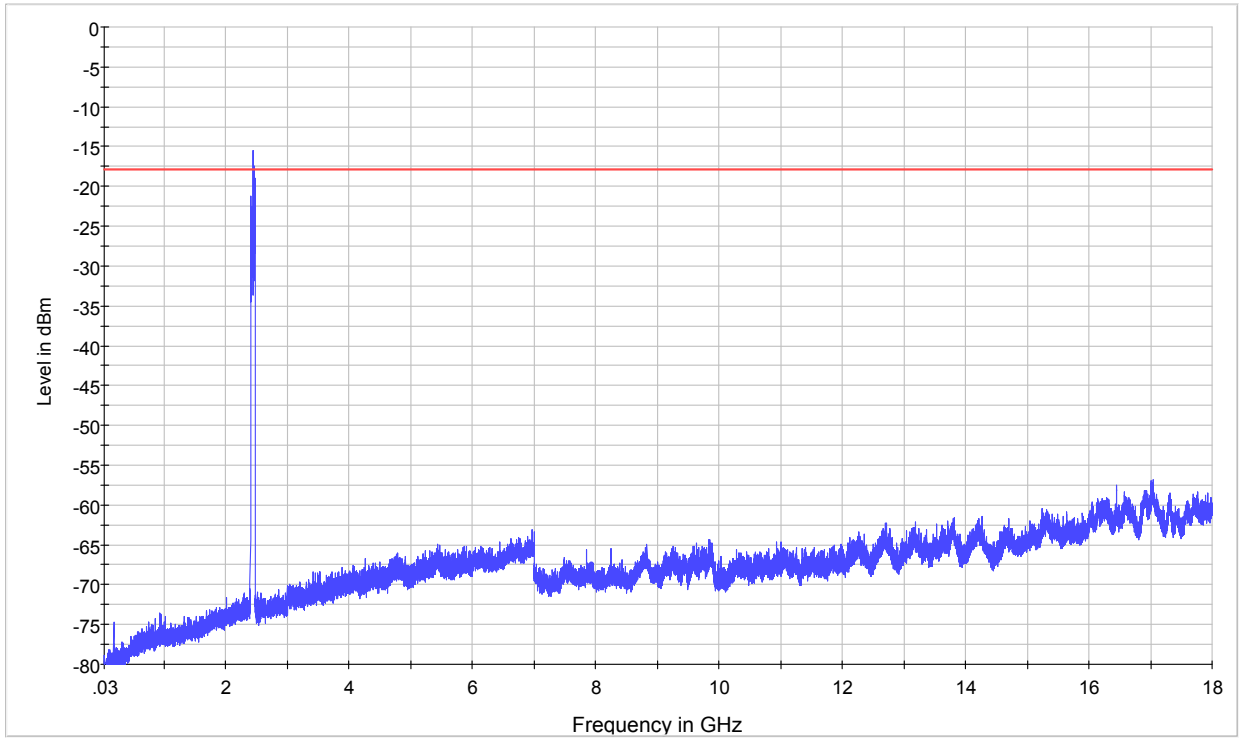


Spurious RF conducted emissions from 18GHz to 26.5GHz

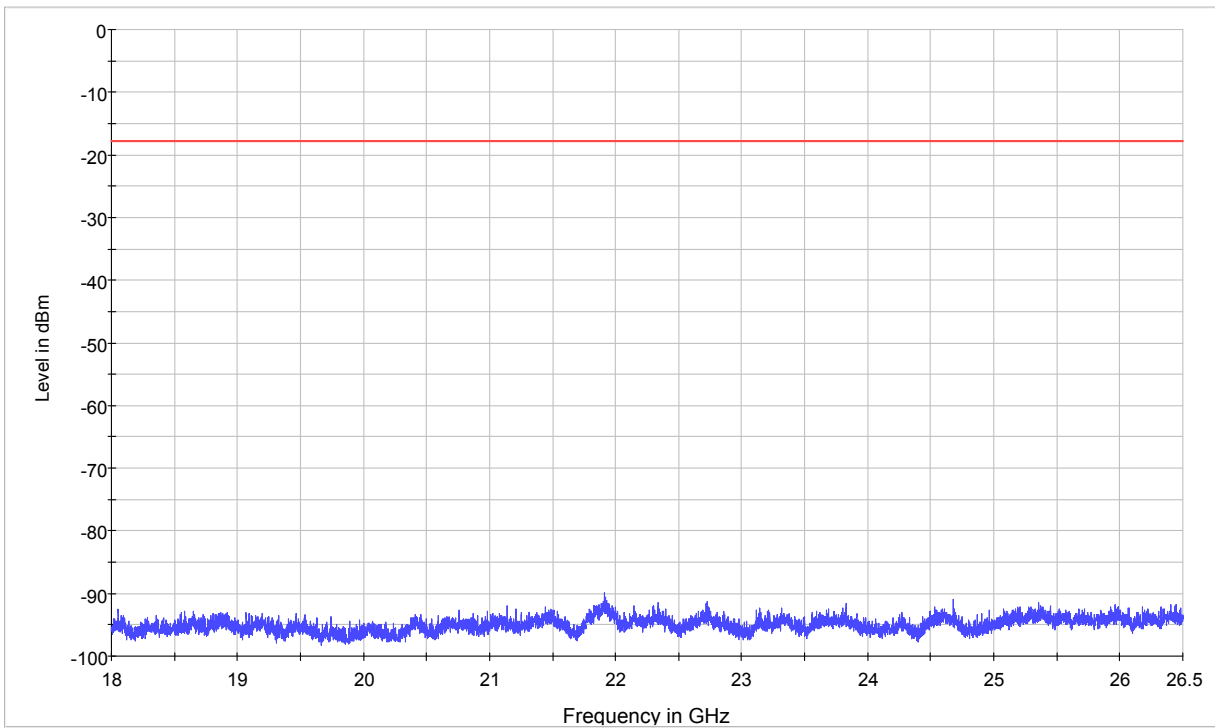
Harmonic	TX ch.0 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4804	Nf	-18.94
3	7206	Nf	-18.94
4	9608	Nf	-18.94
5	12010	Nf	-18.94
6	14412	Nf	-18.94
7	16814	Nf	-18.94
8	19216	Nf	-18.94
9	21618	Nf	-18.94
10	24020	Nf	-18.94
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

EDR(3DH5)-CH39:



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

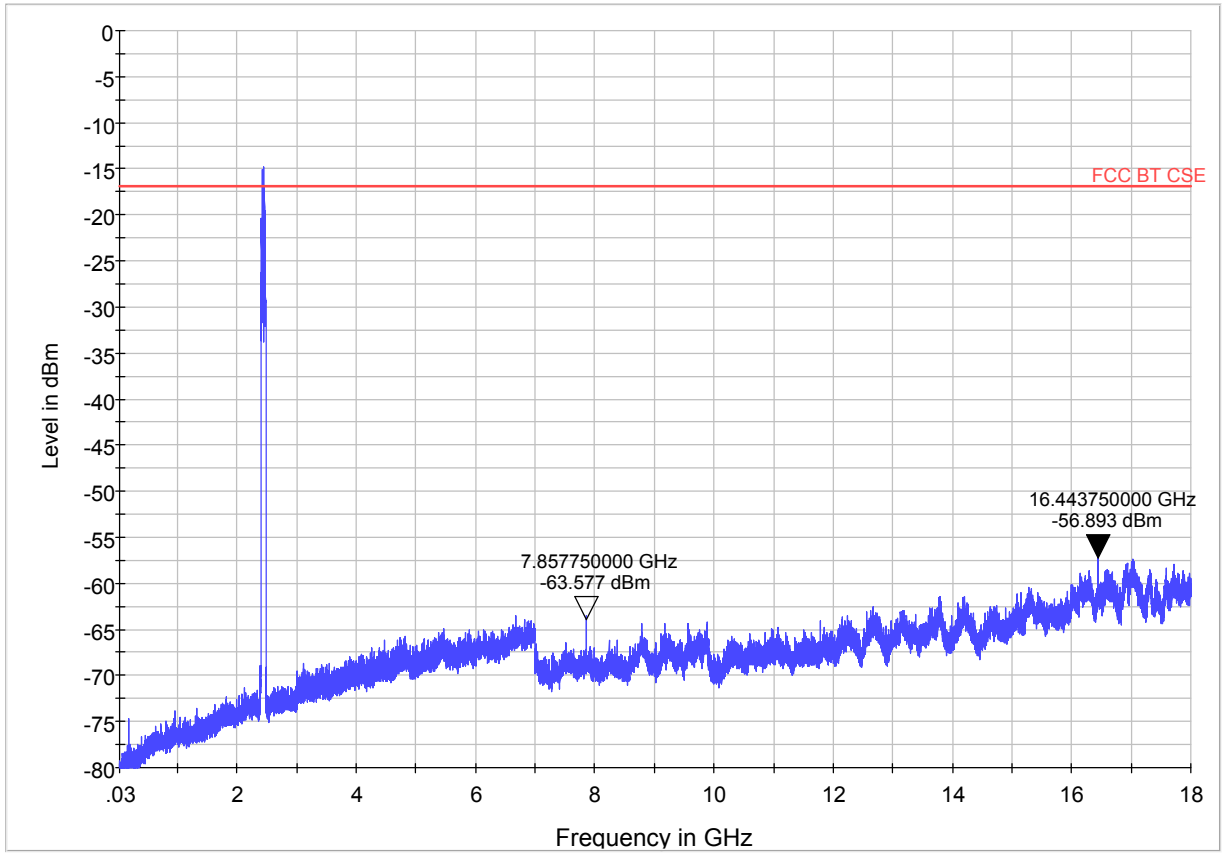


Spurious RF conducted emissions from 18GHz to 26.5GHz

Harmonic	TX ch.39 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4882	Nf	-17.87
3	7323	Nf	-17.87
4	9764	Nf	-17.87
5	12205	Nf	-17.87
6	14646	Nf	-17.87
7	17087	Nf	-17.87
8	19528	Nf	-17.87
9	21969	Nf	-17.87
10	24410	Nf	-17.87
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

EDR(3DH5)-CH78:



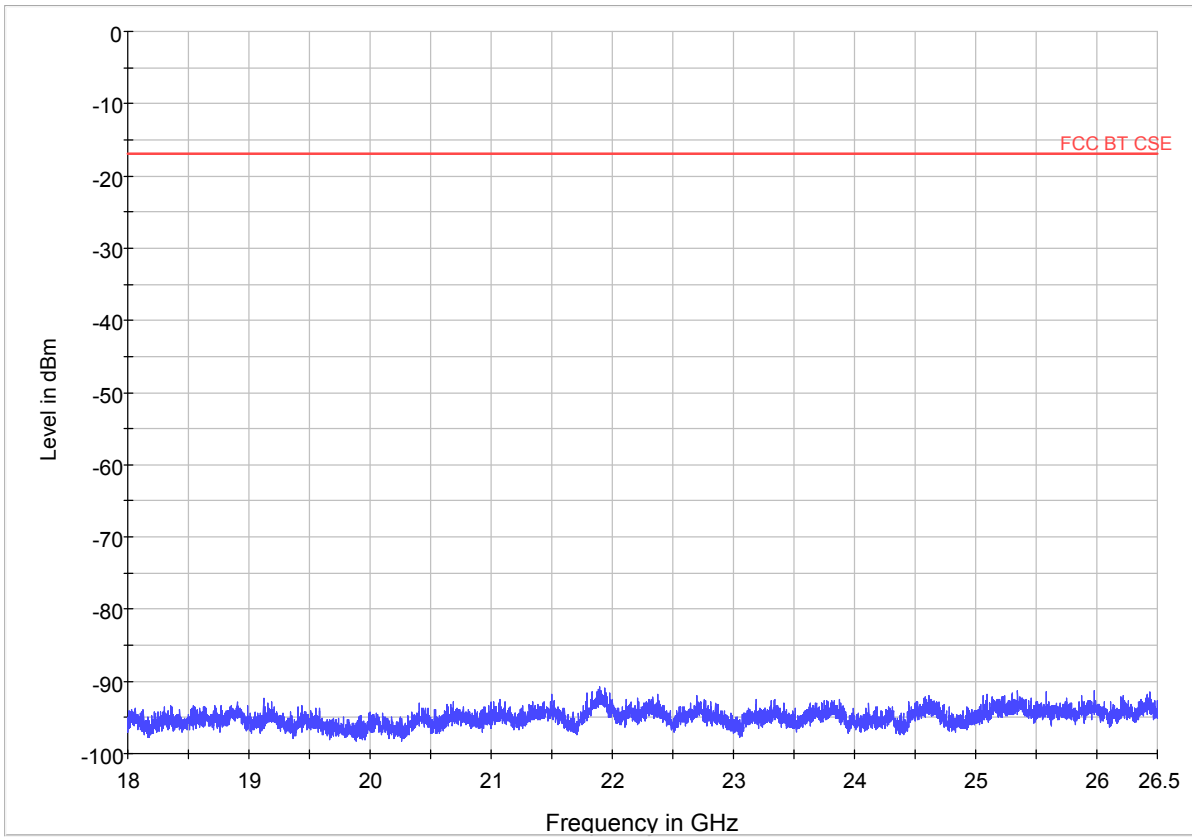
Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2480
Spurious RF conducted emissions from 30MHz to 18GHz

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Spurious RF conducted emissions from 18GHz to 26.5GHz

Harmonic	TX ch.78 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	4960	Nf	-16.86
3	7440	Nf	-16.86
4	9920	Nf	-16.86
5	12400	Nf	-16.86
6	14880	Nf	-16.86
7	17360	Nf	-16.86
8	19840	Nf	-16.86
9	22320	Nf	-16.86
10	24800	Nf	-16.86
Nf: noise floor			

Note: The other Spurious RF conducted emissions level is no more than noise floor.

2.10. 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 C63.4-2003. 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 through the range from 30MHz to 26GHz 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

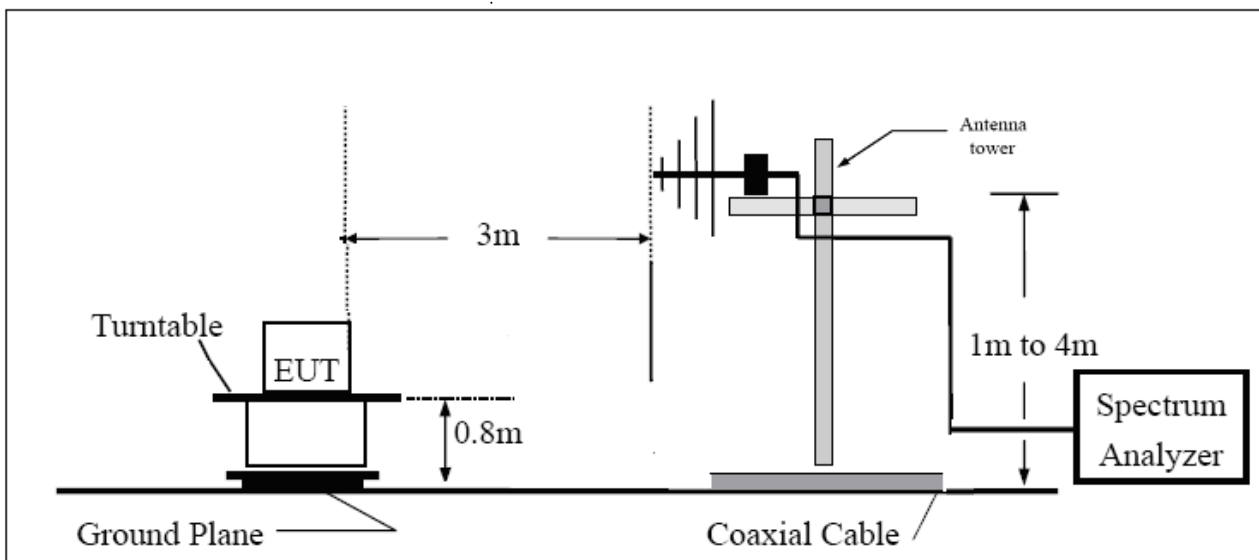
Above 1GHz(detector: Peak):

- (a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO
- (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

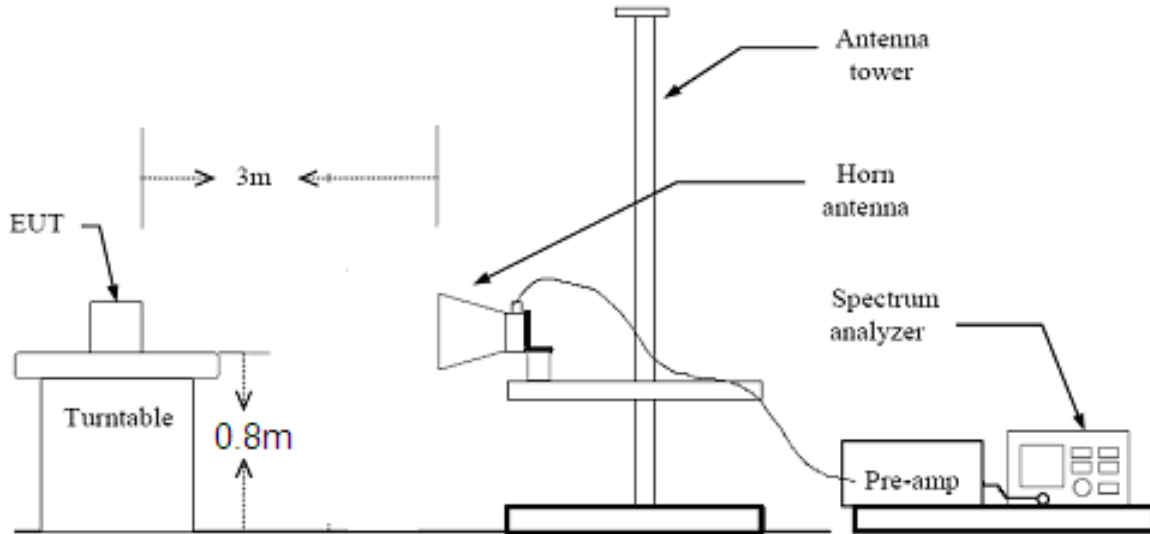
The test is in transmit mode.

Test setup

Below 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)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	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.

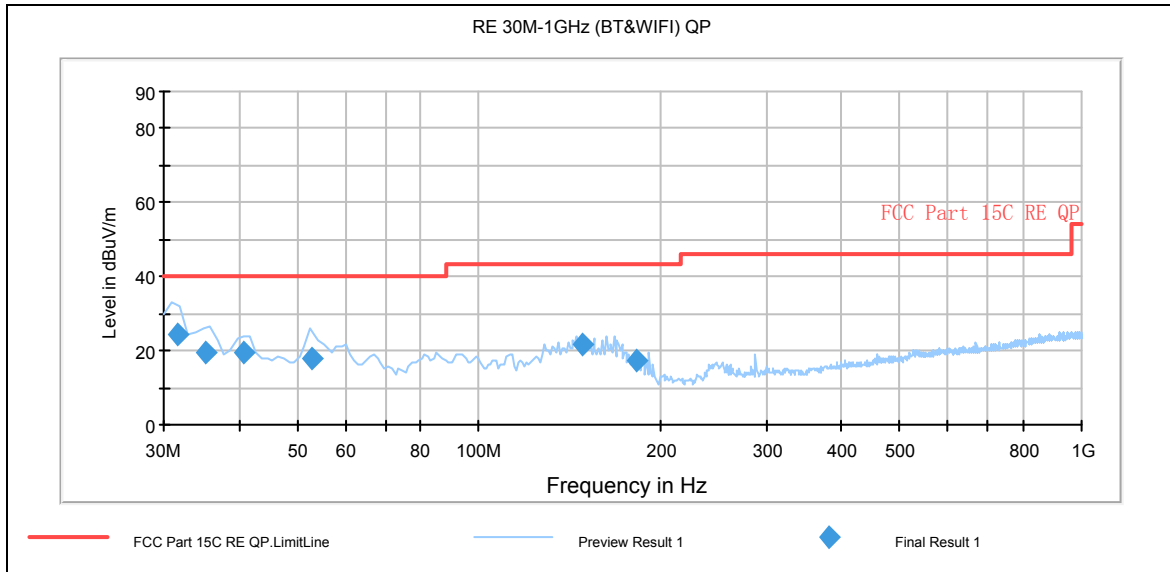
Measurement Uncertainty

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

Frequency	Uncertainty
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
1GHz – 6GHz	3.68 dB

Test result

Basic Rate(DH5)-Channel 0



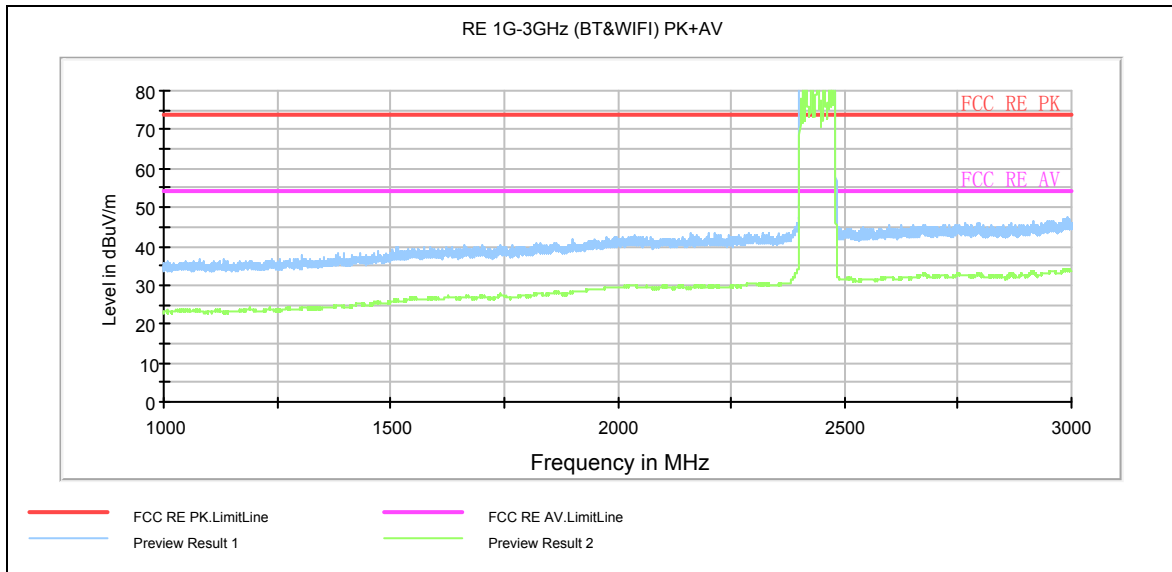
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
31.570000	24.6	190.0	V	0.0	48.7	-24.1	15.4	40.0
35.300000	19.5	175.0	V	9.0	44.1	-24.6	20.5	40.0
40.870000	19.3	100.0	V	352.0	43.5	-24.2	20.7	40.0
52.910000	18.0	121.0	V	81.0	44.1	-26.1	22.0	40.0
148.780000	21.4	100.0	V	70.0	54.2	-32.8	22.1	43.5
182.410000	17.4	114.0	V	163.0	48.6	-31.2	26.1	43.5

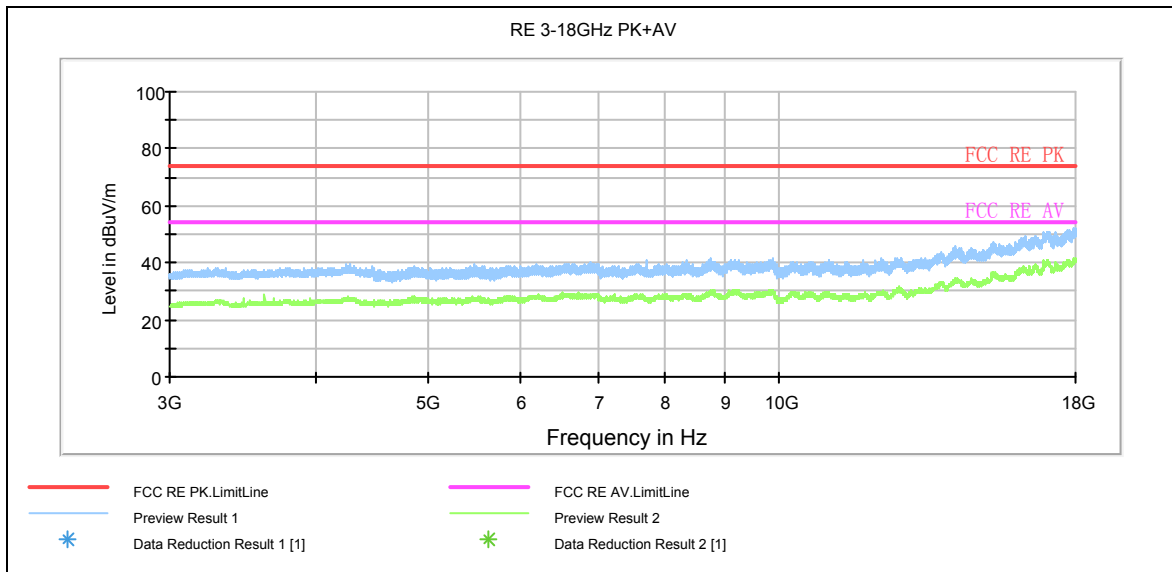
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

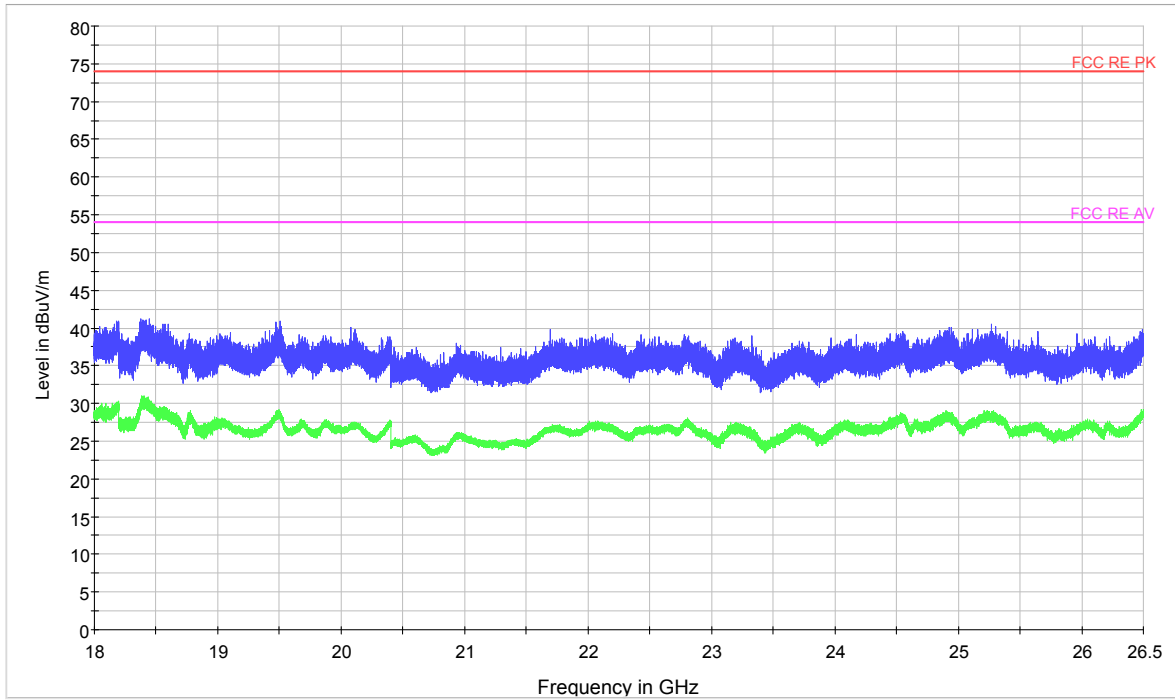
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

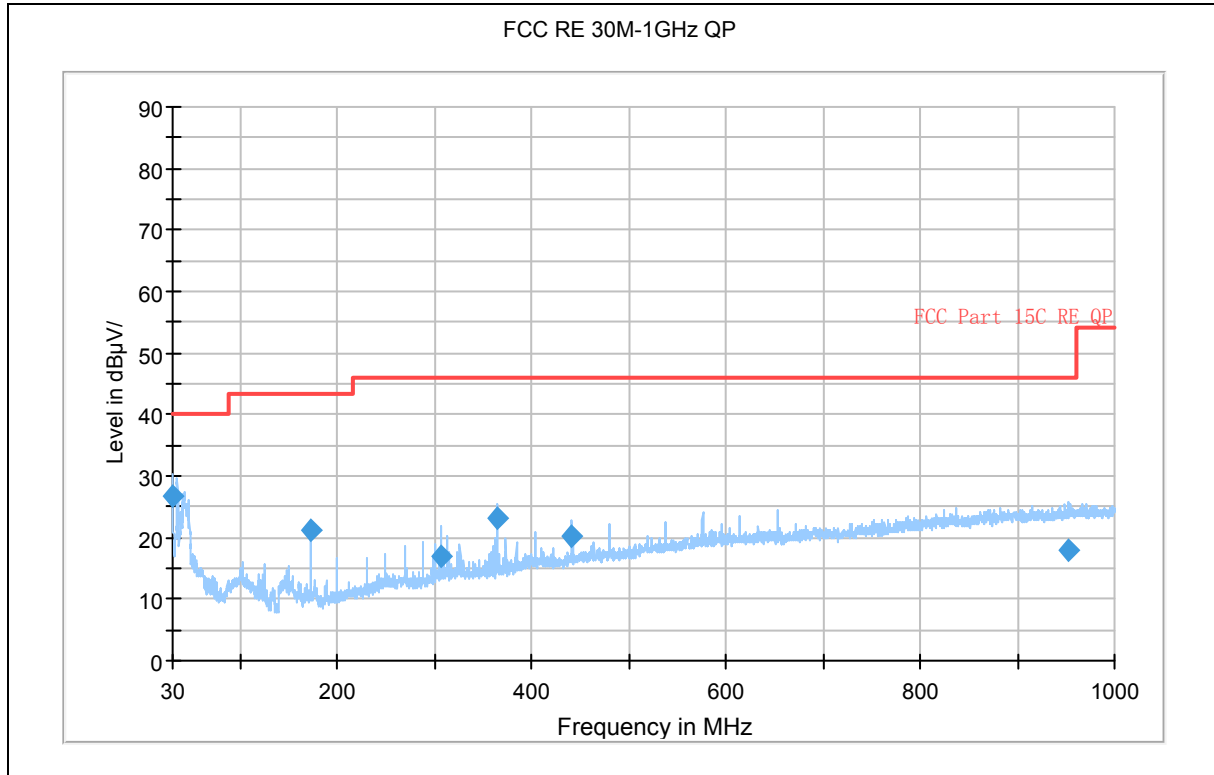


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

Basic Rate(DH5)-Channel 39



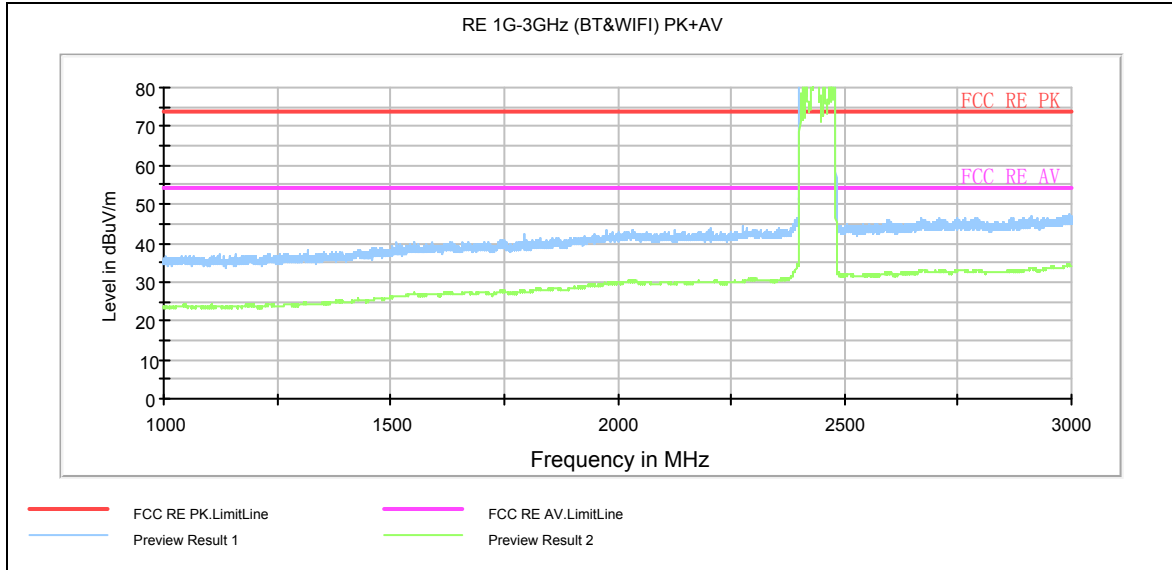
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
30.040000	26.7	100.0	V	11.0	50.5	-23.8	13.3	40.0
172.792500	21.1	100.0	V	258.0	52.7	-31.6	22.4	43.5
307.177500	16.8	100.0	H	18.0	43.6	-26.8	29.2	46.0
364.810000	23.0	100.0	H	33.0	48.9	-25.9	23.0	46.0
441.602500	20.2	115.0	V	18.0	44.3	-24.1	25.8	46.0
952.395000	17.8	100.0	H	116.0	34.2	-16.4	28.2	46.0

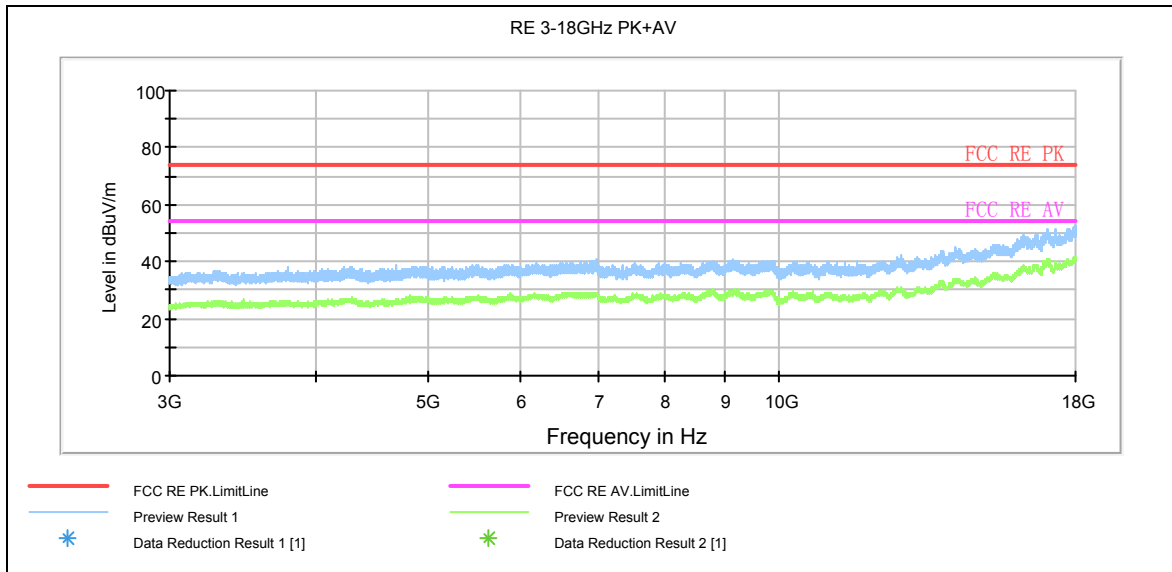
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

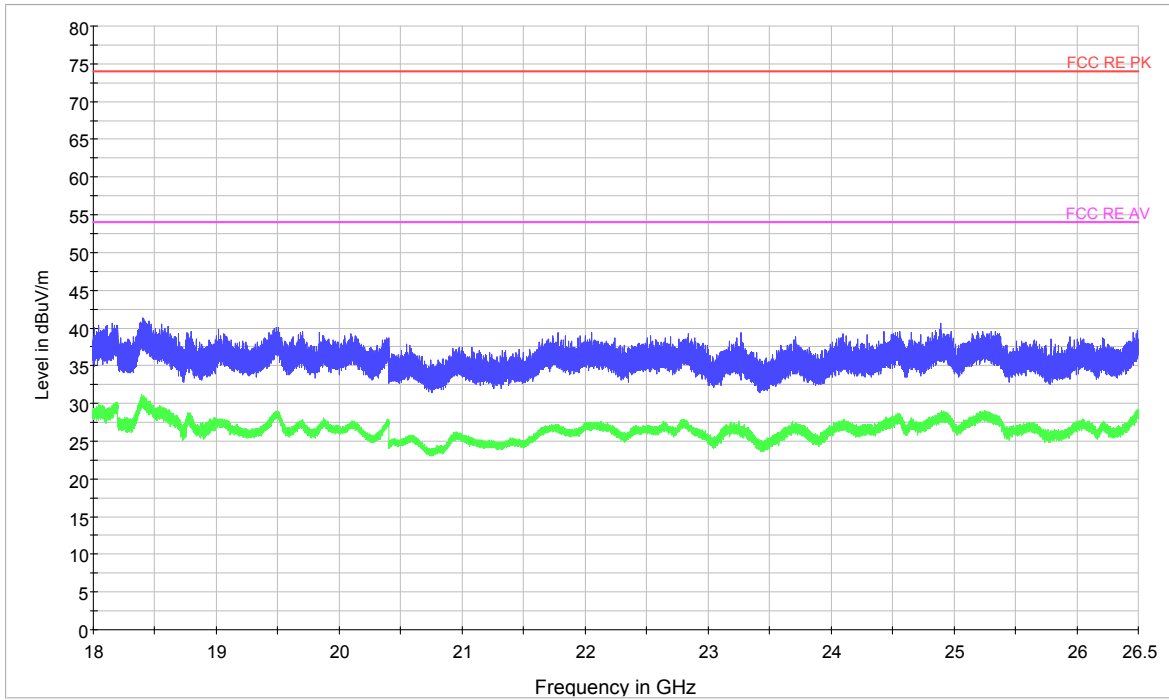
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

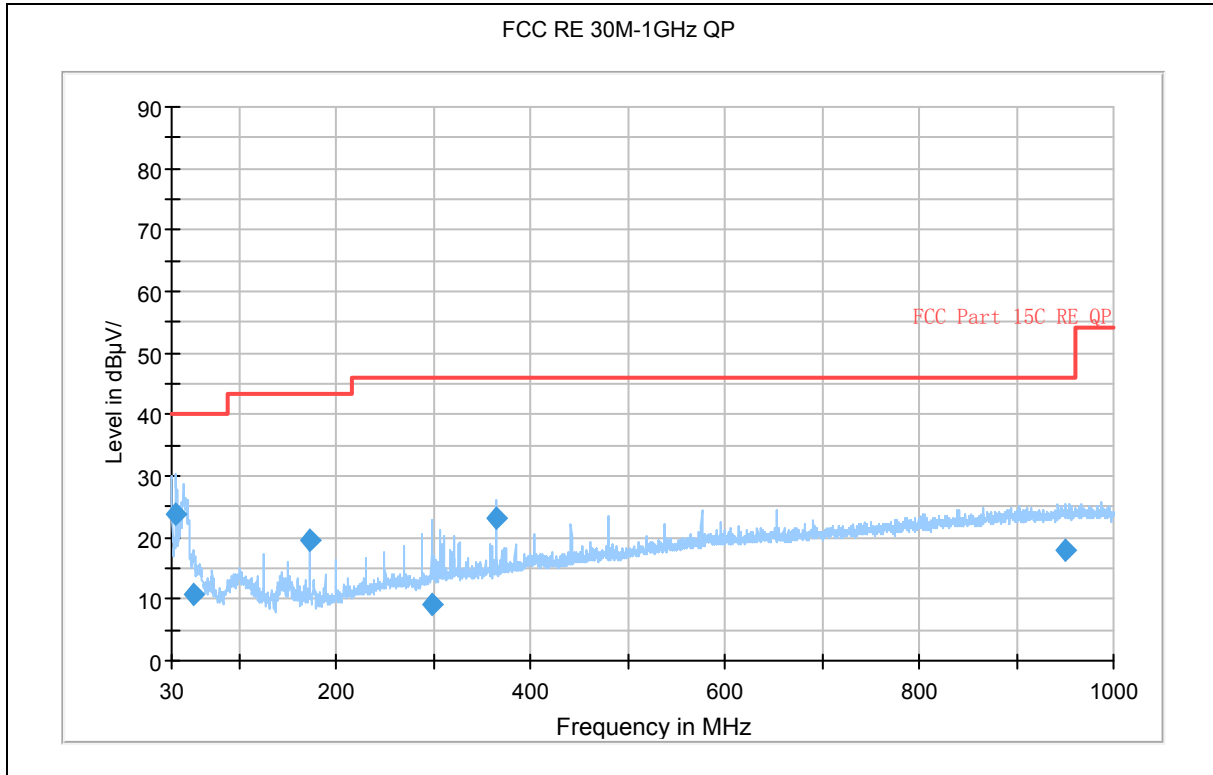


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

Basic Rate(DH5)-Channel 78



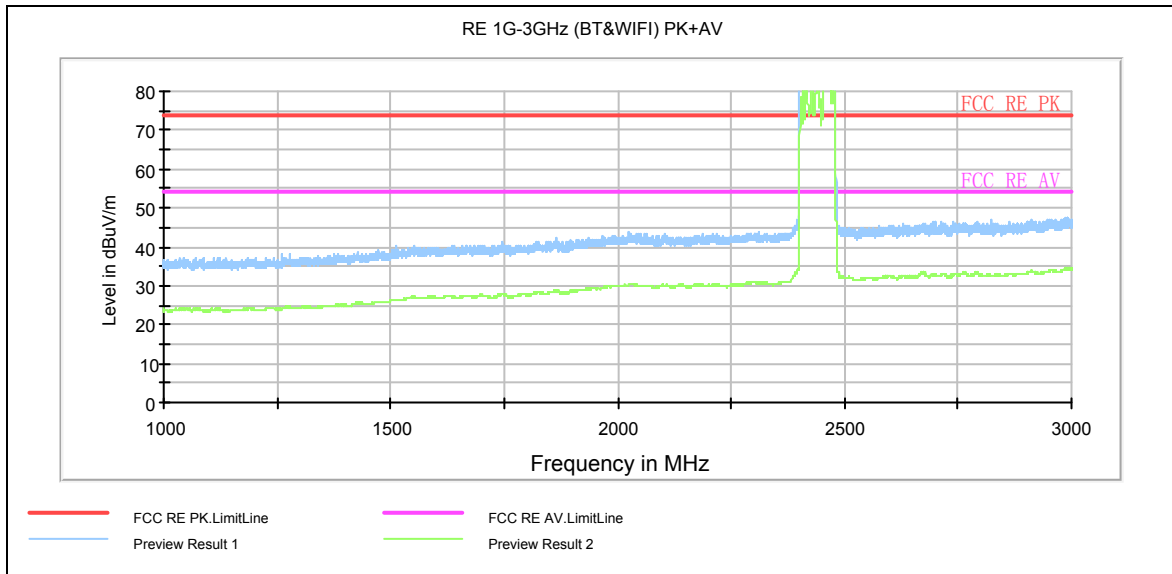
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
34.887500	23.7	100.0	V	54.0	48.3	-24.6	16.3	40.0
53.567500	10.8	100.0	V	144.0	37	-26.2	29.2	40.0
172.792500	19.7	100.0	V	236.0	51.3	-31.6	23.8	43.5
298.607500	9.0	100.0	H	171.0	36.2	-27.2	37.0	46.0
364.810000	23.3	100.0	H	34.0	49.2	-25.9	22.7	46.0
950.332500	17.8	119.0	V	342.0	34.2	-16.4	28.2	46.0

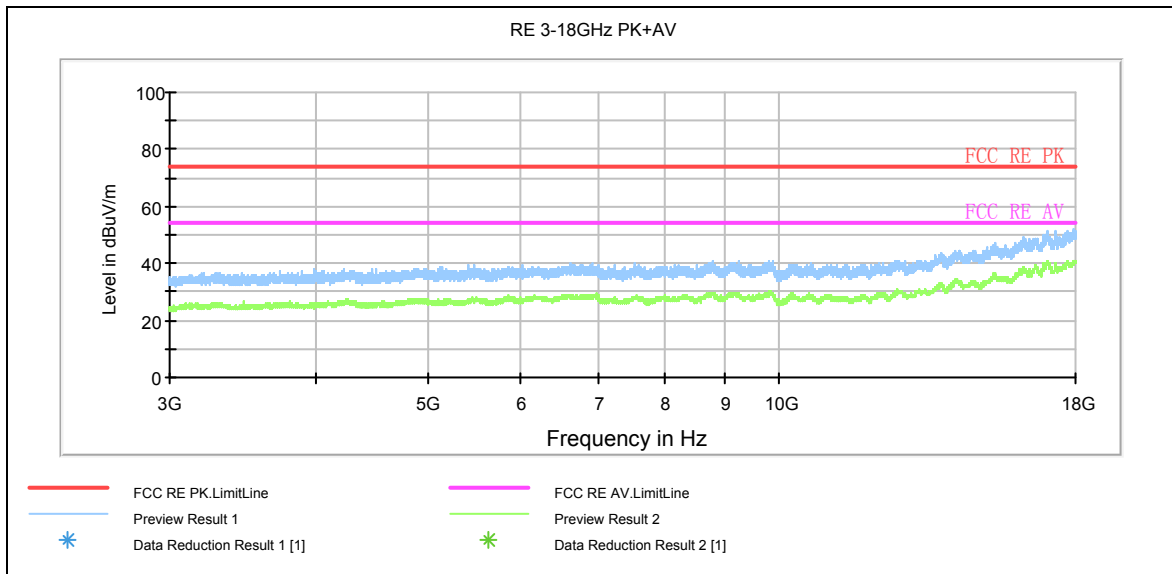
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

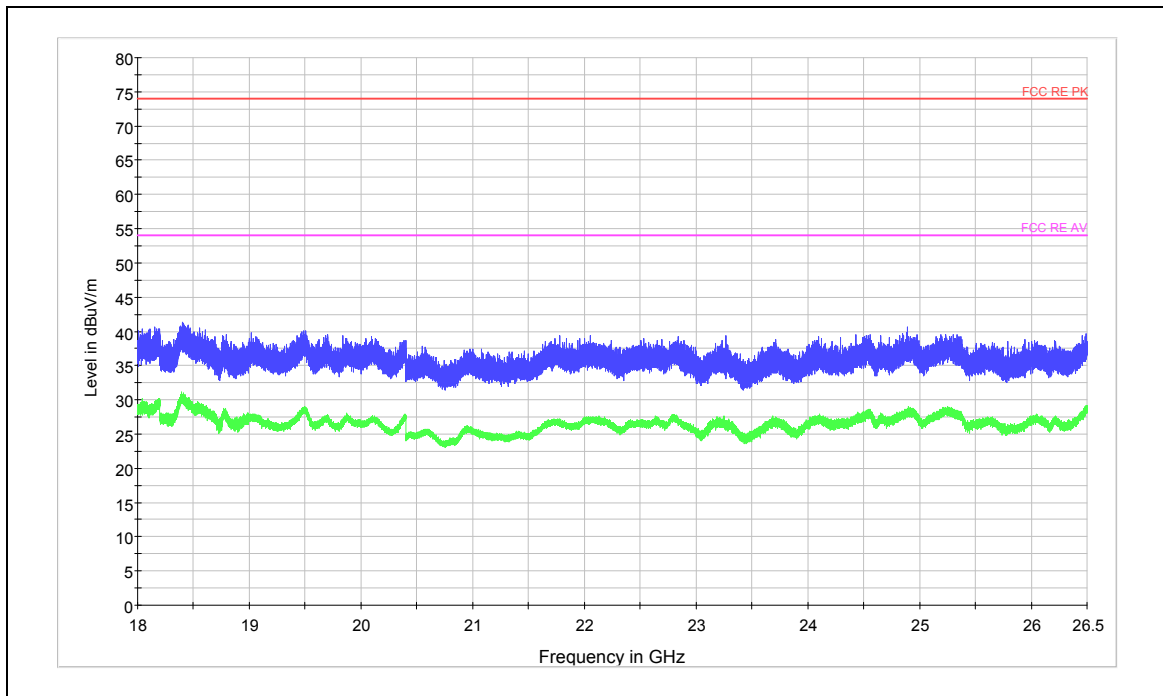
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

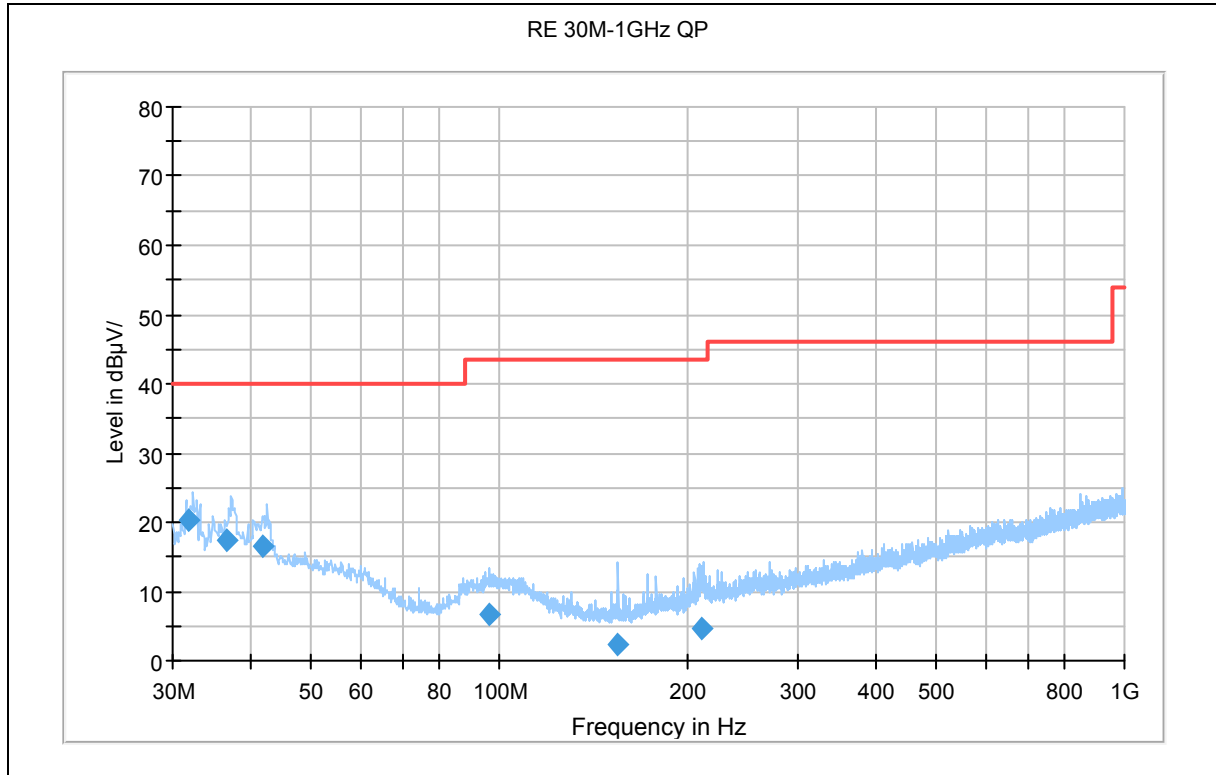


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

EDR(2DH5)-Channel 0



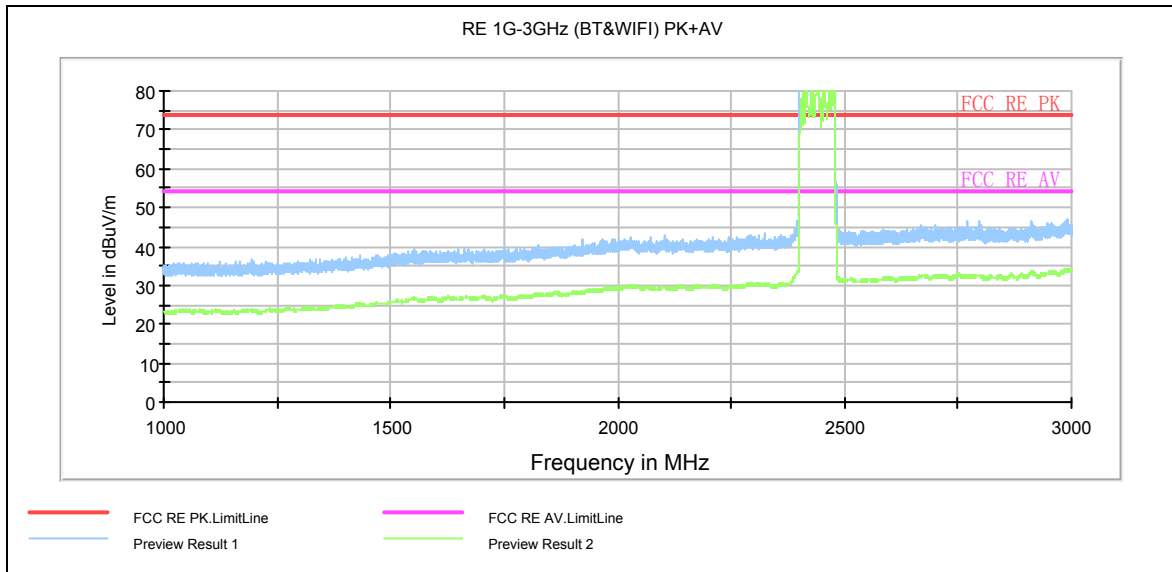
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
31.823750	20.2	100.0	V	312.0	44.5	-24.3	19.8	40.0
36.715000	17.3	100.0	V	319.0	41.9	-24.6	22.7	40.0
41.928750	16.7	100.0	V	235.0	41.3	-24.6	23.3	40.0
96.563750	6.6	100.0	H	310.0	34.9	-28.3	36.9	43.5
154.608750	2.3	100.0	V	10.0	34.8	-32.5	41.2	43.5
211.392500	4.7	200.0	V	81.0	34.7	-30.0	38.8	43.5

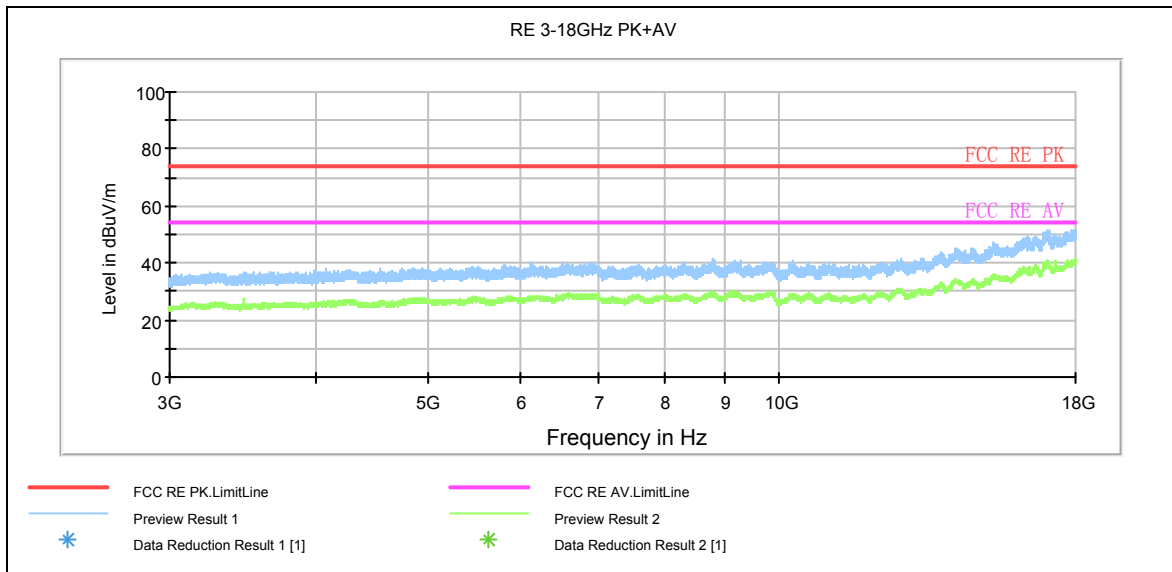
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

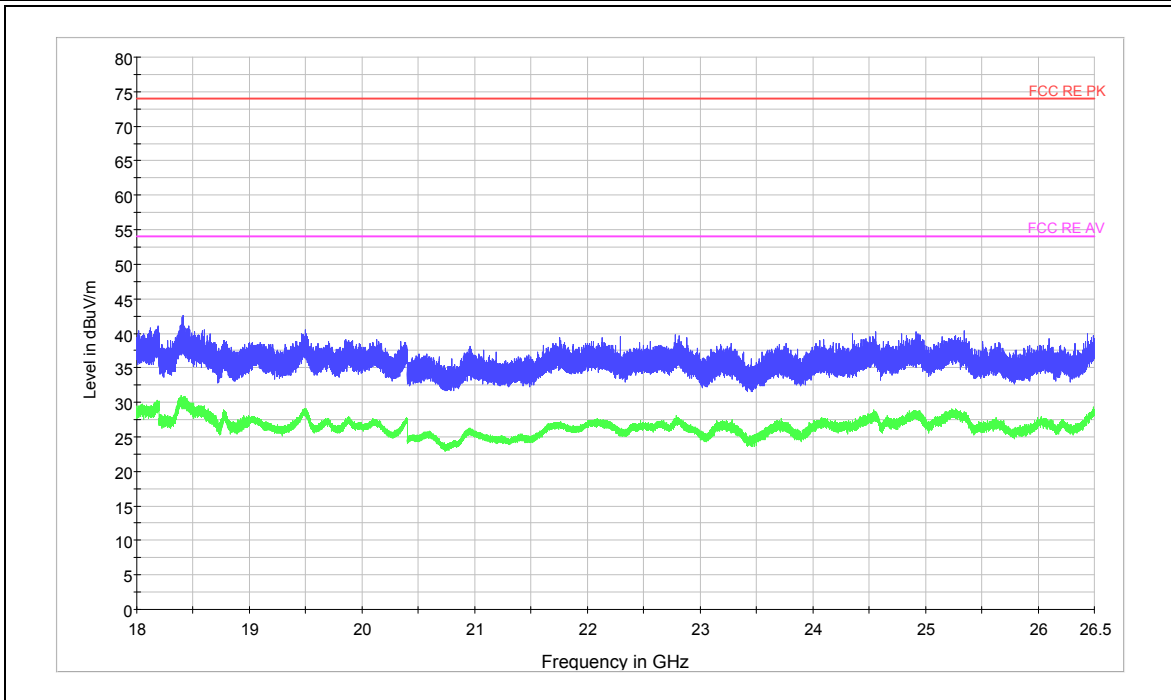
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

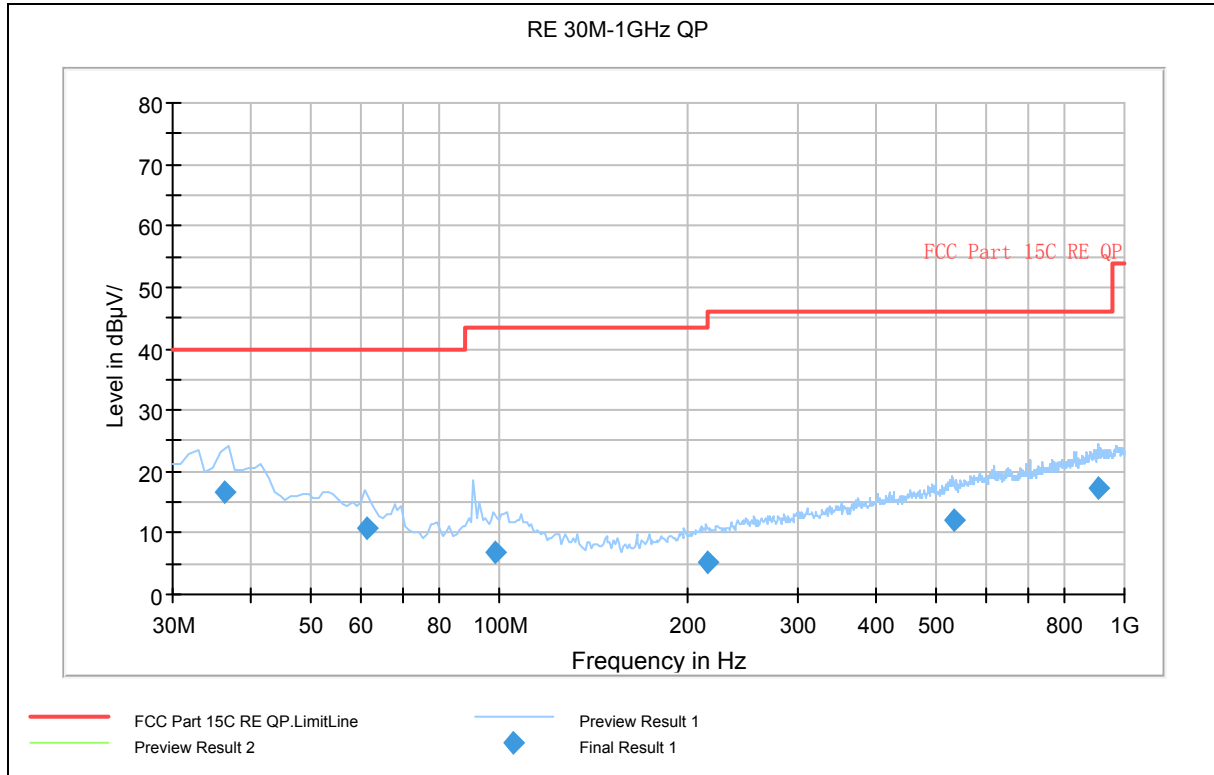


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

EDR(2DH5)-Channel 39



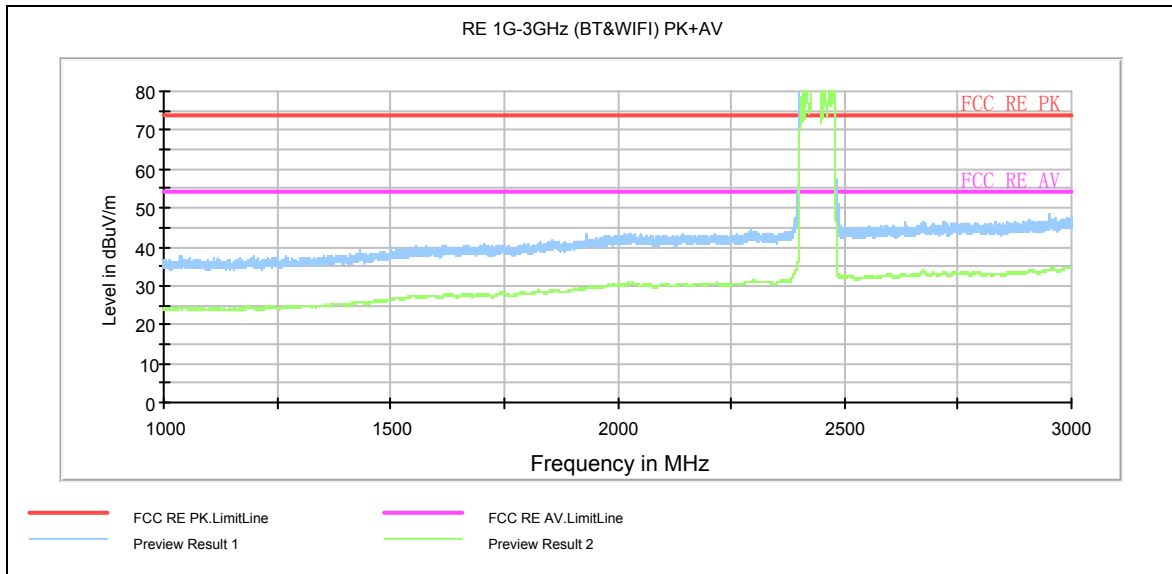
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
36.270000	16.5	100.0	V	3.0	41.2	-24.7	23.5	40.0
61.560000	10.6	100.0	V	219.0	38.4	-27.8	29.4	40.0
98.180000	6.9	125.0	H	220.0	35.1	-28.2	36.6	43.5
214.780000	5.2	225.0	H	112.0	35.1	-29.9	38.3	43.5
532.050000	12.2	116.0	V	121.0	34.6	-22.4	33.8	46.0
907.400000	17.2	100.0	V	3.0	34.2	-17.0	28.8	46.0

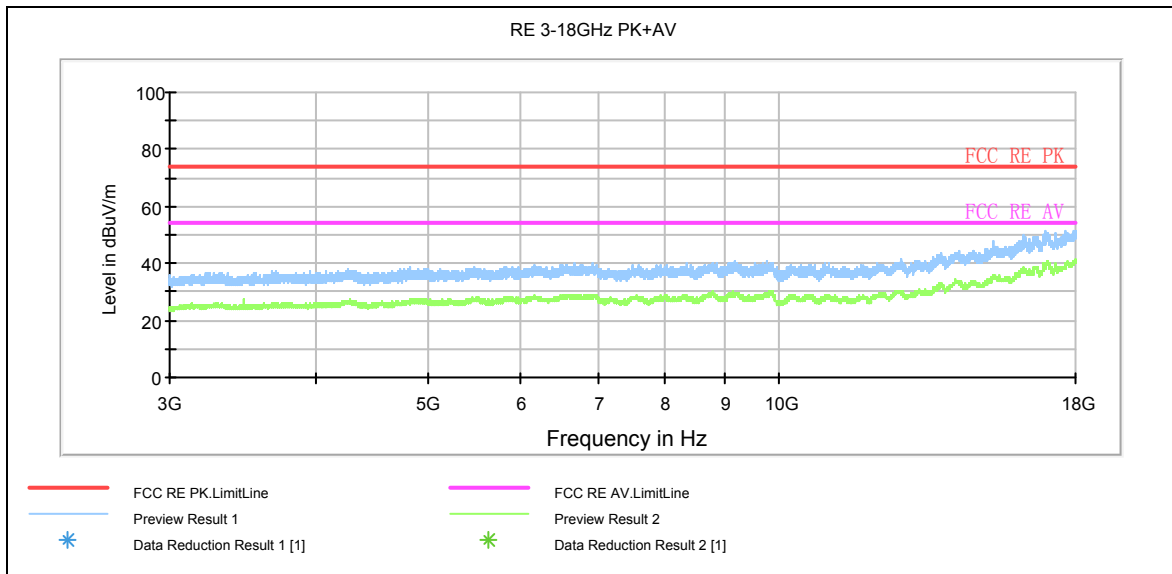
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

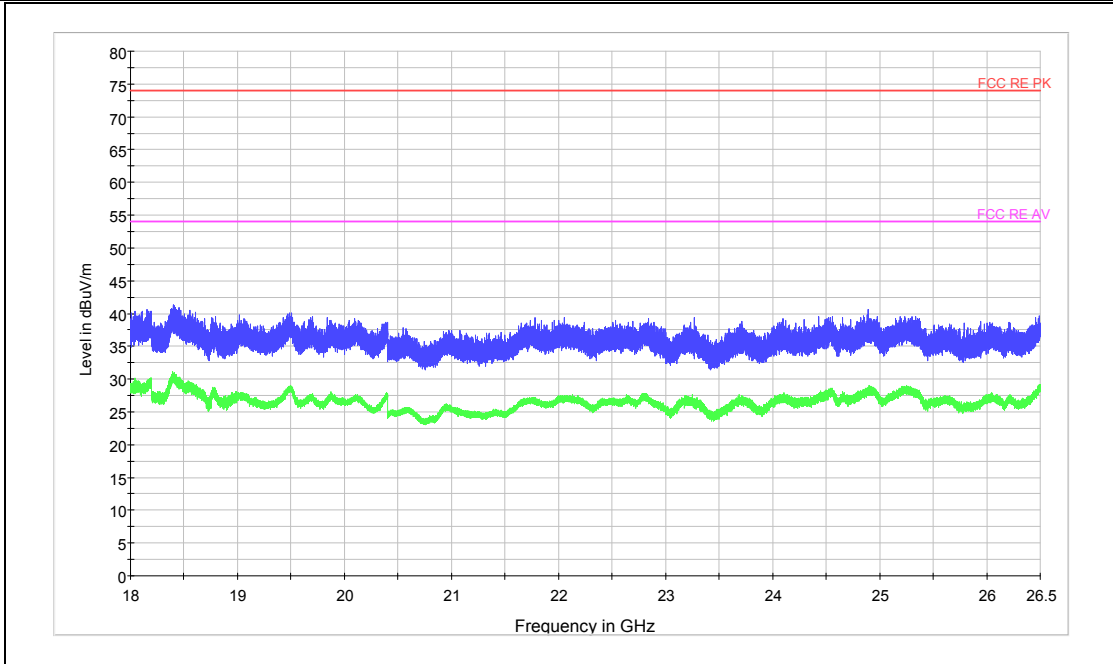
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

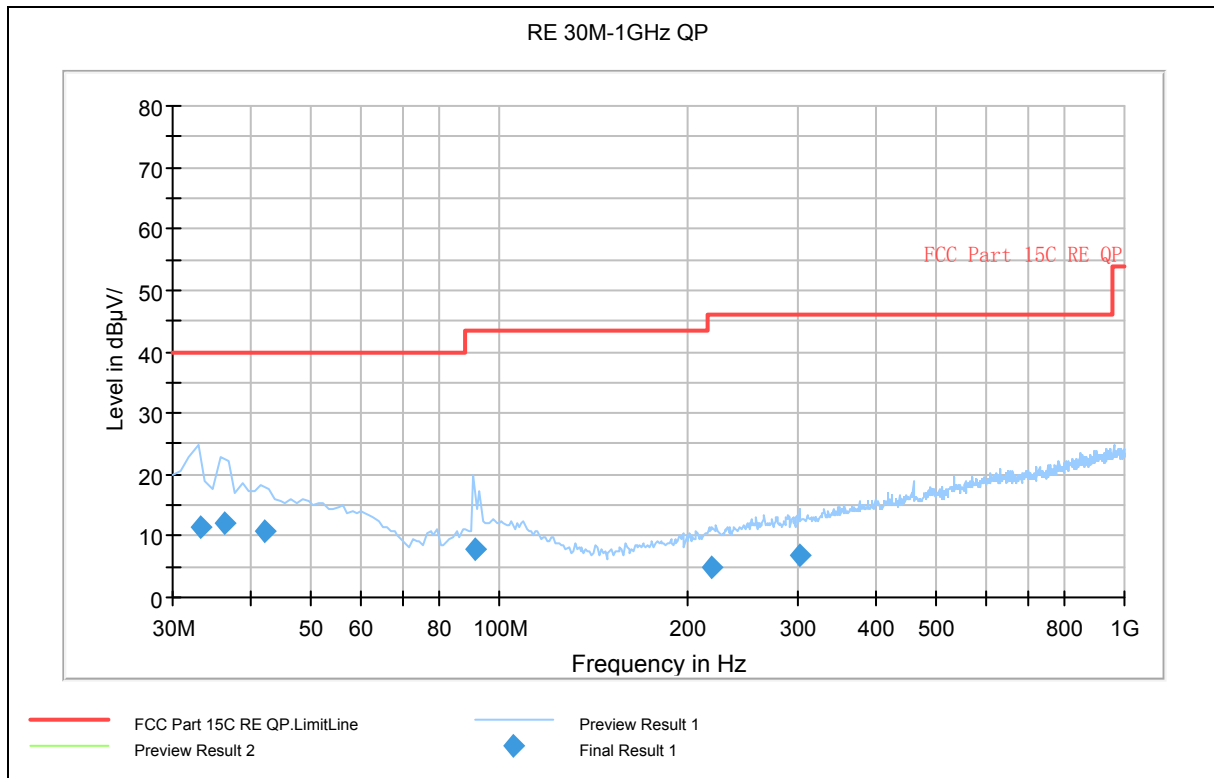


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

EDR(2DH5)-Channel 78



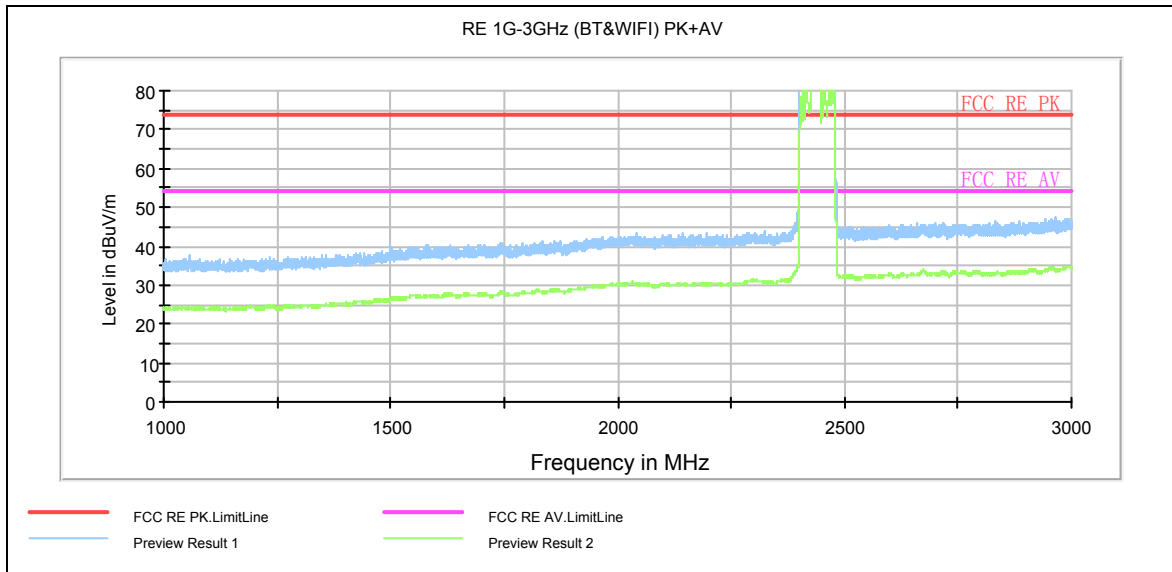
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
33.230000	11.3	100.0	V	359.0	35.8	-24.5	28.7	40.0
36.260000	12.0	100.0	V	264.0	36.7	-24.7	28.0	40.0
42.240000	10.7	100.0	V	0.0	35.3	-24.6	29.3	40.0
91.390000	8.0	206.0	H	273.0	36.8	-28.8	35.5	43.5
218.870000	4.8	116.0	V	206.0	34.5	-29.7	41.2	46.0
302.210000	6.9	199.0	H	283.0	34.3	-27.4	39.1	46.0

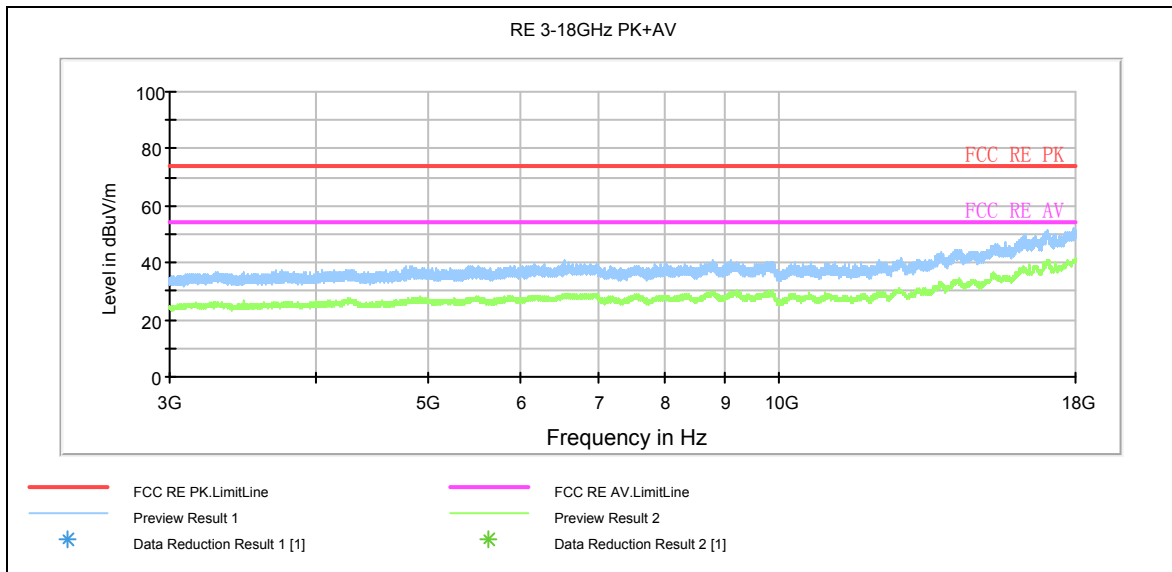
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

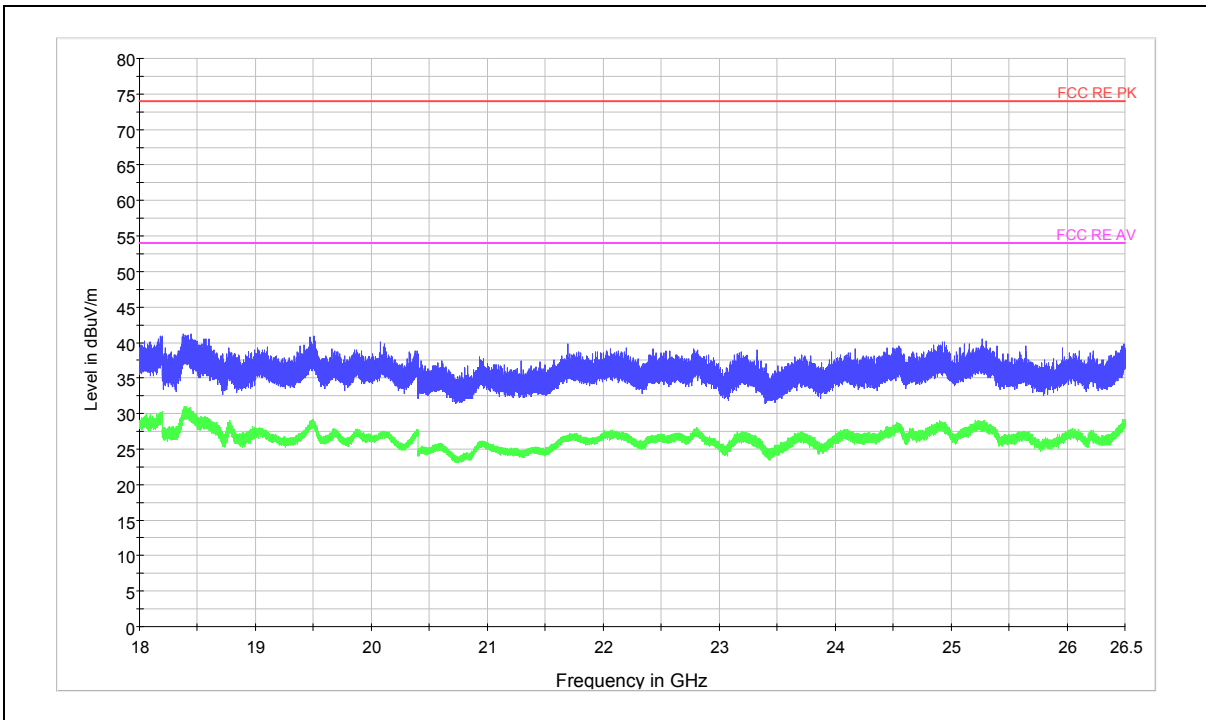
3. Margin = Limit - Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz



Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

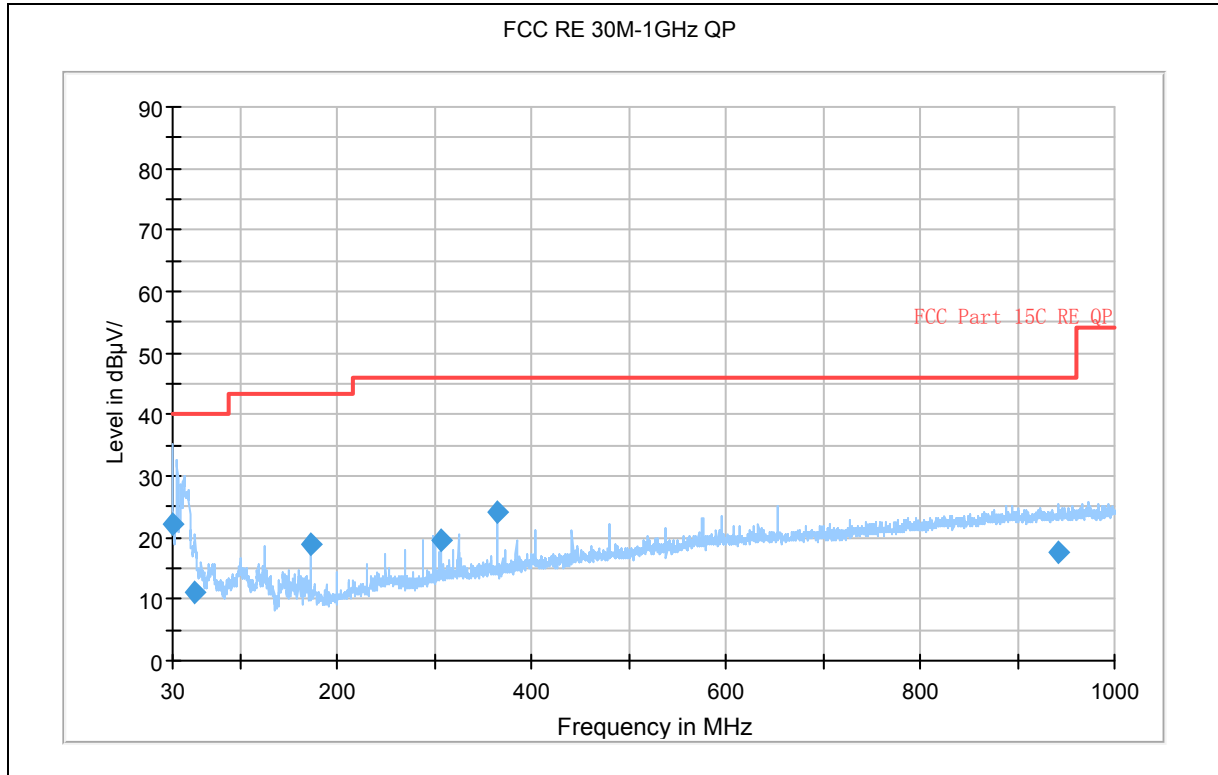
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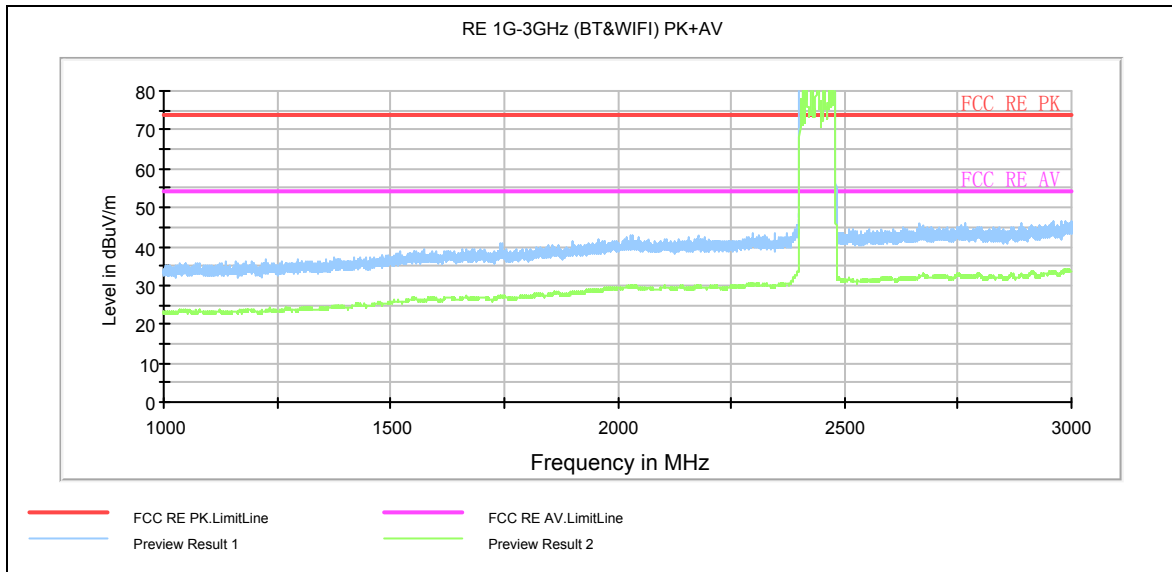
EDR(3DH5)-Channel 0



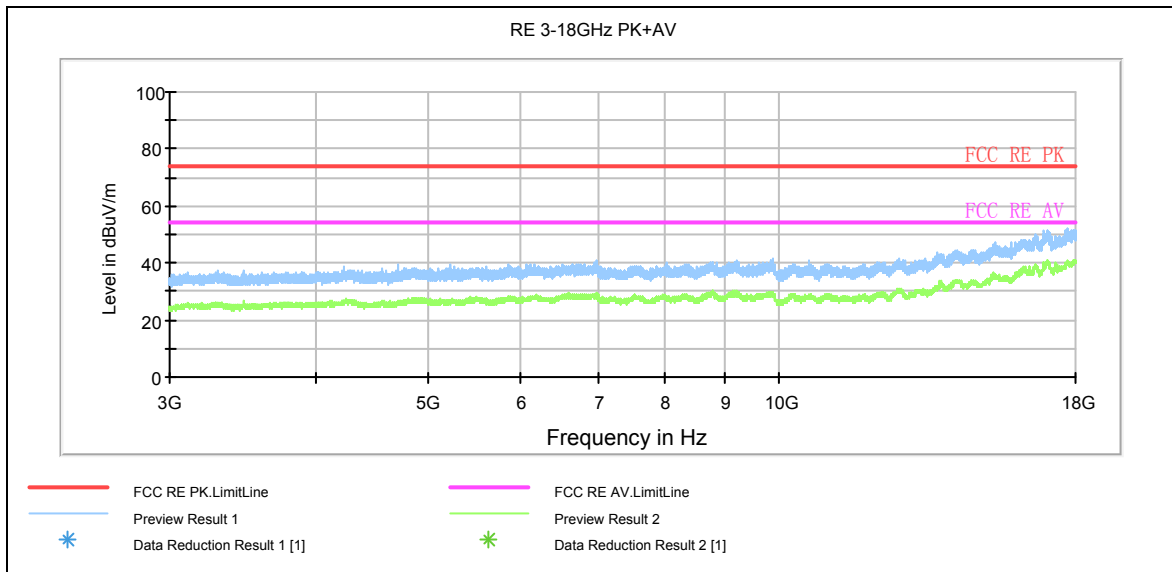
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
30.000000	22.1	100.0	V	15.0	45.9	-23.8	17.9	40.0
53.527500	11.1	100.0	V	220.0	37.3	-26.2	28.9	40.0
172.792500	19.0	100.0	V	233.0	50.6	-31.6	24.5	43.5
307.177500	19.4	100.0	H	49.0	46.2	-26.8	26.6	46.0
364.810000	24.3	100.0	H	16.0	50.2	-25.9	21.7	46.0
941.957500	17.8	125.0	V	45.0	34.4	-16.6	28.2	46.0

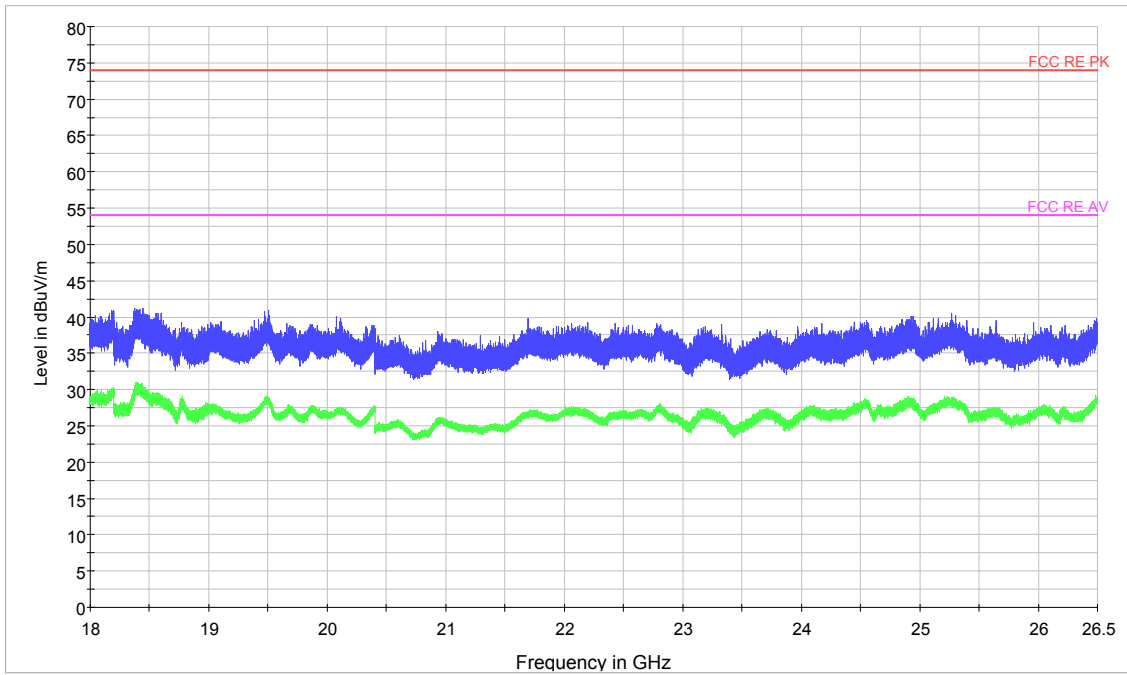
- Remark:**
1. Quasi-Peak = Reading value + Correction factor
 2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
 3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

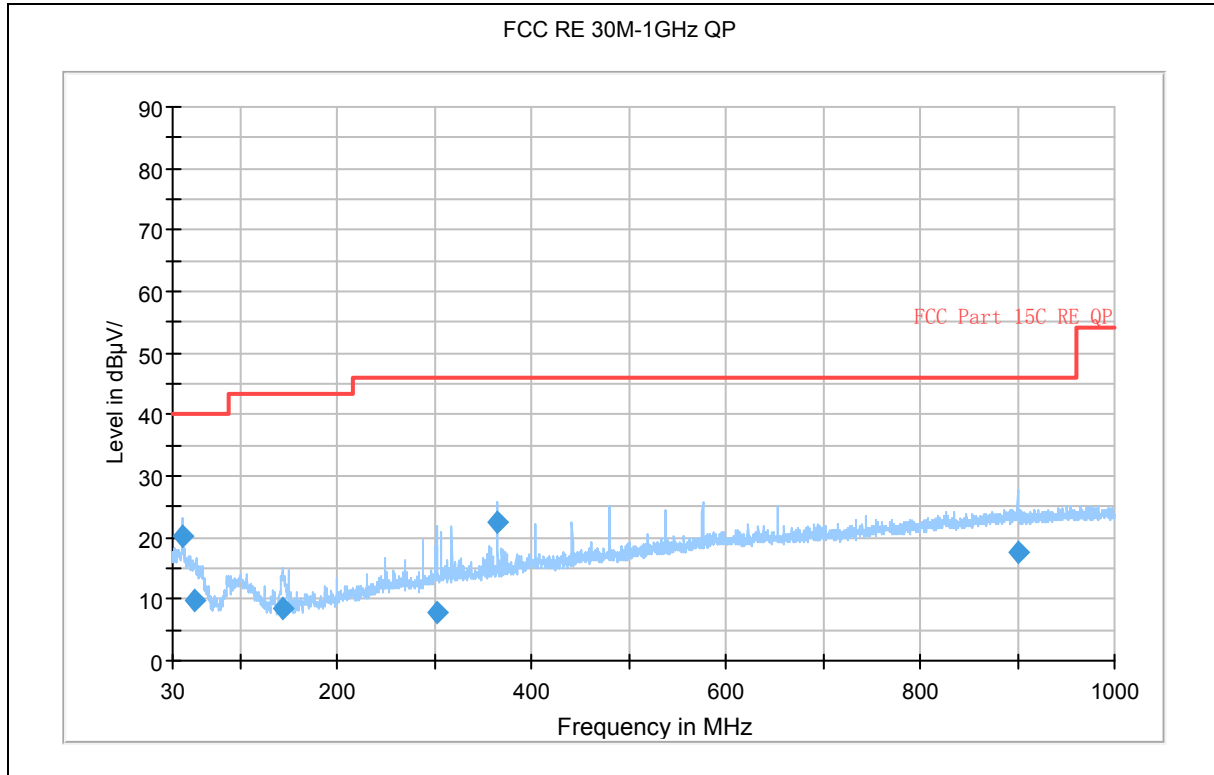


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

EDR(3DH5)-Channel 39



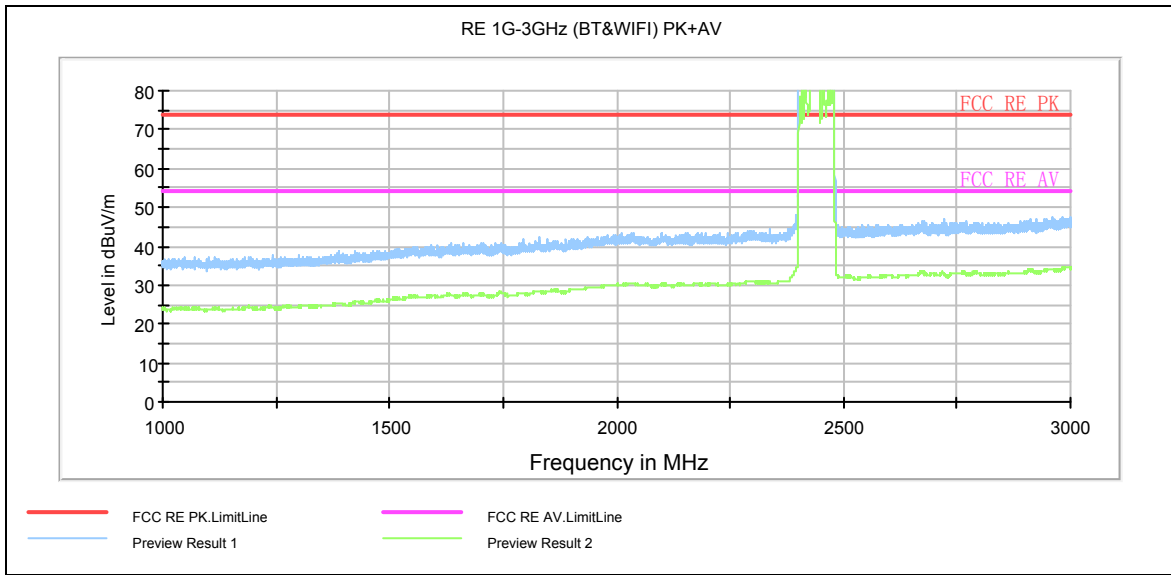
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
40.022500	20.2	100.0	V	0.0	44.2	-24.0	19.8	40.0
53.650000	9.8	100.0	H	37.0	36	-26.2	30.2	40.0
144.010000	8.3	100.0	V	45.0	41.1	-32.8	35.2	43.5
302.892500	7.9	100.0	H	45.0	34.9	-27.0	38.1	46.0
364.810000	22.4	100.0	H	16.0	48.3	-25.9	23.6	46.0
900.090000	17.5	100.0	H	285.0	34.4	-16.9	28.6	46.0

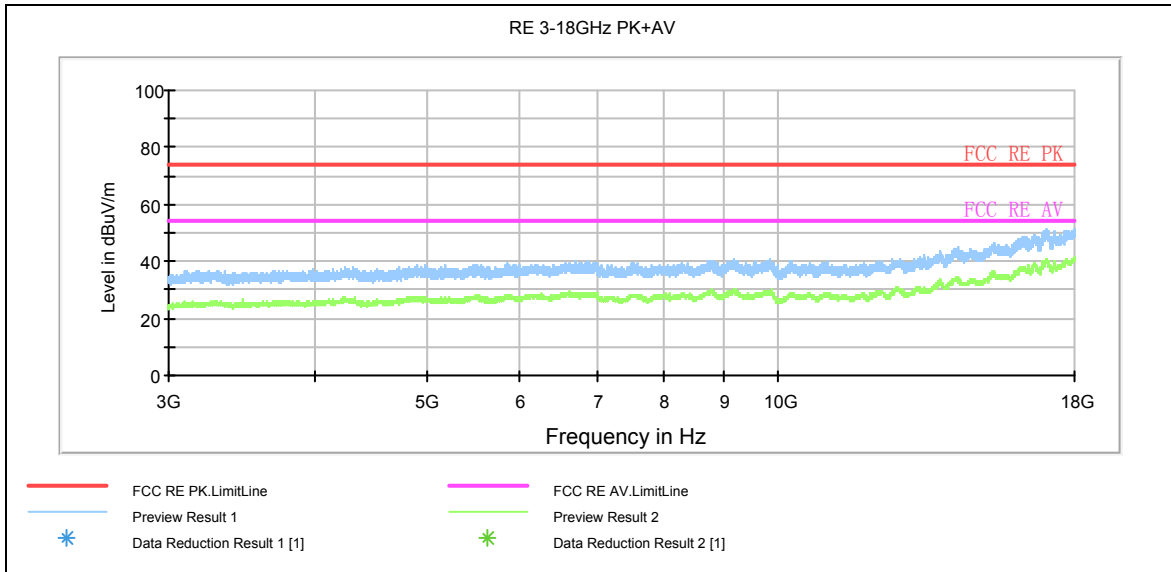
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

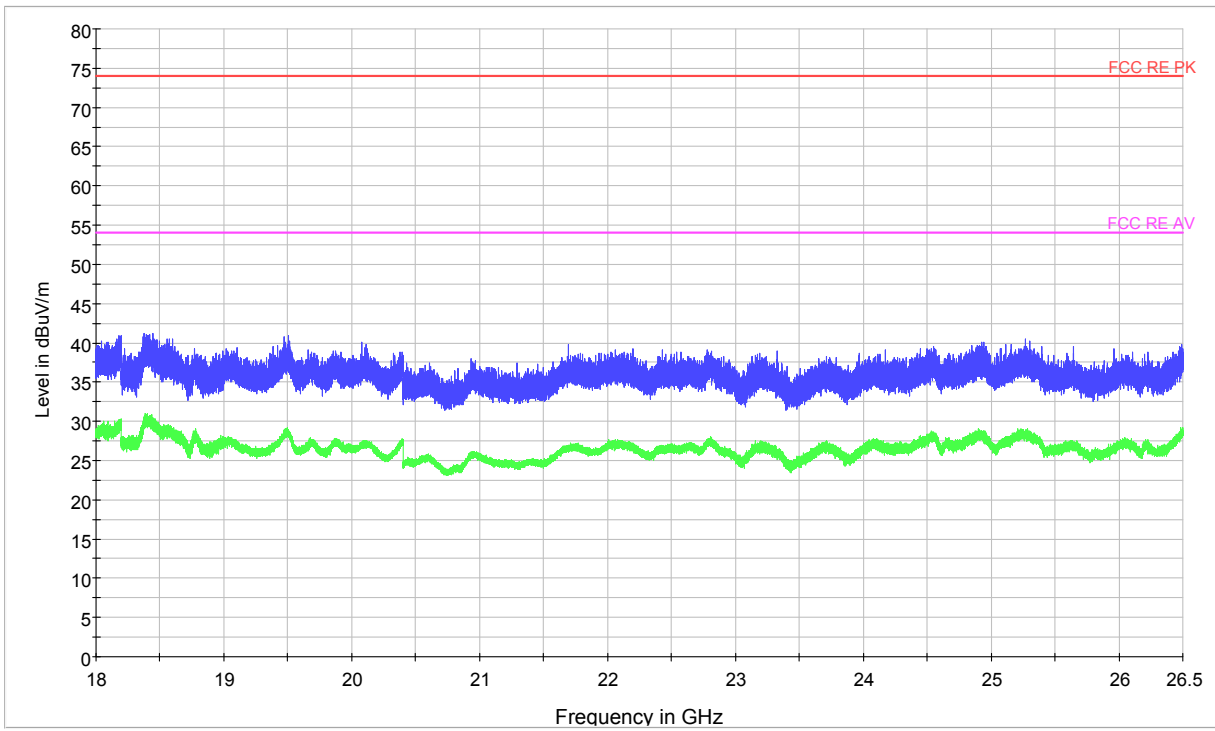
3. Margin = Limit – Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

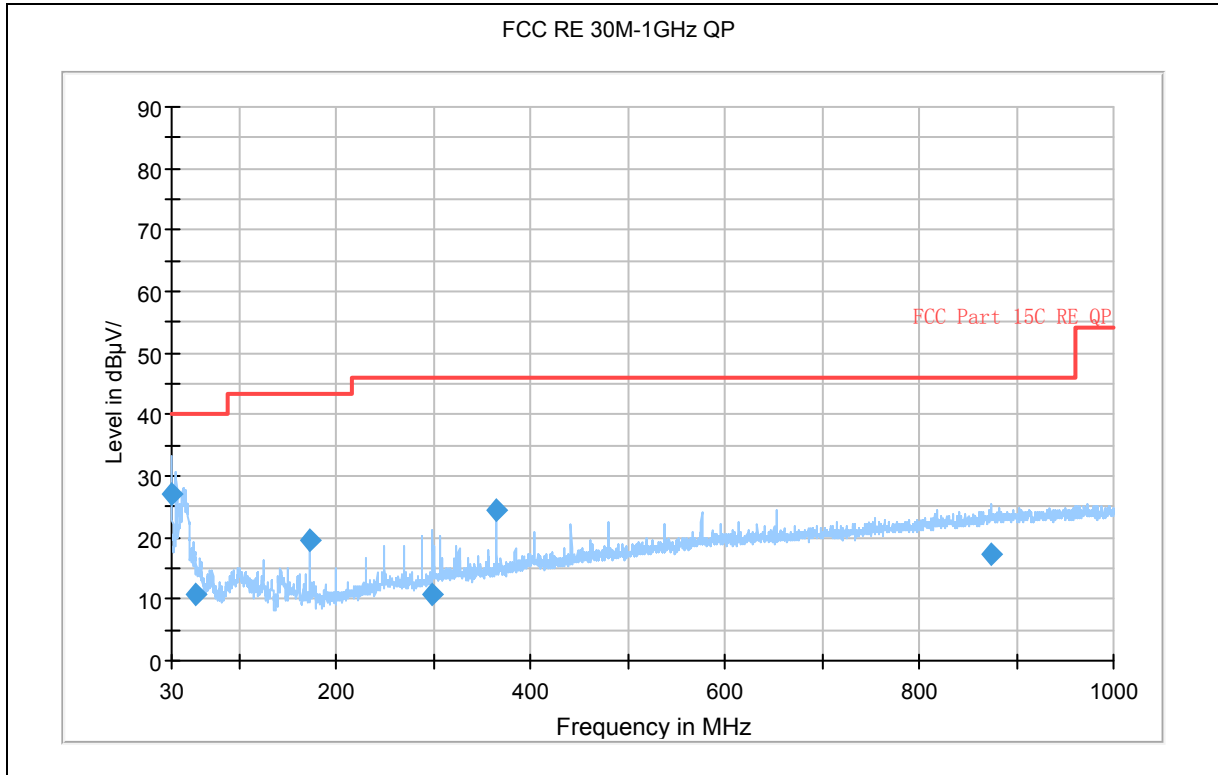


Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

EDR(3DH5)-Channel 78



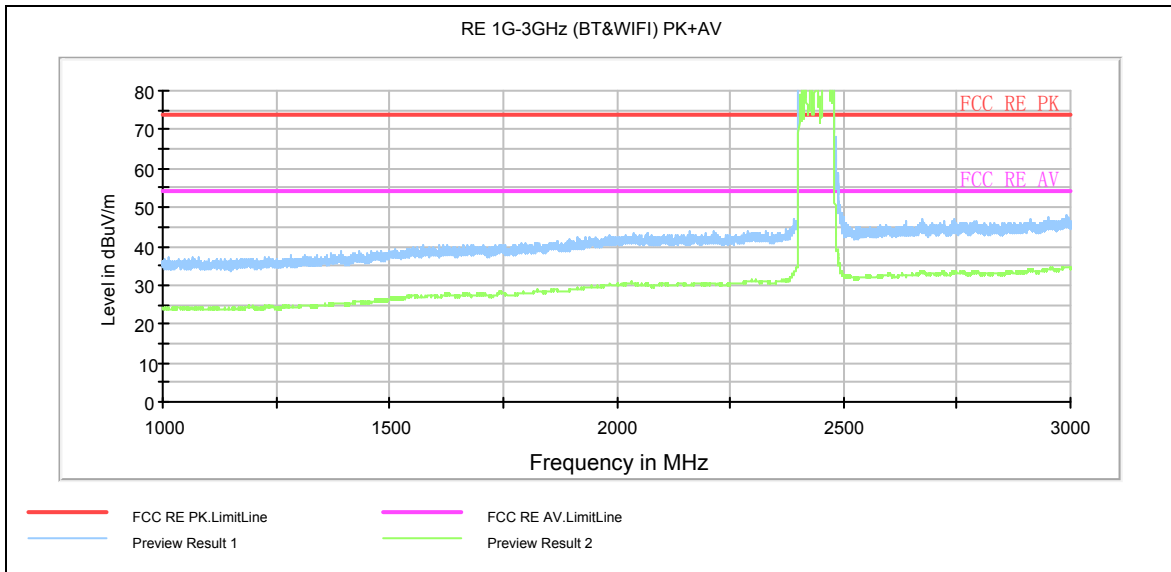
Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
30.240000	26.9	100.0	V	0.0	50.7	-23.8	13.1	40.0
54.007500	10.8	116.0	V	151.0	37	-26.2	29.2	40.0
172.792500	19.7	100.0	V	232.0	51.3	-31.6	23.8	43.5
298.972500	10.6	100.0	H	192.0	37.8	-27.2	35.4	46.0
364.810000	24.5	100.0	H	16.0	50.4	-25.9	21.5	46.0
874.947500	17.3	100.0	H	11.0	34.3	-17.0	28.7	46.0

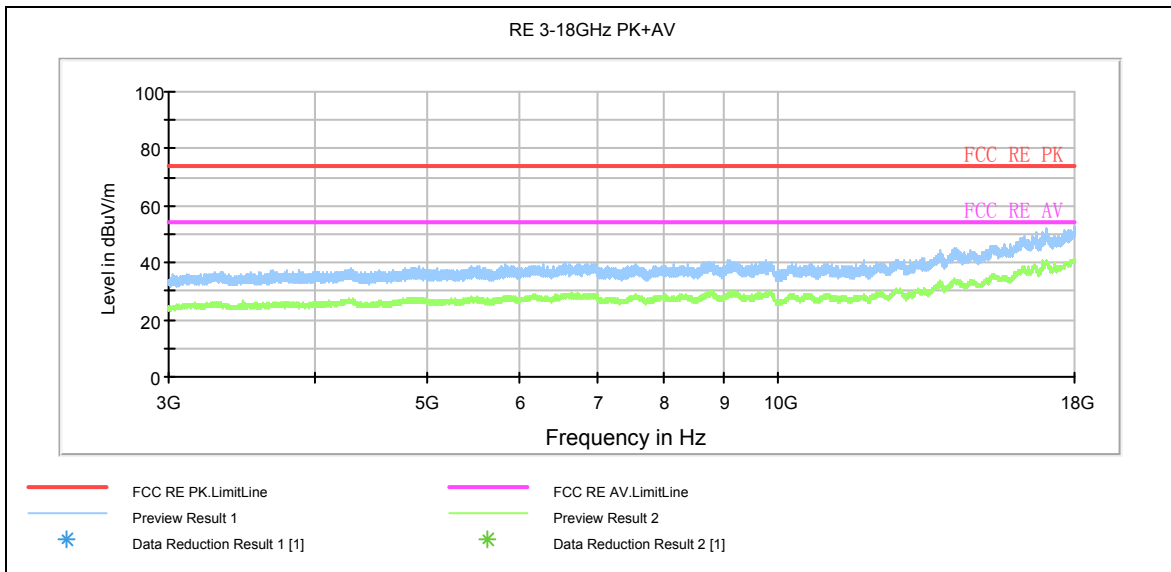
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

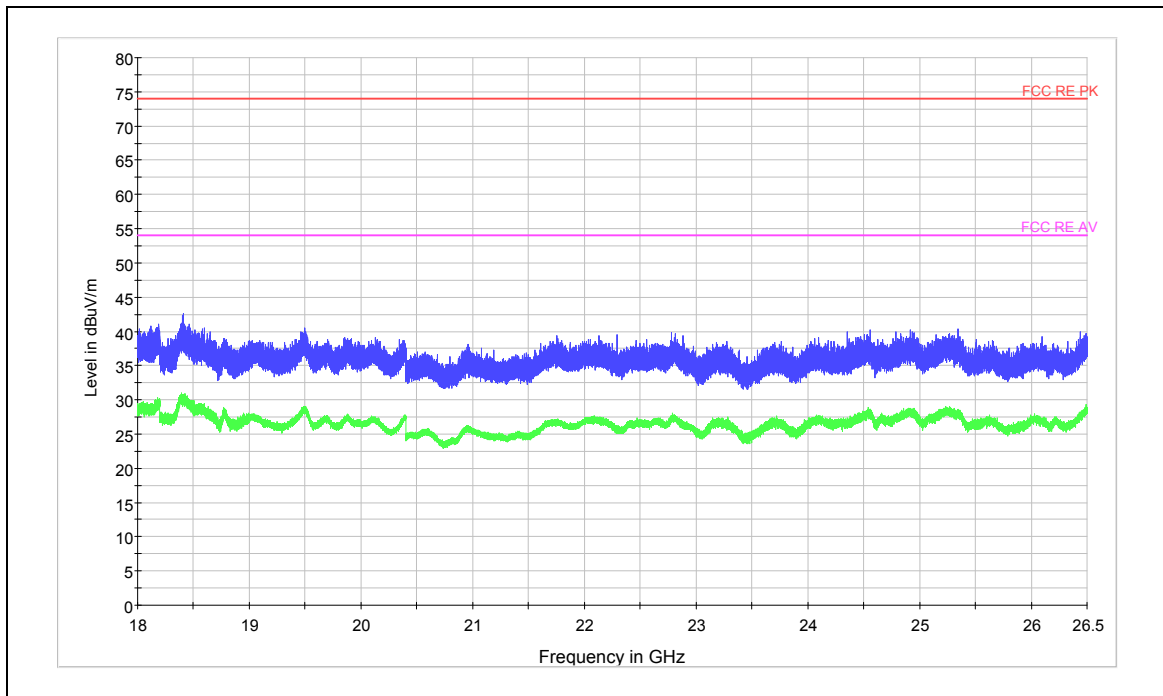
3. Margin = Limit - Quasi-Peak



Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz



Radiates Emission from 3GHz to 18GHz



Radiates Emission from 18GHz to 26.5GHz

2.11. Conducted Emission

Ambient condition

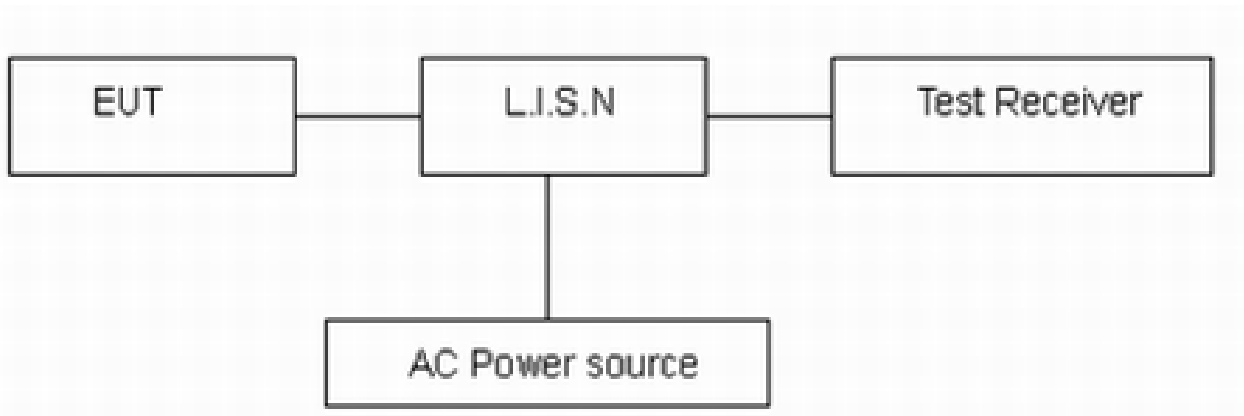
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 C63.4-2003. 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 9kHz,VBW is set to 30kHz.The measurement result should include both L line and N line.

The test is in transmit 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

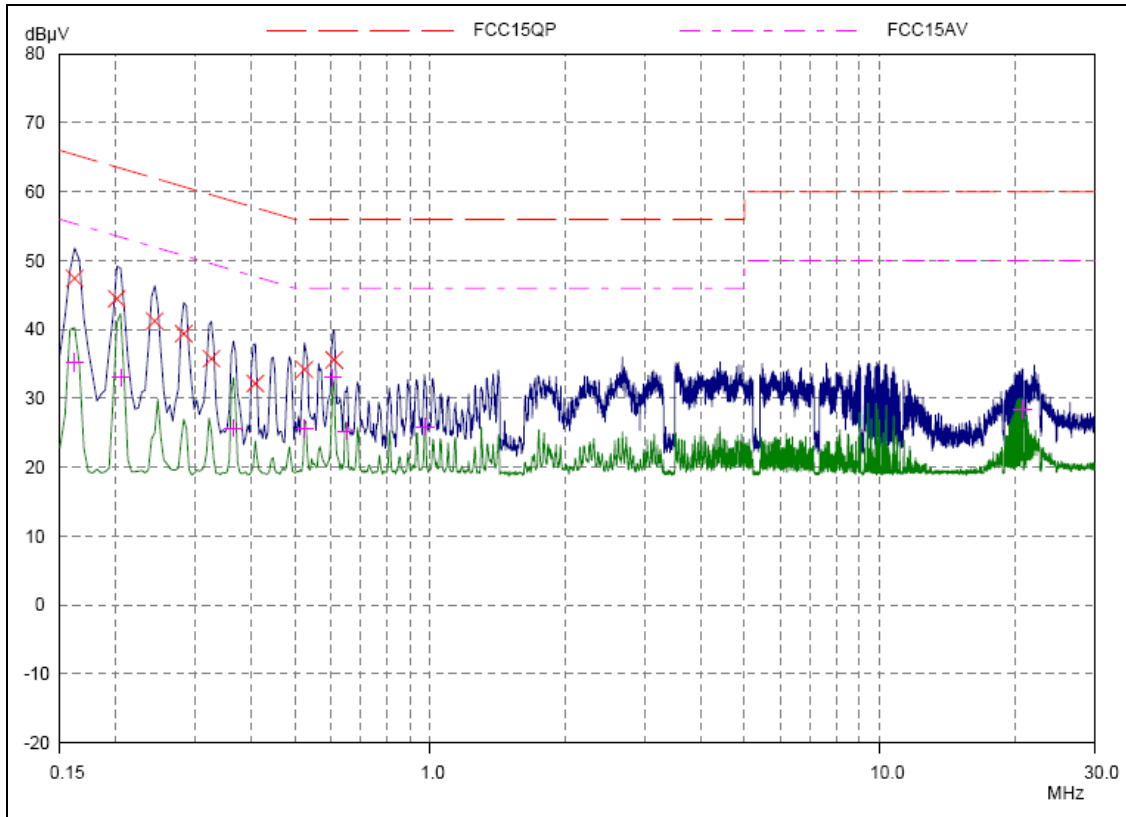
*: Decreases with the logarithm of the frequency.

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(DH5)-CH0



L Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	47.44	65.38	17.94	L1
0.20078	44.48	63.58	19.10	L1
0.24375	41.22	61.97	20.75	L1
0.28281	39.40	60.73	21.33	L1
0.32578	35.76	59.56	23.80	L1
0.40781	32.18	57.69	25.51	L1
0.525	34.20	56.00	21.80	L1
0.61093	35.60	56.00	20.40	L1

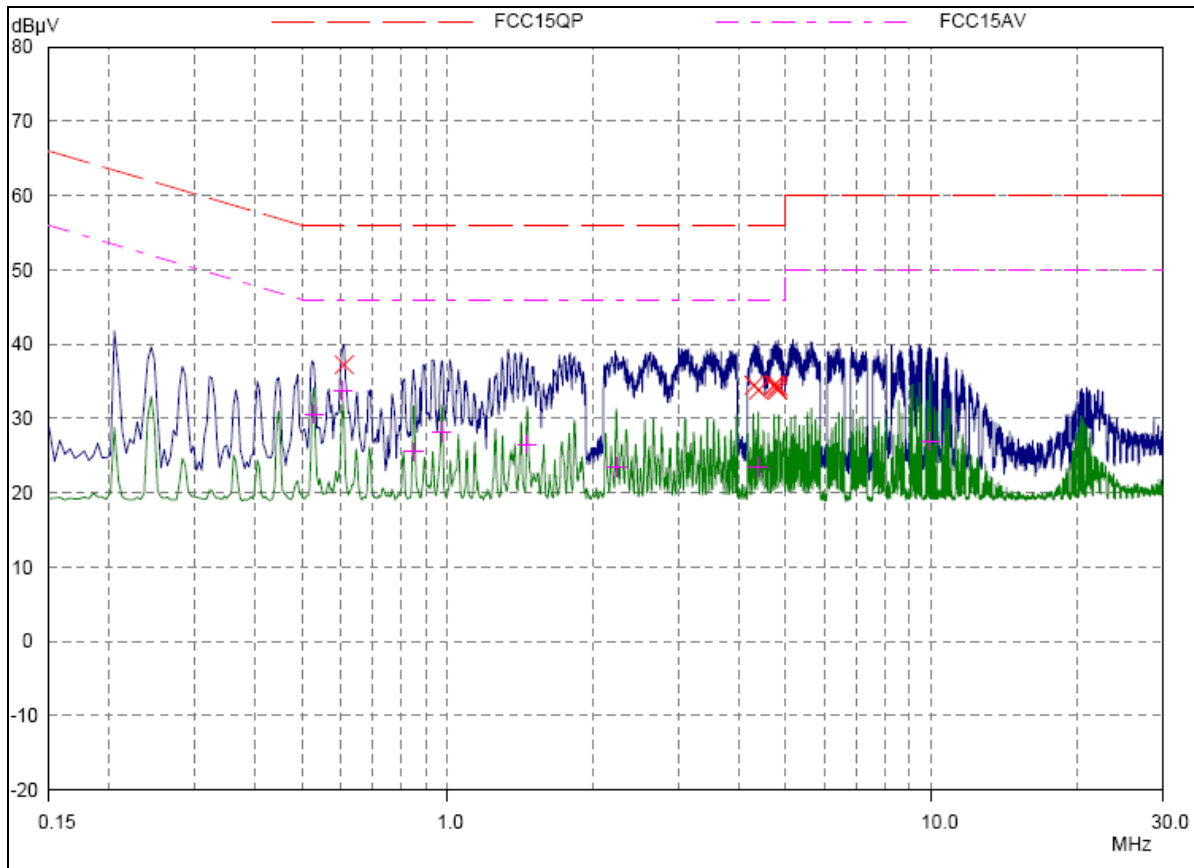
Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.16171	35.26	55.38	20.12	L1
0.20468	33.00	53.42	20.42	L1
0.36484	25.69	48.62	22.93	L1
0.525	25.62	46.00	20.38	L1
0.60703	33.06	46.00	12.94	L1
0.65	25.24	46.00	20.76	L1
0.97421	25.91	46.00	20.09	L1
20.81015	28.42	50.00	21.58	L1

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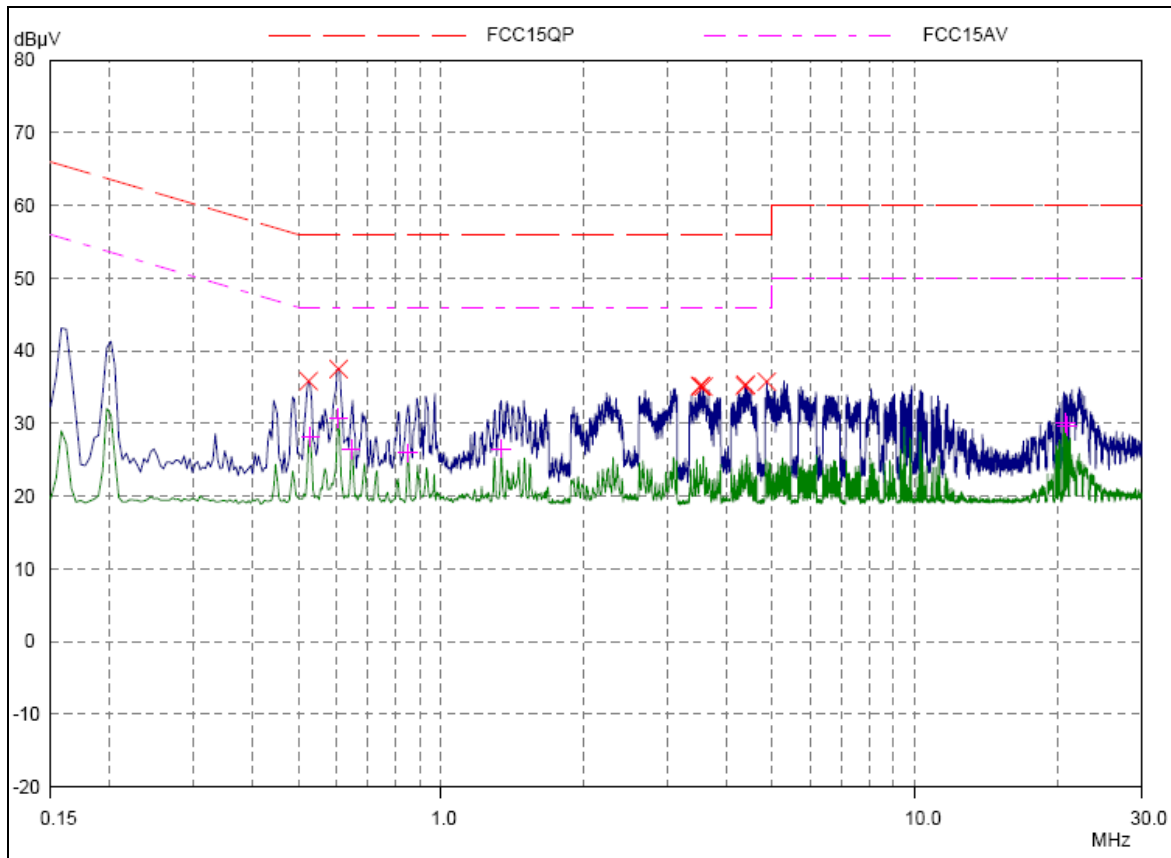
N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.61093	37.24	56.00	18.76	N
4.30234	34.48	56.00	21.52	N
4.38828	33.84	56.00	22.16	N
4.72812	34.52	56.00	21.48	N
4.74765	34.52	56.00	21.48	N
4.77109	34.08	56.00	21.92	N
4.81015	33.86	56.00	22.14	N
4.82578	34.36	56.00	21.64	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.5289	30.62	46.00	15.38	N
0.60703	33.72	46.00	12.28	N
0.84921	25.54	46.00	20.46	N
0.97031	28.21	46.00	17.79	N
1.45859	26.53	46.00	19.47	N
2.23203	23.46	46.00	22.54	N
4.38437	23.46	46.00	22.54	N
9.93515	26.98	50.00	23.02	N

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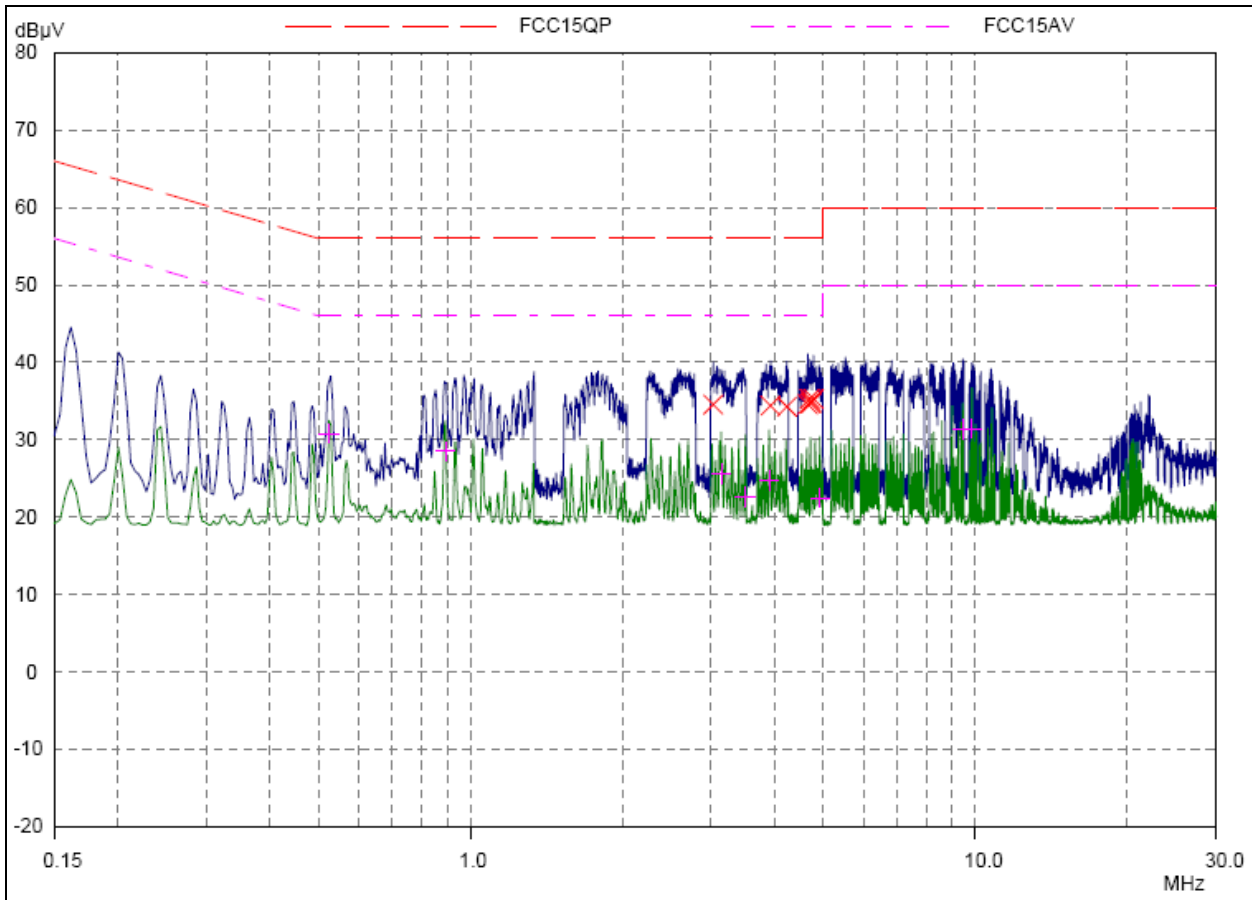


L Line

Peak Search Results

Frequency MHz	PK Level dBµV	PK Limit dBµV	PK Delta dB	Phase -
0.525	35.88	56.00	20.12	L1
0.60703	37.52	56.00	18.48	L1
3.52109	35.18	56.00	20.82	L1
3.5289	35.14	56.00	20.86	L1
3.57578	35.10	56.00	20.90	L1
4.37265	35.20	56.00	20.80	L1
4.38828	35.36	56.00	20.64	L1
4.86484	35.78	56.00	20.22	L1

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.5289	28.20	46.00	17.80	L1
0.60703	30.74	46.00	15.26	L1
0.64609	26.44	46.00	19.56	L1
0.84921	26.00	46.00	20.00	L1
1.3375	26.54	46.00	19.46	L1
20.78671	30.08	50.00	19.92	L1
20.86484	29.70	50.00	20.30	L1
20.90781	29.74	50.00	20.26	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
3.025	34.54	56.00	21.46	N
3.93125	34.40	56.00	21.60	N
4.23203	34.26	56.00	21.74	N
4.66171	34.58	56.00	21.42	N
4.70078	35.30	56.00	20.70	N
4.72031	34.68	56.00	21.32	N
4.73984	34.82	56.00	21.18	N
4.78281	35.24	56.00	20.76	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.525	30.79	46.00	15.21	N
0.89218	28.48	46.00	17.52	N
3.13828	25.62	46.00	20.38	N
3.50546	22.56	46.00	23.44	N
3.9039	24.77	46.00	21.23	N
4.91953	22.46	46.00	23.54	N
9.44687	31.34	50.00	18.66	N
9.84921	31.41	50.00	18.59	N

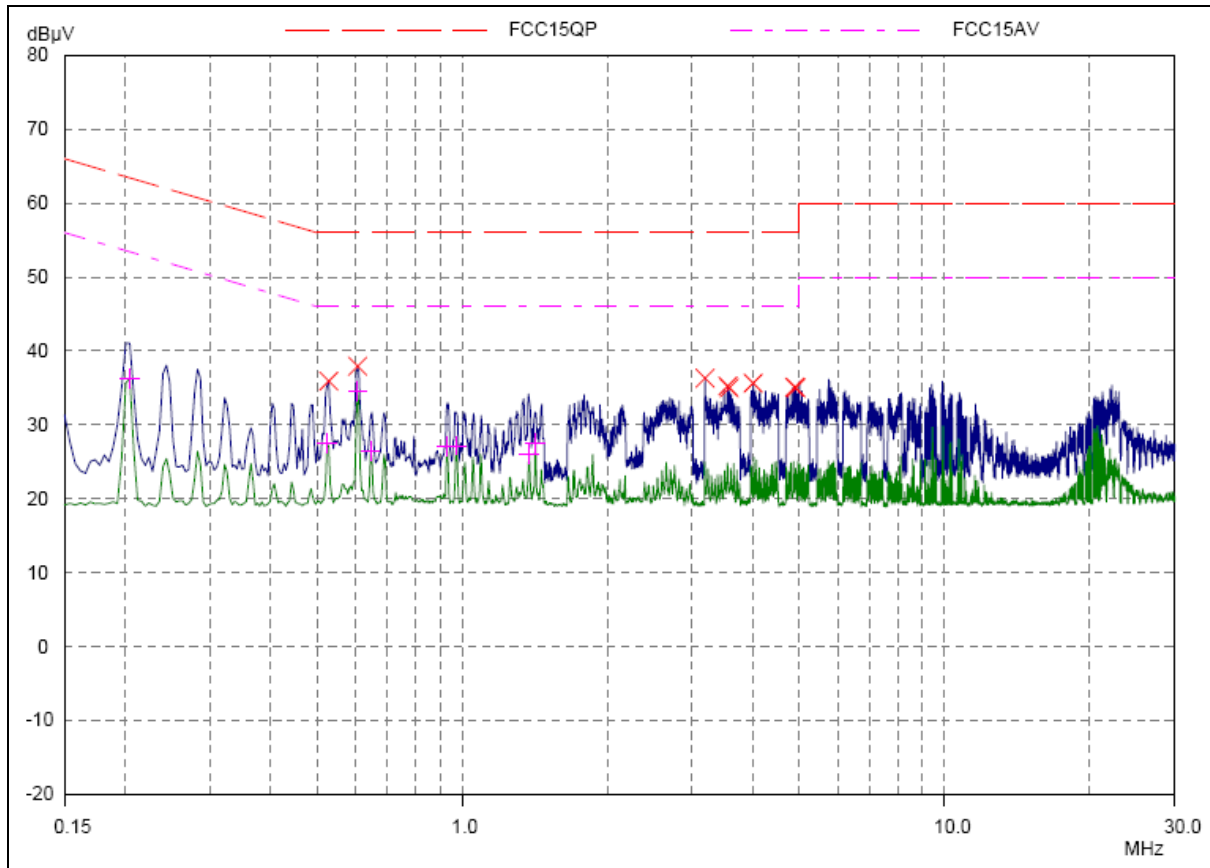
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L Line

Peak Search Results

Frequency MHz	PK Level dBμV	PK Limit dBμV	PK Delta dB	Phase -
0.5289	35.92	56.00	20.08	L1
0.60703	37.94	56.00	18.06	L1
3.18906	36.30	56.00	19.70	L1
3.55234	35.24	56.00	20.76	L1
3.57578	35.00	56.00	21.00	L1
4.01328	35.64	56.00	20.36	L1
4.88437	35.10	56.00	20.90	L1
4.92343	35.00	56.00	21.00	L1

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -
0.20468	36.28	53.42	17.14	L1
0.525	27.54	46.00	18.46	L1
0.60703	34.60	46.00	11.40	L1
0.64609	26.44	46.00	19.56	L1
0.93125	27.04	46.00	18.96	L1
0.97421	27.14	46.00	18.86	L1
1.37656	26.06	46.00	19.94	L1
1.41953	27.54	46.00	18.46	L1

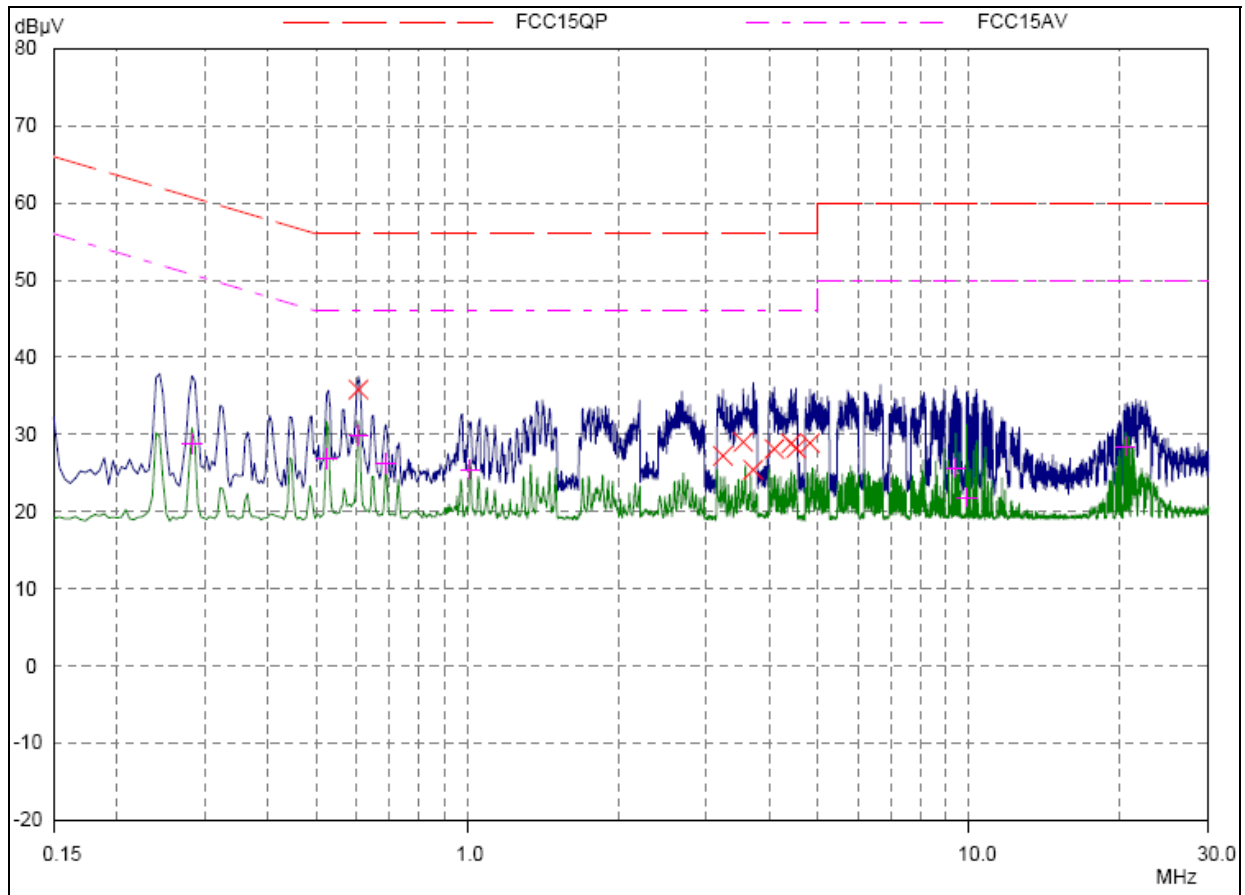
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N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.60703	35.82	56.00	20.18	N
3.23203	27.20	56.00	28.80	N
3.54843	29.02	56.00	26.98	N
3.7125	25.42	56.00	30.58	N
4.0914	28.10	56.00	27.90	N
4.41953	28.84	56.00	27.16	N
4.52109	28.18	56.00	27.82	N
4.82187	28.86	56.00	27.14	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.28281	28.79	50.73	21.94	N
0.525	26.85	46.00	19.15	N
0.60703	29.85	46.00	16.15	N
0.68906	26.26	46.00	19.74	N
1.01328	25.47	46.00	20.53	N
9.4039	25.69	50.00	24.31	N
9.89218	21.85	50.00	28.15	N
20.50937	28.42	50.00	21.58	N

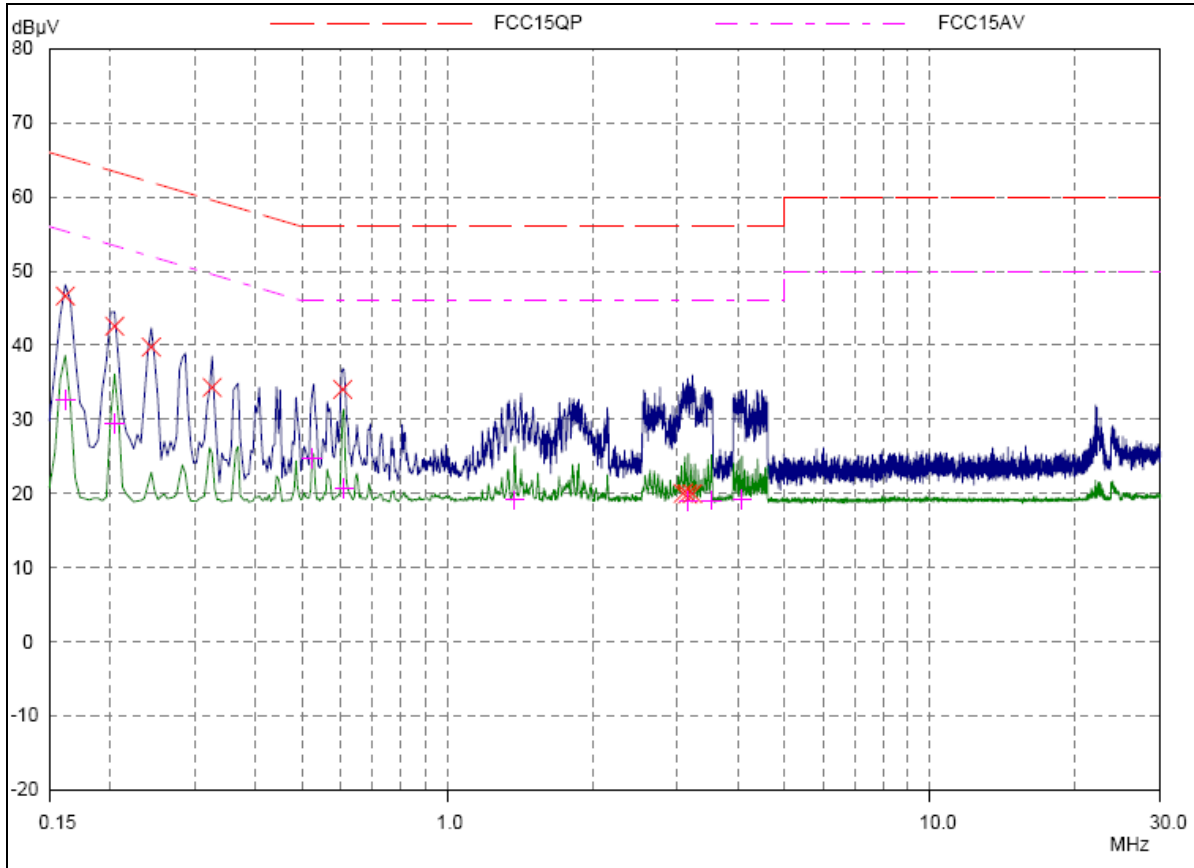
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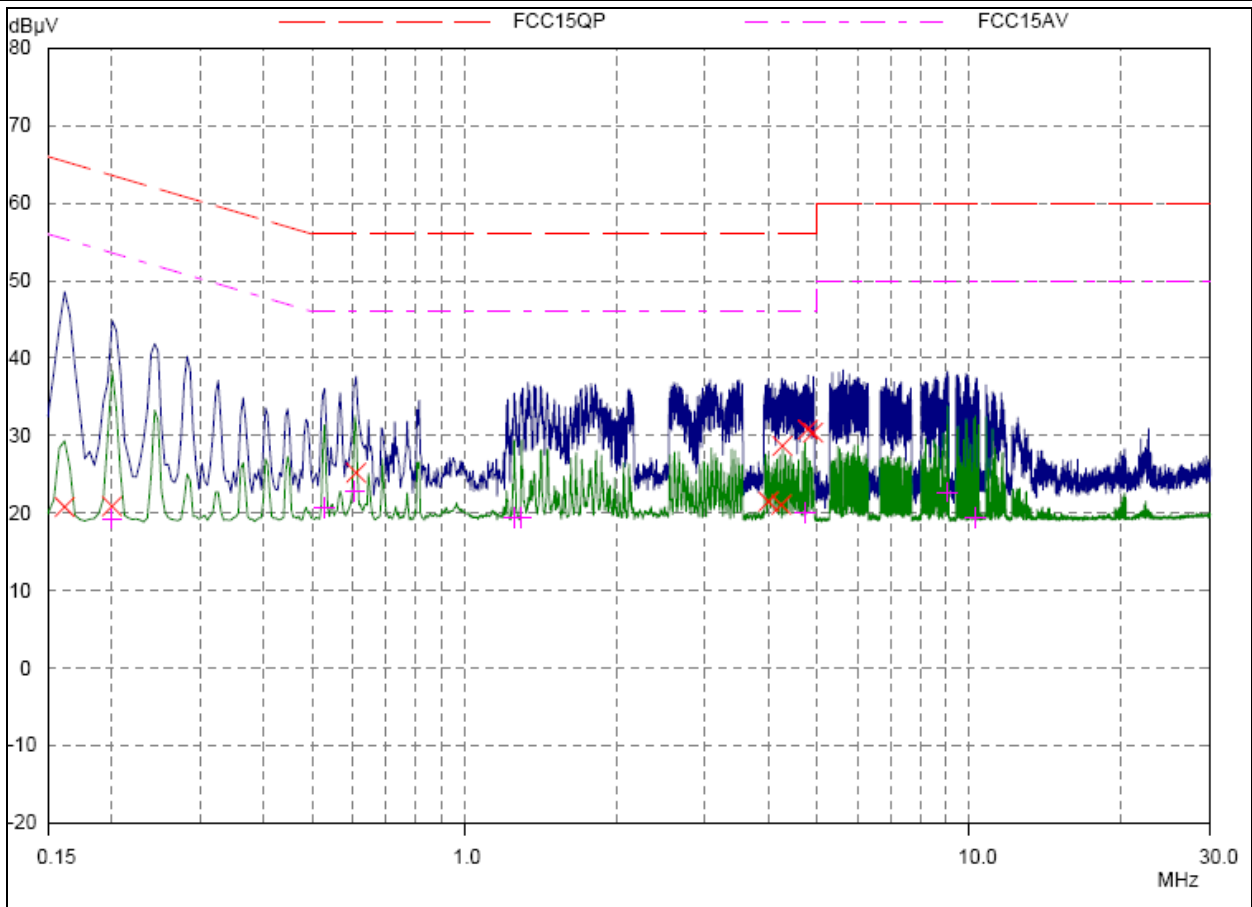


L Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	46.64	65.38	18.74	L1
0.20468	42.56	63.42	20.86	L1
0.24375	39.74	61.97	22.23	L1
0.32578	34.32	59.56	25.24	L1
0.60703	34.06	56.00	21.94	L1
3.07968	20.02	56.00	35.98	L1
3.15	19.88	56.00	36.12	L1
3.22031	19.96	56.00	36.04	L1

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.16171	32.68	55.38	22.70	L1
0.20468	29.43	53.42	23.99	L1
0.525	24.77	46.00	21.23	L1
0.61093	20.70	46.00	25.30	L1
1.38046	19.14	46.00	26.86	L1
3.15781	18.99	46.00	27.01	L1
3.525	19.07	46.00	26.93	L1
4.07967	19.22	46.00	26.78	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.78	65.38	44.60	N
0.20078	20.88	63.58	42.70	N
0.61093	25.18	56.00	30.82	N
4.00155	21.48	56.00	34.52	N
4.24375	21.08	56.00	34.92	N
4.26328	28.66	56.00	27.34	N
4.79062	30.76	56.00	25.24	N
4.90781	30.38	56.00	25.62	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.20078	19.30	53.58	34.28	N
0.5289	20.70	46.00	25.30	N
0.60703	22.82	46.00	23.18	N
1.25546	19.45	46.00	26.55	N
1.29843	19.45	46.00	26.55	N
4.72421	20.10	46.00	25.90	N
9.04843	22.72	50.00	27.28	N
10.26718	19.37	50.00	30.63	N

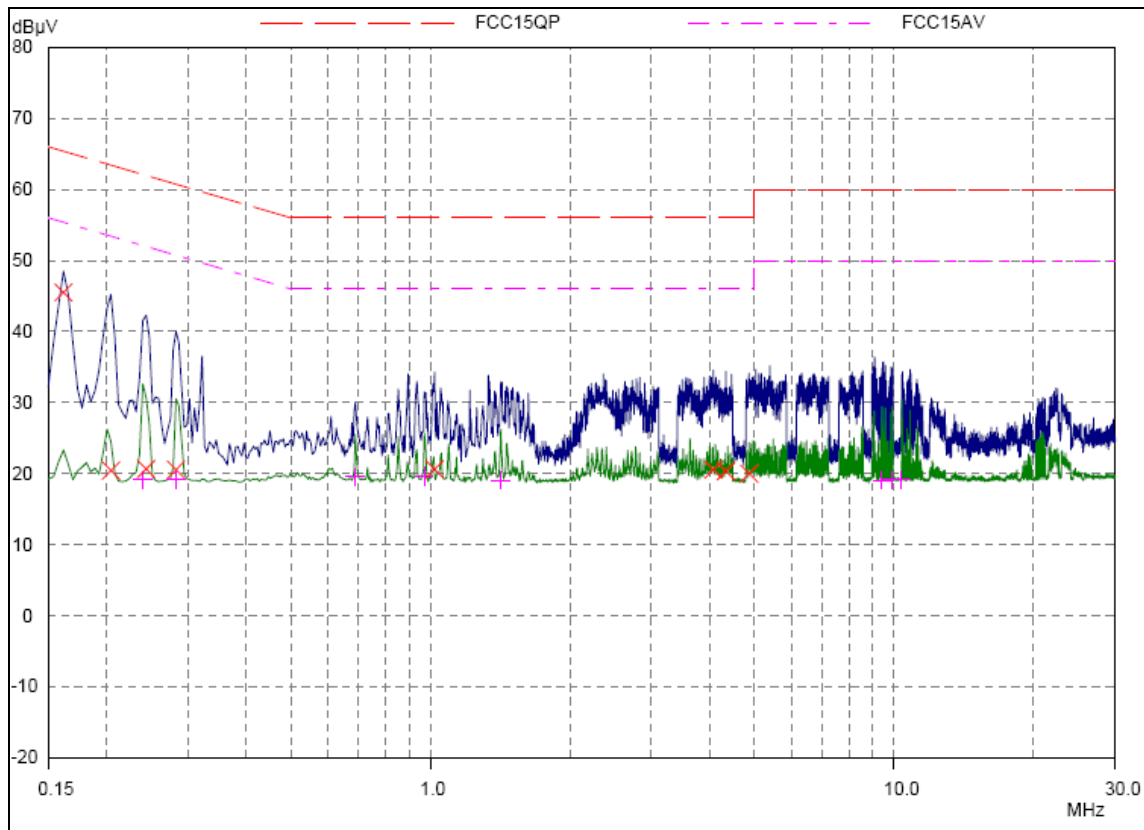
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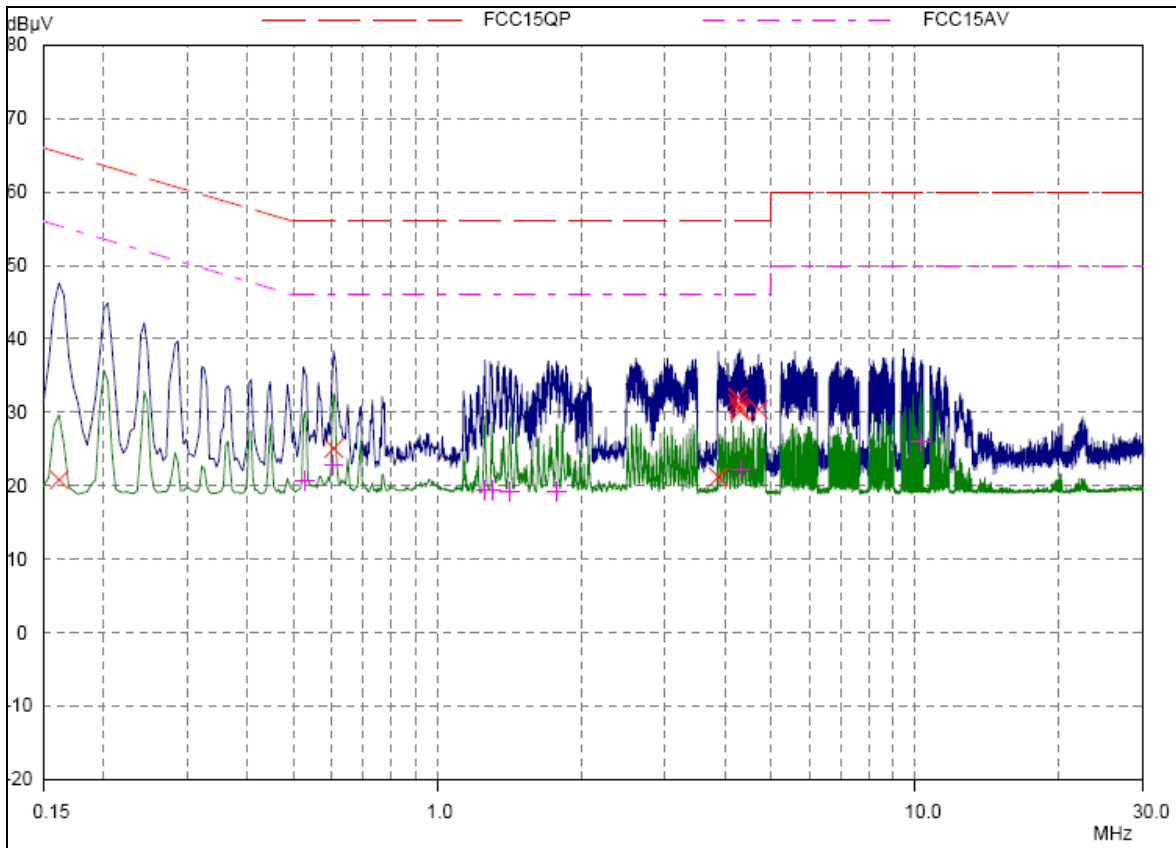


L Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	45.50	65.38	19.88	L1
0.20468	20.42	63.42	43.00	L1
0.24375	20.64	61.97	41.33	L1
0.28281	20.56	60.73	40.17	L1
1.02109	20.62	56.00	35.38	L1
4.07578	20.54	56.00	35.46	L1
4.3375	20.32	56.00	35.68	L1
4.86875	19.98	56.00	36.02	L1

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.23984	19.14	52.10	32.96	L1
0.28281	19.22	50.73	31.51	L1
0.68906	19.52	46.00	26.48	L1
0.97031	19.60	46.00	26.40	L1
1.41953	19.07	46.00	26.93	L1
9.41562	19.07	50.00	30.93	L1
9.9	19.14	50.00	30.86	L1
10.38828	19.14	50.00	30.86	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.80	65.38	44.58	N
0.60703	25.10	56.00	30.90	N
3.87265	21.20	56.00	34.80	N
4.24375	32.08	56.00	23.92	N
4.25937	31.16	56.00	24.84	N
4.2789	30.60	56.00	25.40	N
4.30234	30.16	56.00	25.84	N
4.70468	30.36	56.00	25.64	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.5289	20.70	46.00	25.30	N
0.60703	22.82	46.00	23.18	N
1.25937	19.37	46.00	26.63	N
1.30234	19.37	46.00	26.63	N
1.41953	19.22	46.00	26.78	N
1.7789	19.22	46.00	26.78	N
4.32187	22.19	46.00	23.81	N
10.26718	25.91	50.00	24.09	N

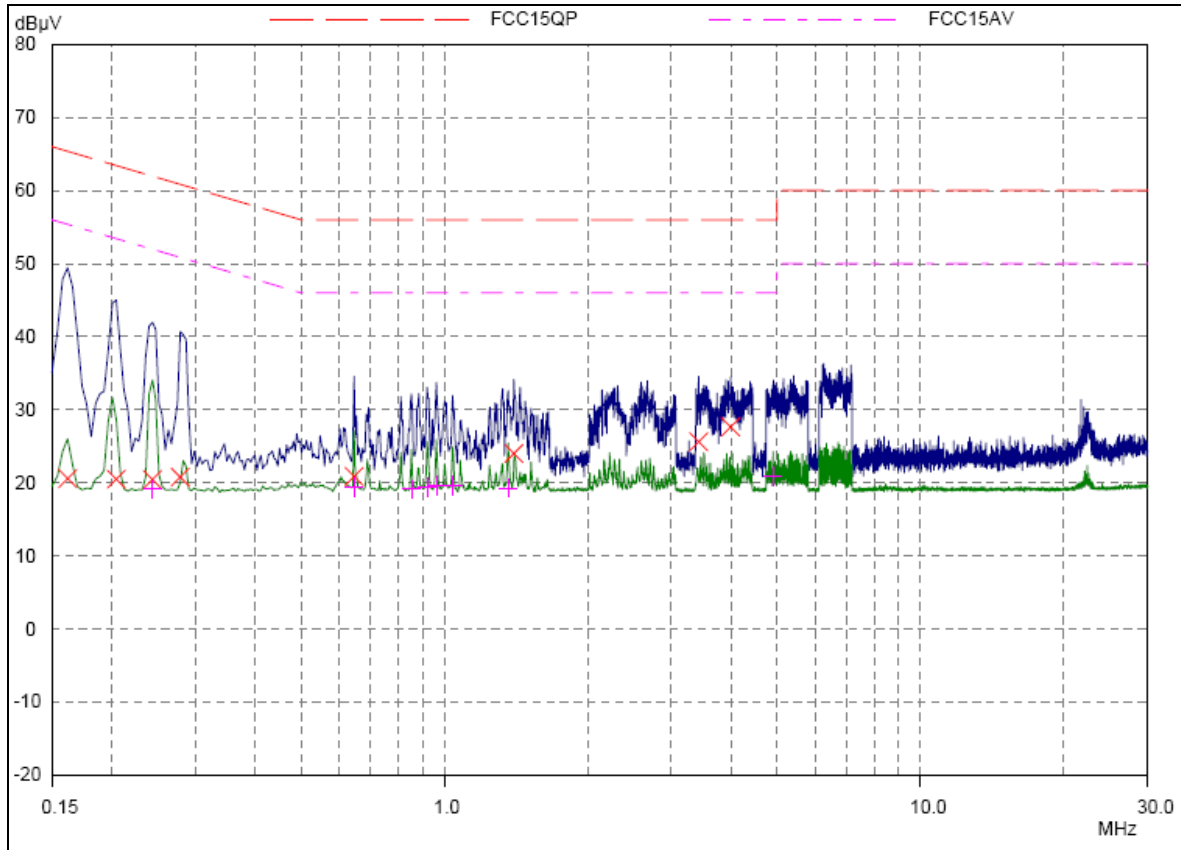
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L Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.58	65.38	44.80	L1
0.20468	20.50	63.42	42.92	L1
0.24375	20.44	61.97	41.53	L1
0.2789	20.78	60.85	40.07	L1
0.64609	20.88	56.00	35.12	L1
1.4	24.02	56.00	31.98	L1
3.41953	25.62	56.00	30.38	L1
3.98984	27.64	56.00	28.36	L1

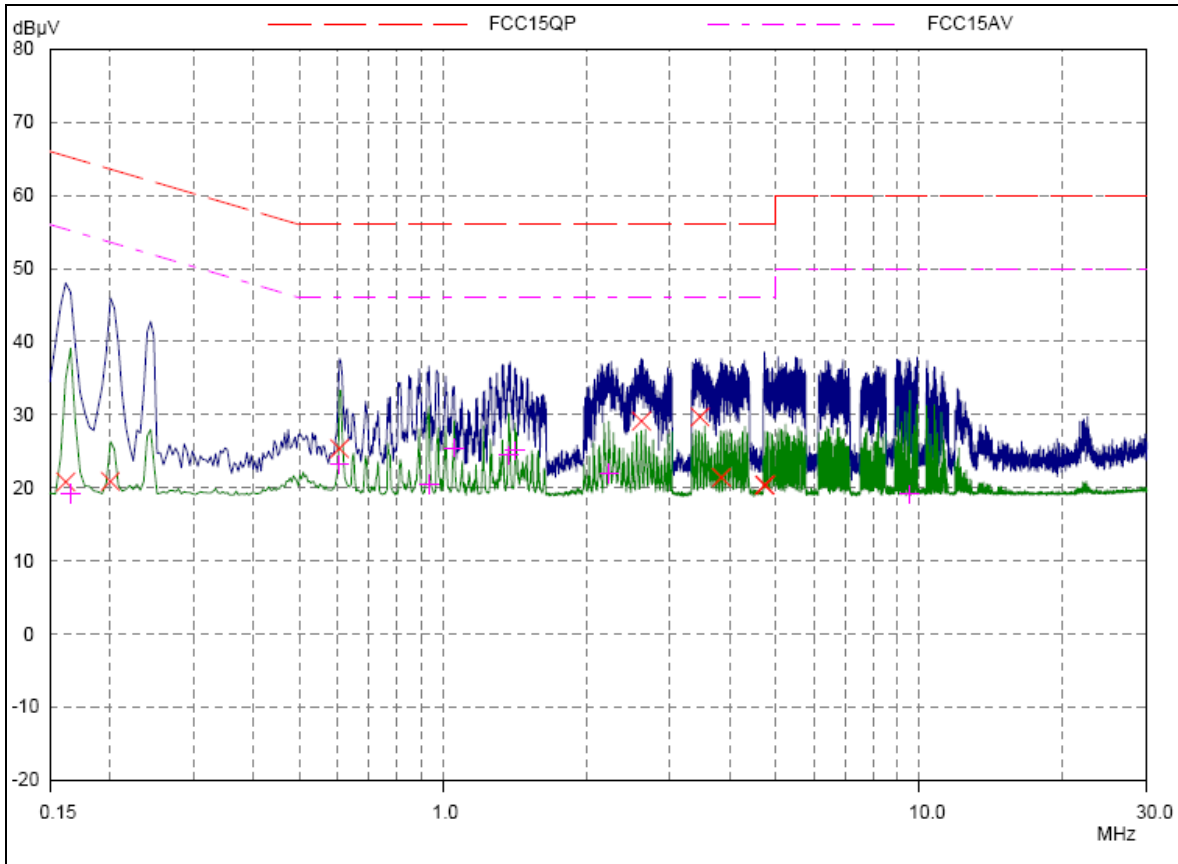
Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.24375	19.14	51.97	32.83	L1
0.64609	19.37	46.00	26.63	L1
0.85312	19.14	46.00	26.86	L1
0.91953	19.37	46.00	26.63	L1
0.9625	19.60	46.00	26.40	L1
1.04062	19.60	46.00	26.40	L1
1.36093	19.30	46.00	26.70	L1
4.9	20.89	46.00	25.11	L1

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N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.80	65.38	44.58	N
0.20078	20.88	63.58	42.70	N
0.60703	25.36	56.00	30.64	N
2.61093	29.12	56.00	26.88	N
3.4625	29.68	56.00	26.32	N
3.8414	21.40	56.00	34.60	N
4.72812	20.34	56.00	35.66	N
4.74765	20.40	56.00	35.60	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.16562	19.22	55.18	35.96	N
0.60703	23.17	46.00	22.83	N
0.93515	20.51	46.00	25.49	N
1.05625	25.47	46.00	20.53	N
1.37656	24.44	46.00	21.56	N
1.41953	25.09	46.00	20.91	N
2.23203	21.97	46.00	24.03	N
9.53671	19.14	50.00	30.86	N

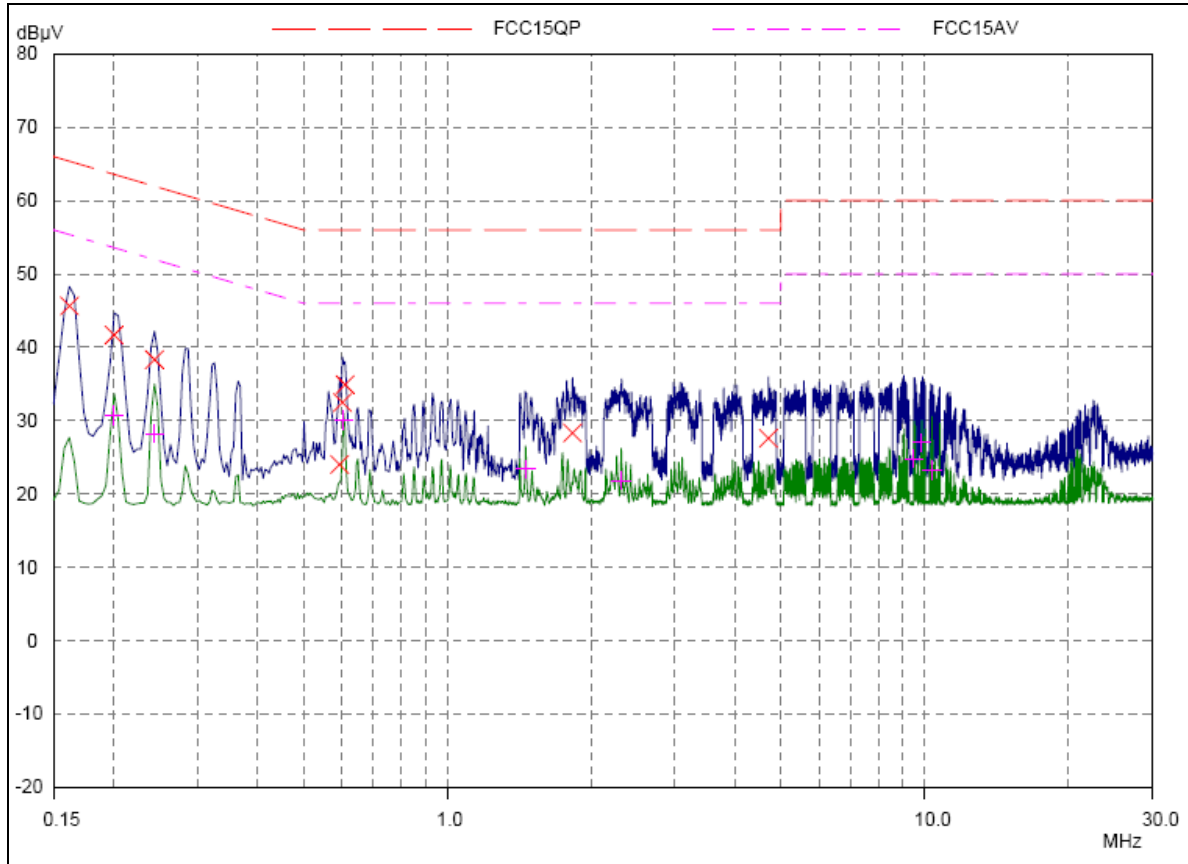
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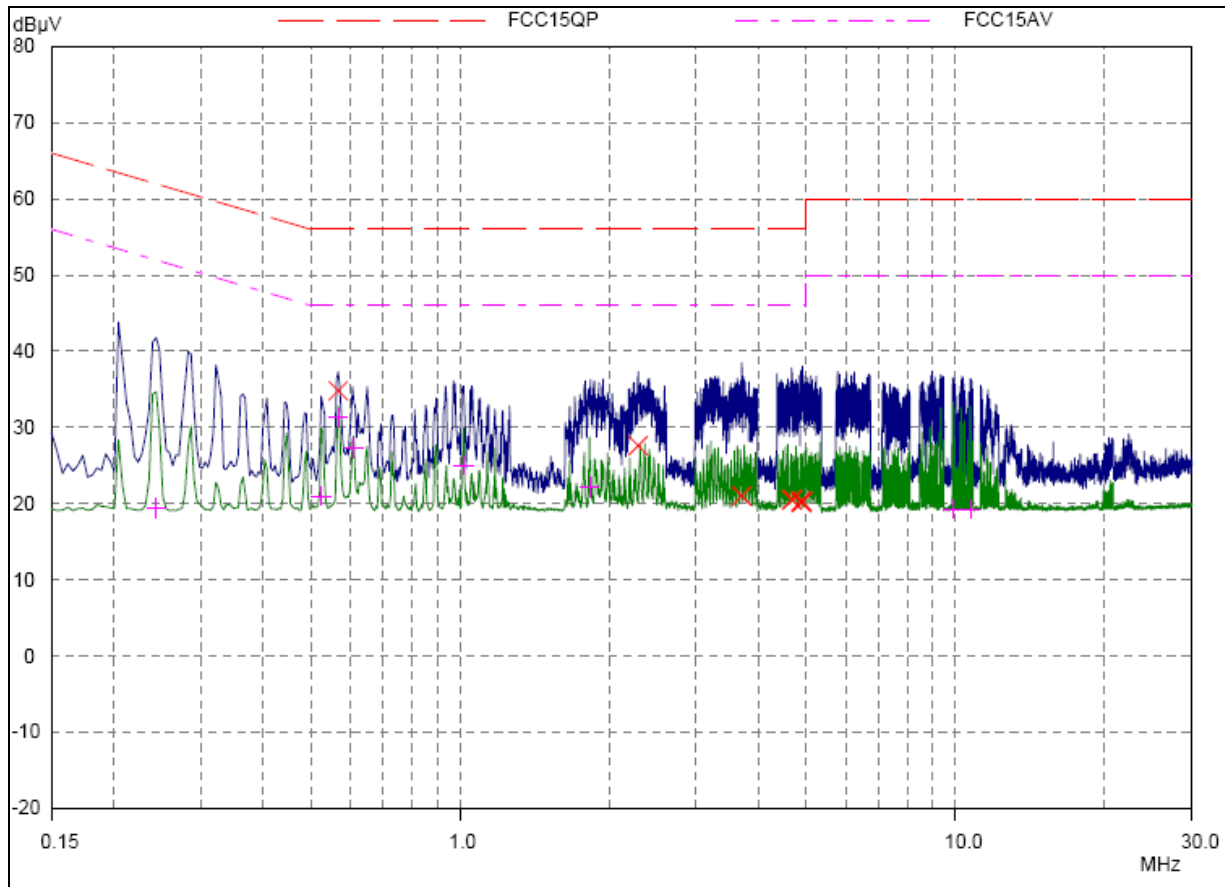


L Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	45.64	65.38	19.74	L1
0.20078	41.68	63.58	21.90	L1
0.24375	38.32	61.97	23.65	L1
0.59531	24.02	56.00	31.98	L1
0.60312	32.46	56.00	23.54	L1
0.61093	34.92	56.00	21.08	L1
1.82968	28.32	56.00	27.68	L1
4.70468	27.60	56.00	28.40	L1

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.20078	30.71	53.58	22.87	L1
0.24375	28.21	51.97	23.76	L1
0.60703	30.07	46.00	15.93	L1
1.45859	23.36	46.00	22.64	L1
2.31406	21.85	46.00	24.15	L1
9.48984	24.85	50.00	25.15	L1
9.85703	26.98	50.00	23.02	L1
10.34531	23.27	50.00	26.73	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.56796	34.80	56.00	21.20	N
2.29062	27.60	56.00	28.40	N
3.70468	21.00	56.00	35.00	N
4.66953	20.46	56.00	35.54	N
4.68515	20.52	56.00	35.48	N
4.87265	20.26	56.00	35.74	N
4.88828	20.14	56.00	35.86	N
4.91171	20.30	56.00	35.70	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.24375	19.45	51.97	32.52	N
0.525	20.96	46.00	25.04	N
0.56796	31.26	46.00	14.74	N
0.61093	27.29	46.00	18.71	N
1.01718	25.01	46.00	20.99	N
1.82578	22.13	46.00	23.87	N
9.9	19.30	50.00	30.70	N
10.7125	19.30	50.00	30.70	N

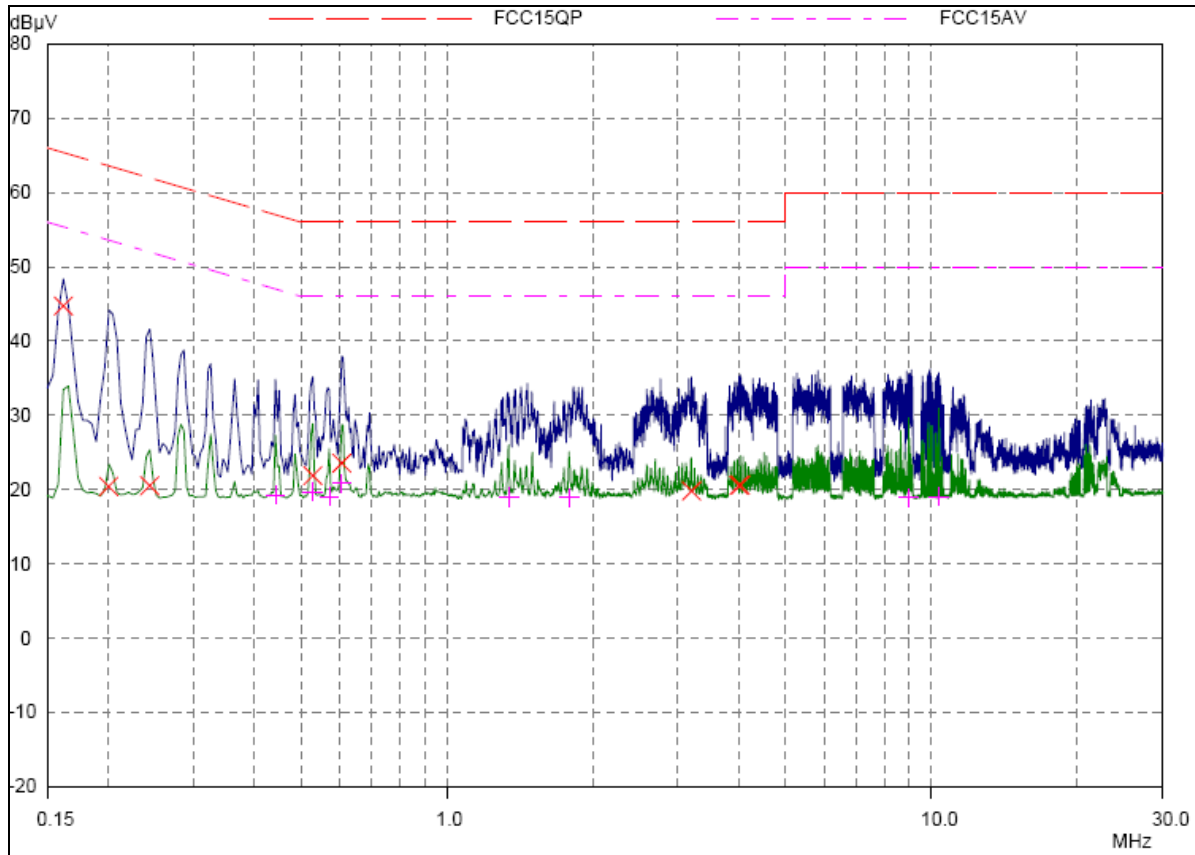
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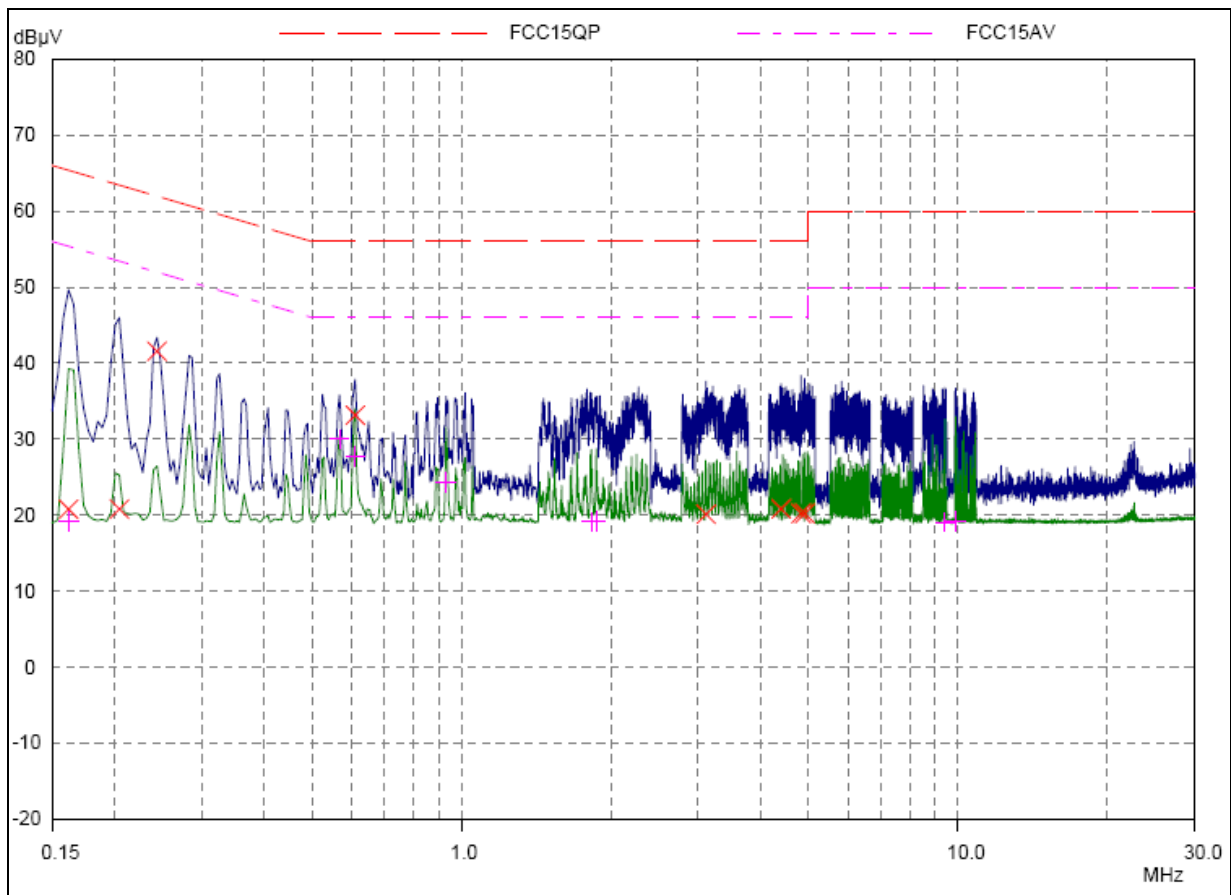


L Line

Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -
0.16171	44.72	65.38	20.66	L1
0.20078	20.42	63.58	43.16	L1
0.24375	20.52	61.97	41.45	L1
0.5289	21.88	56.00	34.12	L1
0.60703	23.56	56.00	32.44	L1
3.19687	19.78	56.00	36.22	L1
4.00546	20.56	56.00	35.44	L1
4.0328	20.60	56.00	35.40	L1

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -
0.44296	19.30	47.01	27.71	L1
0.5289	19.67	46.00	26.33	L1
0.57187	19.07	46.00	26.93	L1
0.60703	20.83	46.00	25.17	L1
1.3414	18.99	46.00	27.01	L1
1.78671	18.91	46.00	27.09	L1
8.9664	18.91	50.00	31.09	L1
10.34531	19.07	50.00	30.93	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.76	65.38	44.62	N
0.20468	20.80	63.42	42.62	N
0.24375	41.54	61.97	20.43	N
0.61093	33.16	56.00	22.84	N
3.11093	20.12	56.00	35.88	N
4.4039	20.82	56.00	35.18	N
4.82968	20.22	56.00	35.78	N
4.91171	20.22	56.00	35.78	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.16171	19.22	55.38	36.16	N
0.56796	29.98	46.00	16.02	N
0.61093	27.70	46.00	18.30	N
0.93125	24.27	46.00	21.73	N
1.82578	19.14	46.00	26.86	N
1.86875	19.22	46.00	26.78	N
9.41562	19.07	50.00	30.93	N
9.9039	19.22	50.00	30.78	N

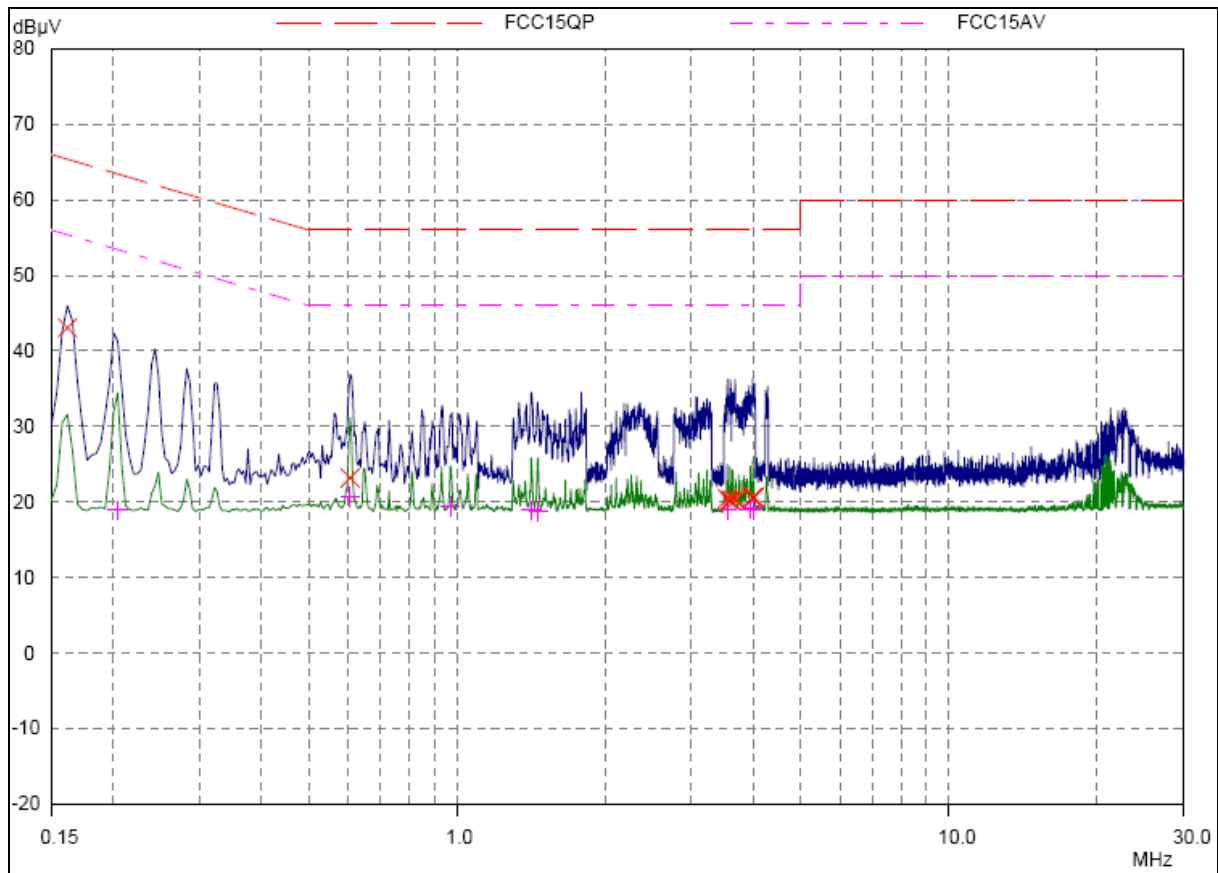
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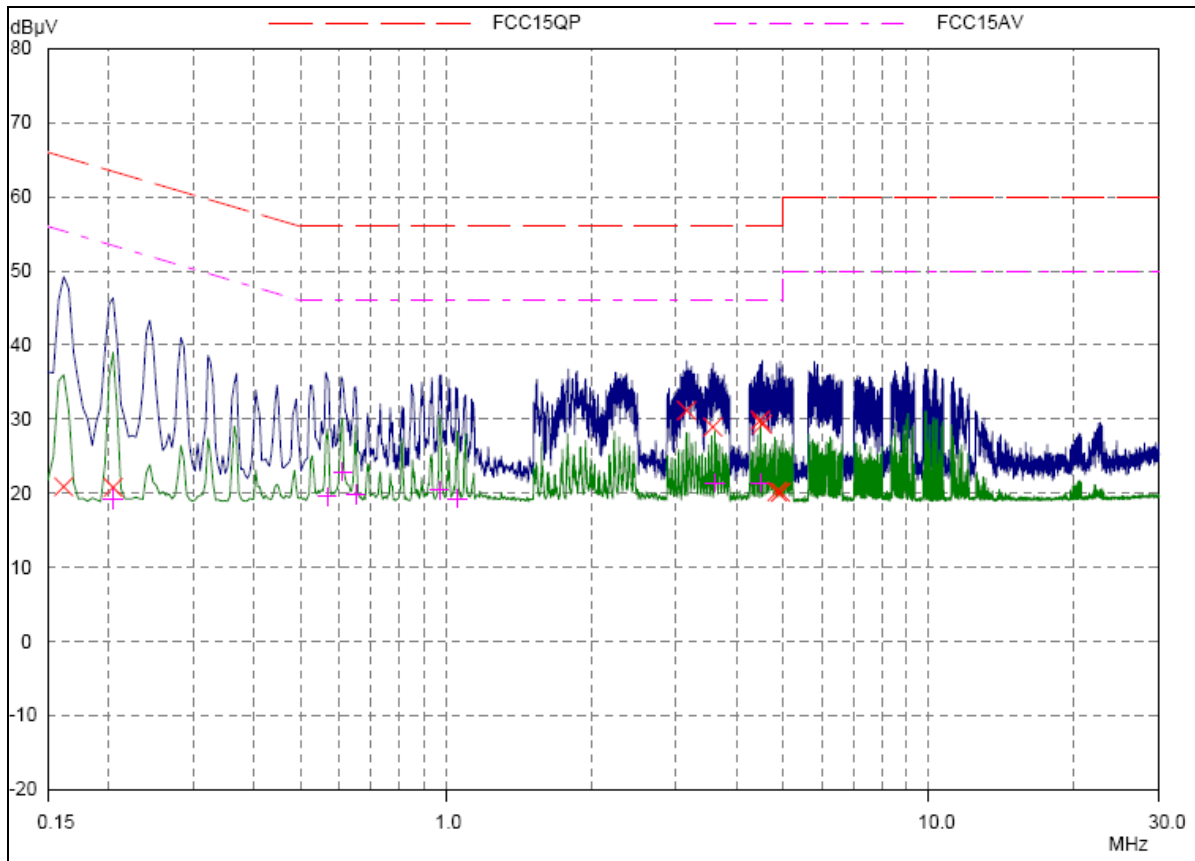


L Line

Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -
0.16171	43.06	65.38	22.32	L1
0.60703	23.18	56.00	32.82	L1
3.54453	20.42	56.00	35.58	L1
3.5914	20.18	56.00	35.82	L1
3.60312	20.20	56.00	35.80	L1
3.67734	20.30	56.00	35.70	L1
3.98984	20.58	56.00	35.42	L1
4.0289	20.64	56.00	35.36	L1

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -
0.20468	18.91	53.42	34.51	L1
0.60703	20.64	46.00	25.36	L1
0.97031	19.45	46.00	26.55	L1
1.41562	18.91	46.00	27.09	L1
1.4625	18.83	46.00	27.17	L1
3.54453	18.91	46.00	27.09	L1
3.94687	19.07	46.00	26.93	L1
3.99765	19.14	46.00	26.86	L1



N Line

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -
0.16171	20.88	65.38	44.50	N
0.20468	20.76	63.42	42.66	N
3.1539	31.18	56.00	24.82	N
3.57187	28.94	56.00	27.06	N
4.48203	29.84	56.00	26.16	N
4.52109	29.32	56.00	26.68	N
4.84921	20.22	56.00	35.78	N
4.93125	20.12	56.00	35.88	N

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -
0.20468	19.22	53.42	34.20	N
0.56796	19.52	46.00	26.48	N
0.61093	22.92	46.00	23.08	N
0.65	19.82	46.00	26.18	N
0.97031	20.37	46.00	25.63	N
1.05625	19.30	46.00	26.70	N
3.60703	21.39	46.00	24.61	N
4.48203	21.39	46.00	24.61	N

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	BT Base Station Simulator	CBT	R&S	100271	2010-11-25	One year
02	EMI Test Receiver	ESCS30	R&S	100138	2011-01-17	One year
03	LISN	ENV216	R&S	101171	2010-04-16	Two years
04	EMI Test Receiver	ESCI	R&S	100948	2011-06-30	One year
05	TRILOG Broadband Antenna	VULB 9163	Schwarzbeck	391	2011-05-14	Two years
06	Double Ridged Waveguide Horn Antenna	HF907	R&S	100126	2011-07-01	Two years
07	Horn Antenna	3160-09	ETS	00102643	2011-05-20	Two years
08	PSG Analog Signal Generator	E8257D	Agilent	MY49281101	2011-06-29	One year
09	ESG Vector Signal Generator	E4438C	Agilent	MY49070900	2011-07-01	One year
10	Spectrum Analyzer	E4445A	Agilent	MY46181146	2011-06-07	One year
11	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
12	MOB COMMS DC SUPPLY	66319D	Agilent	MY43004105	2011-06-30	One year
13	Power Sensor	E9304A	Agilent	MY50220022	2011-06-01	One year
14	Power Meter	E4418B	Agilent	MY50000623	2011-06-07	One year
15	Vibration table	ESS-050-120	dongling	D1007126	2010-08-23	Three years
16	Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2011-06-04	One year

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