



FCC Test Report

FOR:

Model Name: A1332
Smart Cellular Telephone with Quad band GSM, UMTS I/II/V/VI/VIII,
Bluetooth and WiFi 802.11 b,g,n

FCC ID: BCG-E2380B

47 CFR Part 15.247 for FHSS Systems

TEST REPORT #: EMC_057_09001_FCC15.247FHSS_BCG-E2380B_Rev3
DATE: 2010-06-08



FCC listed
A2LA Accredited
IC recognized #
3462B

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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations.

Company	Description	Model #
Apple Inc.	Smart Cellular Telephone with Quad band GSM, UMTS I/II/V/VI/VIII, Bluetooth and WiFi 802.11 b,g,n	A1332

Responsible for Testing Laboratory:

2010-06-08	Compliance	Heiko Strehlow (Director)	
Date	Section	Name	Signature

Responsible for the Report:

2010-06-08	Compliance	Sajay Jose (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Heiko Strehlow
Responsible Project Leader:	Sajay Jose

2.2 Identification of the Client

Applicant's Name:	Apple Inc.
Street Address:	1 Infinite Loop
City/Zip Code	Cupertino, CA 95014
Country	USA
Contact Person:	Bob Steinfeld
Phone No.	408-974-2618
e-mail:	steinf1@apple.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as above.
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	A1332
Model No:	A1332
Product Type:	Smart Cellular Telephone with Quad band GSM, UMTS I/II/V/VI/VIII, Bluetooth and WiFi 802.11 b/g/n. Includes Ipod music, photo, GPS and application functions.
FCC-ID:	BCG-E2380B
Frequency:	2.4 GHz- 2.4835 GHz
Type(s) of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK (EDR Supported)
Antenna Type:	Internal PIFA
Power Supply (DC):	3.4V (Low)/4.2V (Nominal)/4.2V (High)
Temperature Range °C:	0 (Low)/22 (Nominal)/35 (High)

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number/IMEI	HW Version	SW Version	Notes
1	88012055FRZ/ 00107200 288894 7	Rev C	01.50.01/ 8A224	Conducted testing sample.
2	880120A4FRX/ 00107200 285569 8	Rev C	01.50.01/ 8A224	Radiated testing sample.

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	110V AC Adapter	Flextronics	A1265	N/A
2	Dummy Battery	Apple Inc.	N/A	N/A
3	External Antenna connector	Apple Inc.	N/A	N/A



4 Subject Of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations.

This test report is to support a request for new equipment authorization under the **FCC ID BCG-E2380B**.

All testing was performed on the product referred to in Section 3 as EUT. This test report contains full radiated and conducted testing results as per FCC15.247.

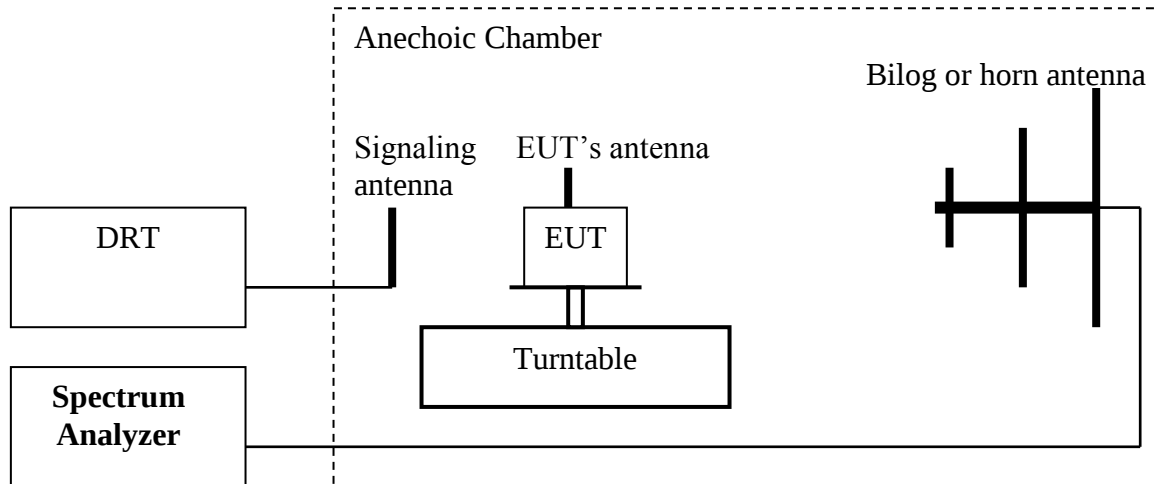
During the testing process the EUT was tested on a single channel using PRBS payload using DH5, 2DH5 or 3DH5 packets, all data in this report shows the worst case between horizontal and vertical polarization measurements.

This test report replaces all the previously issued reports:

“EMC_APPLE_057_09001_FCC15.247FHSS_BCG-E2380B” issued by Cetecom Inc.

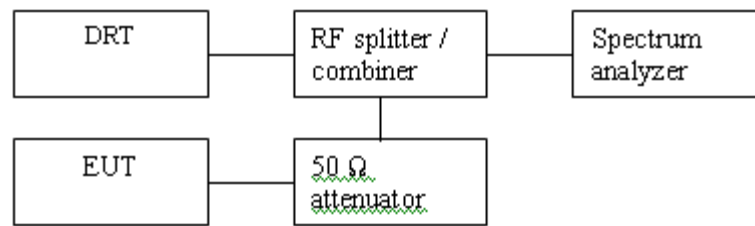
5 Measurements

5.1 Radiated Measurement Procedure



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
ERP (dBm) = LVL (dBm) + LOSS (dB)
8. Determine the EIRP using the following equation:
EIRP (dBm) = ERP (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channels.

5.2 Conducted Measurement Procedure



1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Measurements are to be performed with the EUT set to the low, middle and high channels.

5.3 Maximum Peak Output Power

5.3.1 Limits:

§15.247 (b)(1)

Nominal Peak Output Power < 30 dBm (1W)

5.3.2 Test Conditions:

T_{nom}: 25°C; V_{nom}: 4.2 V

Antenna Gain (dBi):

Low Channel: -1.89

Mid Channel: -1.63

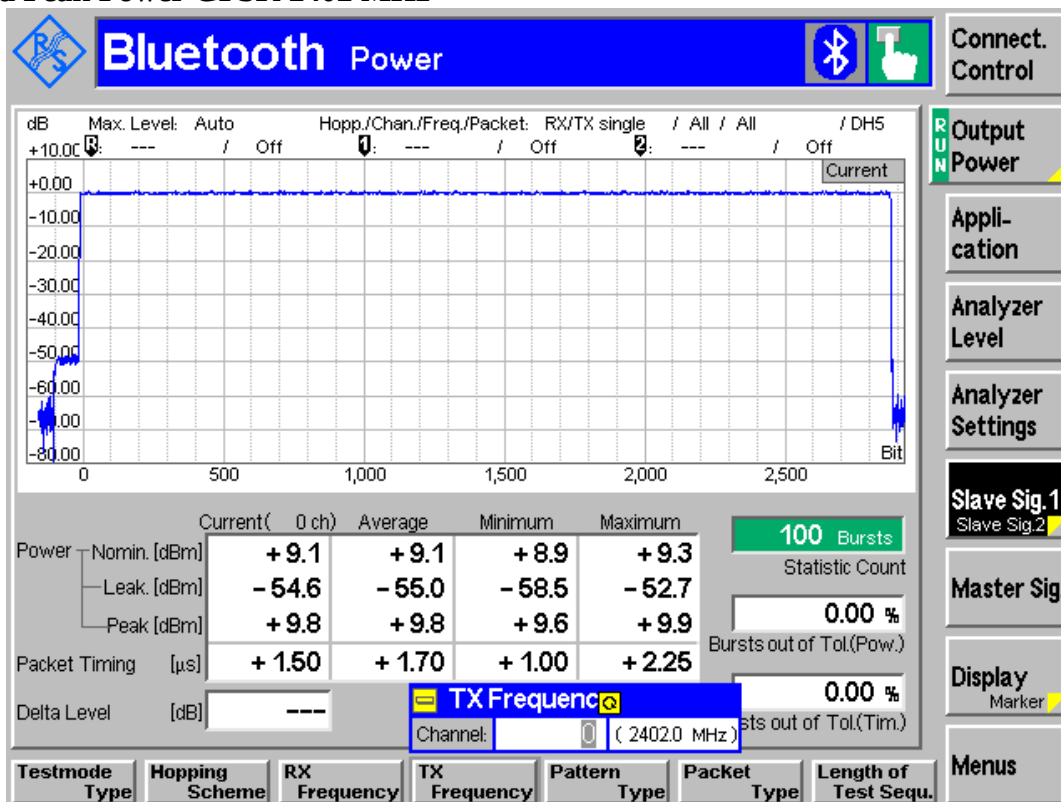
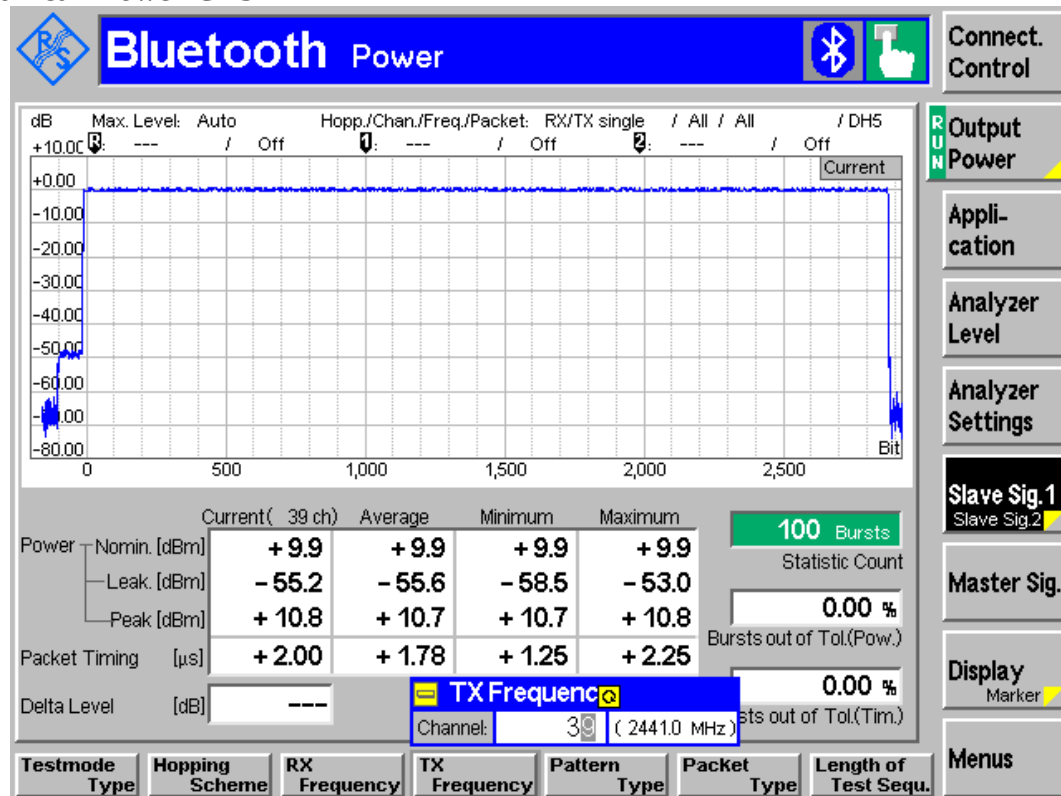
High Channel: -2.58

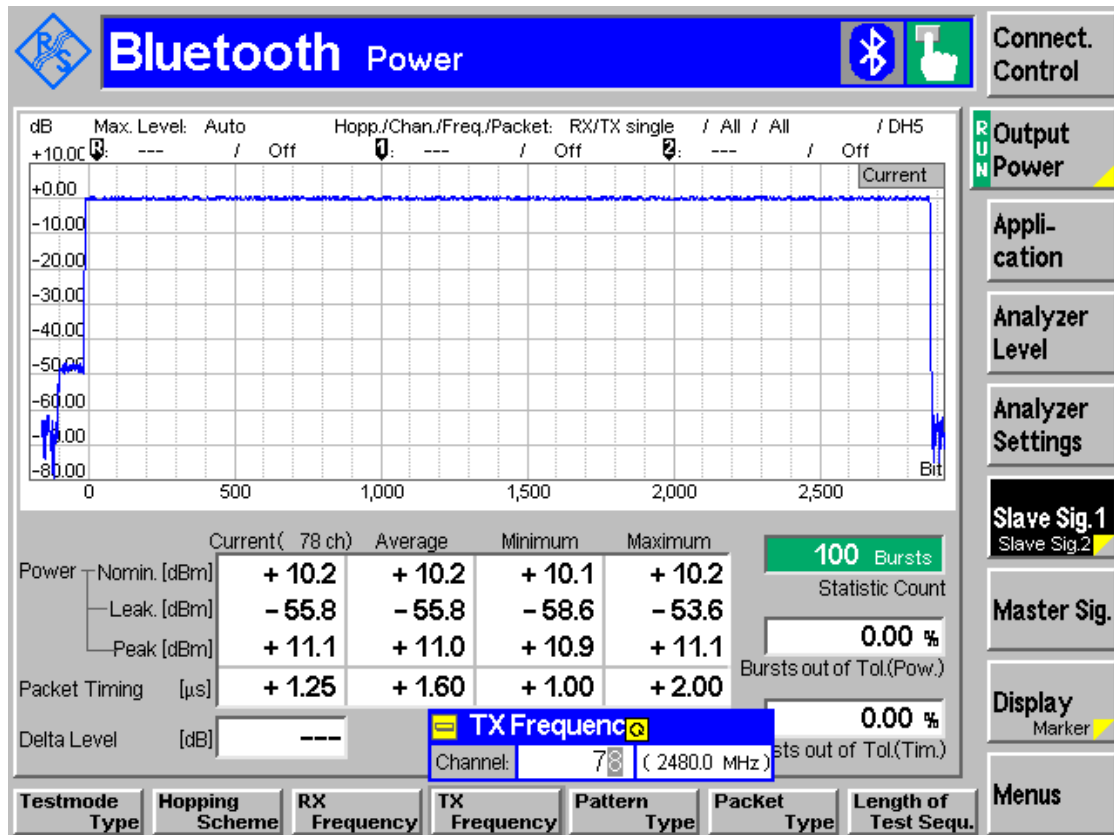
5.3.3 Test Result:

Max Peak Output Power- Conducted (dBm)			
Modulation	Frequency (MHz)		
	2402	2441	2480
GFSK	9.9	10.8	11.1
$\pi/4$ DQPSK	12.3	13.1	13.5
8-DPSK	10.1	11.0	11.2
Measurement Uncertainty: ± 0.5 dB			

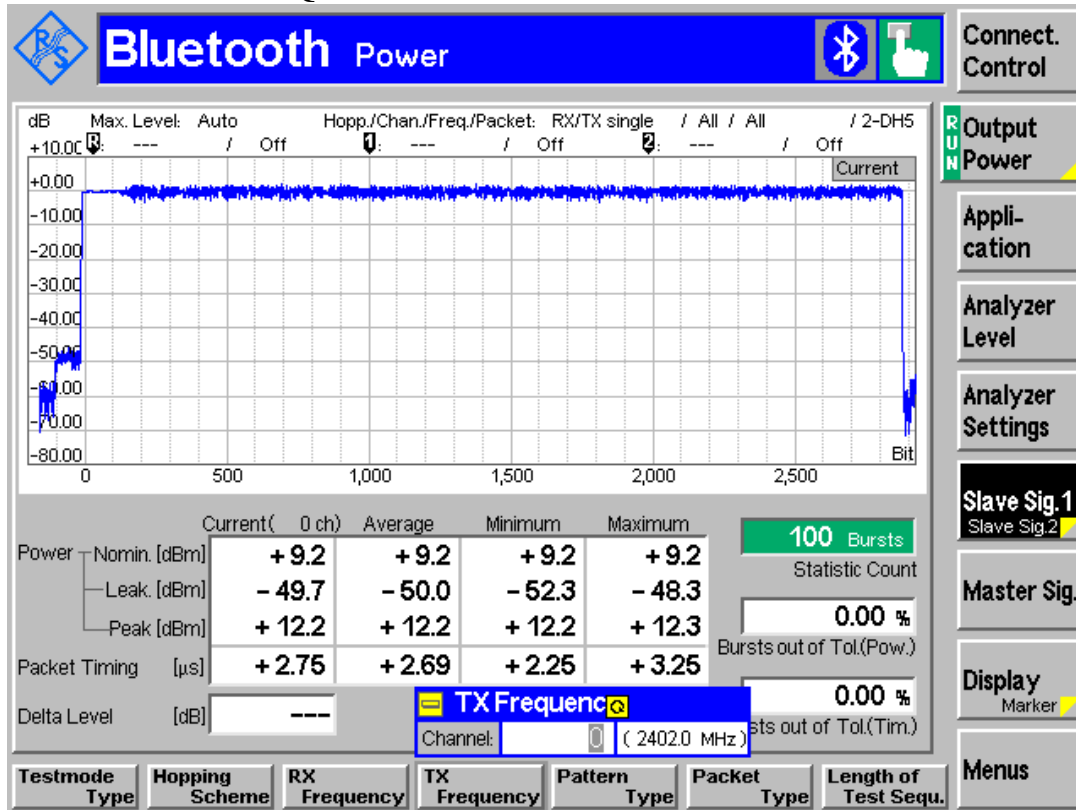
Max Peak Output Power- Radiated (dBm)			
Modulation	Frequency (MHz)		
	2402	2441	2480
GFSK	8.01	9.17	8.52
$\pi/4$ DQPSK	10.41	11.47	10.92
8-DPSK	8.21	9.37	8.62
Measurement Uncertainty: ± 3 dB			

Note: Radiated EIRP is calculated as
Conducted Measurement + Antenna Gain

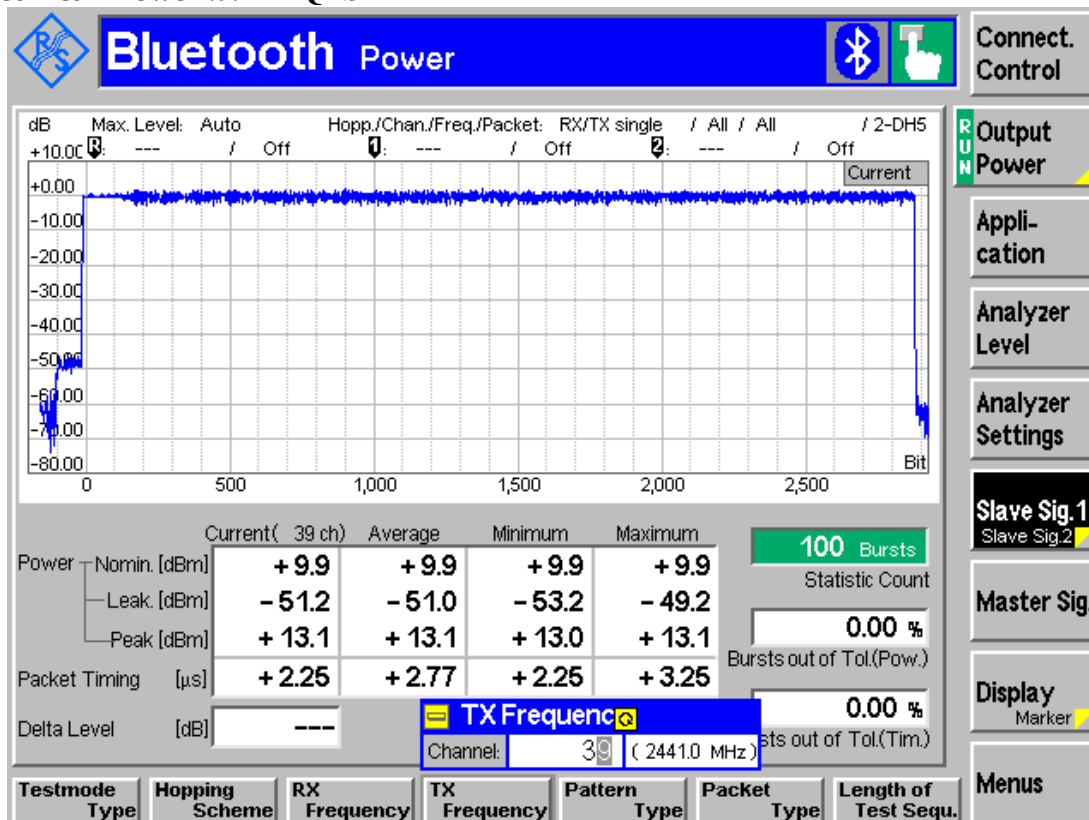
5.3.4 Test Data/plots:**Conducted Peak Power GFSK 2402 MHz****Conducted Peak Power GFSK 2441 MHz**

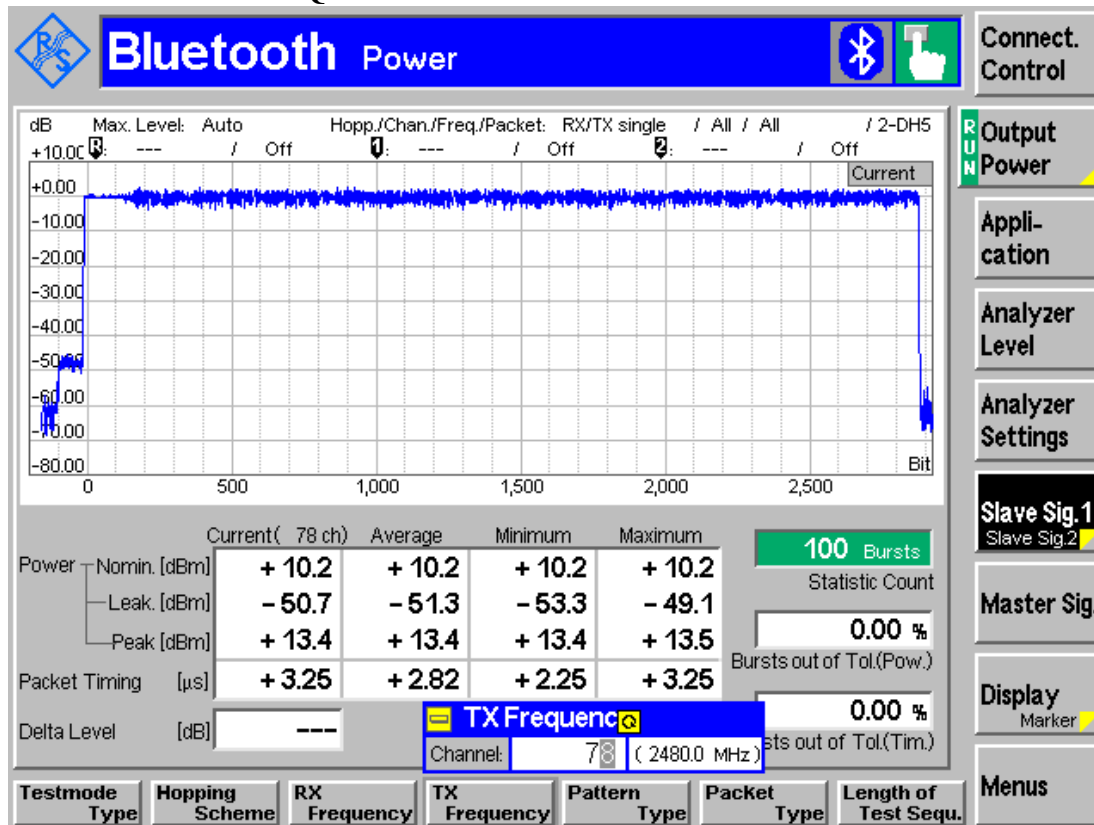
Conducted Peak Power GFSK 2480 MHz

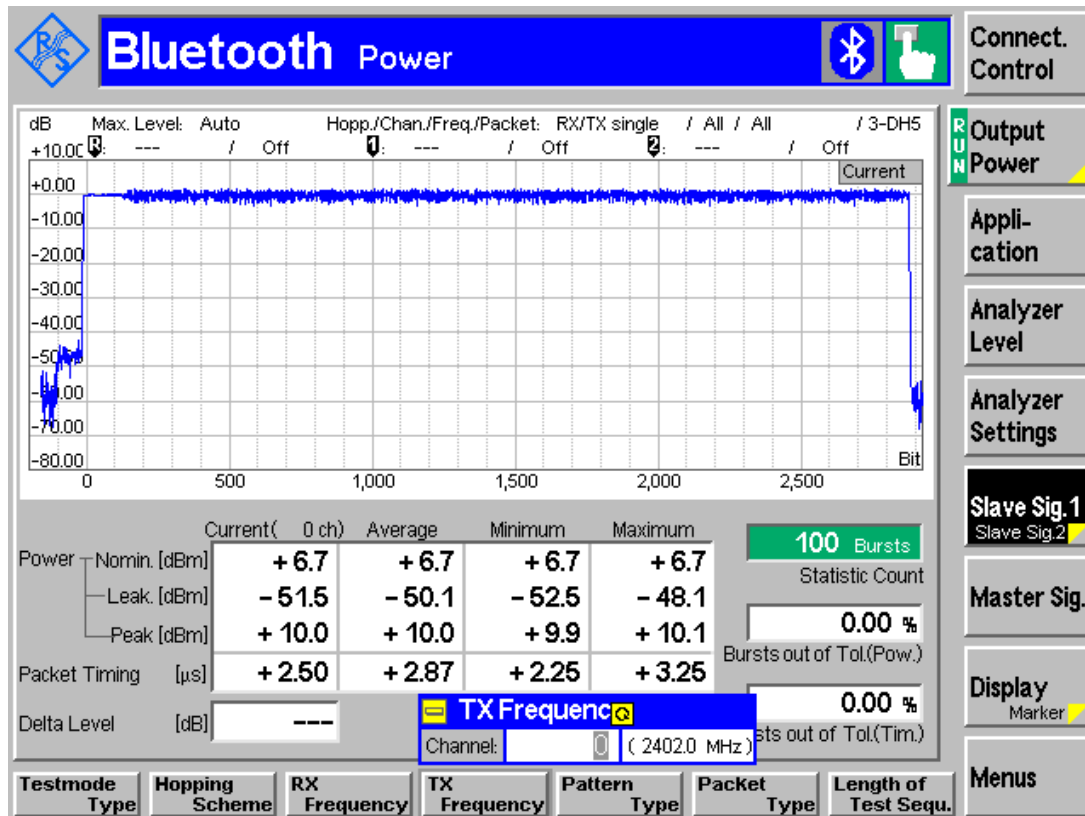
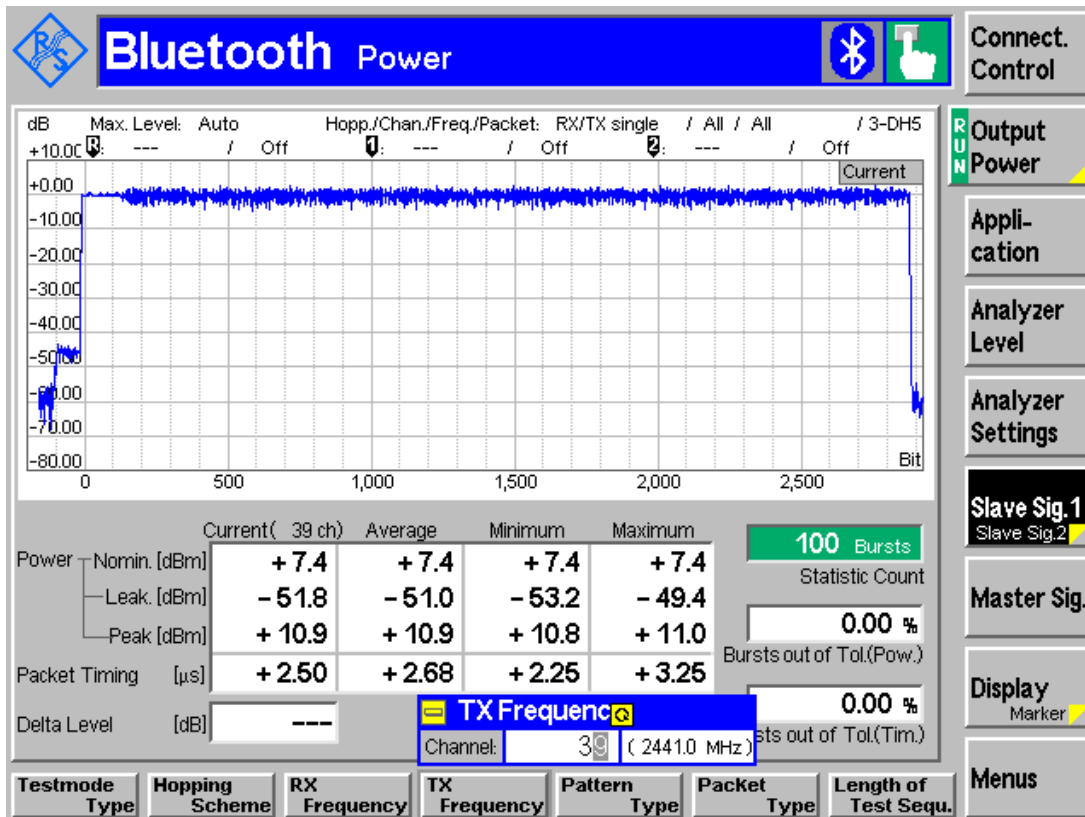
Conducted Peak Power π / 4 DQPSK 2402 MHz



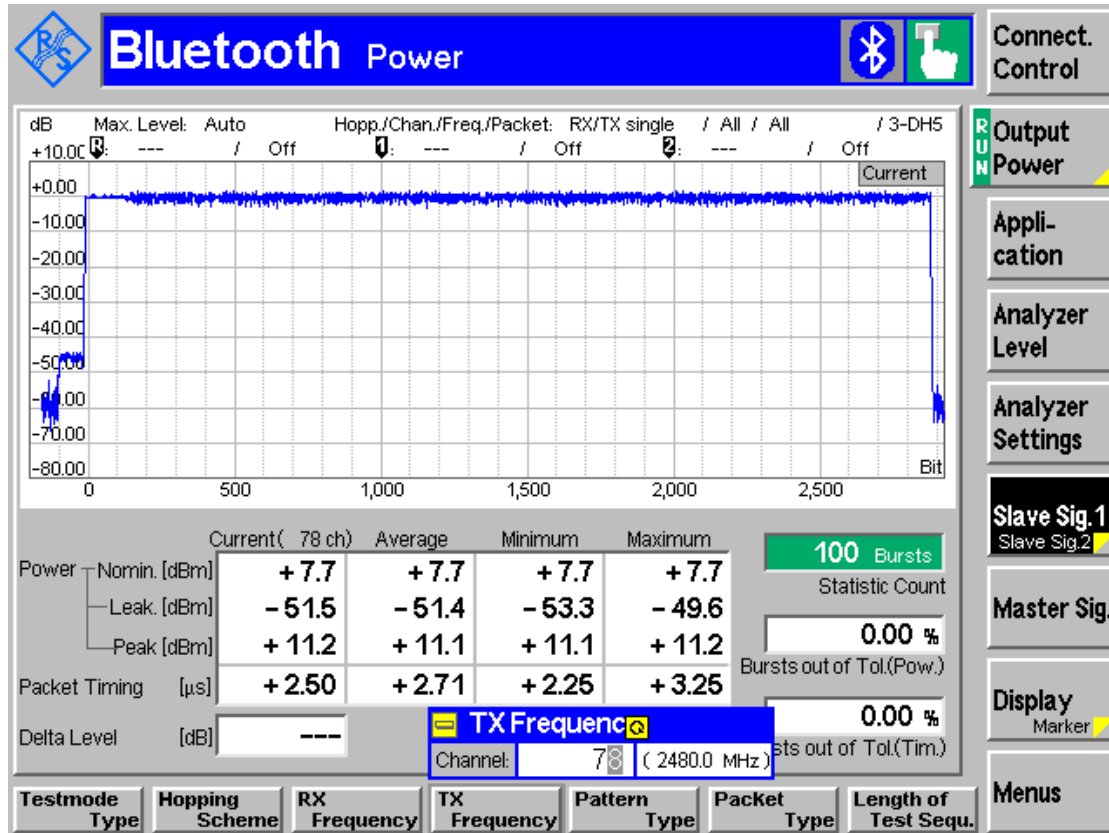
Conducted Peak Power π / 4 DQPSK 2441 MHz



Conducted Peak Power π / 4 DQPSK 2480 MHz

Conducted Peak Power 8DPSK 2402 MHz**Conducted Peak Power 8DPSK 2441 MHz**

Conducted Peak Power 8DPSK 2480 MHz



5.4 Restricted Band Edge Compliance

5.4.1 Limits: §15.247/15.205

(a) Except as shown in paragraph (d) of this section, only spurious 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			

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).

5.4.2 Measurement Procedure:

Peak measurements are made using a peak detector and RBW=1MHz.

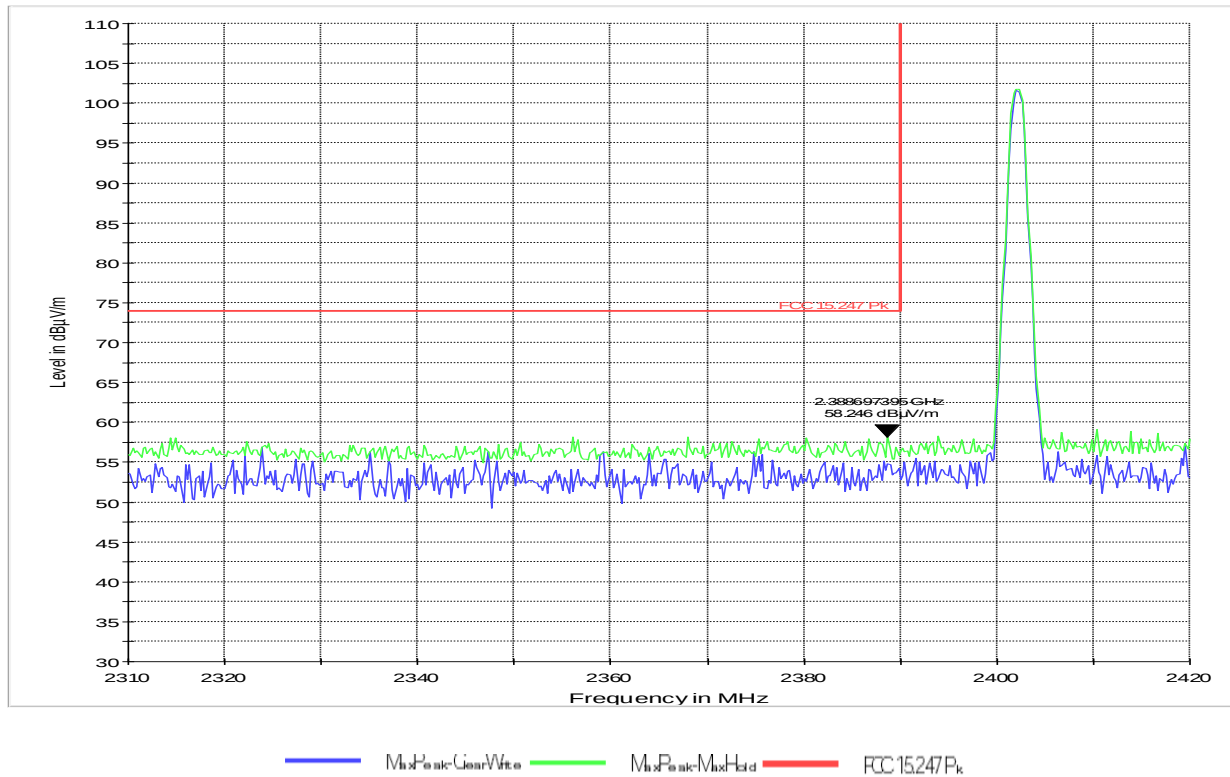
Average measurements performed using a peak detector and according to video averaging procedure with RBW=1MHz and VBW=10Hz.

*PEAK LIMIT= 74dBμV/m

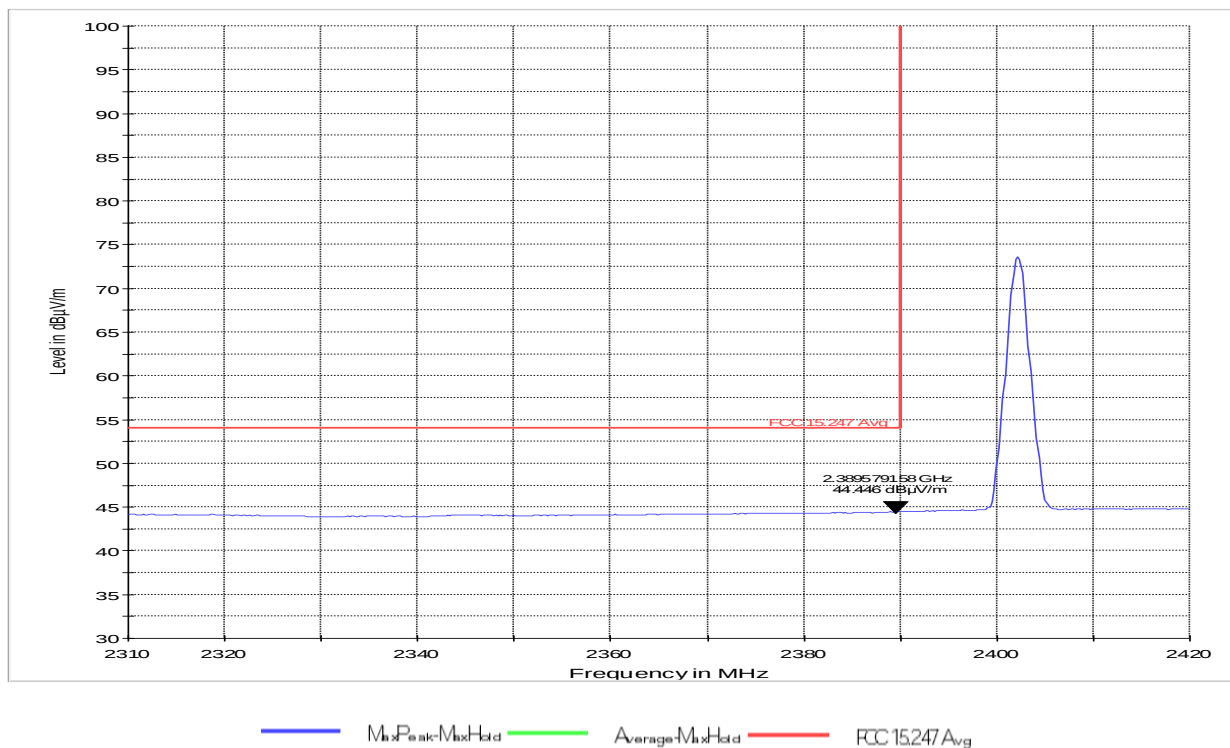
*AVG. LIMIT= 54dBμV/m

5.4.3 Test Data/plots:

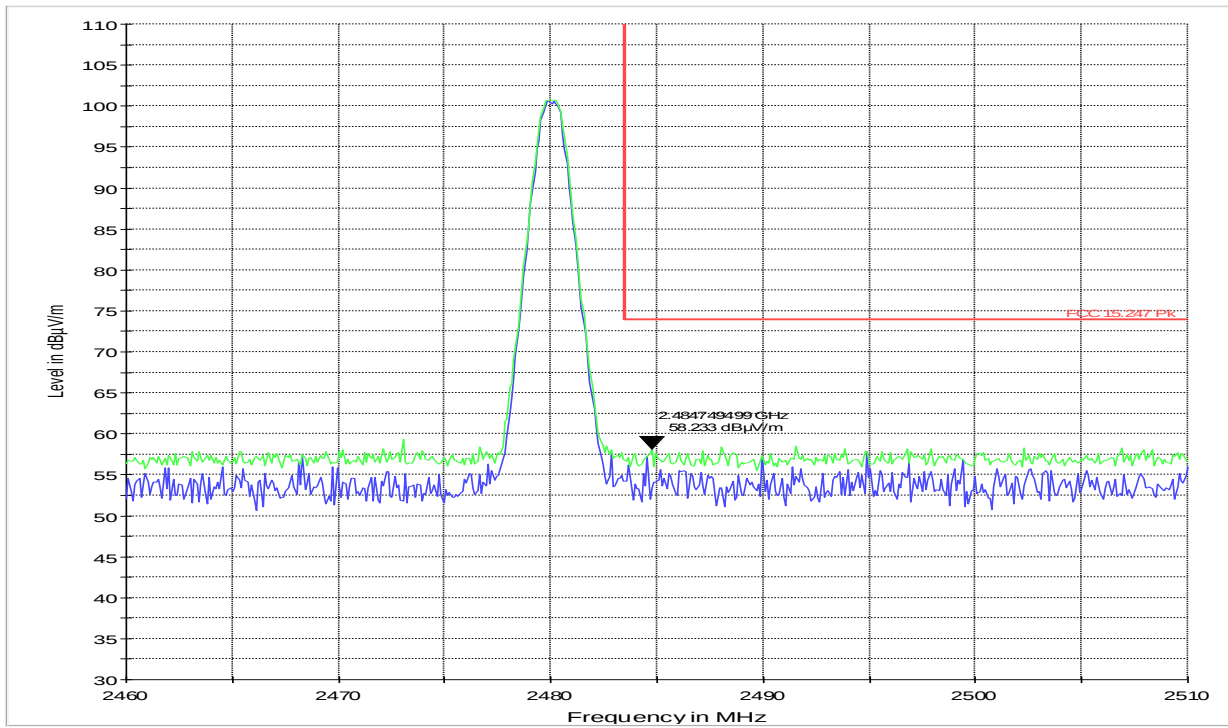
Lower band edge peak -GFSK modulation



Lower band edge average -GFSK modulation

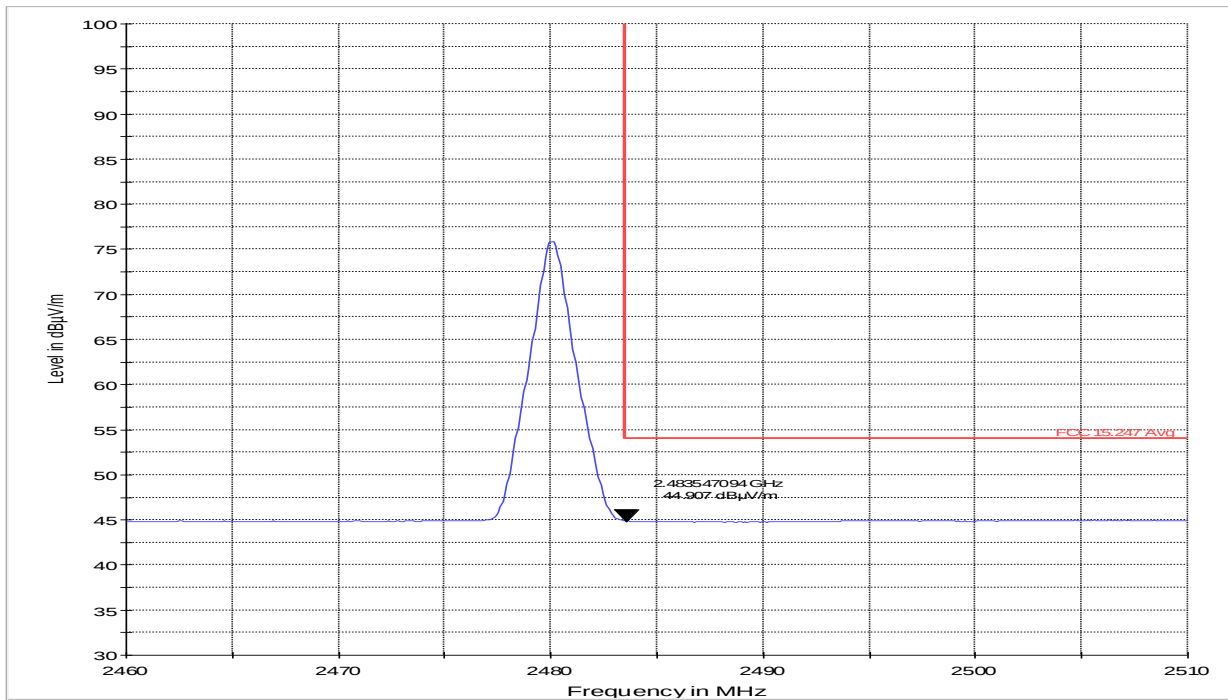


Higher band edge peak -GFSK modulation

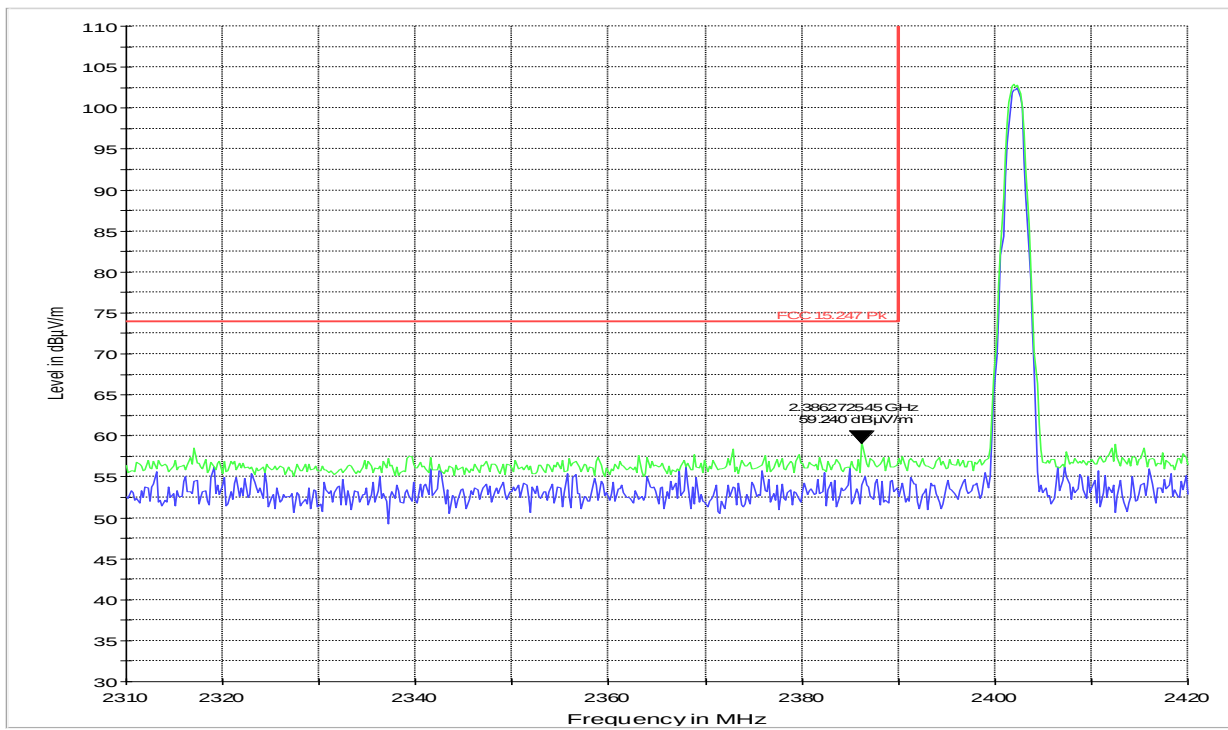
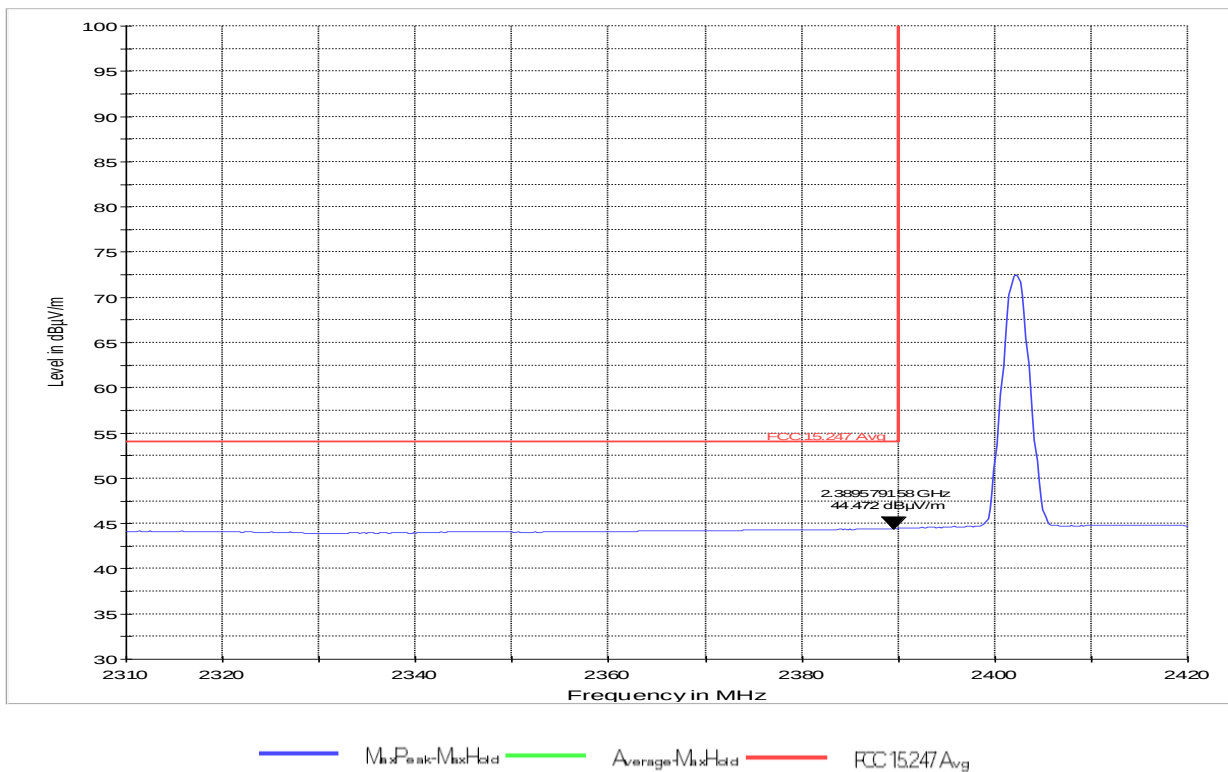


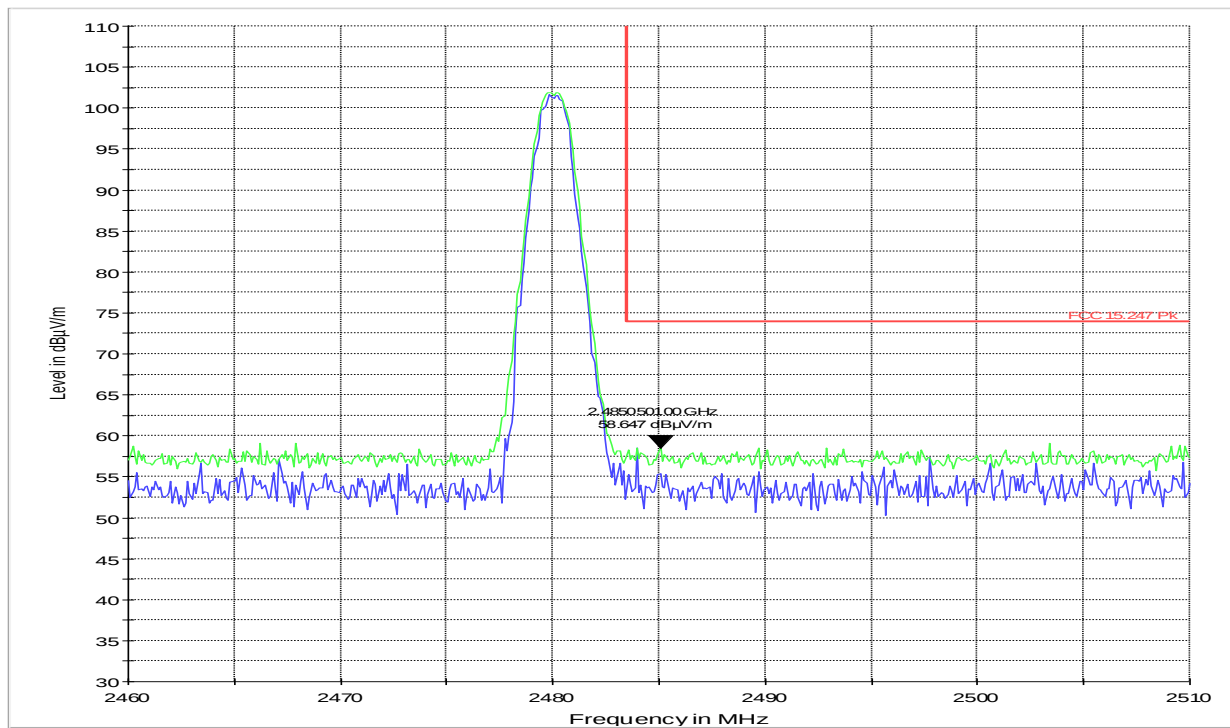
MixPeak-ClearWfs MixPeak-MixHold FCC 15.247 PR

Higher band edge average-GFSK modulation

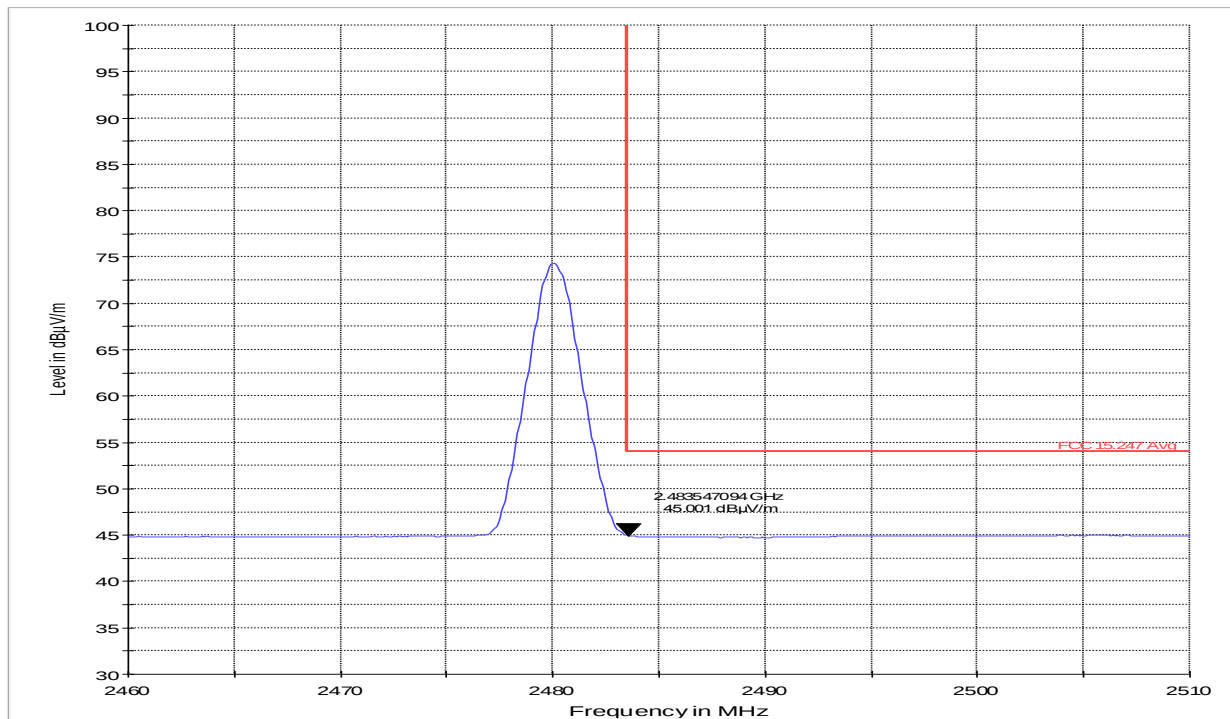


MixPeak-MixHold Average-MixHold FCC 15.247 Avg

Lower band edge peak - $\pi/4$ DQPSK modulation**Lower band edge average - $\pi/4$ DQPSK modulation**

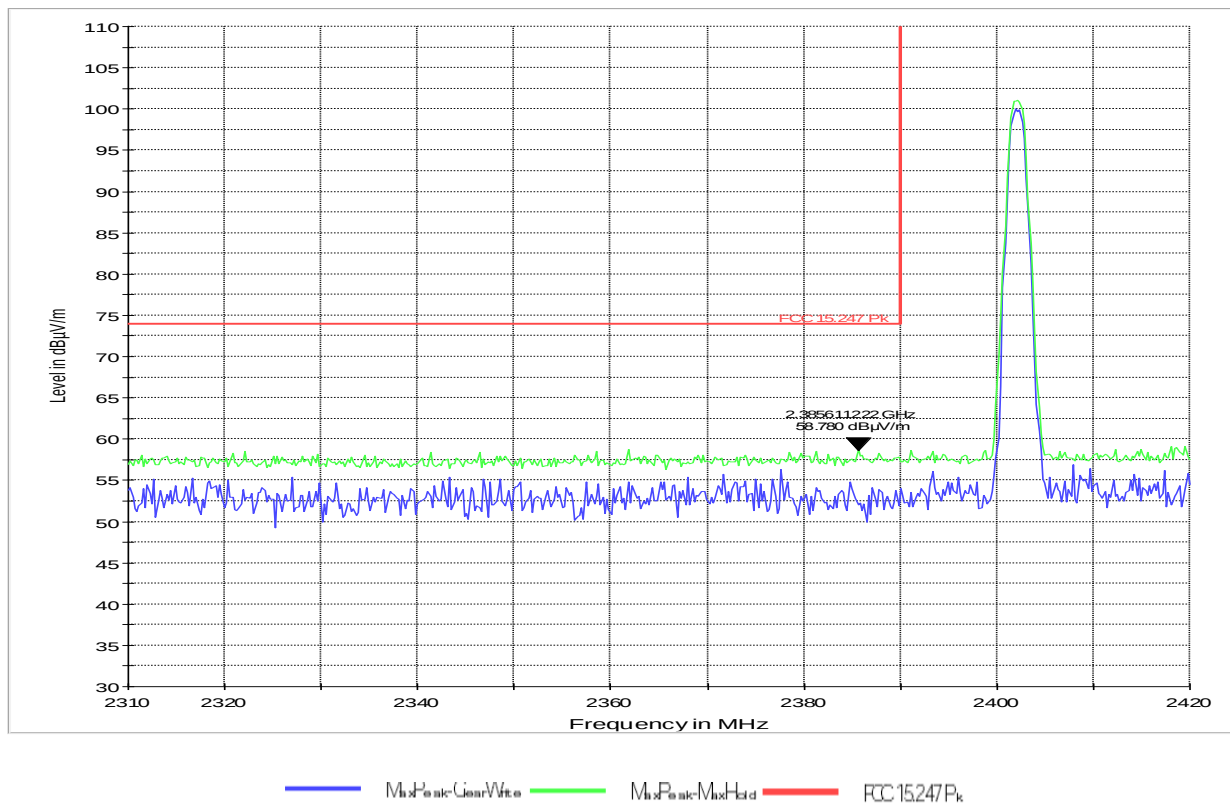
Higher band edge peak $-\pi/4$ DQPSK modulation

— MixPeak-ClearWfcs — MixPeak-MixHeld — FCC 15.247 PR

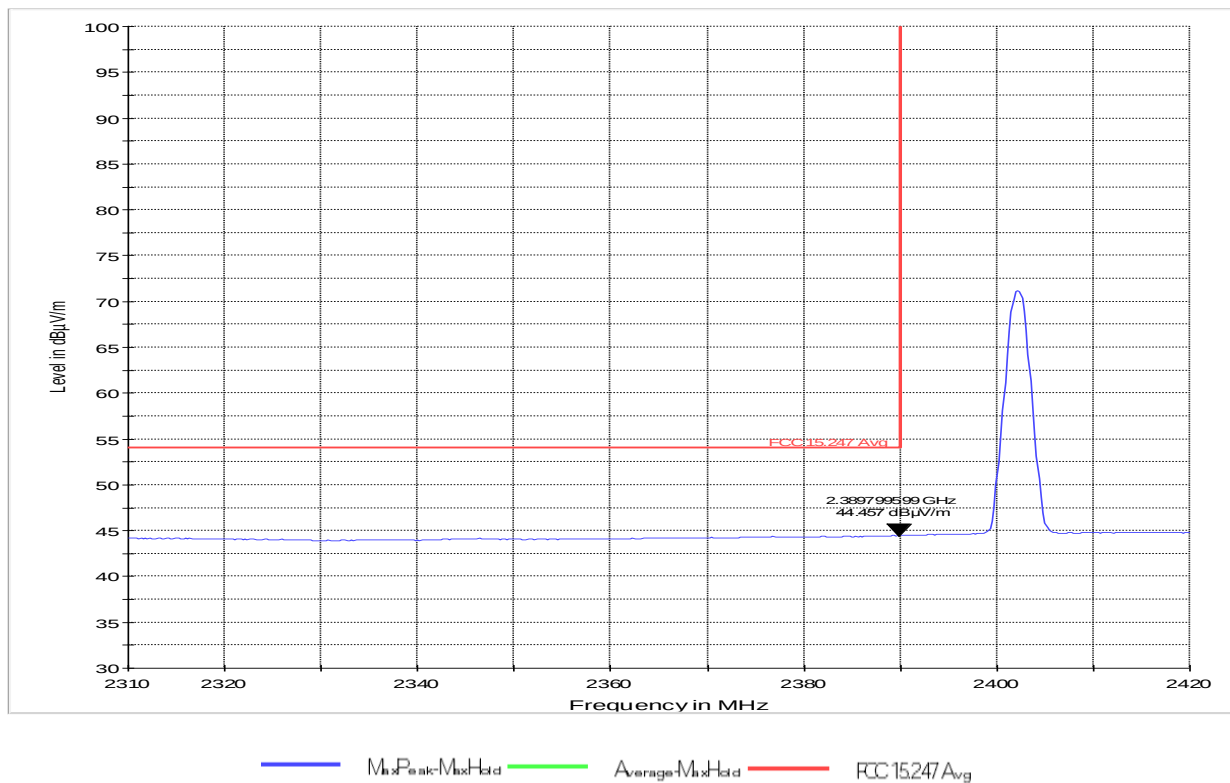
Higher band edge average $-\pi/4$ DQPSK modulation

— MixPeak-MixHeld — Average-MixHeld — FCC 15.247 AVG

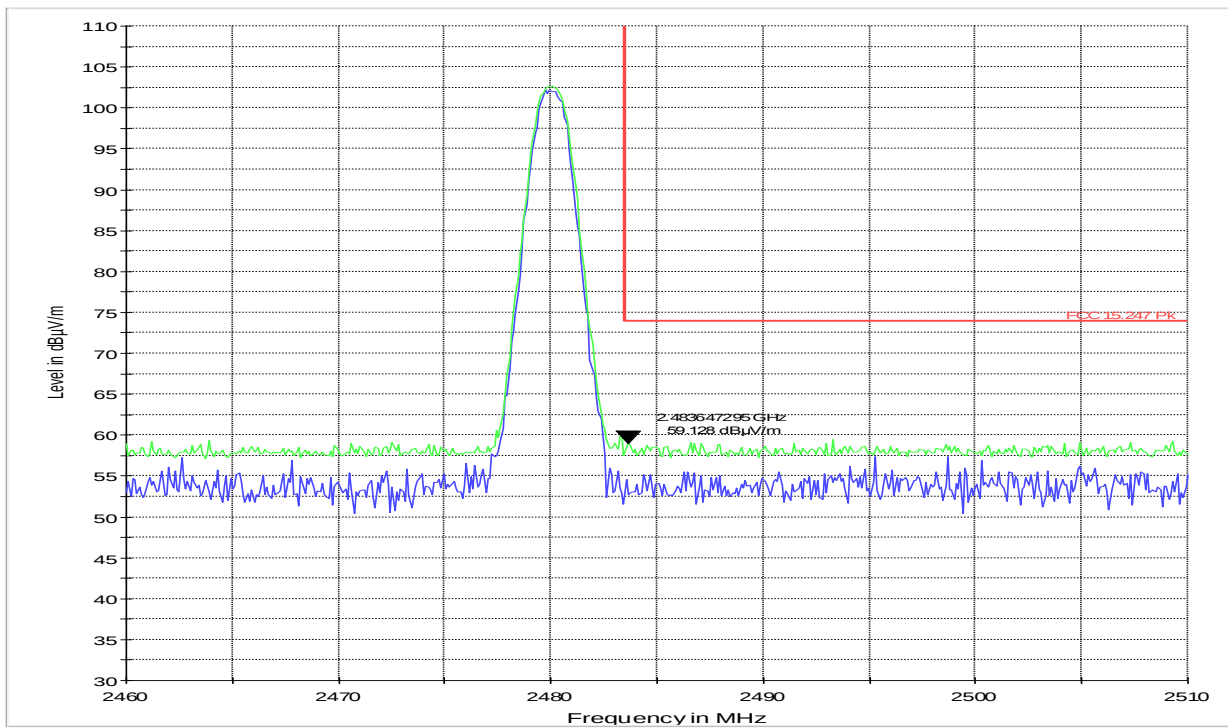
Lower band edge peak - 8DPSK modulation



Lower band edge average -8DPSK modulation

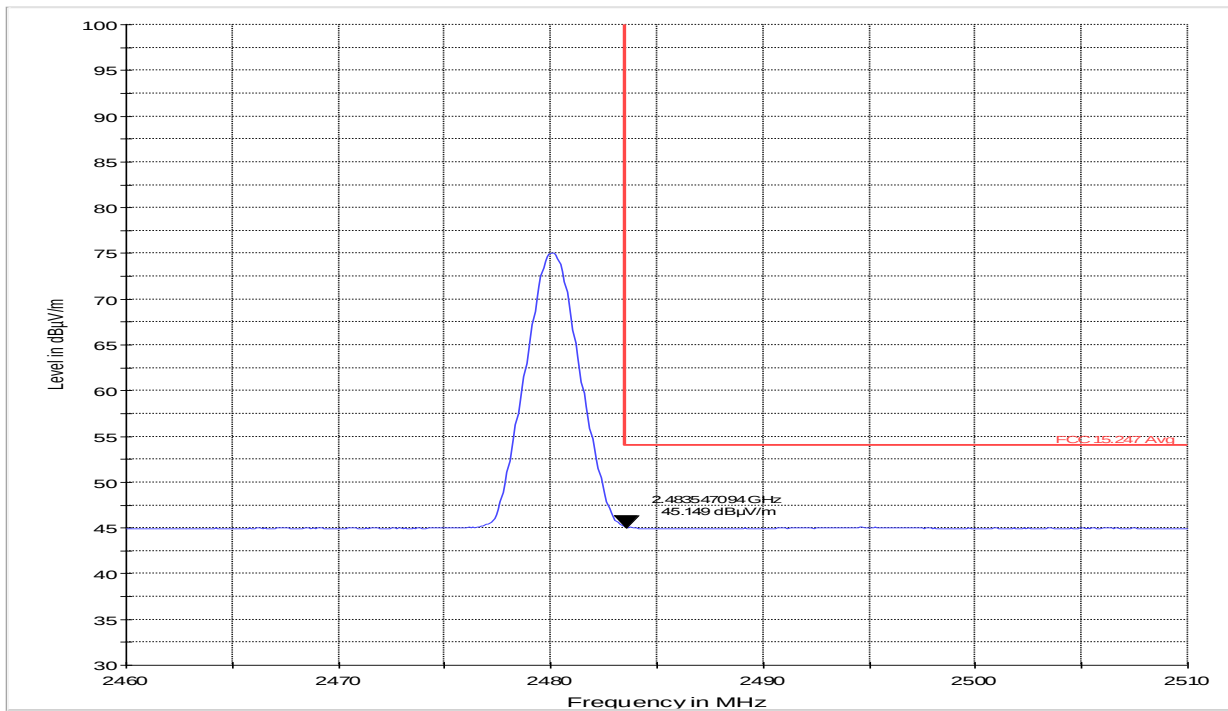


Higher band edge peak - 8DPSK modulation



MixPeak-ClearWfs MixPeak-MixHeld FCC 15.247 PR

Higher band edge average-8DPSK modulation



MixPeak-MixHeld Average-MixHeld FCC 15.247 Avg

5.5 Spectrum Bandwidth/ 20dB Bandwidth

5.5.1 Limits:

§ 15.247 (a)(1)

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.

GFSK < 1000 kHz

$\pi / 4$ DQPSK < 1500 kHz

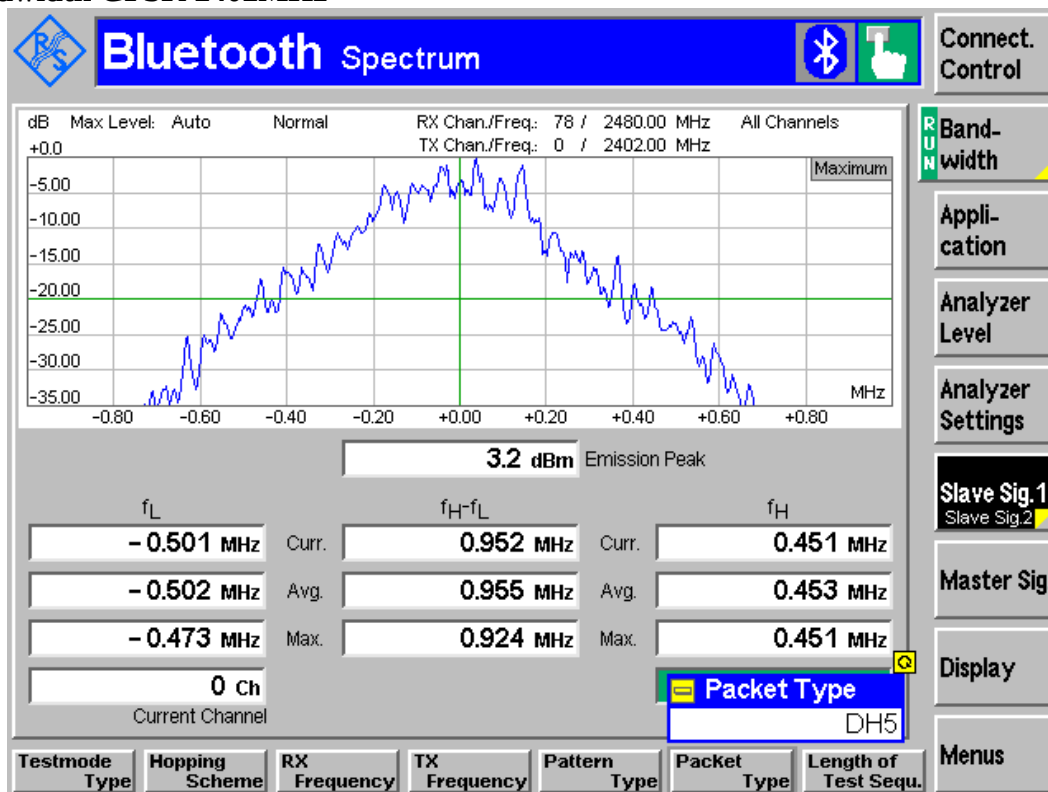
8 dPSK < 1500kHz

5.5.2 Test Result:

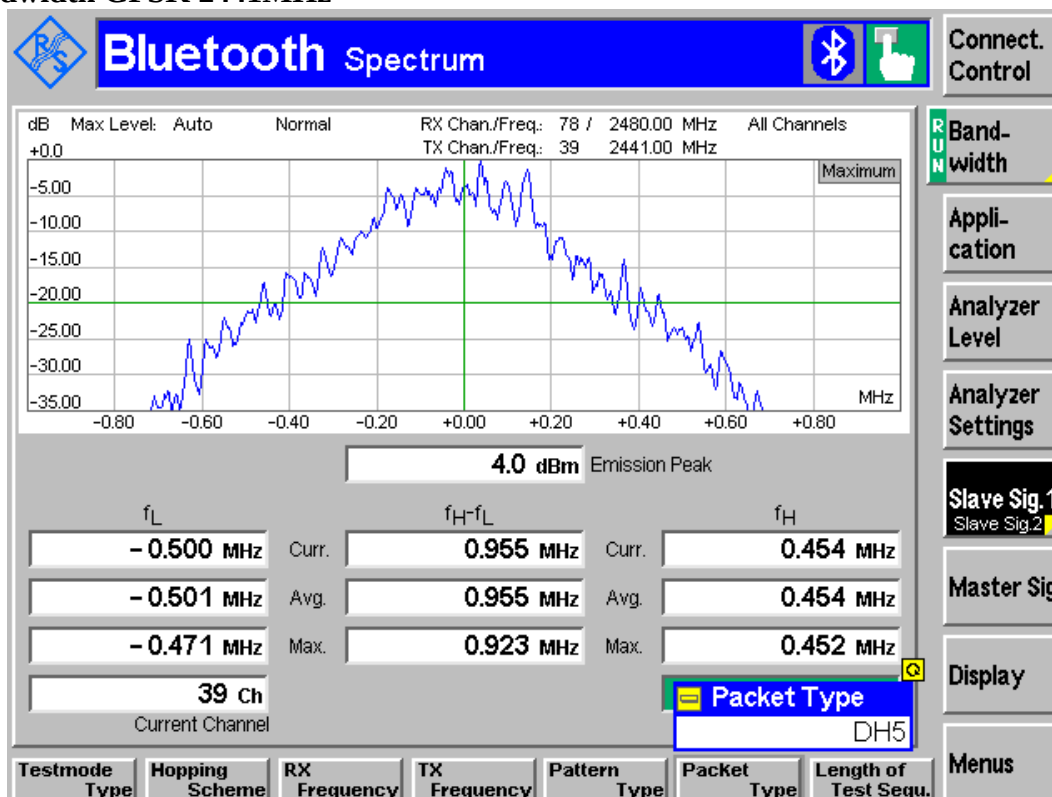
20dB Bandwidth (MHz)			
Modulation	Frequency (MHz)		
	2402	2441	2480
GFSK	0.924	0.923	0.922
$\pi/4$ DQPSK	1.312	1.312	1.313
8-DPSK	1.270	1.271	1.294
Measurement Uncertainty: ± 1 kHz			

5.5.3 Test Data/plots:

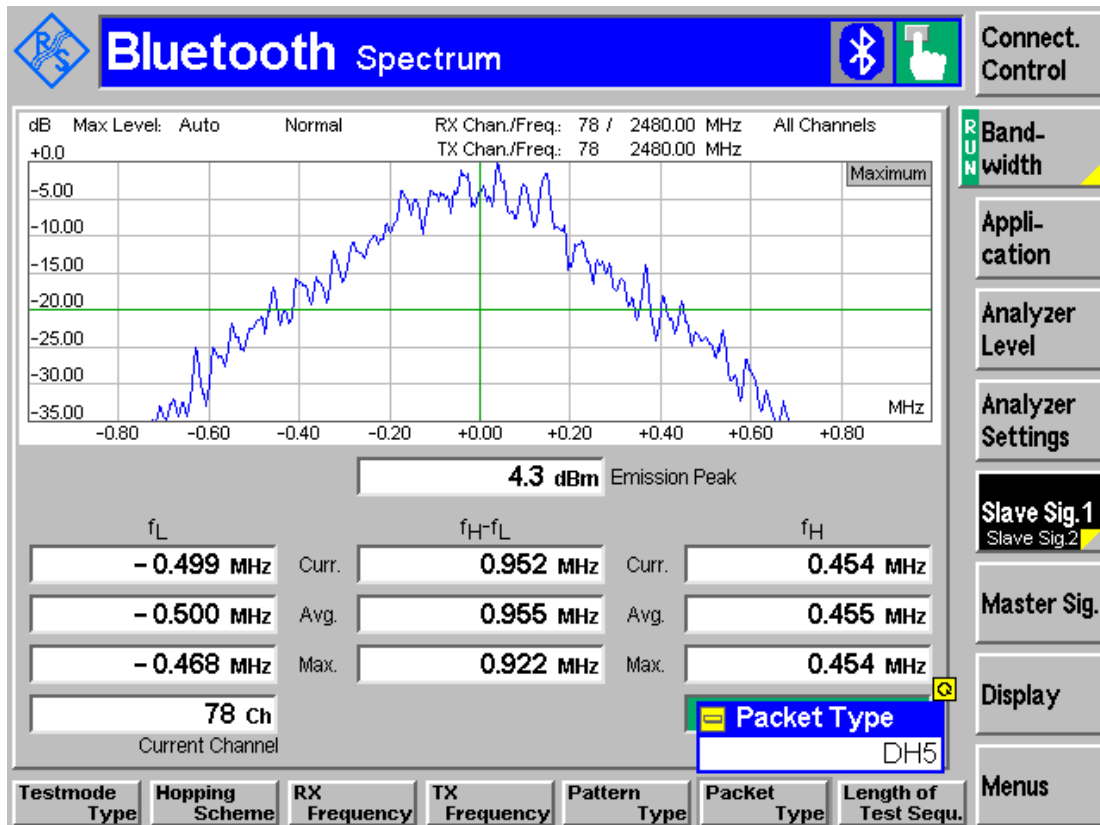
20dB Bandwidth GFSK 2402MHz



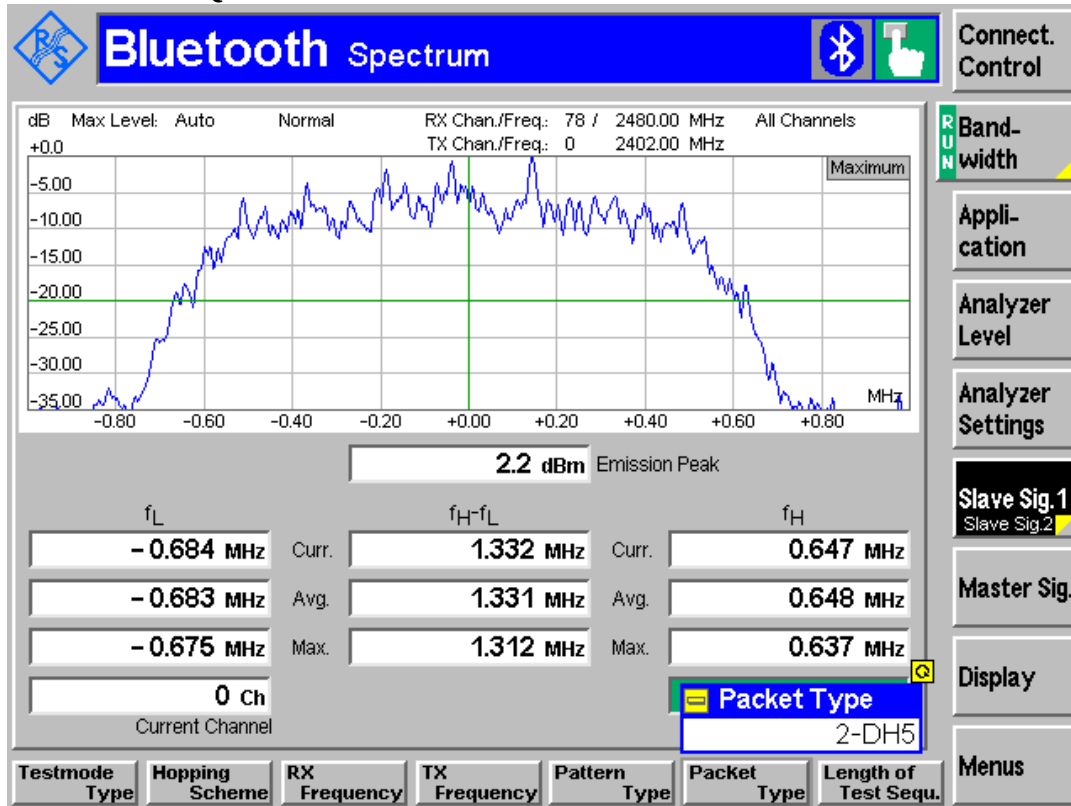
20dB Bandwidth GFSK 2441MHz



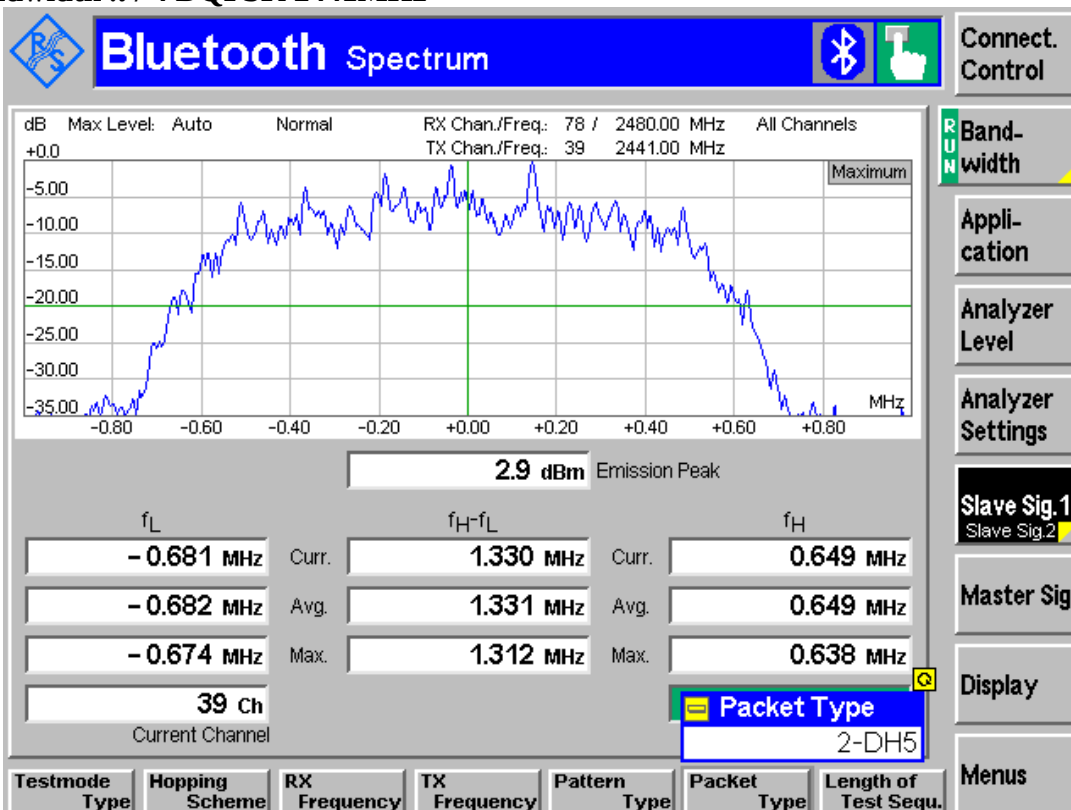
20dB Bandwidth GFSK 2480MHz



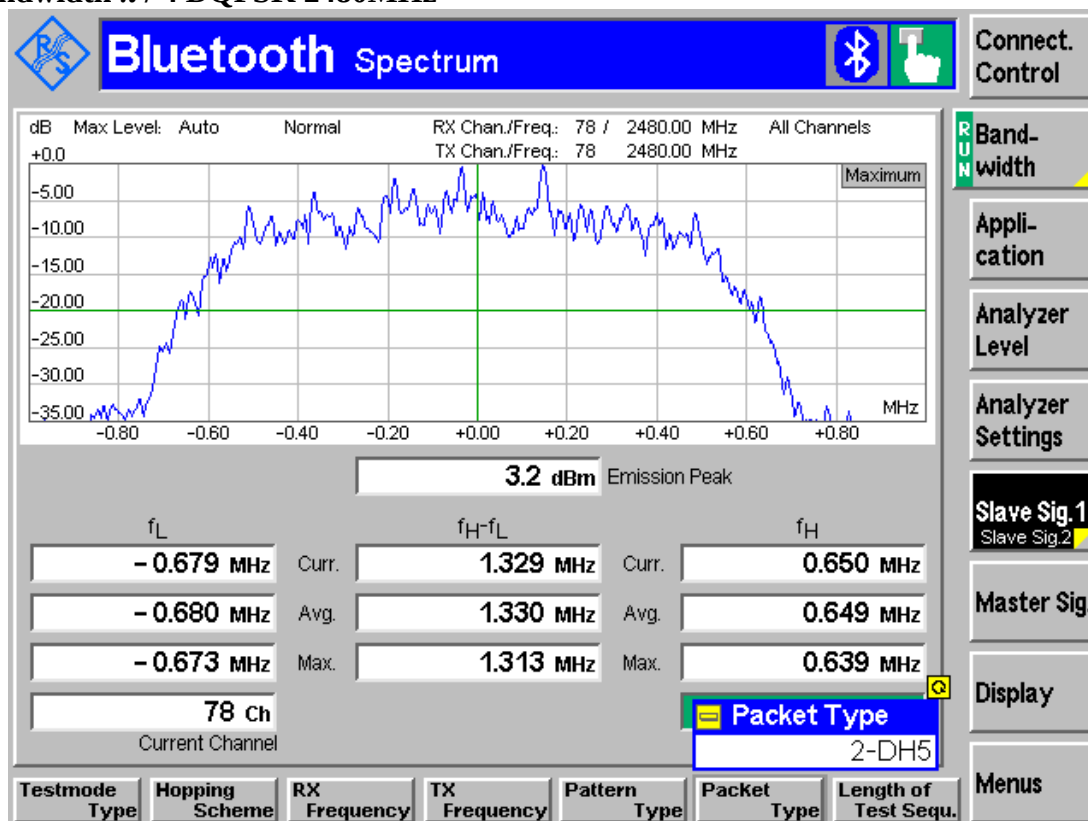
20dB Bandwidth $\pi / 4$ DQPSK 2402MHz

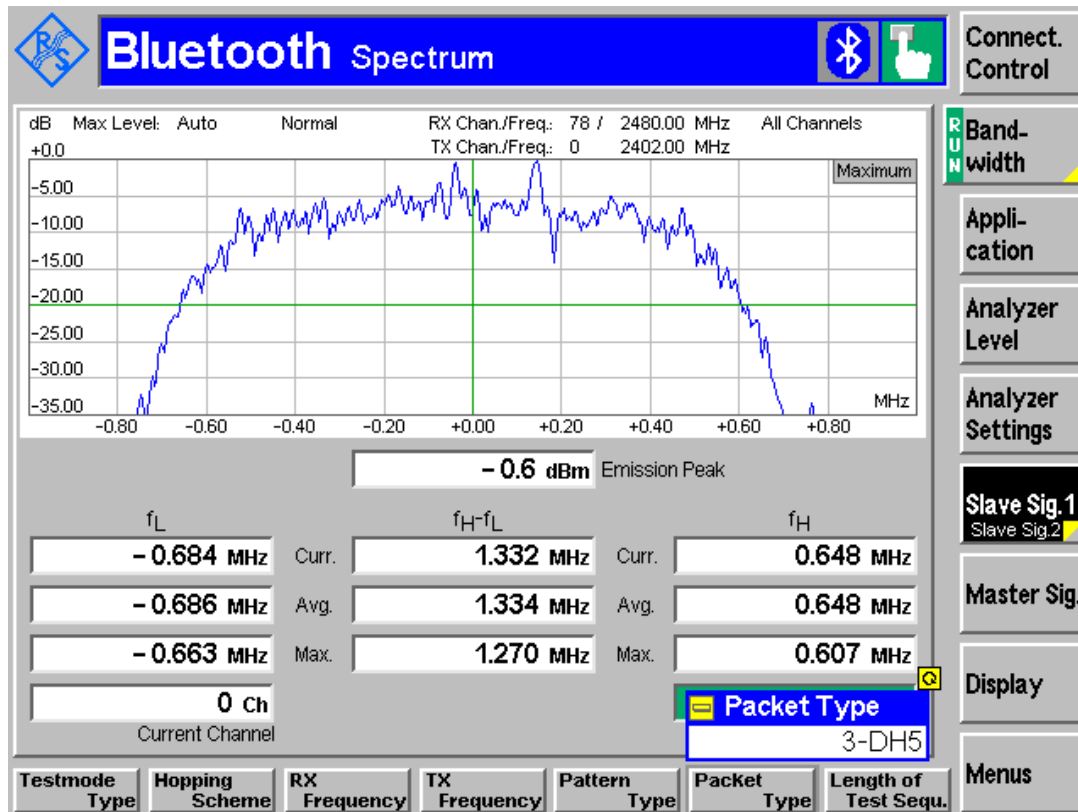
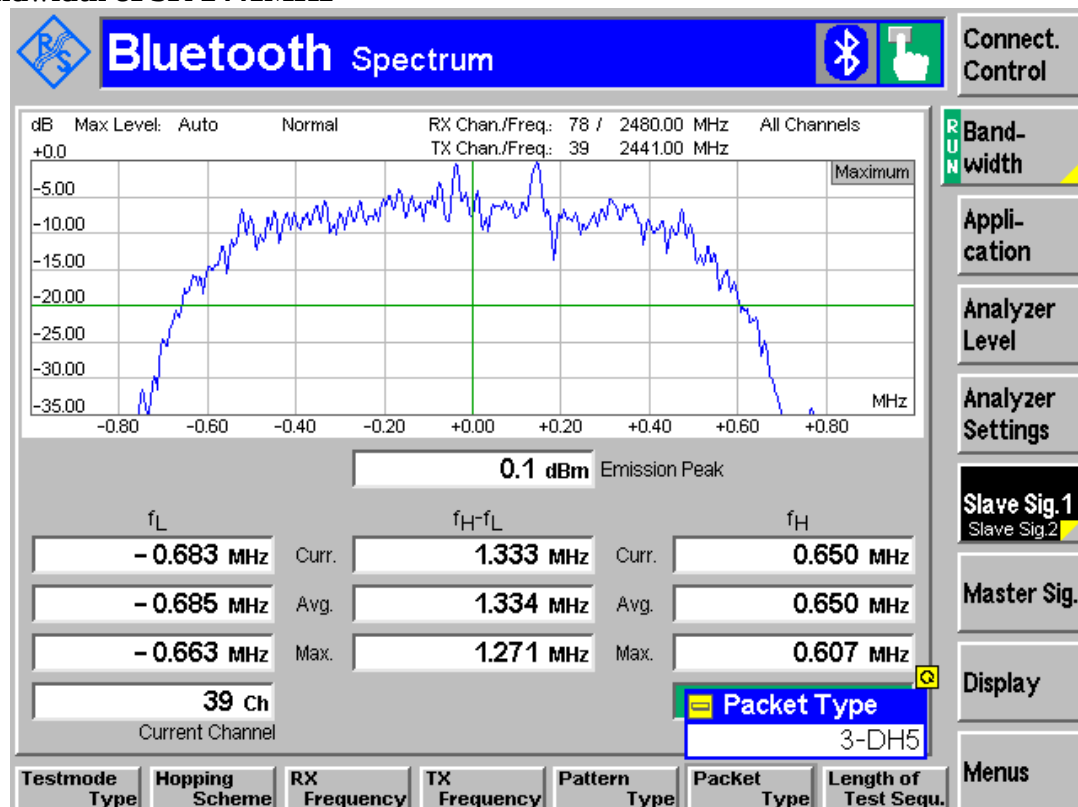


20dB Bandwidth $\pi / 4$ DQPSK 2441MHz

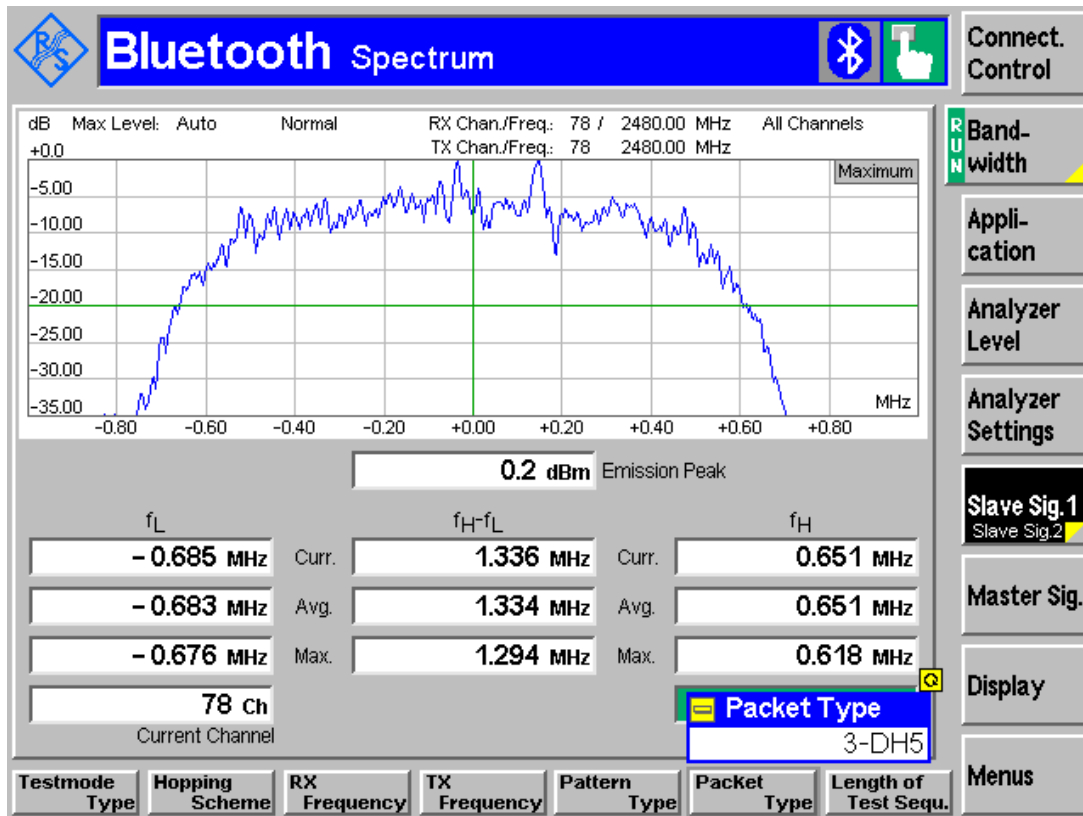


20dB Bandwidth $\pi / 4$ DQPSK 2480MHz



20dB Bandwidth 8PSK 2402MHz**20dB Bandwidth 8PSK 2441MHz**

20dB Bandwidth 8PSK 2480MHz



5.6 Carrier Frequency Separation

5.6.1 Limits:

§ 15.247 (a) (1)

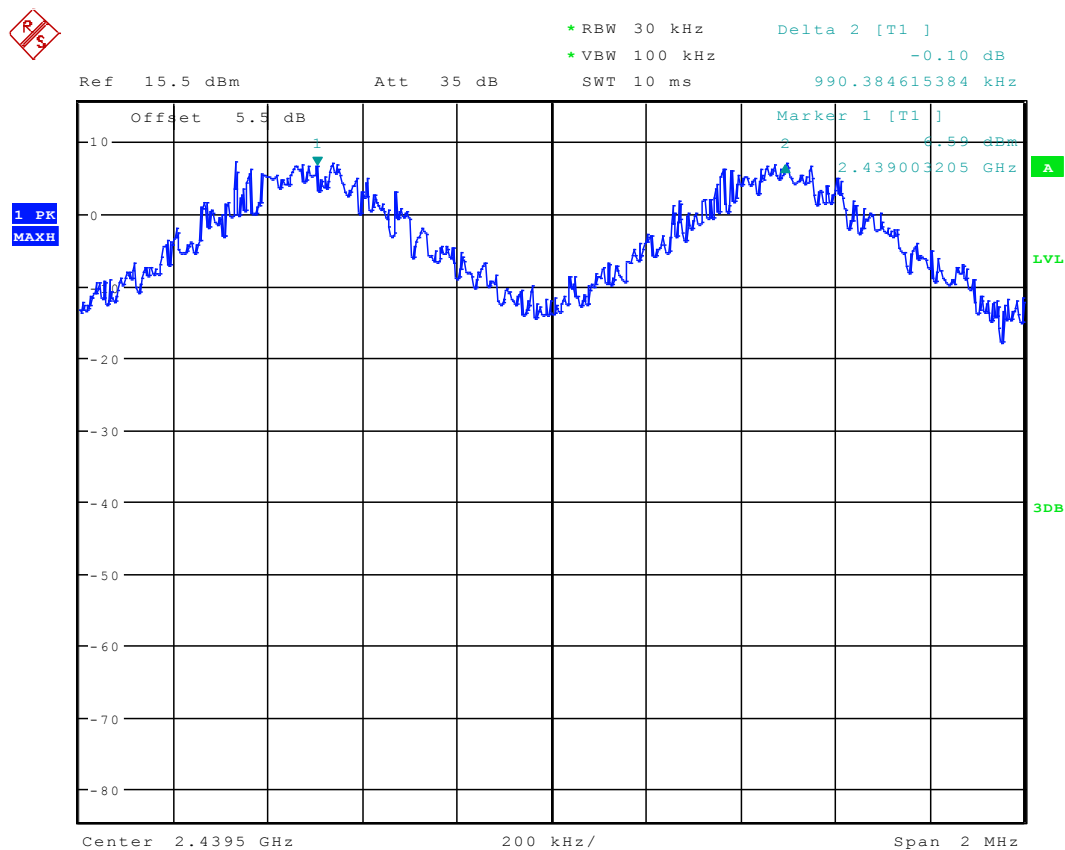
Minimum 25kHz or 2/3 of the 20dB bandwidth of the hopping system

5.6.2 Test Result:

Modulation: GFSK

Channel Separation: 990.38 kHz

5.6.3 Test Data/plot:



Date: 15.APR.2010 09:51:45

5.7 Number of hopping channels

5.7.1 Limits:

§ 15.247 (a) (1)

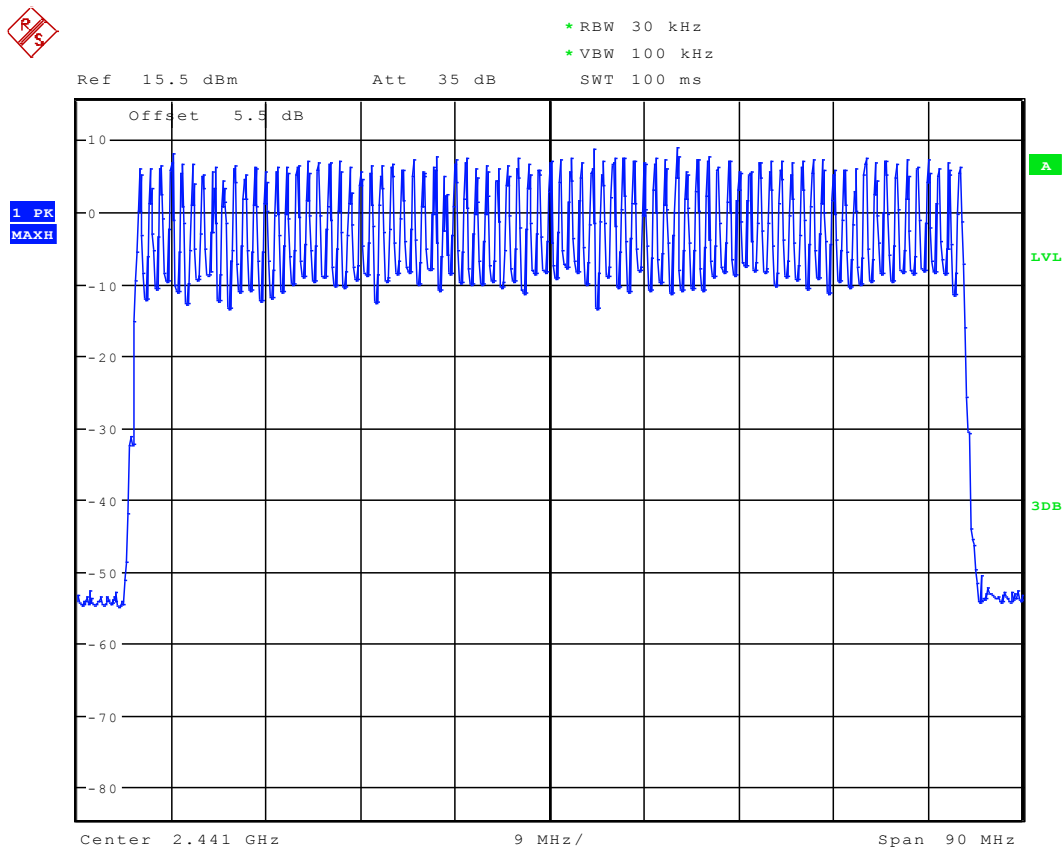
Atleast 15 non-overlapping channels

5.7.2 Test Result:

Modulation: GFSK

Number of hopping channels: 80

5.7.3 Test Data/plot:



Date: 15.APR.2010 09:49:46

5.8 Time of occupancy (Dwell time)

5.8.1 Limits:

§ 15.247 (a) (1) (iii)

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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

5.8.2 Test Result:

For Bluetooth devices:

The dwell time of 0.4 s within a 31.6 second period in data mode is independent from the packet type (packet length). The calculation for a 31.6 second period is as follows:

Dwell time = time slot length * hop rate / number of hopping channels * 31.6 s

Example for a DH1 packet (with a maximum length of one time slot)

Dwell time = $625 \mu\text{s} * 1600 \text{ 1/s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$ (in a 31.6 s period)

For multi-slot packet the hopping is reduced according to the length of the packet.

Example for a DH5 packet (with a maximum length of five time slots)

Dwell time = $5 * 625 \mu\text{s} * 1600 * 1/5 * 1/s / 79 * 31.6 \text{ s} = 0.4 \text{ s}$ (in a 31.6 s period)

This is according to Bluetooth Core Specification for all Bluetooth devices. Therefore all BT devices satisfy FCC requirement on time of occupancy (dwell time) in the data mode.

5.9 Power Spectral Density (Hybrid system in Inquiry mode/ Page scan)

5.9.1 Limits: § 15.247 (e)

For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.9.2 Test Result:

Not Applicable.

5.10 Transmitter Spurious Emissions- Conducted

5.10.1 Limits:

§ 15.247 (d)

30dBm for the transmitter.

-20dBc in the frequency range 30MHz- 25GHz.

5.10.2 Test Conditions:

Modulation: $\pi / 4$ DQPSK (since this is the mode with highest output power)

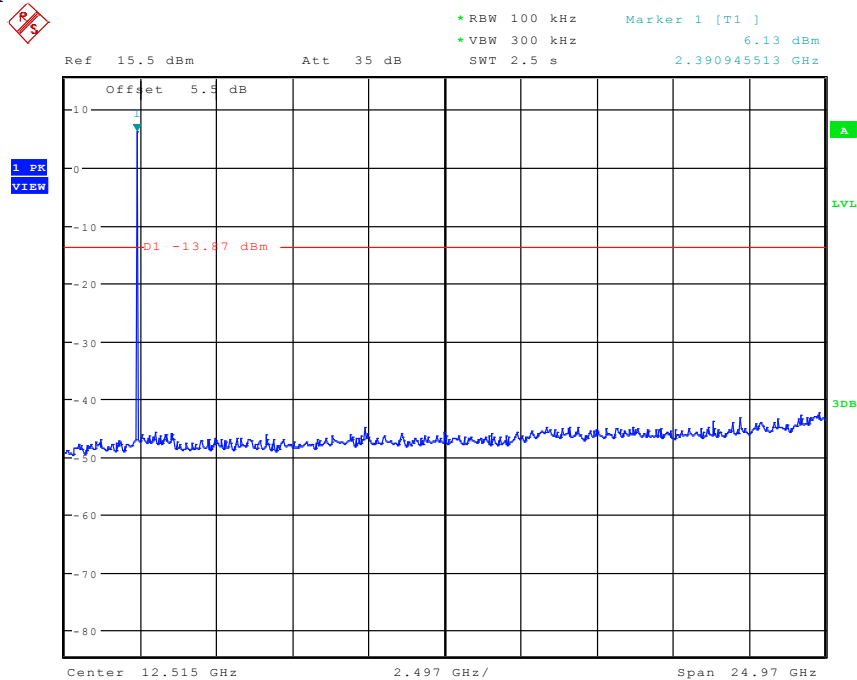
Analyzer settings: RBW=100 kHz

5.10.3 Test data/ plots:

Conducted Spurious Emissions			
Channel	Frequency (MHz)	Amplitude (dBm)	Limits
Low	2402	6.13	30dBm
	All other peaks >20dB below limit.		-20dBc
Mid	2441	6.47	30 dBm
	All other peaks >20dB below limit.		-20dBc
High	2480	7.17	30 dBm
	All other peaks >20dB below limit.		-20dBc
Measurement Uncertainty: ±1 dB			

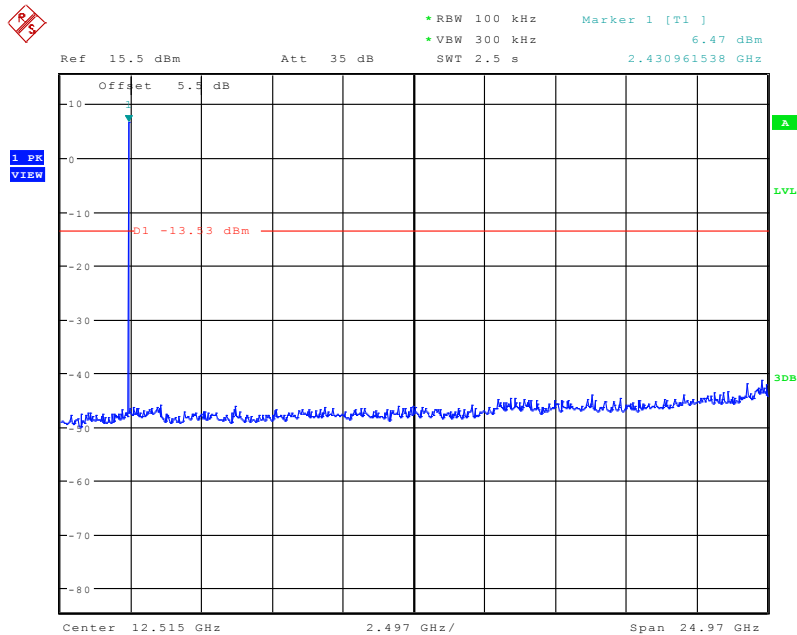
Test data/ plots:

Conducted Spurious Emission 2402MHz



Date: 15.APR.2010 09:58:03

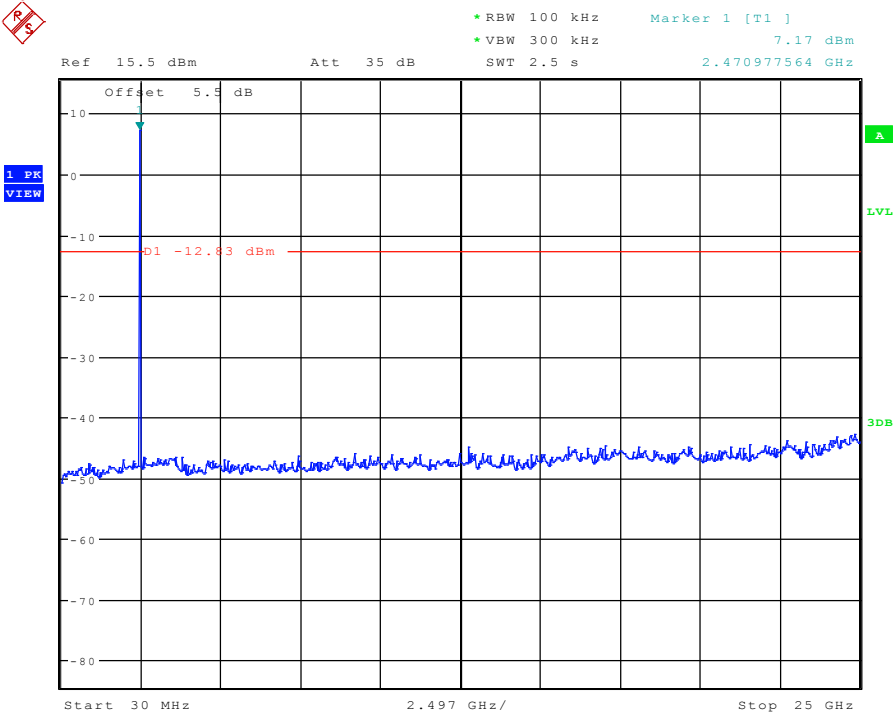
Conducted Spurious Emission 2441 MHz



Date: 15.APR.2010 10:07:03



Conducted Spurious Emission 2480MHz



Date: 15.APR.2010 10:06:14

5.11 Transmitter Spurious Emissions- Radiated

5.11.1 Limits: §15.247/15.205

(a) Except as shown in paragraph (d) of this section, only spurious 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			

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. 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)).

*PEAK LIMIT= 74dB μ V/m

*AVG. LIMIT= 54dB μ V/m

5.11.2 Limits: §15.209

(For measurement distance of 3m)

Frequency of emission (MHz)	Field strength (μ V/m)
30–88	100 (40dB μ V/m)
88–216	150 (43.5 dB μ V/m)
216–960	200 (46 dB μ V/m)
Above 960	500 (54 dB μ V/m)

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in Peak mode using an Average limit, unless specified within the plots.

5.11.3 Limits: §15.209

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30

5.11.4 Test Result:

Modulation: $\pi / 4$ DQPSK- since highest conducted power.

Plots reported here represent the worse case emissions for horizontal and vertical antenna polarizations and for there orientations of the EUT.

Unless mentioned otherwise, the peaks in the plots which are above the limit lines are from the Transmitter TCH signal.

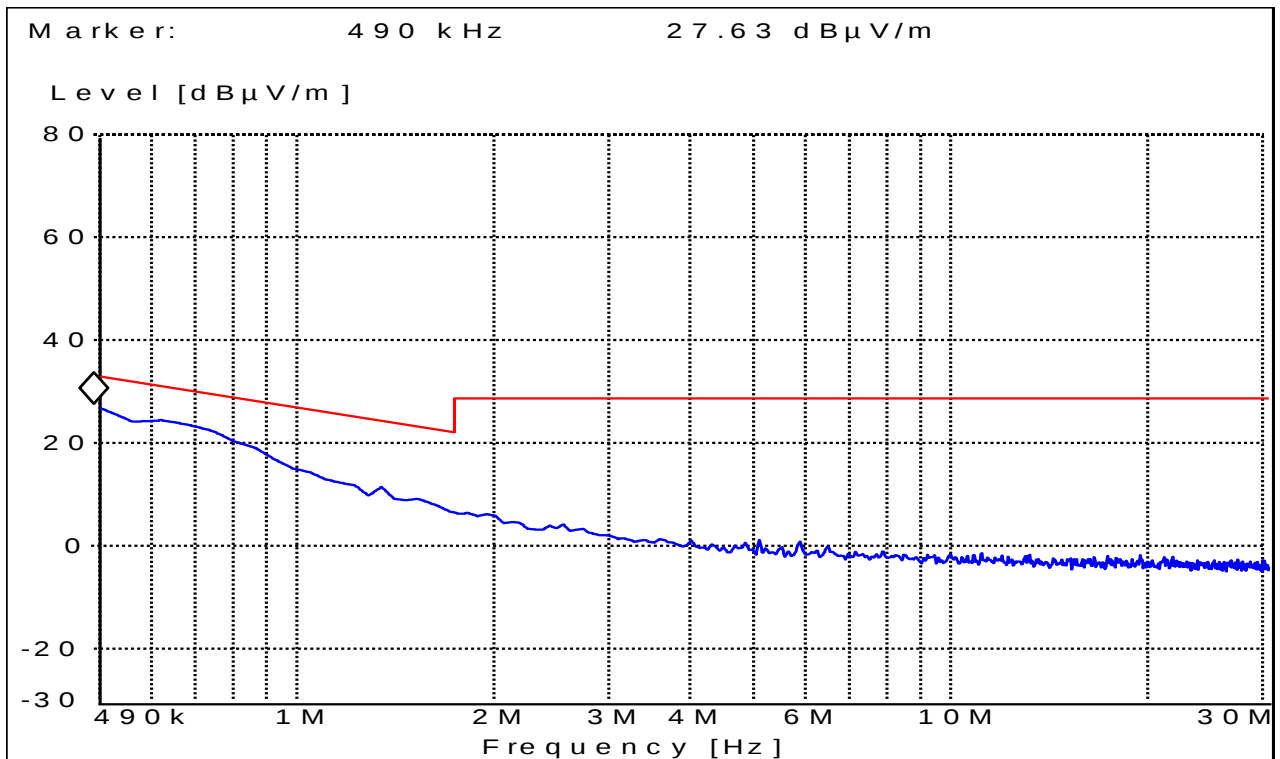
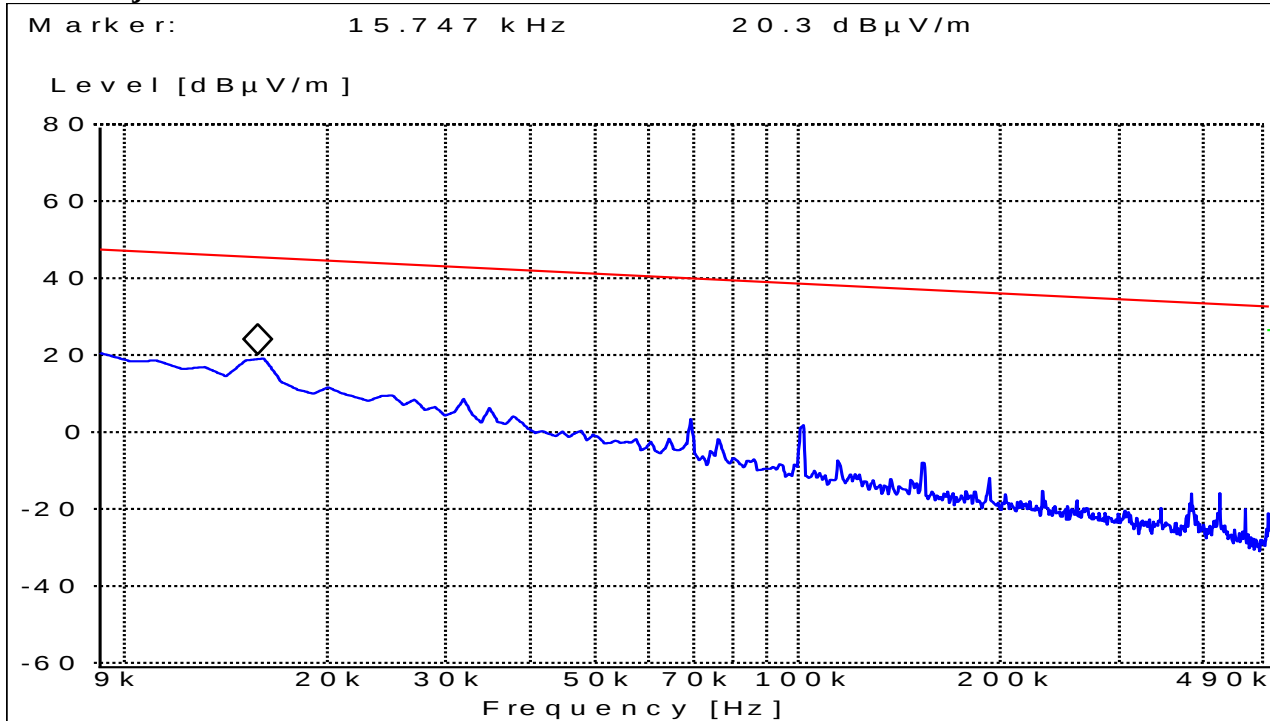
No spurious emissions reported below 30MHz.

5.11.5 Test data/ plots:

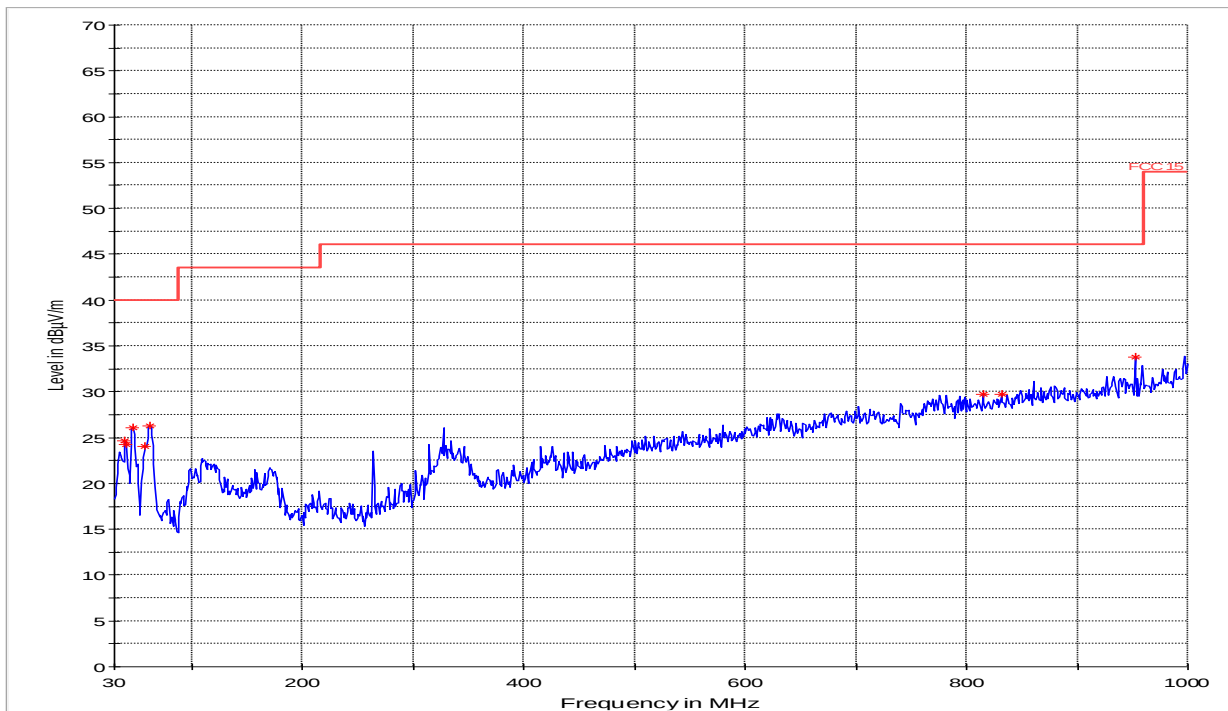
Transmitter Radiated Spurious Emission:<30MHz

Note: Worst case representation for all modes of operation in this frequency range-

Limits adjusted for 3m measurement.

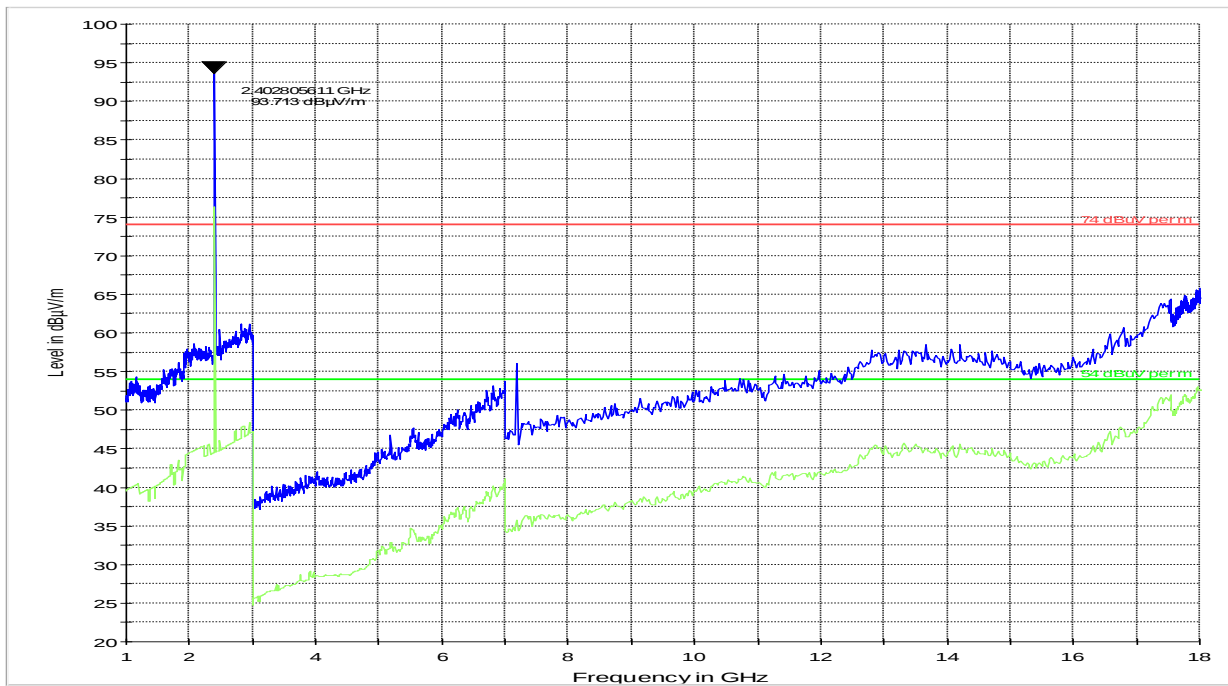


Transmitter Radiated Spurious Emission- Ch0- 30M-1GHz



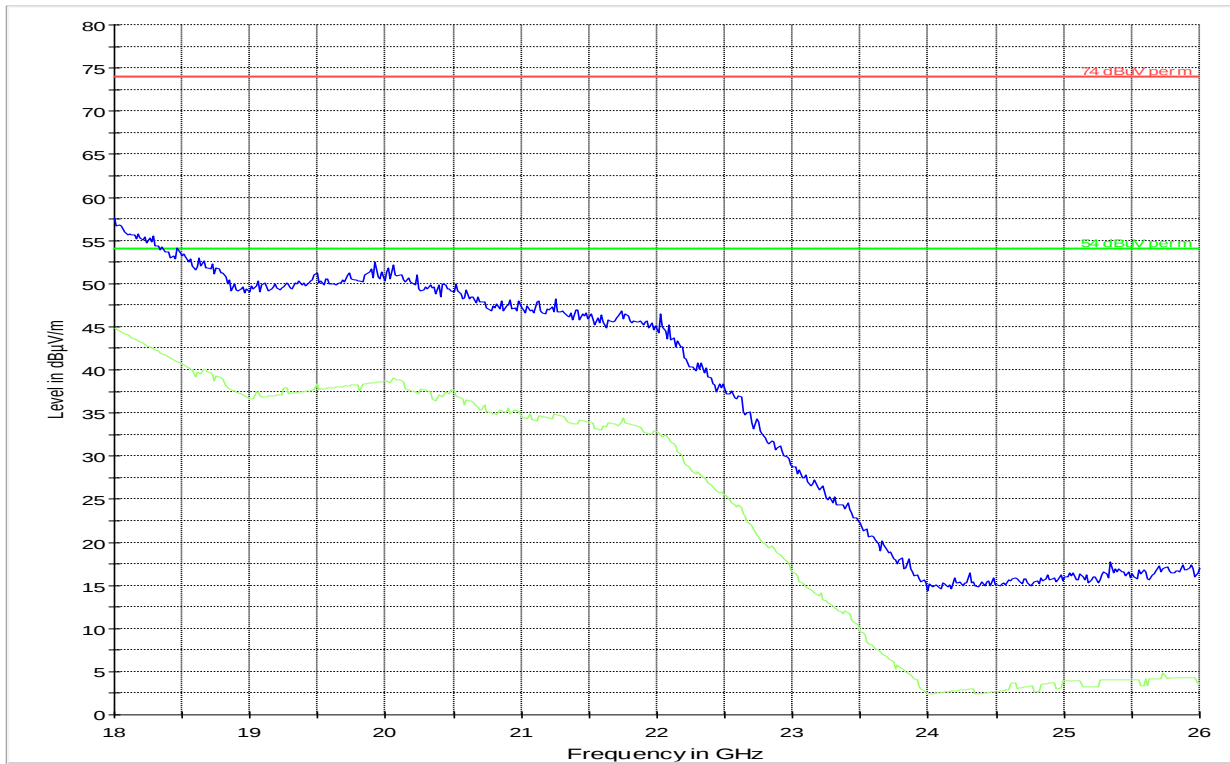
— FCC15 Limit Line — Preview Result 1

Transmitter Radiated Spurious Emission- Ch0- 1G-18GHz



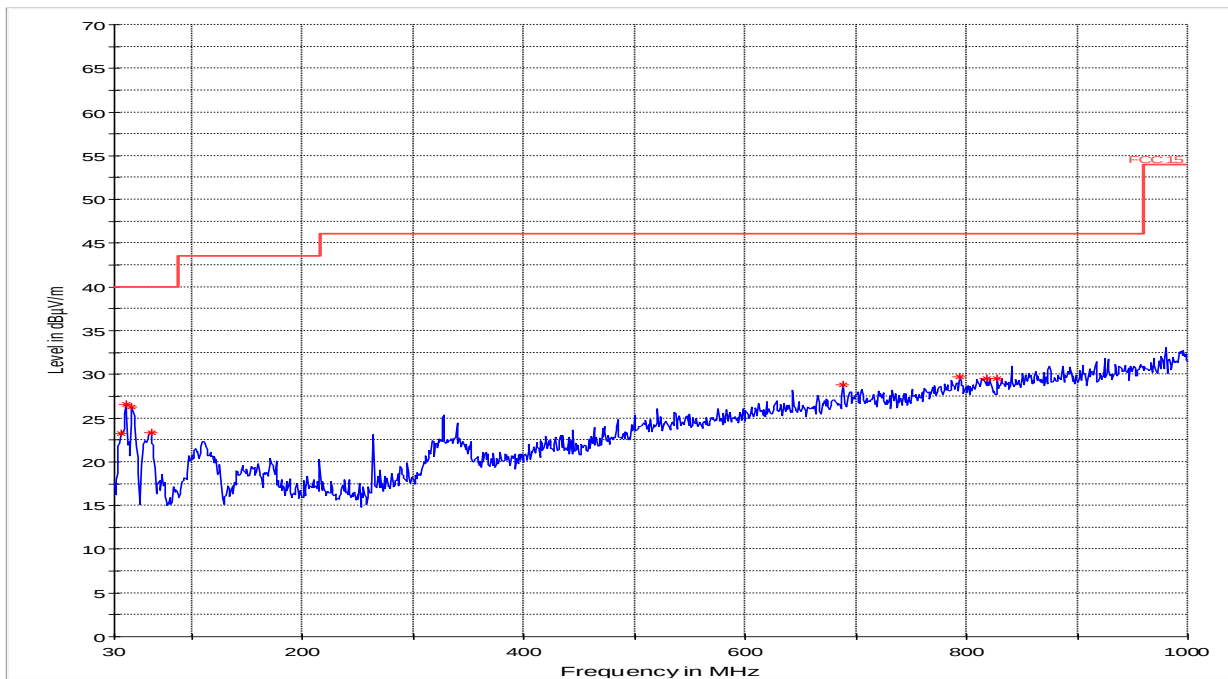
— 74 dBµV per m Limit Line — 54 dBµV per m Limit Line
— Preview Result 1 — Preview Result 2

Transmitter Radiated Spurious Emission- Ch0- 18G-26GHz



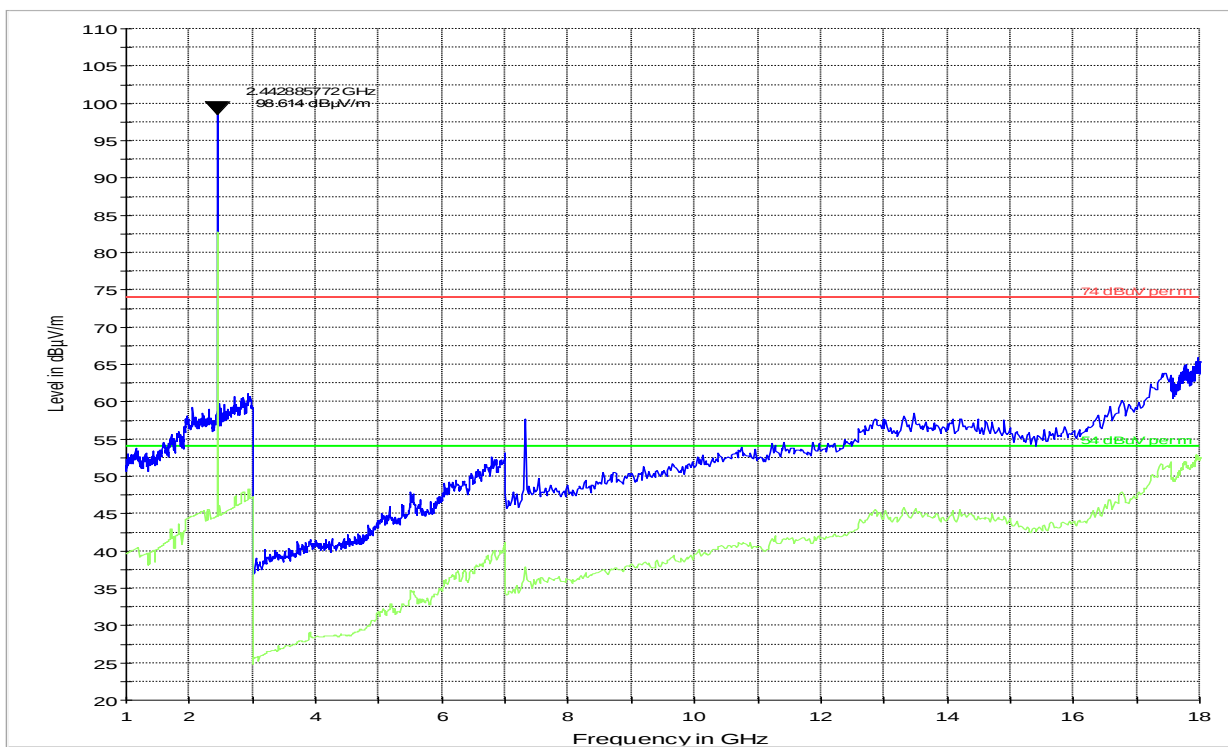
— 74 dBuV per mLimitLine
— Preview Result 1
— 54 dBuV per mLimitLine
— Preview Result 2

Transmitter Radiated Spurious Emission- Ch39- 30M-1GHz



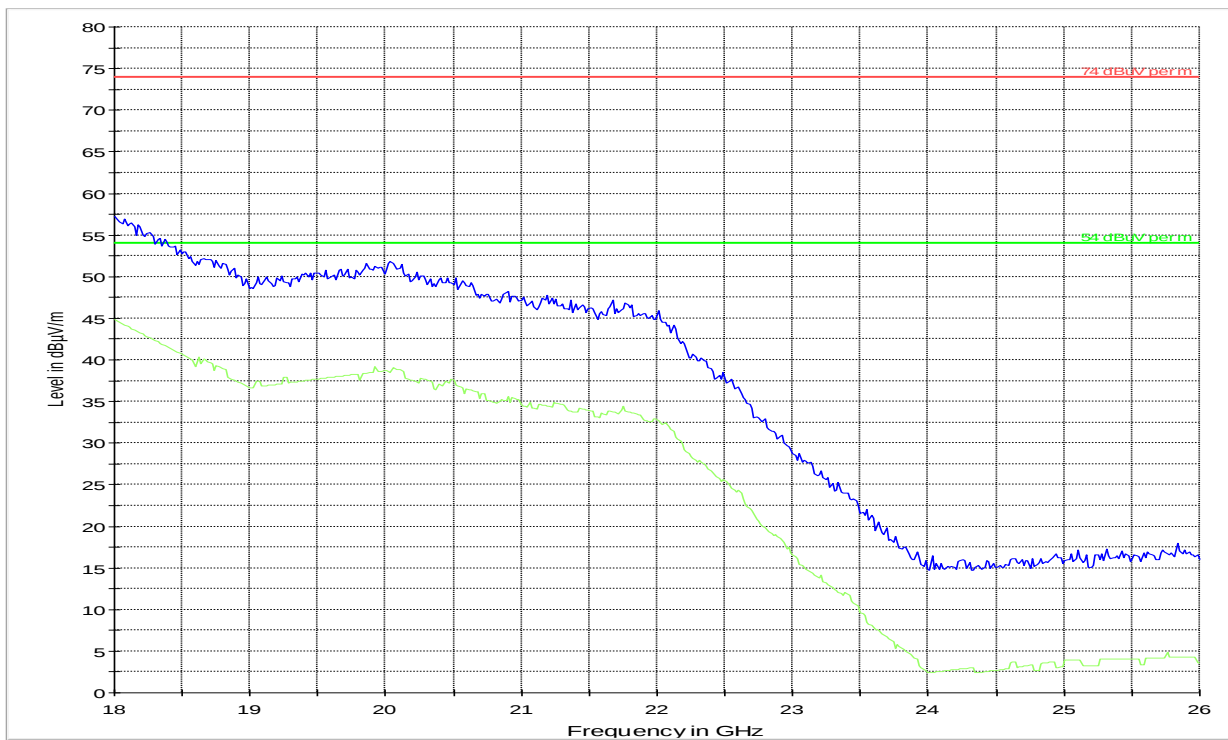
— FCC15 Limit Line — Preview Result 1

Transmitter Radiated Spurious Emission- Ch39- 1G-18GHz



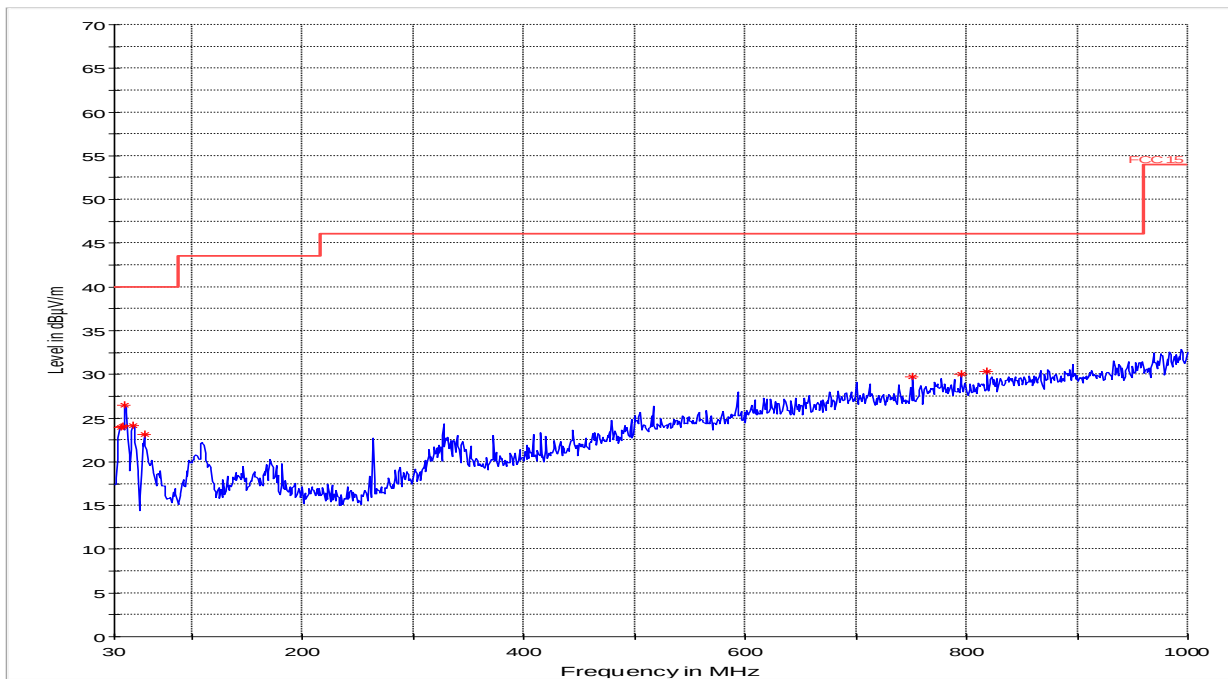
— 74 dBμV per m Limit Line — 54 dBμV per m Limit Line
— Preview Result 1 — Preview Result 2

Transmitter Radiated Spurious Emission- Ch39- 18G-26GHz



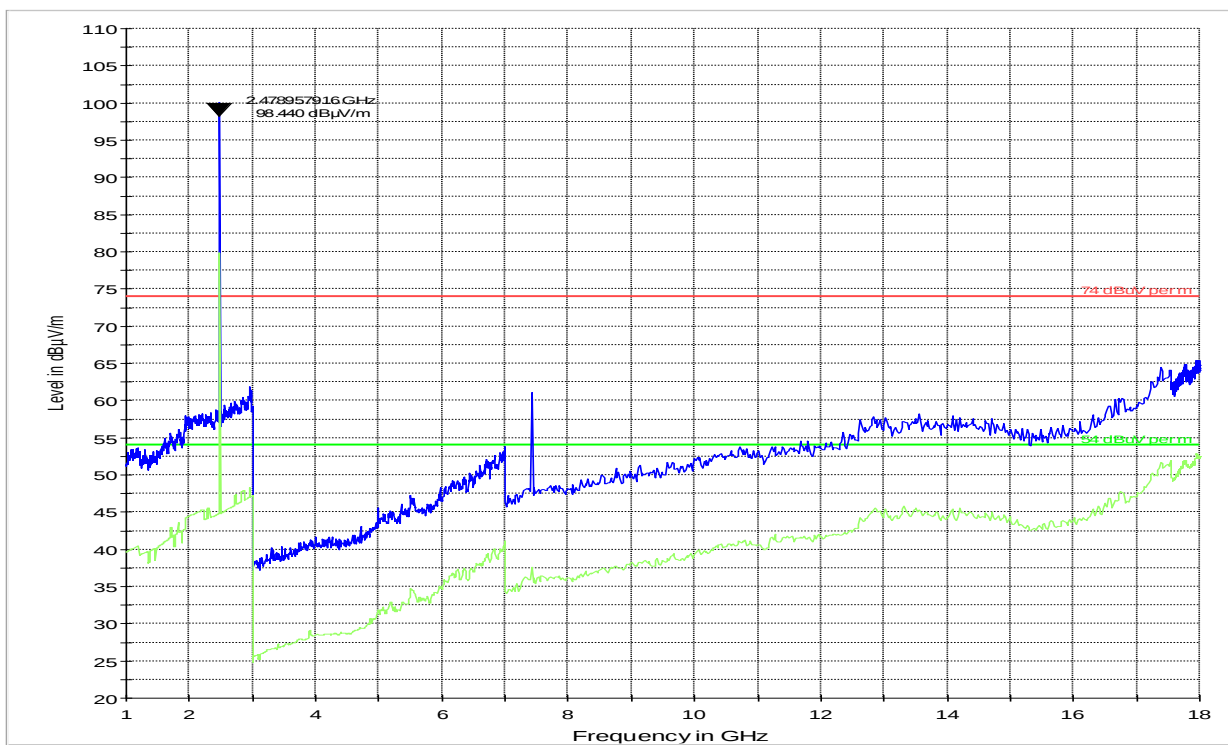
— 74 dBuV per mLimitLine
— Preview Result 1
— 54 dBuV per mLimitLine
— Preview Result 2

Transmitter Radiated Spurious Emission- Ch78- 30M-1GHz



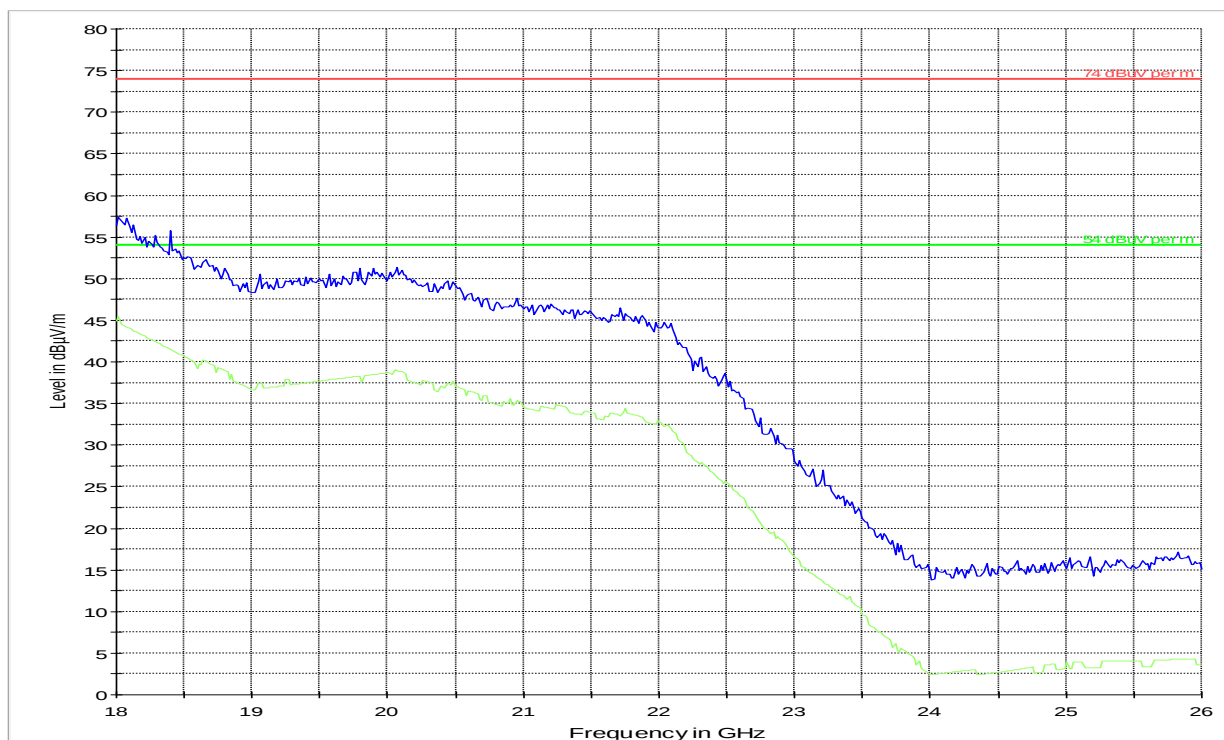
— FCC15LimitLine — Preview Result 1

Transmitter Radiated Spurious Emission- Ch78- 1G-18GHz



— 74 dBµV per m LimitLine — 54 dBµV per m LimitLine
— Preview Result 1 — Preview Result 2

Transmitter Radiated Spurious Emission- Ch78- 18G-26GHz



74 dBuV per mLimitLine
54 dBuV per mLimitLine
Preview Result 1
Preview Result 2

5.12 Receiver Spurious Emissions- Radiated

5.12.1 Limits: §15.109

Frequency of emission (MHz)	Field strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100 (40dB $\mu\text{V/m}$)	3
88–216	150 (43.5 dB $\mu\text{V/m}$)	3
216–960	200 (46 dB $\mu\text{V/m}$)	3
Above 960	500 (54 dB $\mu\text{V/m}$)	3

5.12.2 Test Conditions:

Idle Mode.

5.12.3 Test Result:

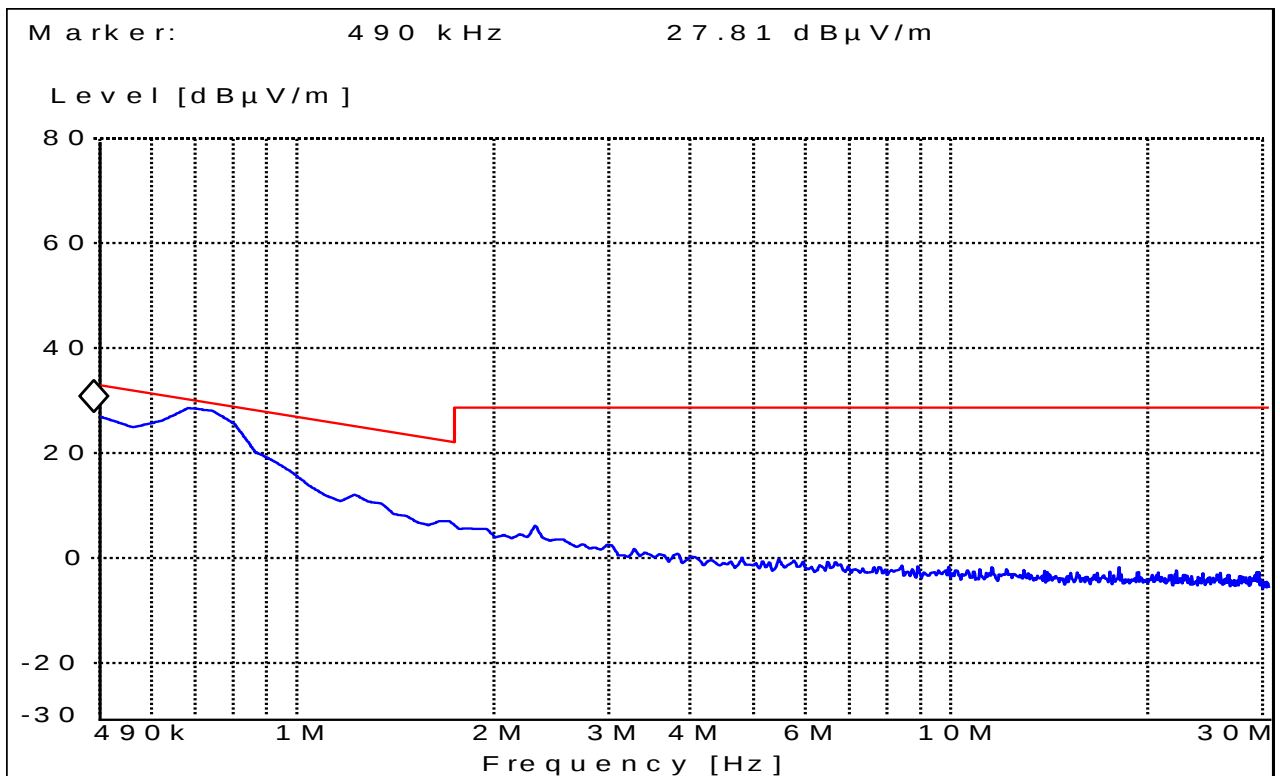
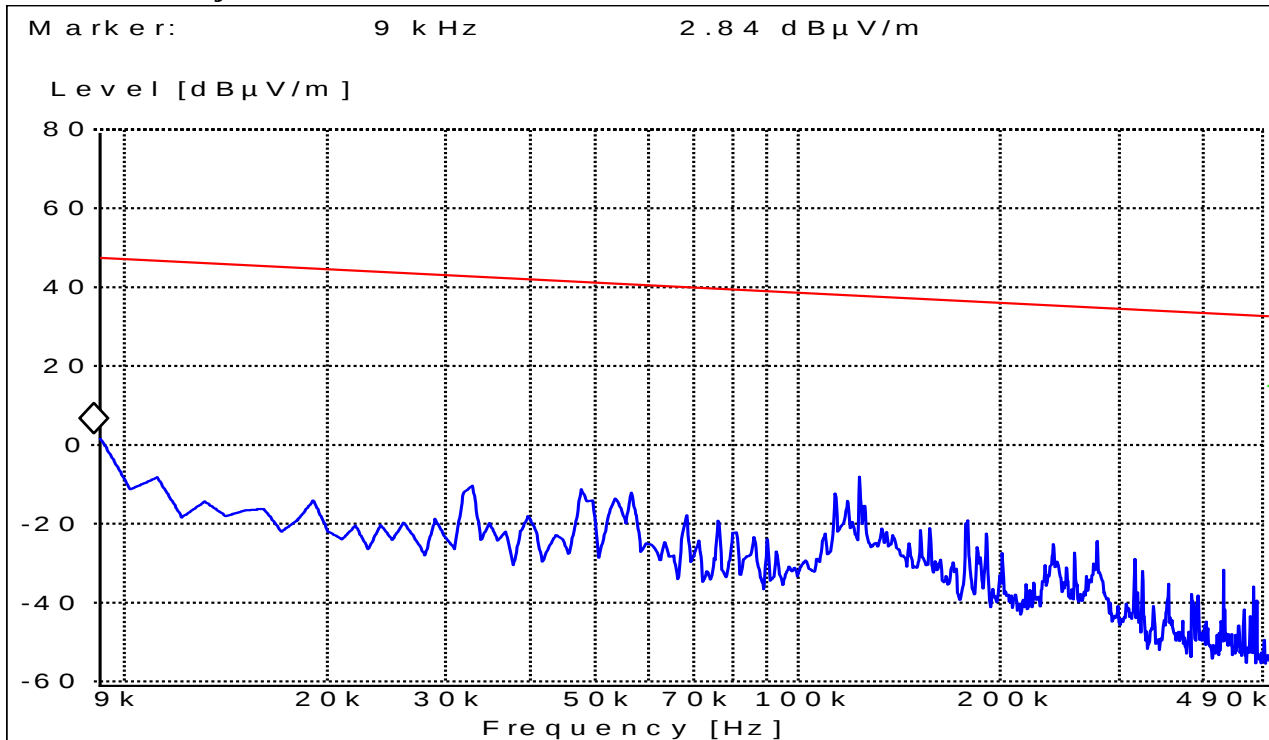
No significant emissions measured below 30MHz.

Plots reported here represent the worse case emissions.

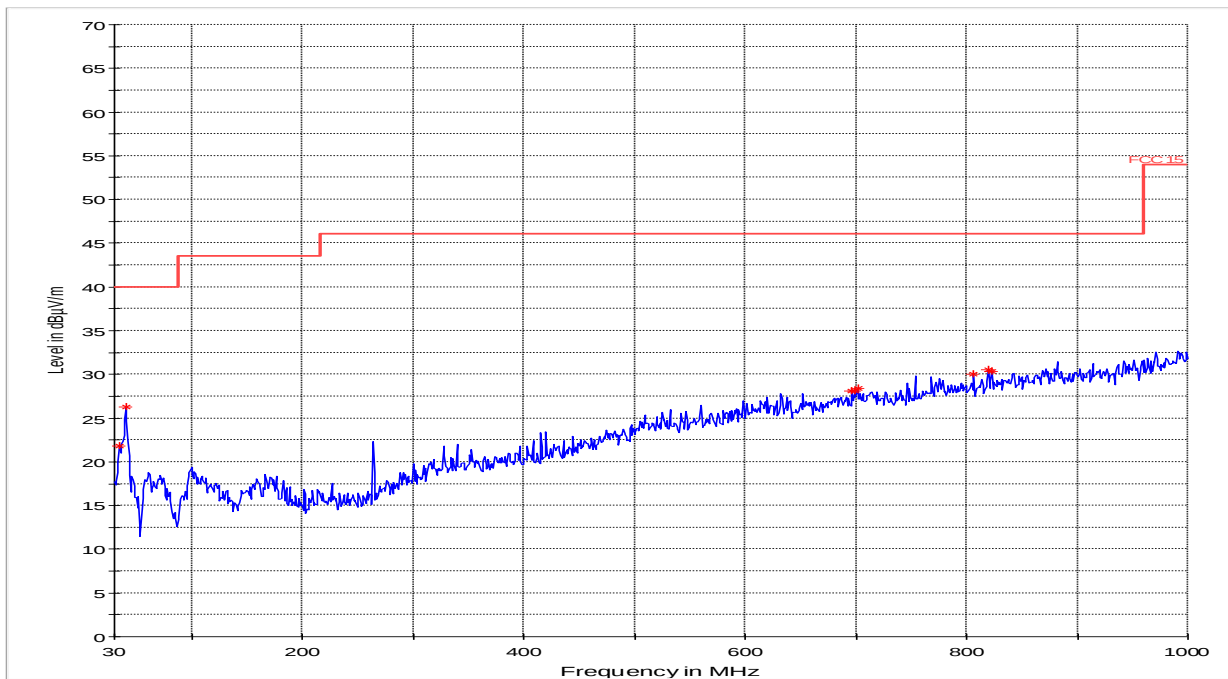
5.12.4 Test data/ plots:

Receive Mode: <30MHz

Note: Limits adjusted for 3m measurement.

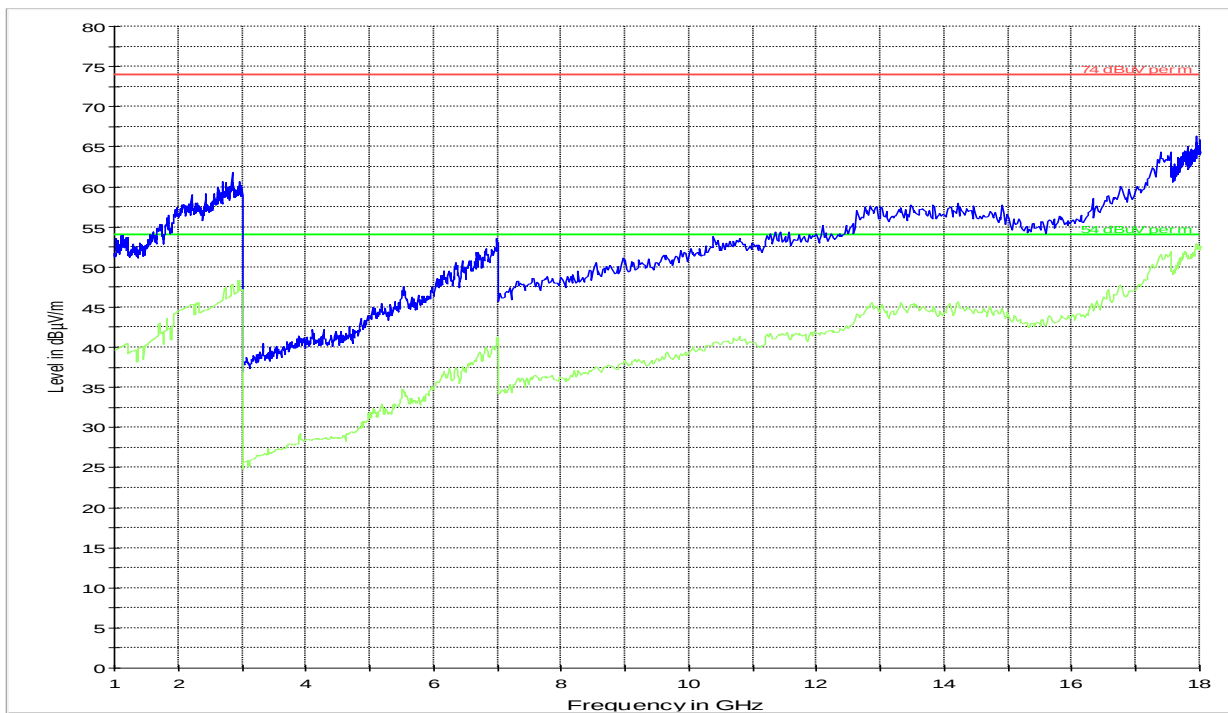


Receive Mode: 30MHz-1GHz



— FCC15 Limit Line — Preview Result 1

Receive Mode: 1GHz-18GHz



— 74 dBµV per m Limit Line — 54 dBµV per m Limit Line
 — Preview Result 1 — Preview Result 2

5.13 AC Power Line Conducted Emissions

5.13.1 Limits: §15.107/15.207

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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.

Analyzer Settings: RBW = 10KHz; VBW = 10KHz

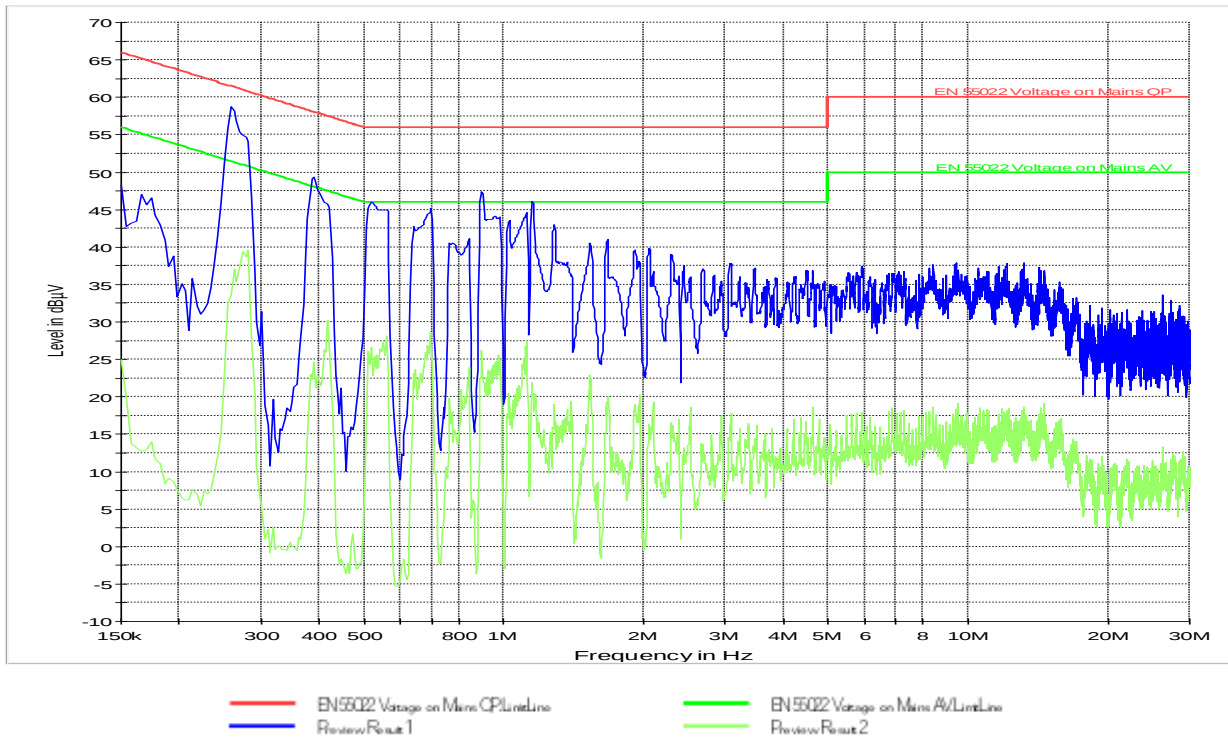
5.13.2 Test Conditions:

Modulation: $\pi / 4$ DQPSK

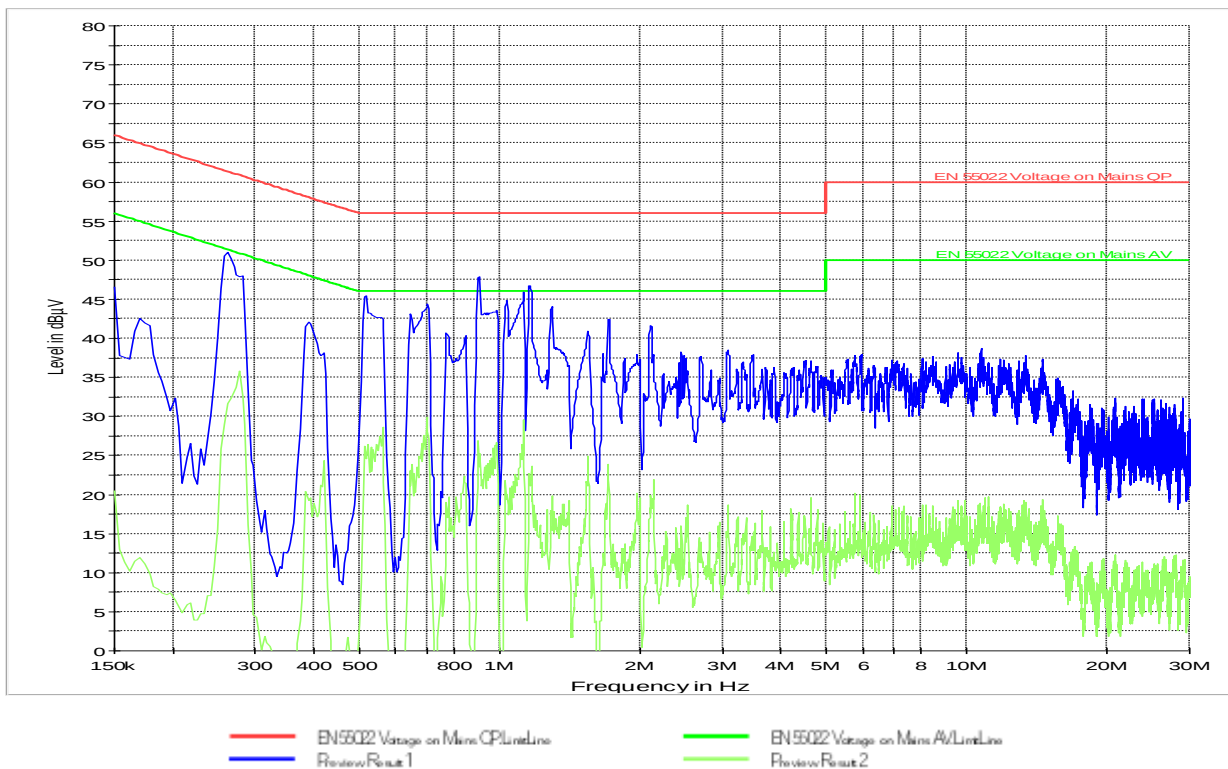
5.13.3 Results

Plots reported here represent the combined worse case emissions for Line and Neutral.

5.13.4 Test data/ plots: BT Transmit Mode



BT Idle Mode



6 Test Equipment and Ancillaries used for tests

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	101821	May 2009	1 year
Radio Communication Tester	CMU 200	Rohde & Schwarz	109879	May 2009	1 year
Radio Communication Tester	CMU 200	Rohde & Schwarz	110759	May 2009	1 year
Bluetooth Tester	CBT	Rohde & Schwarz	100212	May 2009	1 year
EMI Receiver/Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2009	1 year
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	Dec 2009	1 year
Loop Antenna	6512	EMCO	00049838	July 2008	2 years
Biconilog Antenna	3141	EMCO	0005-1186	June 2009	2 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Jan 2009	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Jan 2009	3 years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
6GHz High Pass Filter	HPM50106	Microtronics	001	n/a	n/a
Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
LISN	50-25-2-08	FCC	08014	Apr 2009	1 year
Power Smart Sensor	R&S	NRP-Z81	100161	May 2009	1 Year
Power Smart Sensor	R&S	NRP-Z22	100223	May 2009	1 Year
Upconverter	PXI-5610	NI	E93740	Aug 2008	2 years
Waveform Generator	PXI-5421	NI	E965F1	Aug 2008	2 years
10dB attenuator	ATT-0298-10	MidwestMicrowav	n/a	n/a	n/a
Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
DC Power Supply	E3610A	Hewlett Packard	KR83021224	n/a	n/a
DC Power Supply	E3610A	Hewlett Packard	KR83023316	n/a	n/a
DC Power Supply	6632A	Hewlett Packard	3524A-12822	n/a	n/a
DC Power Supply	6655A	Hewlett Packard	3403A-00487	n/a	n/a
Multimeter	179	Fluke	N/A	Feb 2010	1 Year
Temp Hum Logger	TM320	Dickson	03280063	Feb 2010	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Feb 2010	1 Year
Climatic Chamber	VT4004	Votsch	G1115	May 2009	1 year

Note:

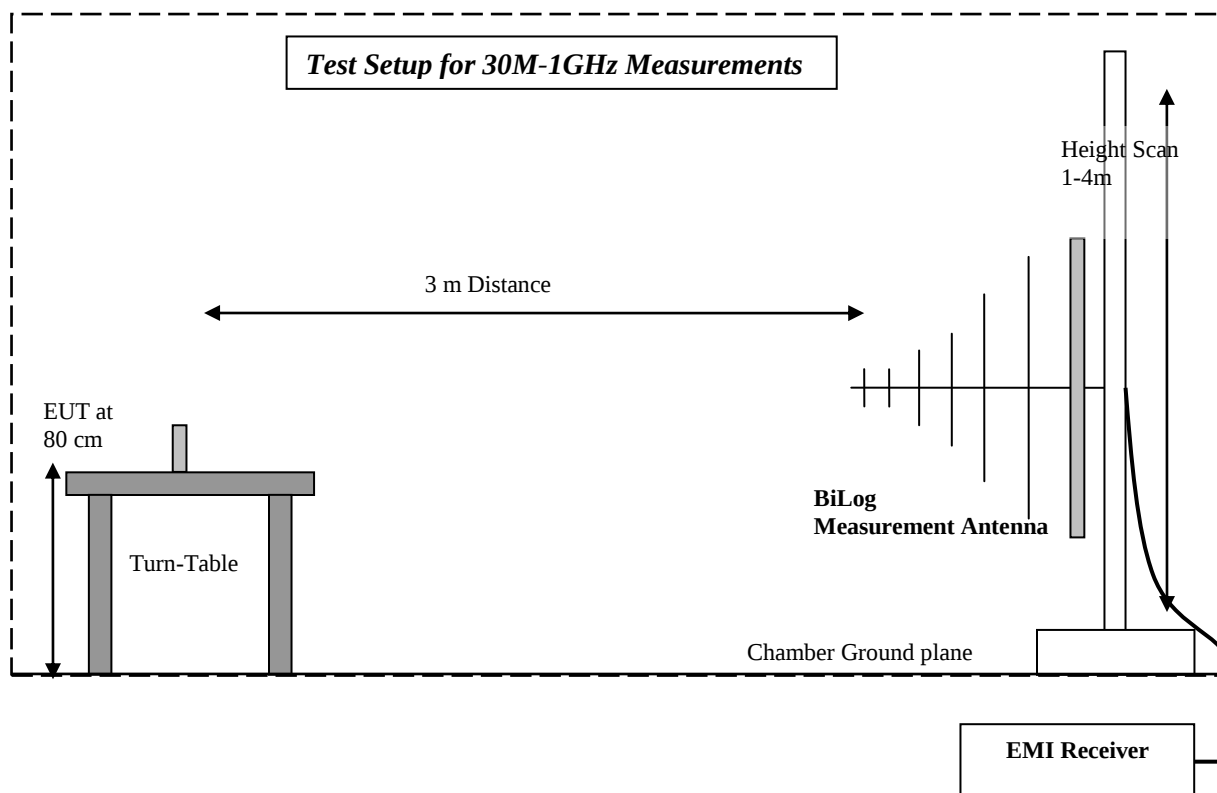
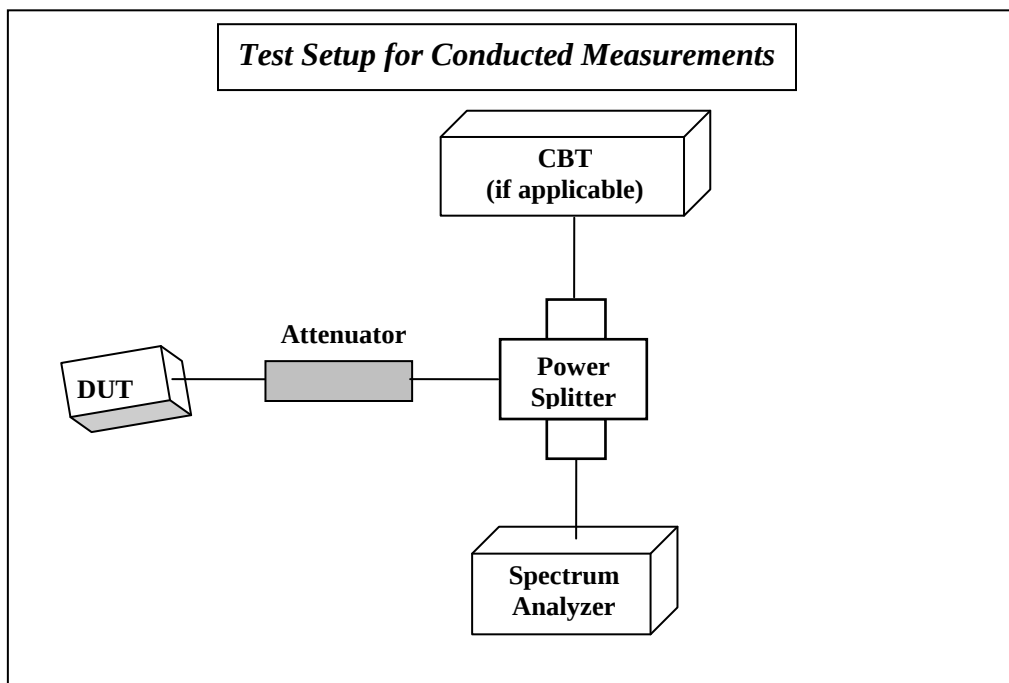
Testing on this EUT performed when the equipment calibration was valid.

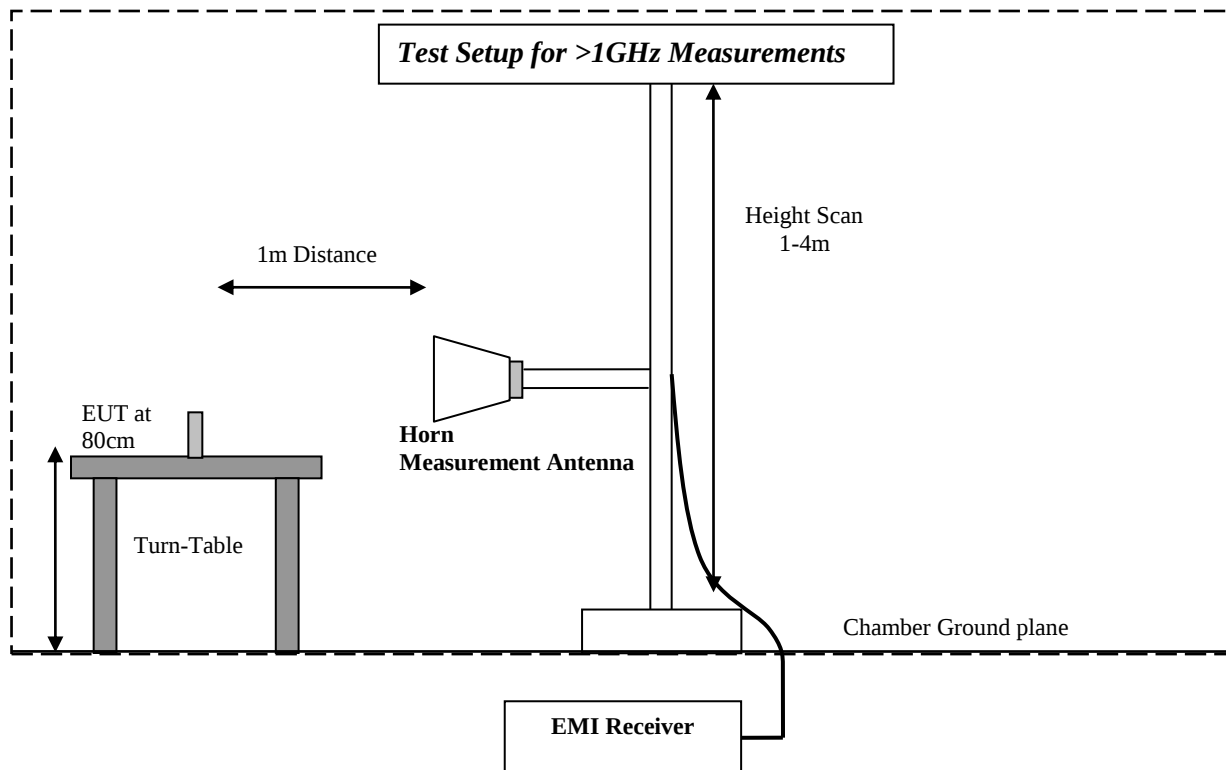
Equipment calibration is performed by an accredited calibration lab according to ISO 17025 requirements.

Calibration intervals are determined from manufacturer recommendation and/or lab discretion.

Cetecom Inc takes all measures to calibrate equipment before the due date; for instances when the equipment has to be used beyond the calibration due date, necessary steps are taken for calibration verification and documented until accredited calibration can be performed- to meet the Quality System requirements

7 Block Diagrams





Test Report #: EMC_057_09001_FCC15.247FHSS_BCG-E2380B_Rev3

Date of Report : 2010-06-08

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8 Revision History

Date	Report Name	Changes to report	Report prepared by
2010-05-30	EMC_APPLE_057_09001_FCC15.247FHSS_BCG-E2380B	First Version	S Jose
2010-06-01	EMC_057_09001_FCC15.247FHSS_BCG-E2380B_Rev1	Updated antenna gain and EIRP.	S Jose
2010-06-05	EMC_057_09001_FCC15.247FHSS_BCG-E2380B_Rev2	Updated Radiated emissions results.	S Jose
2010-06-08	EMC_057_09001_FCC15.247FHSS_BCG-E2380B_Rev3	Updated Radiated emissions results for <30MHz.	S Jose