Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**ULR-TC568819300000022F 001**	**Seite 1 von 42** *Page 1 of 42*
Auftraggeber: *Client:*	**Jason Schmidt Director Government Relations Whirlpool Corporation 2000 M-63 Benton Harbor, MI 49022**	
Gegenstand der Prüfung: *Test item:*	**REBEL UI Module**	
Bezeichnung: *Identification:*	**EICHRB01**	**Serien-Nr.:** *Serial No.* Engineering Sample
Wareneingangs-Nr.: *Receipt No.:*	**166117823**	**Eingangsdatum:** *Date of receipt:* 17.03.2019
Prüfort: *Testing location:*	**Refer Page 5 of 42 for test facilities**	
Prüfgrundlage: *Test specification:*	**FCC Part 15 Subpart C 15.247 ANSI C63.10-2013**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (India) Pvt. Ltd.** 27/B, 2nd corss, Electronic City Phase 1 Bangalore – 560 100. India FCC Test Site Registration no.: **496599**	

geprüft */ tested by:*

26.04.2019	Raghavendra Katti Senior Engineer	Raghu.K
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert */ reviewed by:*

17.05.2019	Shrikanth S Naik Assistant Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges */Other Aspects:* **FCC ID :A5UEICHRB01, On receipt the equipment was in good condition**

Abkürzungen:	***P(ass)***	***= entspricht Prüfgrundlage***	***Abbreviations:***	***P(ass)***	***= passed***
	F(ail)	***= entspricht nicht Prüfgrundlage***		***F(ail)***	***= failed***
	N/A	***= nicht anwendbar***		***N/A***	***= not applicable***
	N/T	***= nicht getestet***		***N/T***	***= not tested***

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

TEST SUMMARY

Section	Test item	Result
15.247 (b) (3)	Maximum Conducted Output Power	Pass
15.247 (a) (1)	20 dB Bandwidth	Pass
15.247 (a) (1)	Carrier Frequency Separation	Pass
15.247 (a) (1)(III)	Number of Hopping channels	Pass
15.247 (a) (1)(III)	Time of Occupancy (Dwell Time)	Pass
15.247 (d)	Emissions in non – restricted band	Pass
15.247 (a)(1)	Conducted Spurious Emissions	Pass
15.247 (d) / (15.209 & 15.205)	Radiated spurious emissions and emissions in Restricted bands of operation	Pass
15.207	Conducted emission on A.C power lines	Pass

Discipline: Electronics Testing
Group: EMC Test Facility

Note: Measurements were performed as the procedure mentioned in ANSI C63.10-2013

Table of Contents

1 GENERAL REMARKS

1.1 Complimentary Materials

All attachments are integral part of this test report.

1. TEST SETUP PHOTOS

2: EUT EXTERNAL PHOTOS

3: EUT INTERNAL PHOTOS

4: FCC LABEL AND LABEL LOCATION

5: BLOCK DIAGRAM

6: SPECIFICATION OF EUT

7: SCHEMATIC DIAGRAM

8: BILL OF MATERIAL

9: USER MANUAL

10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

2.2 List of Test and Measurement Instruments

Table 1: Test and measurements instrument used

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	15-11-2019	Yearly	Antenna - Port Measurements
USB Peak power sensor	AIMIL Ltd	55006	10231	22-12-2019	Yearly	
EMI Test Receiver	Rohde & Schwarz	ESW 44	101732	26-05-2019	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	LAX-10	LAX-10-800	15-01-2020	Yearly	
Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	9124-656	16-01-2020	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	17-01-2020	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	17-05-2019	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	
EMI Receiver	Rohde & Schwarz	ESR7	101133	16-01-2020	Yearly	AC Power line conducted emission
LISN	Rohde & Schwarz	ENV 216	100022	18-10-2019	Yearly	
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100811	09-08-2019	Yearly	

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

REBEL UI Module is the platform which will be used across different appliances categories (Refrigeration, Cooking, Laundry, Dishwashers, etc.) based on Qualcomm Snapdragon 660 (SDA 660) processor.The Rebel Module is 2.4G/5G Wi-Fi-connected graphical user interface. It supports LCD with touch-screen and audio video interfaces. It supports mics, cameras, speaker and other sensor interfaces for smart appliance application. The module contains the high bandwidth Wi-Fi module (WCN3990) for data and video transfer over Wi-Fi interface. Which also supports the communication over Bluetooth.It supports Wi-Fi (802.11 a/b/g/n/ac - 2x2 MIMO, ISM 2.4GHz at 20MHz/40MHz and 5GHz at 20/40/80 MHz),Bluetooth (BT5.0) and BLE. It supports FPC antennas, mentioned in user manual.

3.2 Ratings and System Details

Table 2: Ratings and System Details

Operating frequency range	2400 MHz to 2483.5 MHz	
Radio Protocol	Bluetooth	
Channel Spacing	1 MHz	
Modulation	BT_DH5 :GFSK BT2_DH5: Π/4 DQPSK BT3_DH5: 8-DPSK	
Number of antennas	2	
Antenna type	External FPC(Flexible Printed Circuit) Antenna	
Antenna gain	Antennova	2.8dBi
	Molex	3.2dBi
Supply Voltage to Product	11V-13.5V(Typically 12.7V) DC	
Dimensions	Width: 45mm Length: 190 mm	
Environmental conditions	Operating Temperature Range: -10°C to +70°C (No air flow) Storage Temperature Range: -40°C to +80°C Humidity requirement: is 5% to 95%, non-condensing.	

3.1 Maximum Measurement Uncertainty:

Table 3: Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±3 ℃
Supply Voltages	±3 %
Time	±5 %

Note: The listsed uncertainities are the worst case uncertainity for the entire range of mesurements and are for the reporting purpose only and are not used in determining the PASS/FAIL of the results.

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle on module's low, middle and high channels to obtain maximum emissions.

4.2 Test Operation and Test Software

Test Software - QRCT (Qualcomm Radio Control Tool) Version 4.0.00113
Hardware version - PCBA Rev - W11324868

4.3 Special Accessories and Auxiliary Equipment

- Test Laptop was used to confgure the device in transmission mode and also module was tested with following accessories 1. Display 2, Speaker and 3 Camera.

4.4 Countermeasures to achieve EMC Compliance

- None

4.5 Test modes – data rates and modulations

For Radiated spurious emissions only the worst case results are reported in this report.

4.6 List of Frequencies and Frequency bands

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5 BT(BDR+EDR)	0	2402
	1	2403
	2	2404
	3	2405
	:	:
	:	:
	:	:
	37	2439
	38	2440
	39	2441
	40	2442
	:	:
	:	:
	:	:
	74	2476
	75	2477
	:	:
	:	:
	79	2480

Table 4: List of Bluetooth center Frequencies

Note: TUV Sample Identification number : A000893143-001 (Conducted Sample)
A000893143-002 (Radiated Sample)
A000893143-003 (Radiated Sample)

5 RADIATED TEST METHODOLOGY

5.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and mesurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna. The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.

5.1.1 Test Setup Configuration

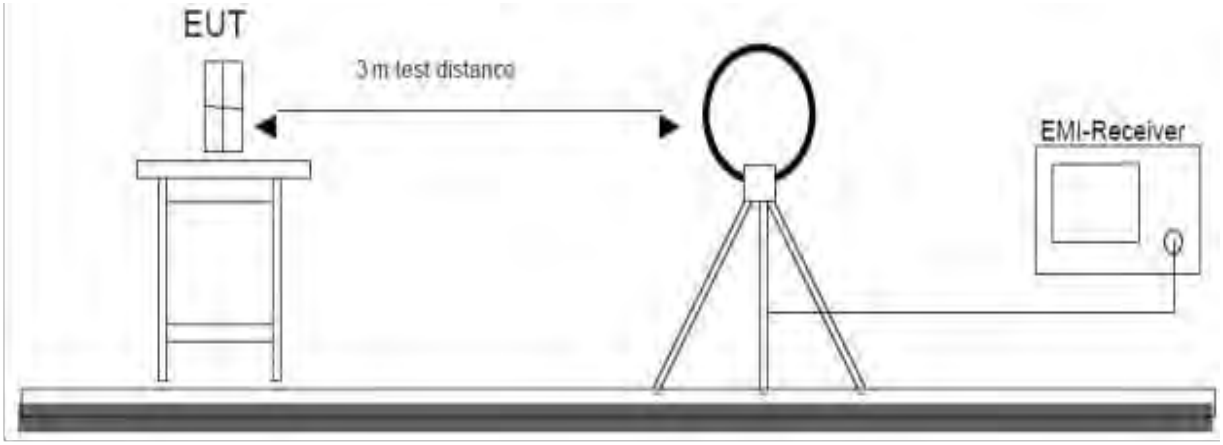


Figure 1: Frequency Range 9 kHz- 30 MHz

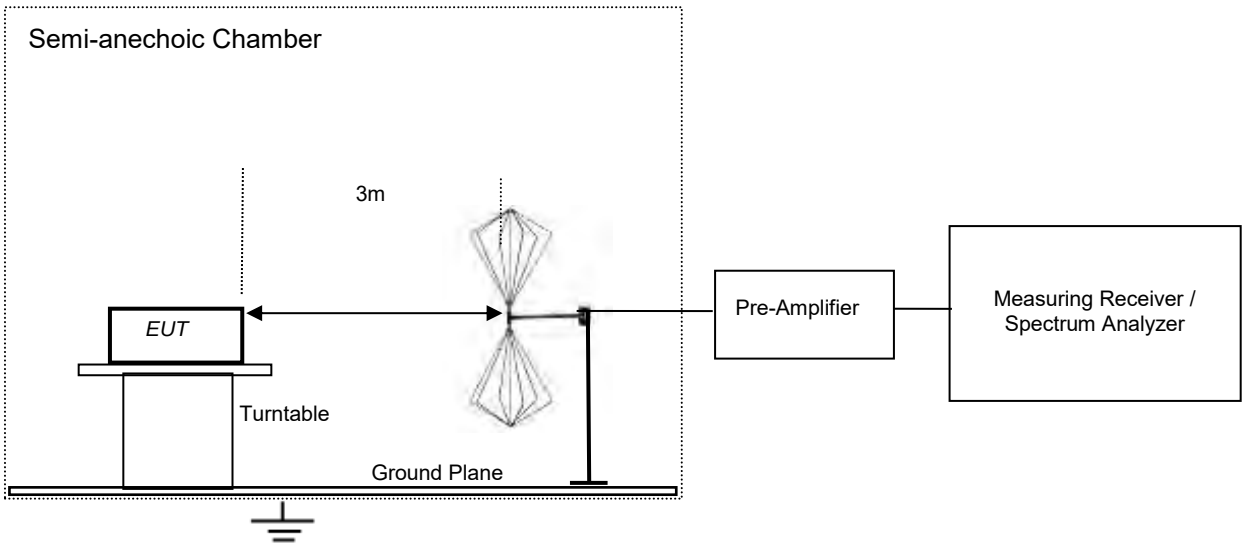


Figure 2: Frequency Range 30 MHz – 200 MHz

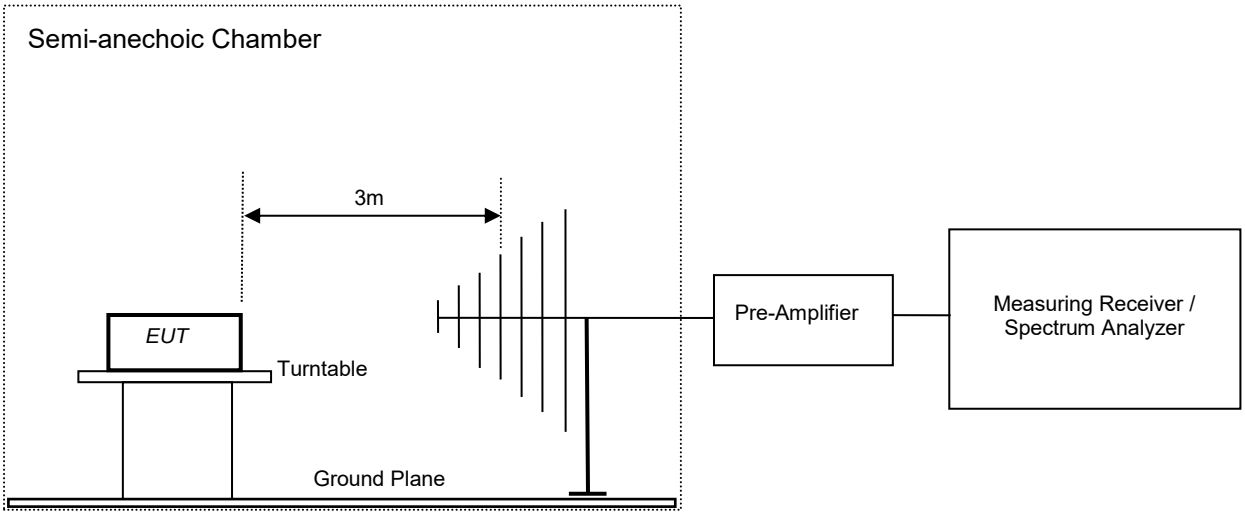


Figure 3: Frequency Range 200 MHz - 1GHz

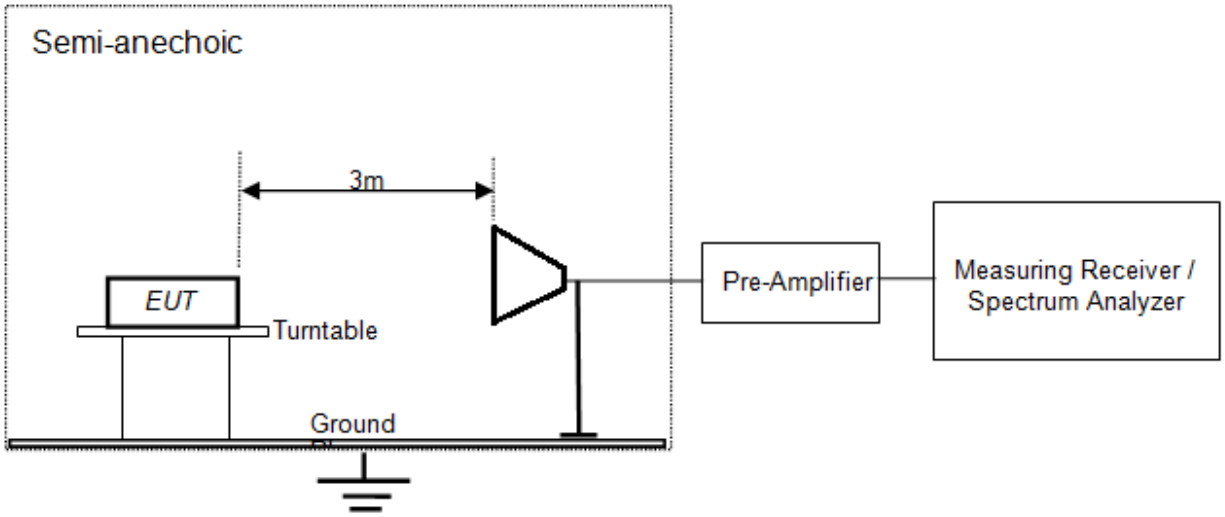


Figure 4: Frequency Range above 1 GHz

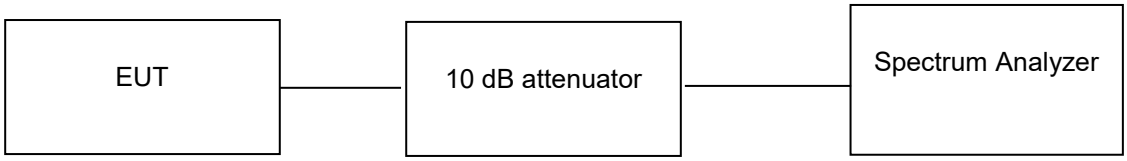
6 Test Results

6.1 Maximum conducted output power

Result ***Pass***

Test Specification	FCC part 15 Subpart C 15.247 (b)(3)
Measurement Bandwidth	1 MHz
Detector	Peak
Requirement	≤ 1 W (30 dBm)

Test Method:



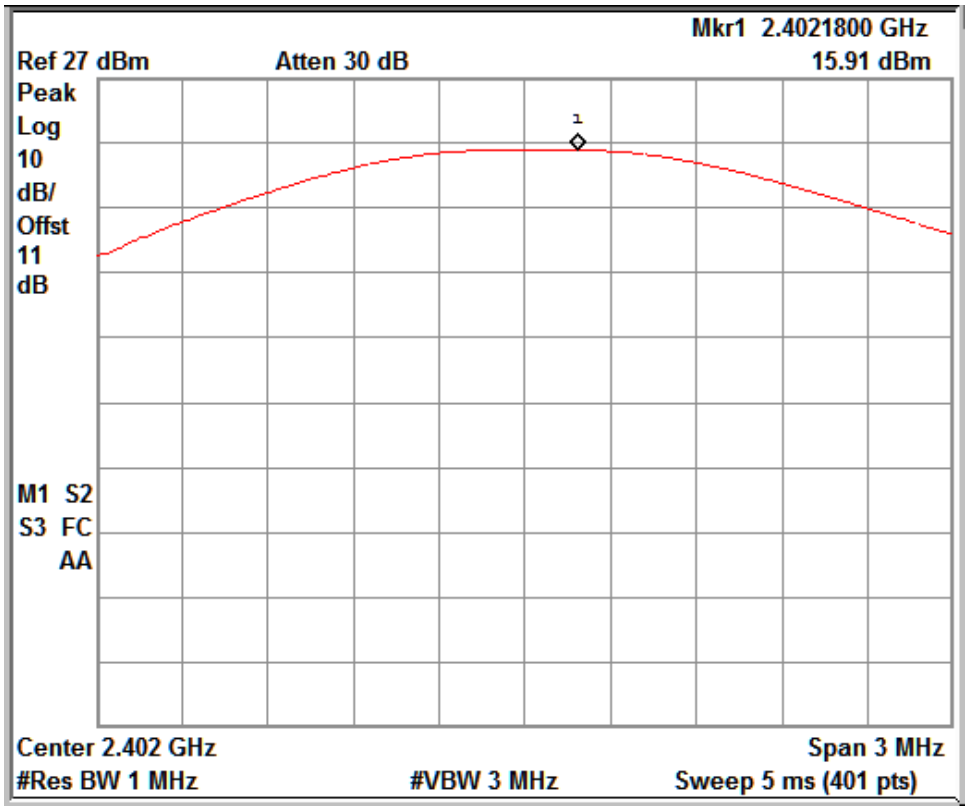
Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

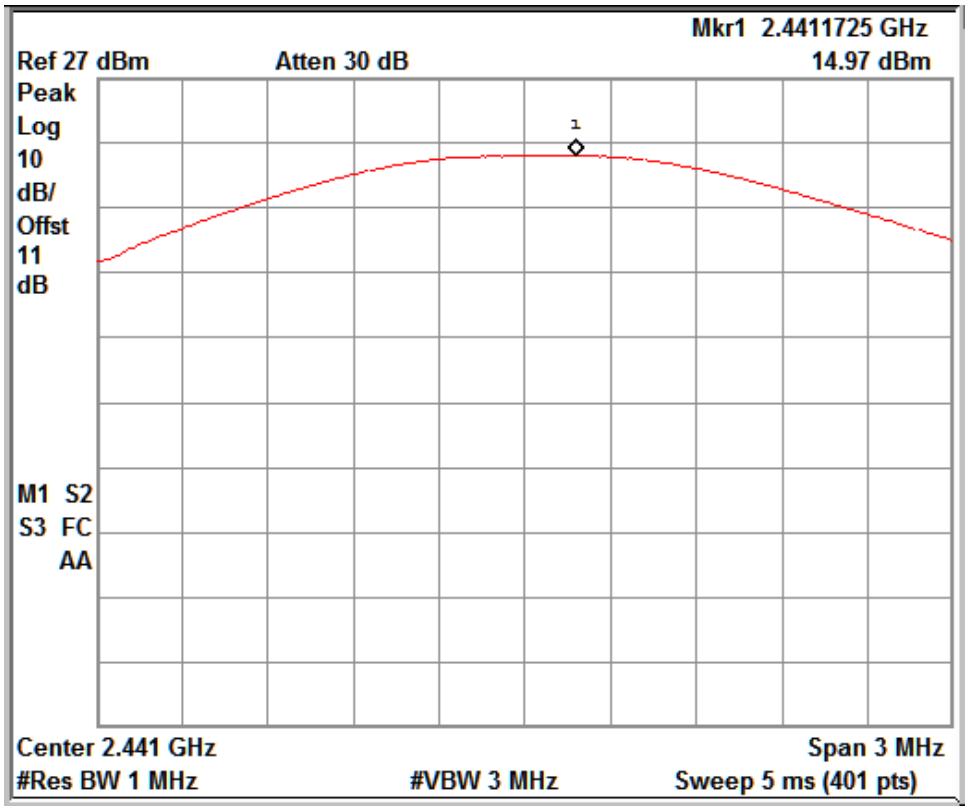
Test results:

10 dB attenuator + 1 Cable loss = 11 dB offset is considered in below result

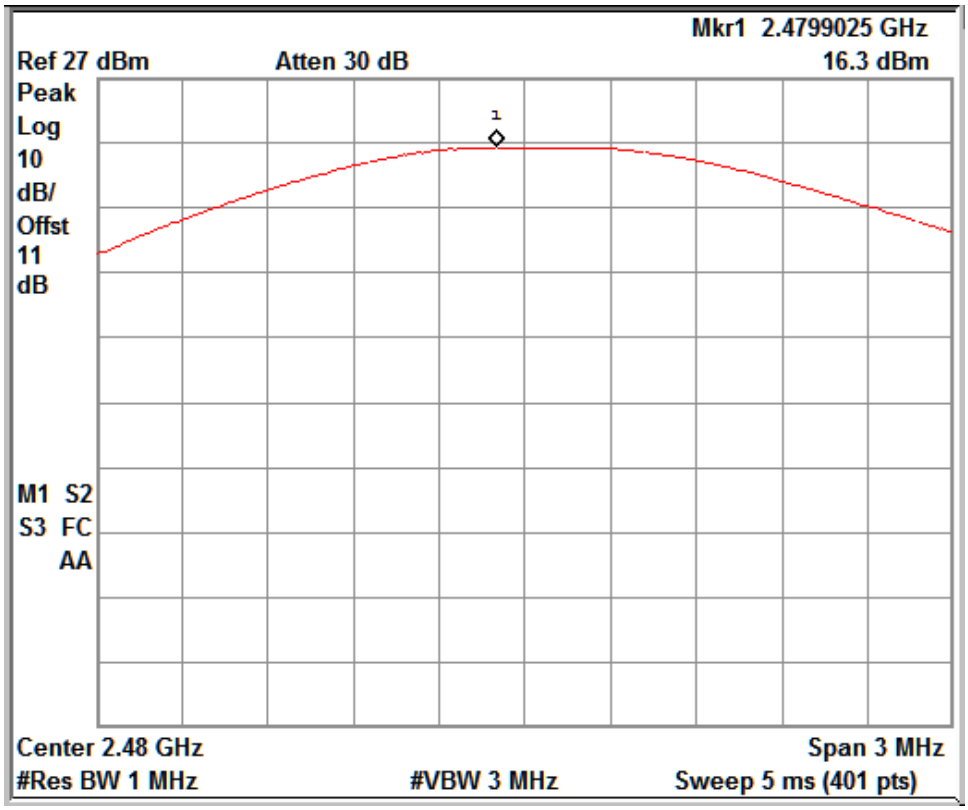
Modulation Type	Channel Frequency (MHz)	Output power (dBm)	Limit (dBm)
1 Mbps	2402	15.91	30.00
	2441	14.97	30.00
	2480	16.30	30.00
2 Mbps	2402	12.44	20.96
	2441	11.54	20.96
	2480	13.26	20.96
3 Mbps	2402	12.74	20.96
	2441	11.77	20.96
	2480	13.51	20.96



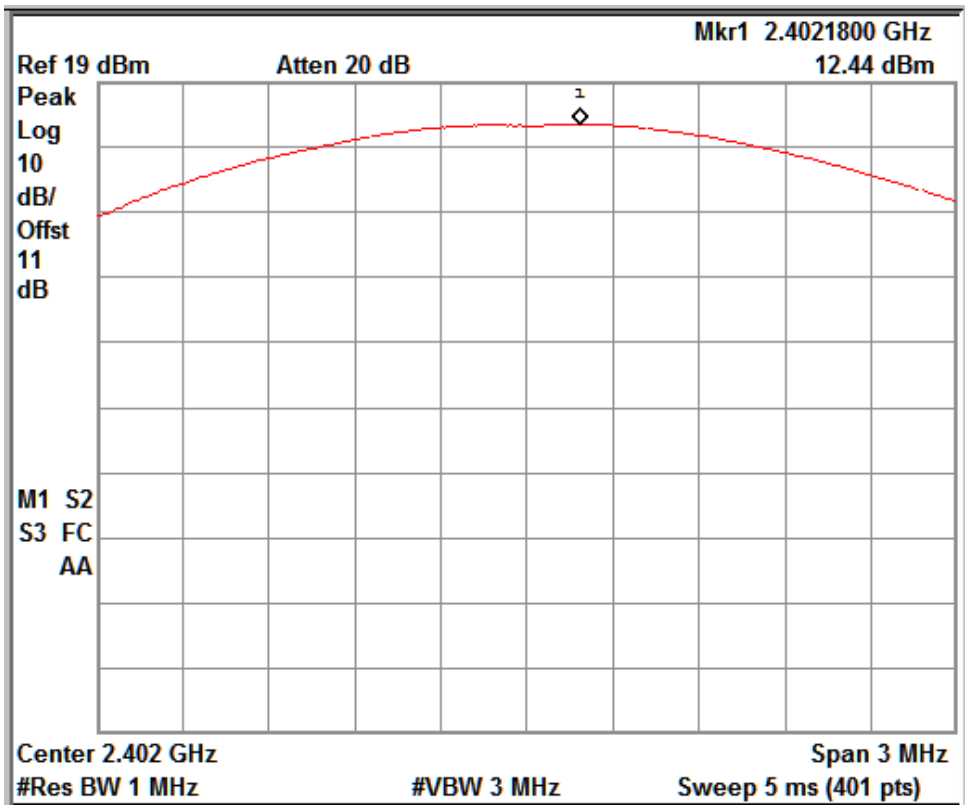
1 Mbps Channel Low



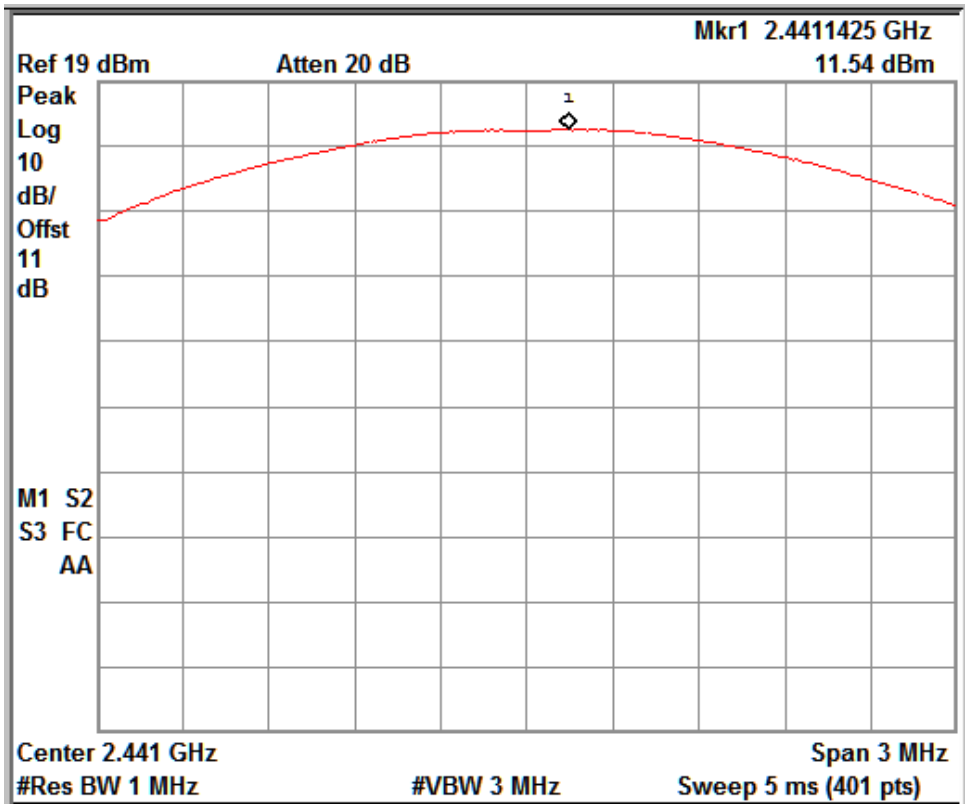
1 Mbps Channel Mid



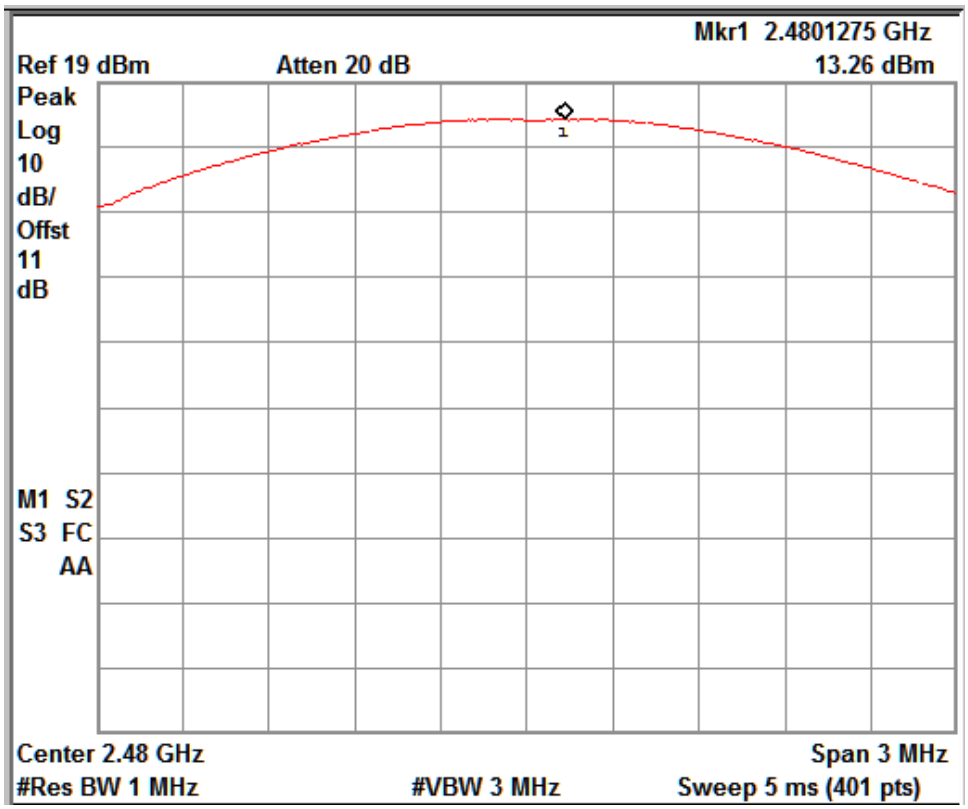
1 Mbps Channel High



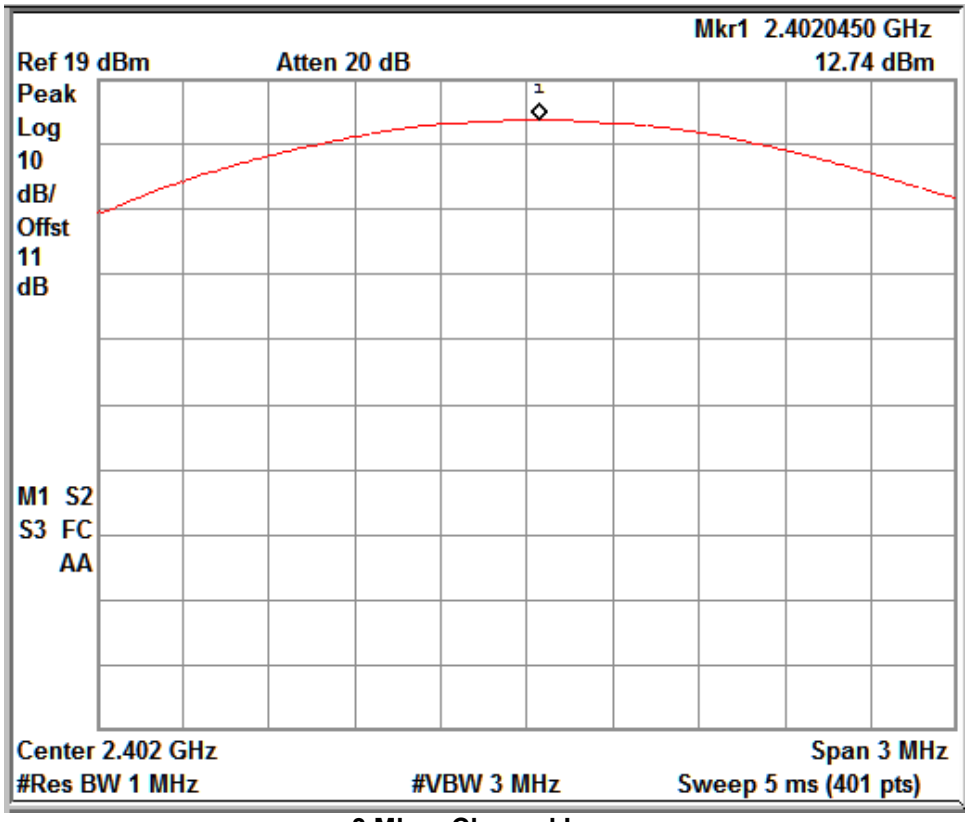
2 Mbps Channel Low



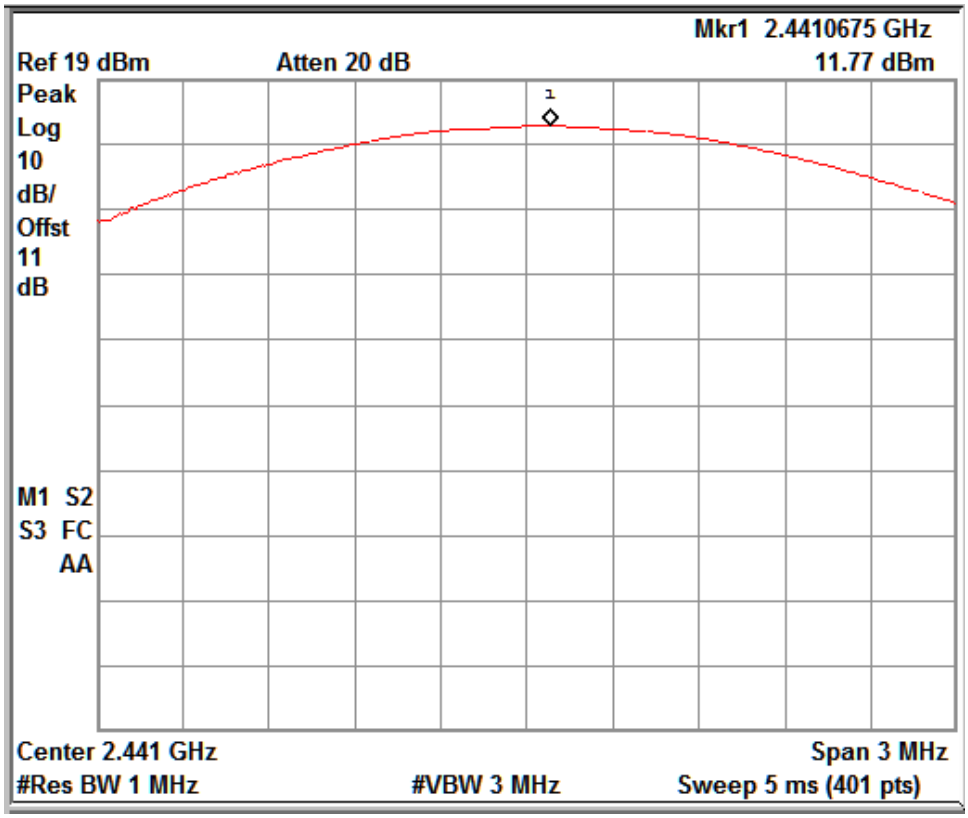
2 Mbps Channel Mid



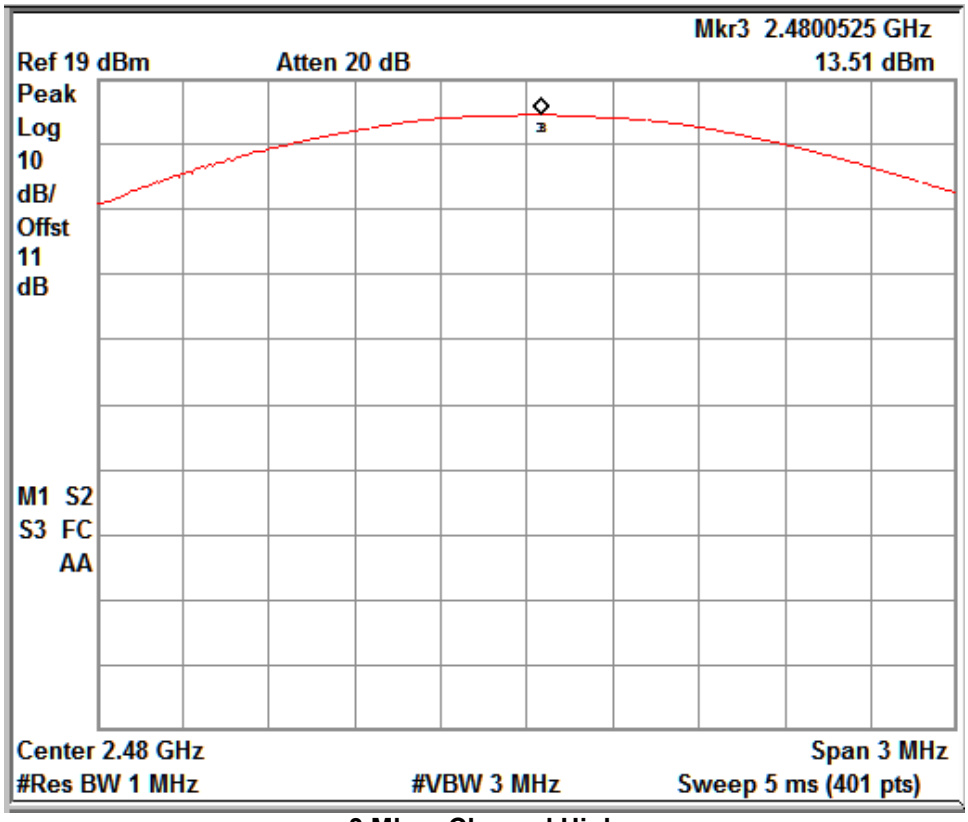
2 Mbps Channel High



3 Mbps Channel Low



3 Mbps Channel Mid

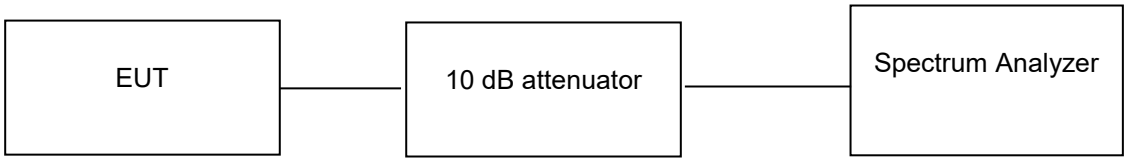


3 Mbps Channel High

6.2 20 dB Bandwidth

Result ***Pass***

Test Specification	FCC part 15 Subpart C Section 15.247 (a)(1)
Detector	Peak
Port of testing	Antenna Port
Requirement	The bandwidth of frequency hopping channel is the 20 dB emission bandwidth measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random , with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.



Environmental and Test conditions:

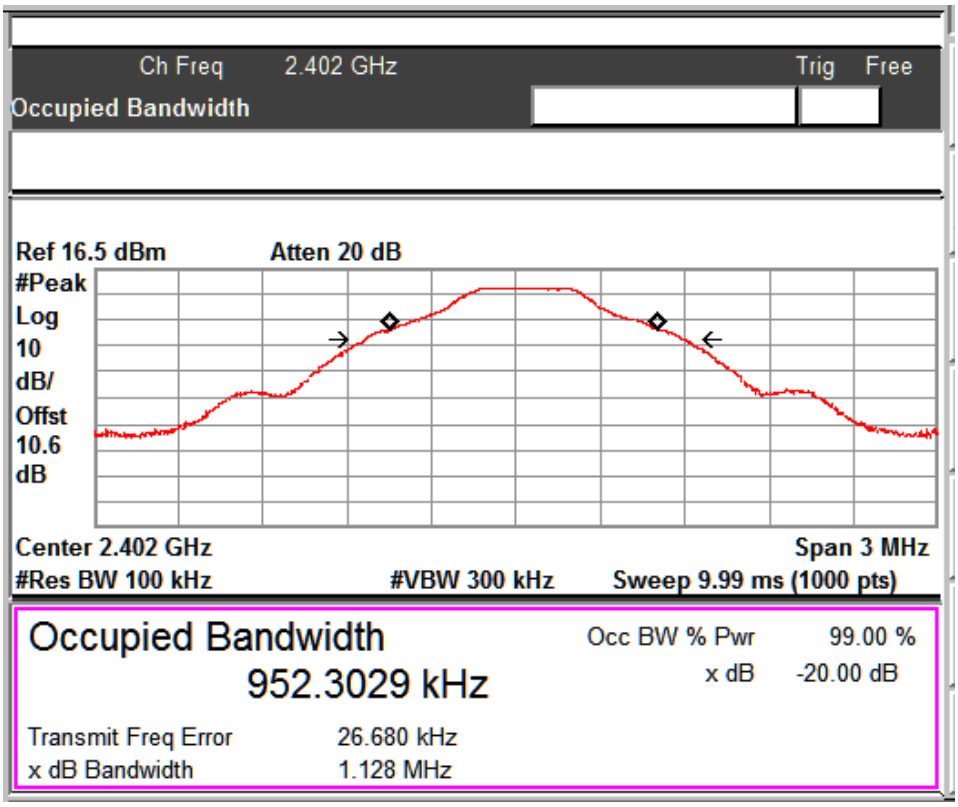
Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

Test results:

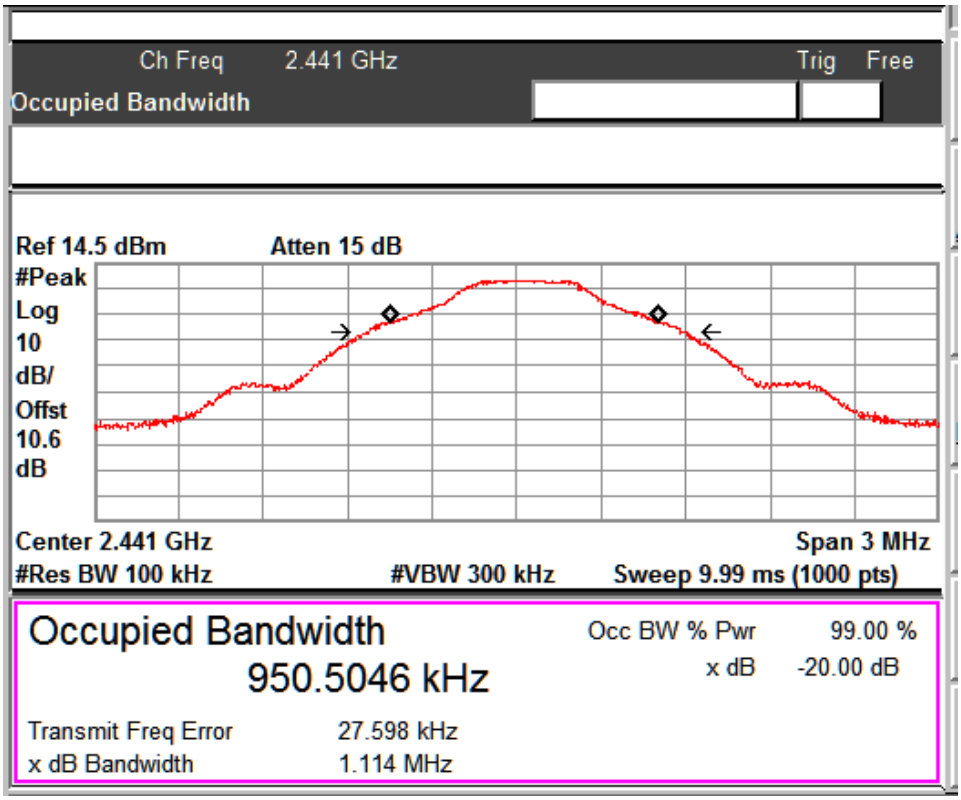
10 dB attenuator + 0.6 Cable loss = 10.6 dB offset is considered in below result

Table 5: 20dB Bandwidth and Occupied Bandwidth Test Results

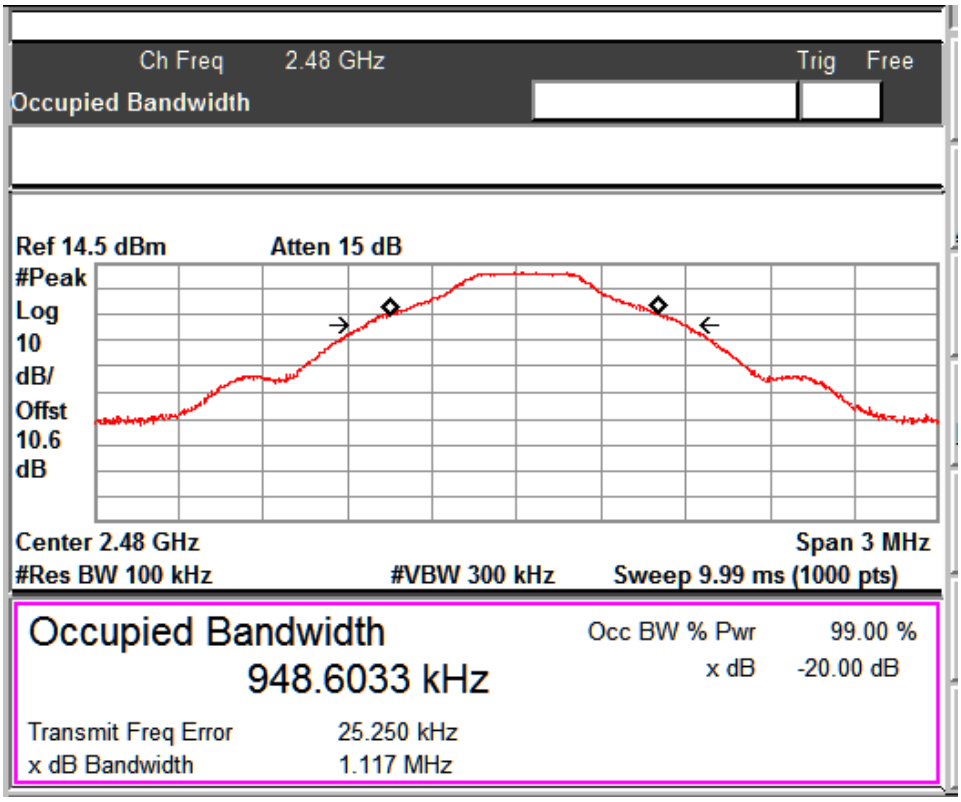
Modulation type	Channel Frequency(MHz)	20dB Bandwidth(MHz)	99% Occupied Bandwidth(MHz)
1 Mbps	2402	1.128	952.3
	2441	1.114	950.5
	2480	1.117	948.6
2 Mbps	2402	1.417	1.228
	2441	1.412	1.228
	2480	1.415	1.228
3 Mbps	2402	1.430	1.239
	2441	1.434	1.242
	2480	1.435	1.238



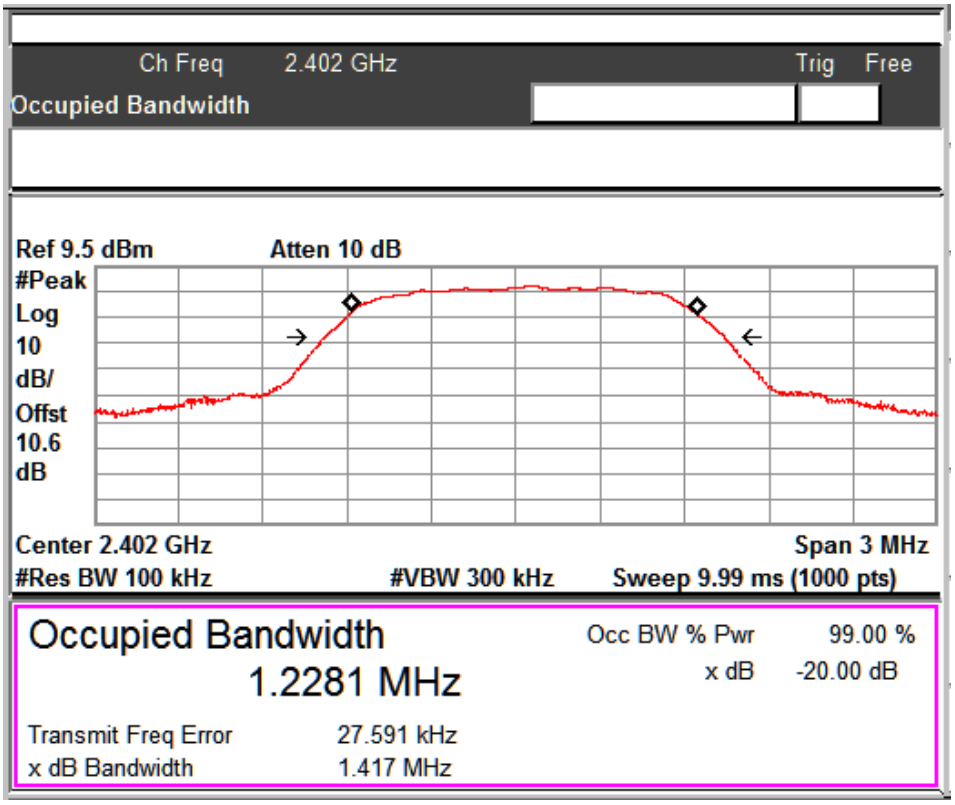
1 Mbps Channel Low



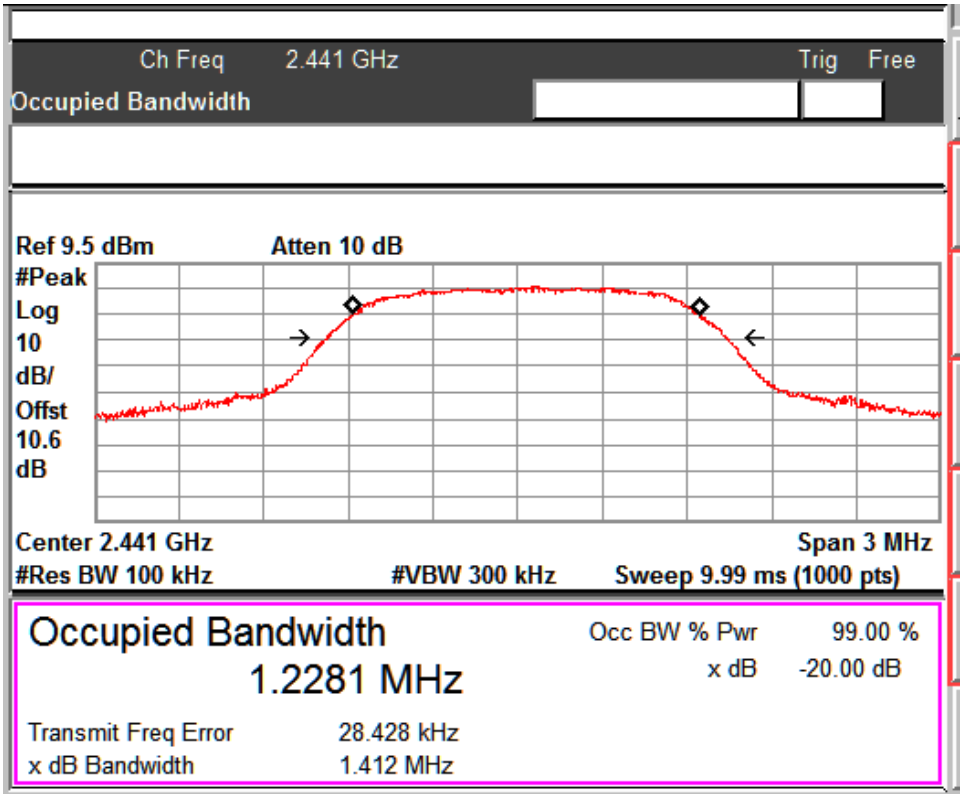
1 Mbps Channel Mid



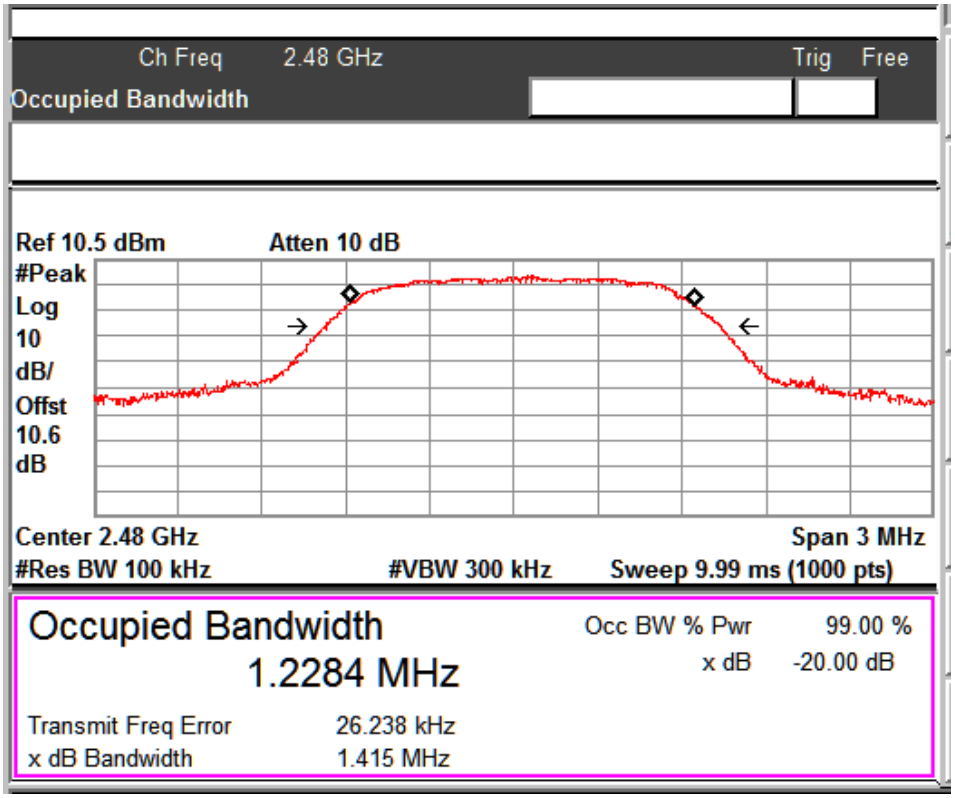
1 Mbps Channel High



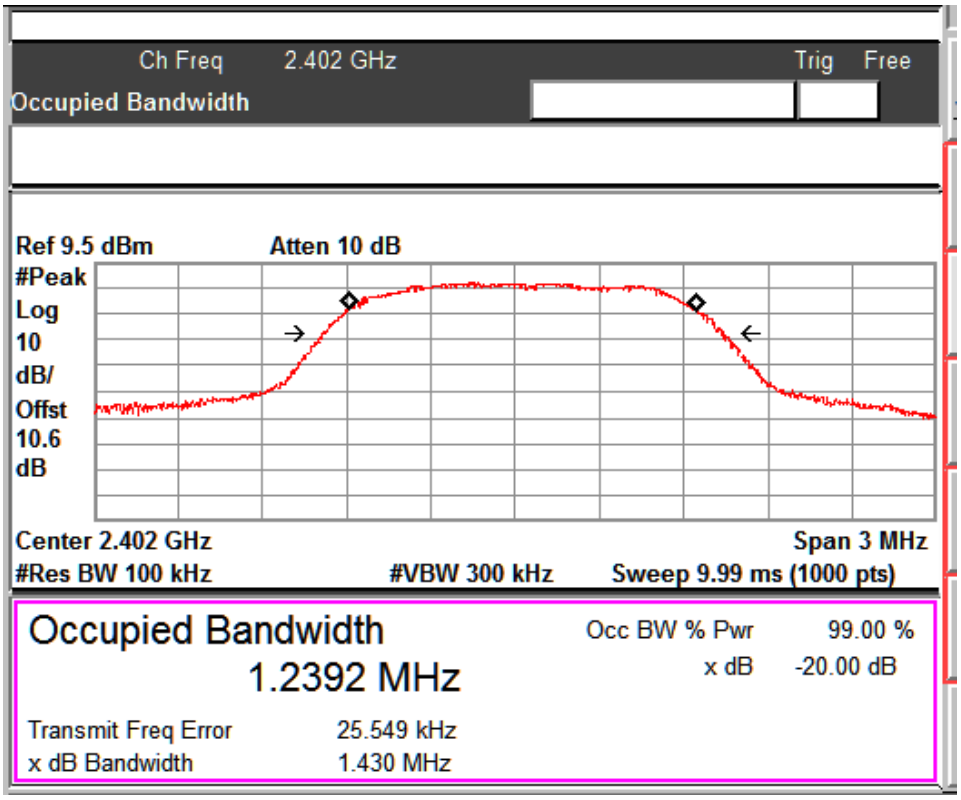
2 Mbps Channel Low



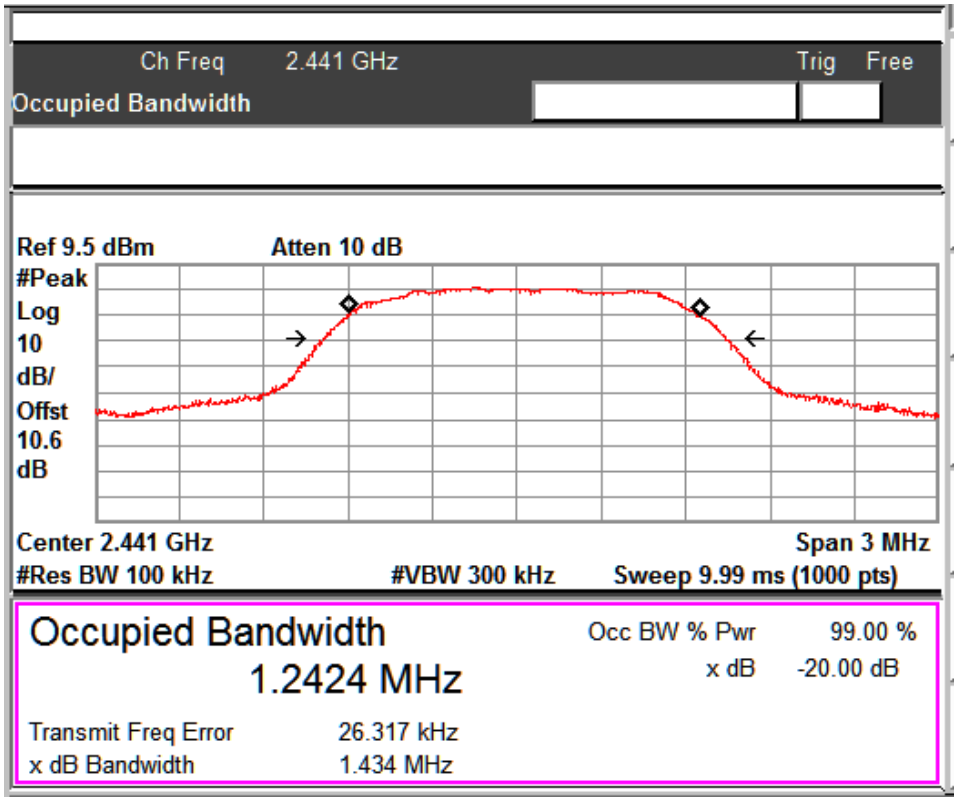
2 Mbps Channel Mid



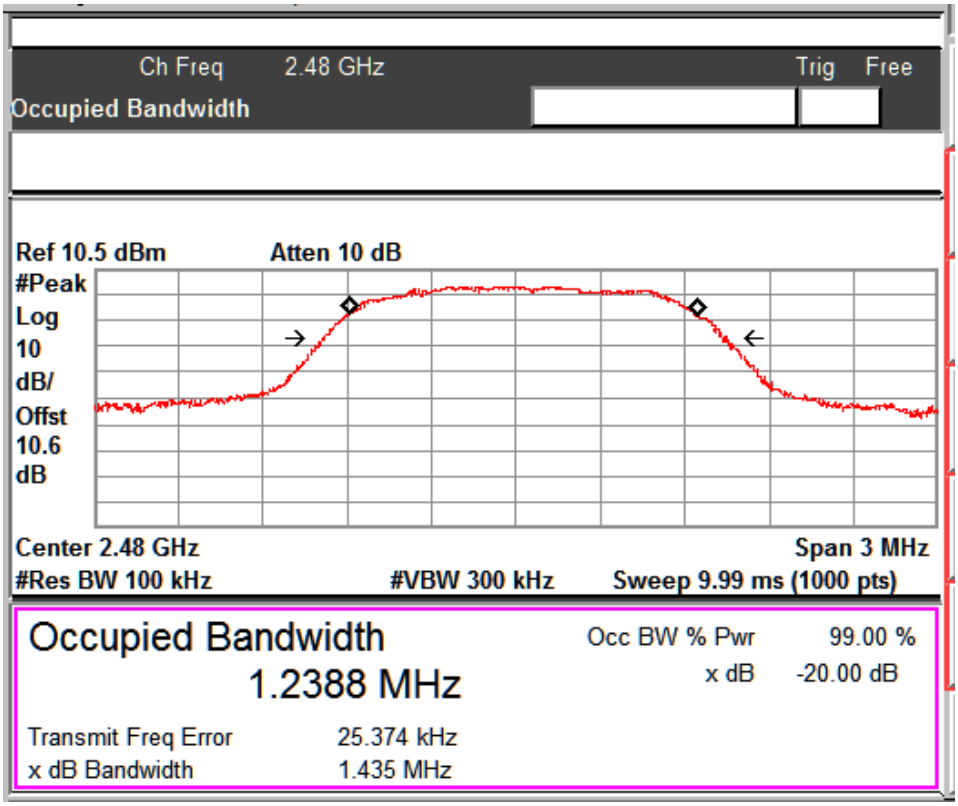
2 Mbps Channel High



3 Mbps Channel Low



3 Mbps Channel Mid



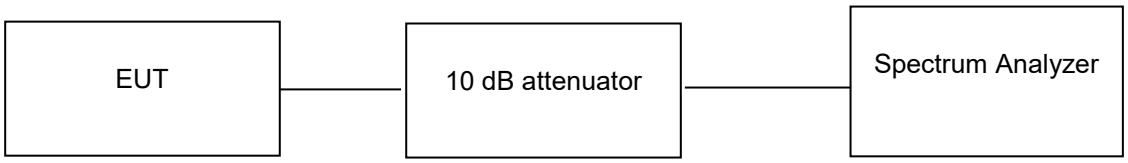
3 Mbps Channel High

6.3 Number of Hopping Channels

Result ***Pass***

Test Specification	FCC Part 15 Subpart C Section 15.247 (a) (1)
Detector Function	Peak
Port of testing	Antenna port
Requirement	Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels

Test Method:

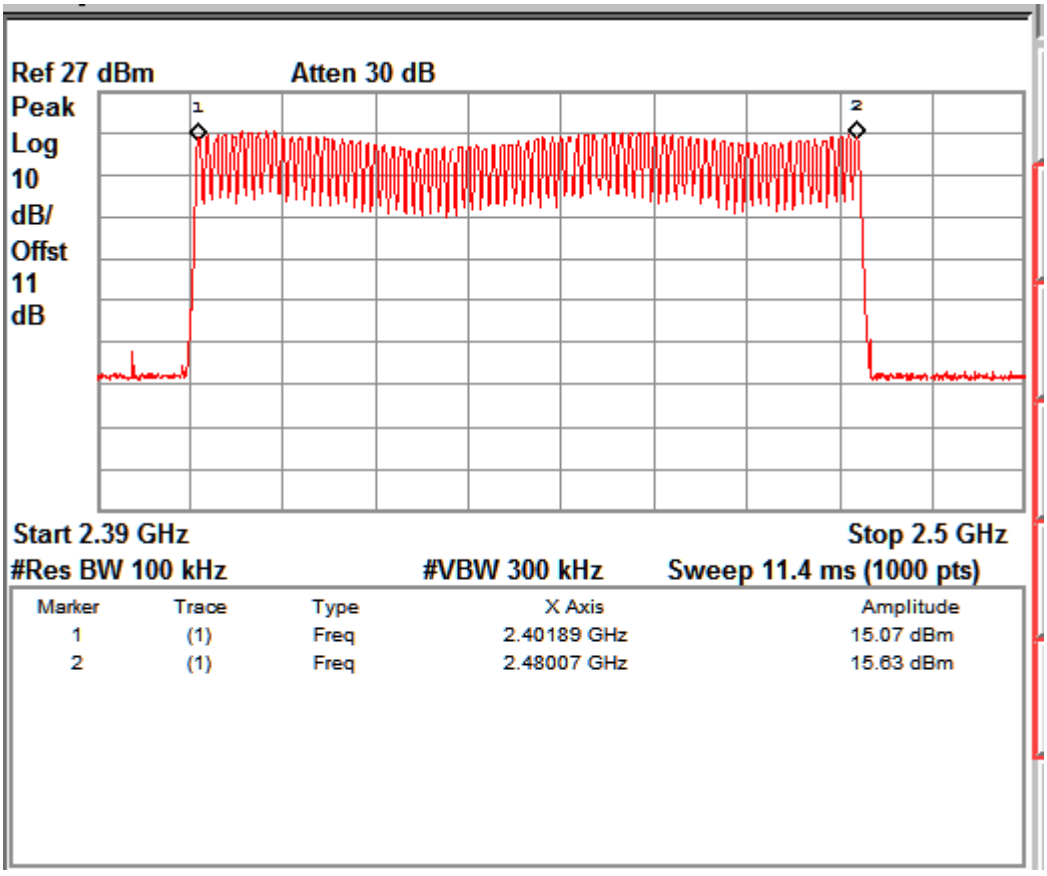


Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

Test results:

10 dB attenuator + 1 dB Cable loss = 11 dB offset is considered in below result



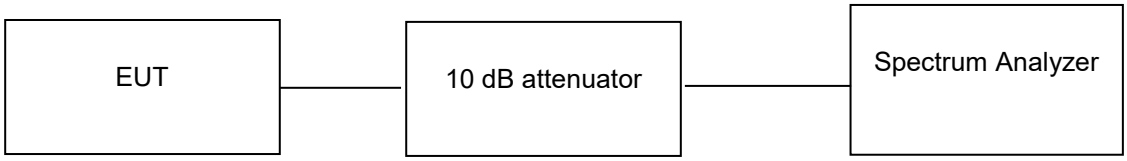
Total Number of hopping channels = 79

6.4 Carrier Frequency Separation

Result ***Pass***

Test Specification	FCC Part 15 Subpart C Section 15.247 (a) (1)
Detector Function	Peak
Port of testing	Antenna port
Requirement	Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater

Test Method:

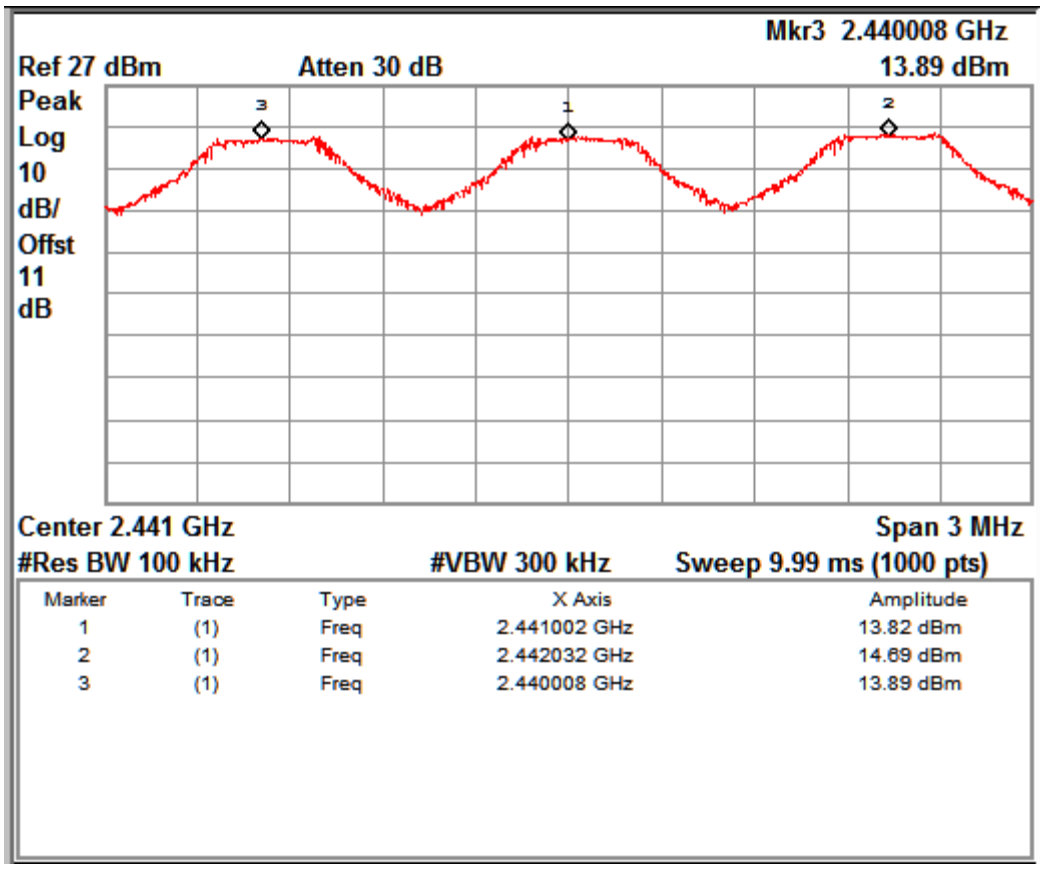


Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

Test results:

10 dB attenuator + 1 dB Cable loss = 11 dB offset is considered in below result



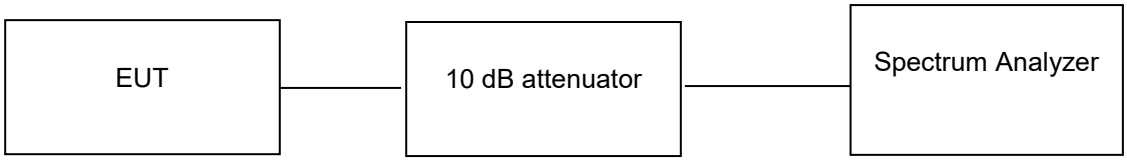
Channel Separation= 1 MHz

6.5 Time of Occupancy (Dwell Time)

Result ***Pass***

Test Specification	FCC Part 15 Subpart C Section 15.247 (a) (1)
Detector Function	Peak
Port of testing	Antenna port
Requirement	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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

Test Method:



Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

Test results:

10 dB attenuator + 0.6 dB Cable loss = 10.6 dB offset is considered in below result

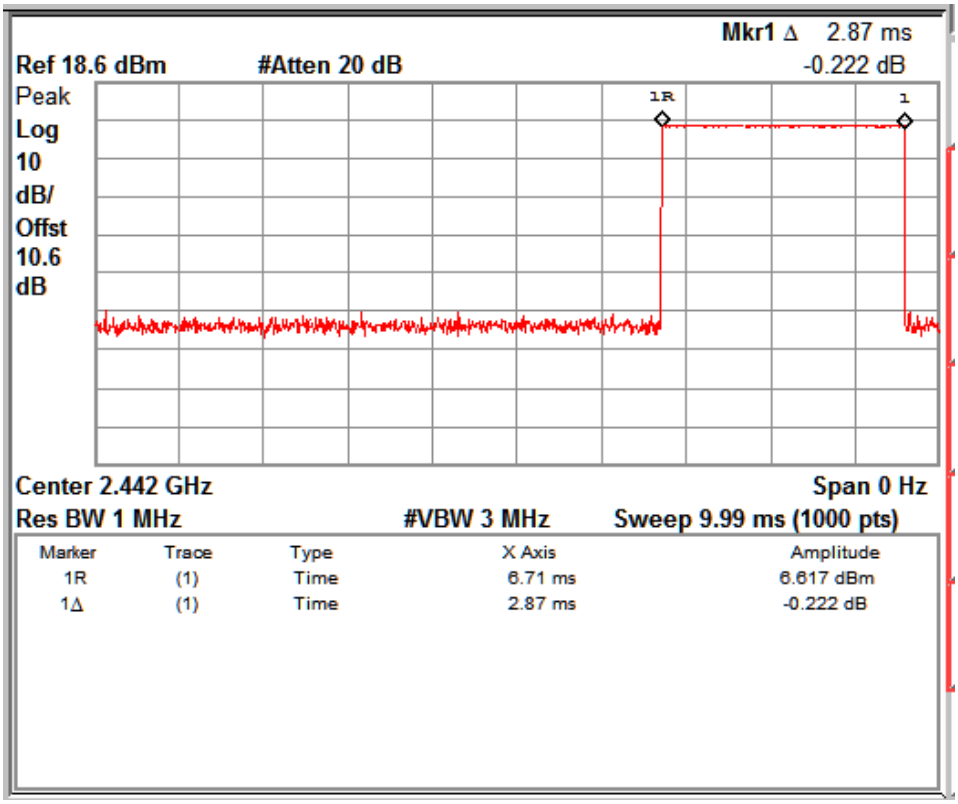
Time slot		**Time Slot (s)**
DH	**Measurement Value (sec)**	
DH5	0.00287	0.306
2DH5	0.00237	0.252
3DH5	0.00288	0.307

Measurement Method

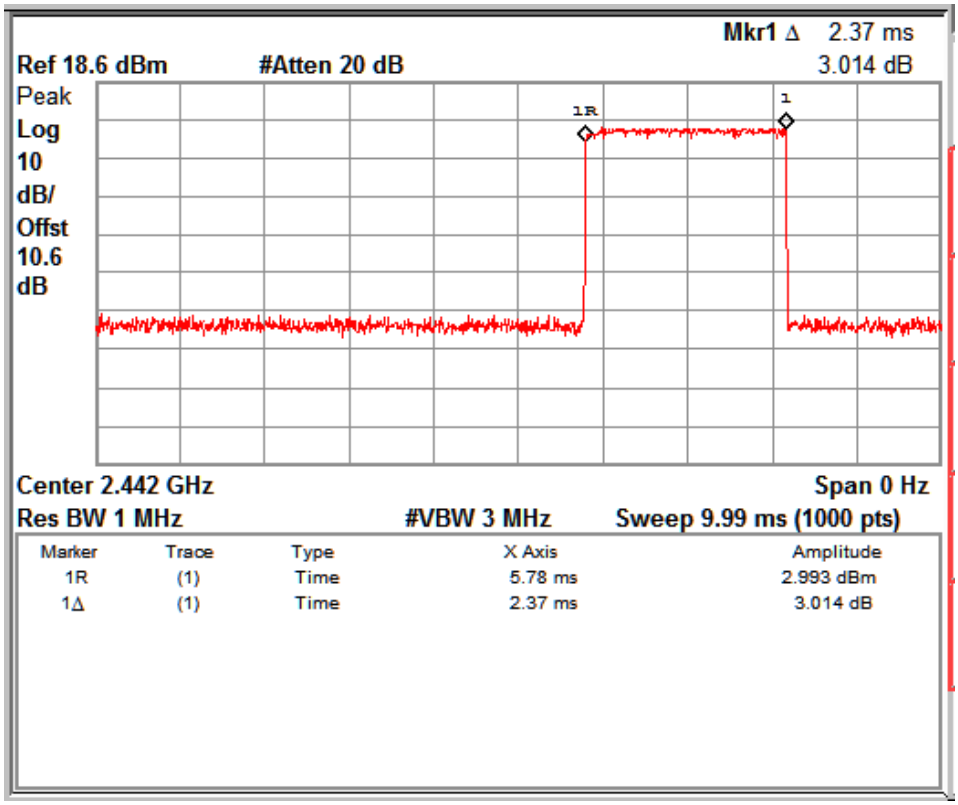
Period Time = 0.4(sec)*79 (hopping channel) = 31.6 s

DH Time slot = Measurement value (Sec)*(1600/ (6*79))*Period time

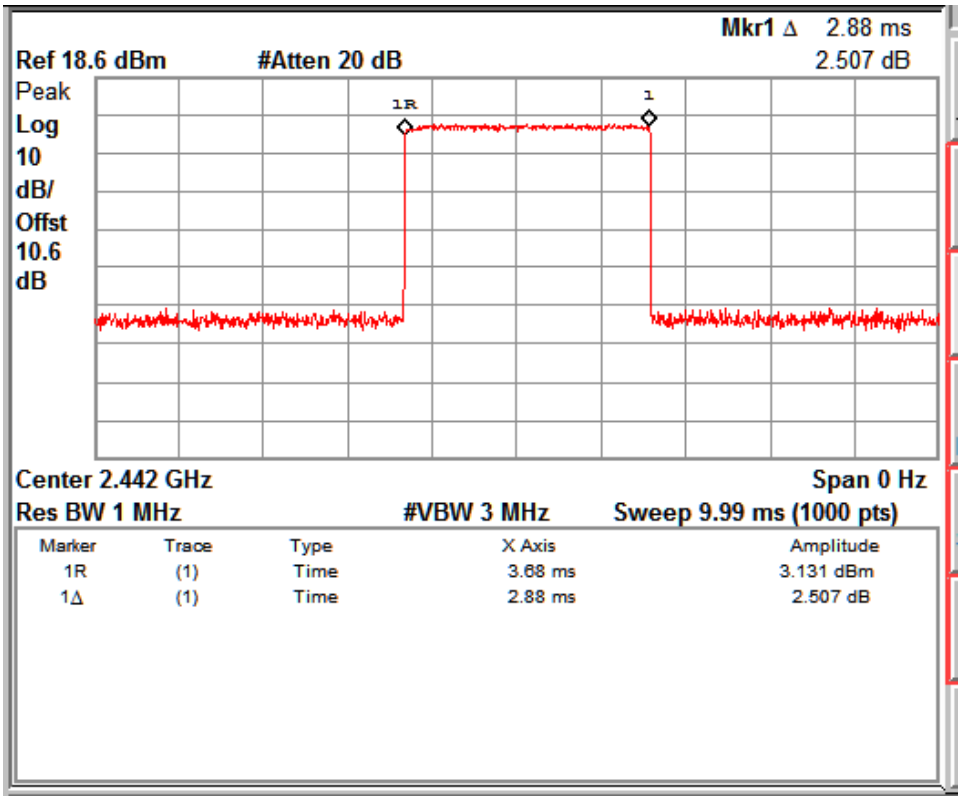
DH5=0.00287*3.3755*31.6=0.306 s
2DH5=0.00237*3.3755*31.6=0.252 s
3DH5=0.00288*3.3755*31.6=0.307 s


Mkr1 Δ 2.87 ms
Ref 18.6 dBm
#Atten 20 dB
-0.222 dB
Peak
Log
10
dB/
Offst
10.6
dB
1R
1
Center 2.442 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 9.99 ms (1000 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 6.71 ms 6.617 dBm
1Δ (1) Time 2.87 ms -0.222 dB

DH5


Mkr1 Δ 2.37 ms
Ref 18.6 dBm
#Atten 20 dB
3.014 dB
Peak
Log
10
dB/
Offst
10.6
dB
1R
1
Center 2.442 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 9.99 ms (1000 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 5.78 ms 2.993 dBm
1Δ (1) Time 2.37 ms 3.014 dB

2DH5


Mkr1 Δ 2.88 ms
Ref 18.6 dBm
#Atten 20 dB
2.507 dB
Peak
Log
10
dB/
Offst
10.6
dB
1R
1
Center 2.442 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 9.99 ms (1000 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 3.68 ms 3.131 dBm
1Δ (1) Time 2.88 ms 2.507 dB

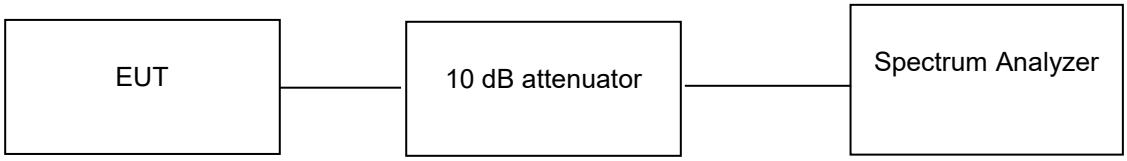
3DH5

6.6 Band- edge Compliance of RF Conducted Emissions

Result ***Pass***

Test Specification	FCC Part 15 Subpart C Section 15.247 (a) (1)
Detector Function	Peak
Port of testing	Antenna port
Requirement	In any 100kHz 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 20dB below that in the 100kHz 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.

Test Method:



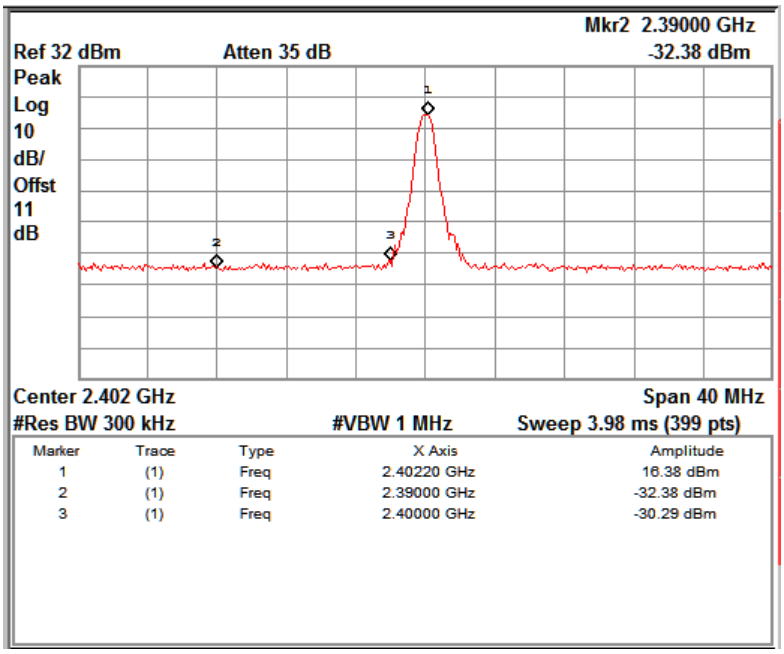
Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.2 %

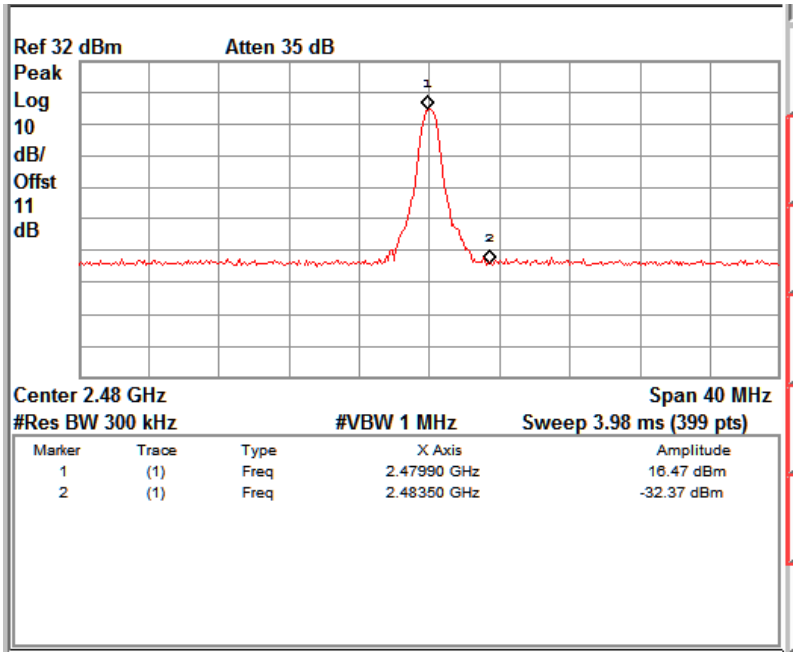
Test results:

10 dB attenuator + 1 dB Cable loss = 11 dB offset is considered in below result

Data Rate (Mbps)	Channel	Fundamental Frequency (MHz)	Value at Band Edge		Reference Value B (dBm)	Band Edge Value A~B (dB)	Limit (dB)
			Frequency (MHz)	Value A (dB)			
1	Low	2402	2400	-30.29	16.38	-46.67	-20
	High	2480	2483.5	-32.37	16.47	-48.84	-20

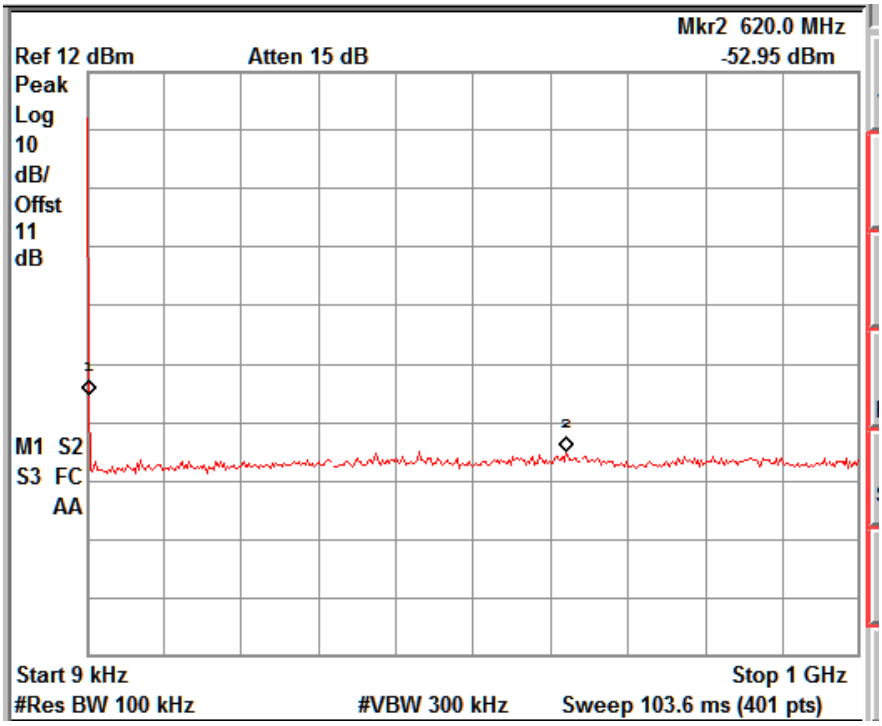


1 Mbps channel low

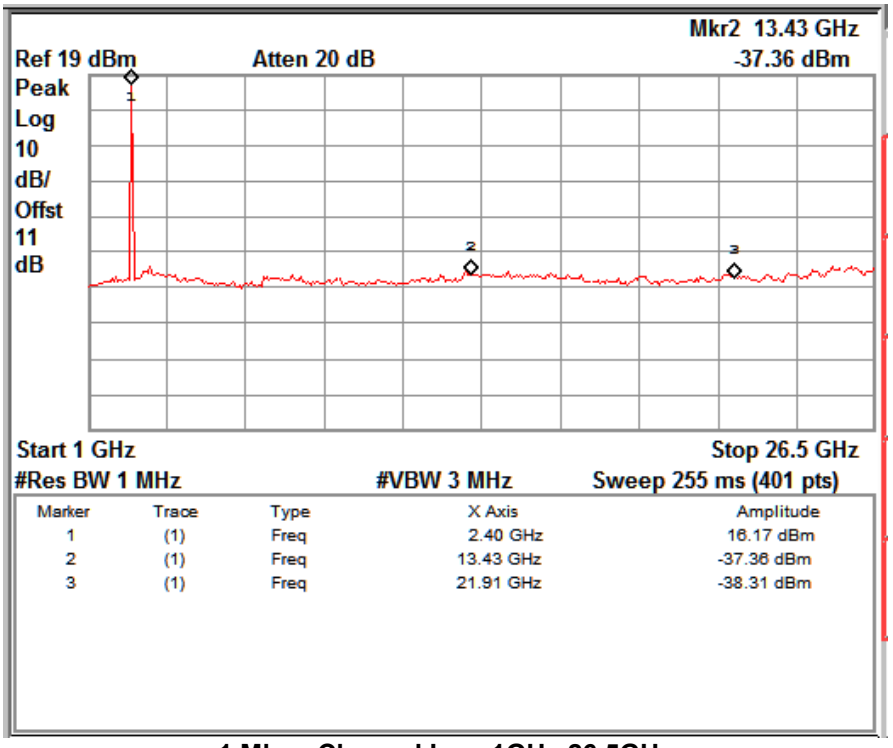


1 Mbps channel High

6.7 Conducted Spurious Emissions



1 Mbps Channel Low 9 kHz-1 GHz



1 Mbps Channel Low 1GHz-26.5GHz

6.8 Radiated spurious emissions and emissions restricted bands of operation

Result ***Pass***

Test Specification	FCC part 15 Subpart C Section 15.247 (d) / (15.209 & 15.205)
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3 m
Detector	QP for frequency below 1 GHz, average for frequency above 1 GHz
Requirement	As per the limits mentioned in the below table

Table 6: Transmitter limits for Radiated emission of Section 15.209

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 dBµV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Environmental and Test conditions:

Normal Temperature = +25 °C Voltage (V norm) = 12 V DC RH = 63.8 %

Module with accessories- frequency range 1-26.5GHz

Antenna: Antennova

Data Rate: 1 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	45.60	74	-28.40
		2390(Av)	24.52	54	-29.48
		2402(Pk)	100.75	*	-
		2402(Av)	98.68	*	-
		4804(Pk)	45.68	74	-28.32
		4804(Av)	37.77	54	-16.23
	Horizontal	2390(Pk)	42.02	74	-31.98
		2390(Av)	24.48	54	-29.52
		2402(Pk)	98.24	*	-
		2402(Av)	96.21	*	-
		4804(Pk)	44.63	74	-29.37
		4804(Av)	36.61	54	-17.39
2441	Vertical	2441(Pk)	99.04	*	-
		2441(Av)	97.03	*	-
		4882(Pk)	33.74	74	-40.26
		4882(Av)	33.54	54	-20.46
	Horizontal	2441(Pk)	96.47	*	-
		2441(Av)	94.47	*	-
		4882(Pk)	45.22	74	-28.78
		4882(Av)	36.90	54	-17.10
2480	Vertical	2480(Pk)	100.94	*	-
		2480(Av)	98.73	*	-
		4960(Pk)	51.88	74	-22.12
		4960(Av)	37.97	54	-16.03
		2483.5(Pk)	50.34	74	-23.66
		2483.5(Av)	28.31	54	-25.69
	Horizontal	2480(Pk)	96.50	*	-
		2480(Av)	94.44	*	-
		4960(Pk)	47.22	74	-26.78
		4960(Av)	40.95	54	-13.05
		2483.5(Pk)	46.05	74	-27.95
		2483.5(Av)	25.61	54	-28.39

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

Data Rate: 2 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	42.26	74	-31.74
		2390(Av)	25.58	54	-28.42
		2402(Pk)	99.11	*	-
		2402(Av)	94.23	*	-
		4804(Pk)	45.68	74	-28.32
		4804(Av)	37.77	54	-16.23
	Horizontal	2390(Pk)	41.89	74	-32.11
		2390(Av)	24.54	54	-29.46
		2402(Pk)	96.77	*	-
		2402(Av)	91.65	*	-
		4804(Pk)	No Harmonics Found		
		4804(Av)			
2441	Vertical	2441(Pk)	97.22	*	-
		2441(Av)	92.04	*	-
		4882(Pk)	No Harmonics Found		
		4882(Av)			
	Horizontal	2441(Pk)	94.74	*	-
		2441(Av)	88.71	*	-
		4882(Pk)	No Harmonics Found		
		4882(Av)			
2480	Vertical	2480(Pk)	99.54	*	-
		2480(Av)	94.72	*	-
		4960(Pk)	No Harmonics Found		
		4960(Av)			
		2483.5(Pk)	46.32	74	-27.68
		2483.5(Av)	28.49	54	-25.51
	Horizontal	2480(Pk)	95.24	*	-
		2480(Av)	90.01	*	-
		4960(Pk)	No Harmonics Found		
		4960(Av)			
		2483.5(Pk)	43.43	74	-30.57
		2483.5(Av)	26.14	54	-27.86

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

Data Rate: 3 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	43.88	74	-30.12
		2390(Av)	26.54	54	-27.46
		2402(Pk)	99.22	*	-
		2402(Av)	94.18	*	-
		4804(Pk)	No Harmonics Found		
		4804(Av)			
	Horizontal	2390(Pk)	41.17	74	-32.83
		2390(Av)	23.86	54	-30.14
		2402(Pk)	96.88	*	-
		2402(Av)	91.83	*	-
		4804(Pk)	No Harmonics Found		
		4804(Av)			
2441	Vertical	2441(Pk)	97.36	*	-
		2441(Av)	92.06	*	-
		4882(Pk)	No Harmonics Found		
		4882(Av)			
	Horizontal	2441(Pk)	94.96	*	-
		2441(Av)	88.72	*	-
		4882(Pk)	No Harmonics Found		
		4882(Av)			
2480	Vertical	2480(Pk)	99.57	*	-
		2480(Av)	94.64	*	-
		4960(Pk)	No Harmonics Found		
		4960(Av)			
		2483.5(Pk)	48.07	74	-25.93
		2483.5(Av)	29.15	54	-24.85
	Horizontal	2480(Pk)	95.22	*	-
		2480(Av)	90.38	*	-
		4960(Pk)	No Harmonics Found		
		4960(Av)			
		2483.5(Pk)	43.14	74	-30.86
		2483.5(Av)	26.50	54	-27.50

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

Antenna: Molex

Data Rate: 1 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	48.69	74	-25.31
		2390(Av)	29.66	54	-24.34
		2402(Pk)	104.84	*	-
		2402(Av)	104.43	*	-
		4804(Pk)	44.96	74	-29.04
		4804(Av)	36.89	54	-17.11
	Horizontal	2390(Pk)	42.06	74	-31.94
		2390(Av)	26.08	54	-27.92
		2402(Pk)	98.77	*	-
		2402(Av)	98.35	*	-
		4804(Pk)	47.10	74	-26.90
		4804(Av)	41.10	54	-12.90
2441	Vertical	2441(Pk)	103.77	*	-
		2441(Av)	103.35	*	-
		4882(Pk)	45.00	74	-29.00
		4882(Av)	37.05	54	-16.95
	Horizontal	2441(Pk)	97.99	*	-
		2441(Av)	97.55	*	-
		4882(Pk)	45.48	74	-28.52
		4882(Av)	38.83	54	-15.17
2480	Vertical	2480(Pk)	106.13	*	-
		2480(Av)	105.70	*	-
		4960(Pk)	49.53	74	-24.47
		4960(Av)	44.72	54	-9.28
		2483.5(Pk)	46.40	74	-27.60
		2483.5(Av)	34.46	54	-19.54
	Horizontal	2480(Pk)	99.01	*	-
		2480(Av)	98.58	*	-
		4960(Pk)	47.68	74	-26.32
		4960(Av)	41.83	54	-12.17
		2483.5(Pk)	40.87	74	-33.13
		2483.5(Av)	28.85	54	-25.15

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

Data Rate: 2 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	48.25	74	-25.75
		2390(Av)	27.52	54	-26.48
		2402(Pk)	100.34	*	-
		2402(Av)	96.64	*	-
		4804(Pk)	43.56	74	-30.44
		4804(Av)	30.61	54	-23.39
	Horizontal	2390(Pk)	46.35	74	-27.65
		2390(Av)	31.33	54	-22.67
		2402(Pk)	94.07	*	-
		2402(Av)	90.33	*	-
		4804(Pk)	43.19	74	-30.81
		4804(Av)	30.81	54	-23.19
2441	Vertical	2441(Pk)	99.62	*	-
		2441(Av)	95.88	*	-
		4882(Pk)	43.79	74	-30.21
		4882(Av)	32.55	54	-21.45
	Horizontal	2441(Pk)	93.47	*	-
		2441(Av)	89.71	*	-
		4882(Pk)	43.04	74	-30.96
		4882(Av)	31.19	54	-22.81
2480	Vertical	2480(Pk)	101.92	*	-
		2480(Av)	98.26	*	-
		4960(Pk)	50.37	74	-23.63
		4960(Av)	34.25	54	-19.75
		2483.5(Pk)	44.05	74	-29.95
		2483.5(Av)	31.40	54	-22.60
	Horizontal	2480(Pk)	94.52	*	-
		2480(Av)	90.87	*	-
		4960(Pk)	45.37	74	-28.63
		4960(Av)	33.88	54	-20.12
		2483.5(Pk)	40.40	74	-33.60
		2483.5(Av)	26.73	54	-27.27

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

Data Rate: 3 Mbps

Channel Frequency (MHz)	Polarization	Measured Frequency (MHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	Vertical	2390(Pk)	47.24	74	-26.76
		2390(Av)	27.29	54	-26.71
		2402(Pk)	100.44	*	-
		2402(Av)	96.57	*	-
		4804(Pk)	43.79	74	-30.21
		4804(Av)	30.66	54	-23.34
	Horizontal	2390(Pk)	44.69	74	-29.31
		2390(Av)	25.56	54	-28.44
		2402(Pk)	94.18	*	-
		2402(Av)	90.30	*	-
		4804(Pk)	42.89	74	-31.11
		4804(Av)	30.66	54	-23.34
2441	Vertical	2441(Pk)	99.90	*	-
		2441(Av)	96.03	*	-
		4882(Pk)	43.19	74	-30.81
		4882(Av)	32.52	54	-21.48
	Horizontal	2441(Pk)	93.31	*	-
		2441(Av)	89.42	*	-
		4882(Pk)	42.31	74	-31.69
		4882(Av)	32.52	54	-21.48
2480	Vertical	2480(Pk)	101.96	*	-
		2480(Av)	91.11	*	-
		4960(Pk)	44.54	74	-29.46
		4960(Av)	34.16	54	-19.84
		2483.5(Pk)	43.85	74	-30.15
		2483.5(Av)	31.51	54	-22.49
	Horizontal	2480(Pk)	94.65	*	-
		2480(Av)	90.79	*	-
		4960(Pk)	51.99	74	-22.01
		4960(Av)	34.16	54	-19.84
		2483.5(Pk)	40.16	74	-33.84
		2483.5(Av)	27.76	54	-26.24

***-> Fundamental frequency**
Pk-> Peak
Av-> Average

7 Conducted Emission Test on A.C. Power Line

Result **Pass**

Test Specification	:	FCC Part 15 Section 15.207
Test Method	:	ANSI C63.10-2013
Testing Location	:	Screened room
Measurement Bandwidth	:	9kHz
Frequency Range	:	150kHz – 30MHz
Supply Voltage	:	110VAC,60Hz

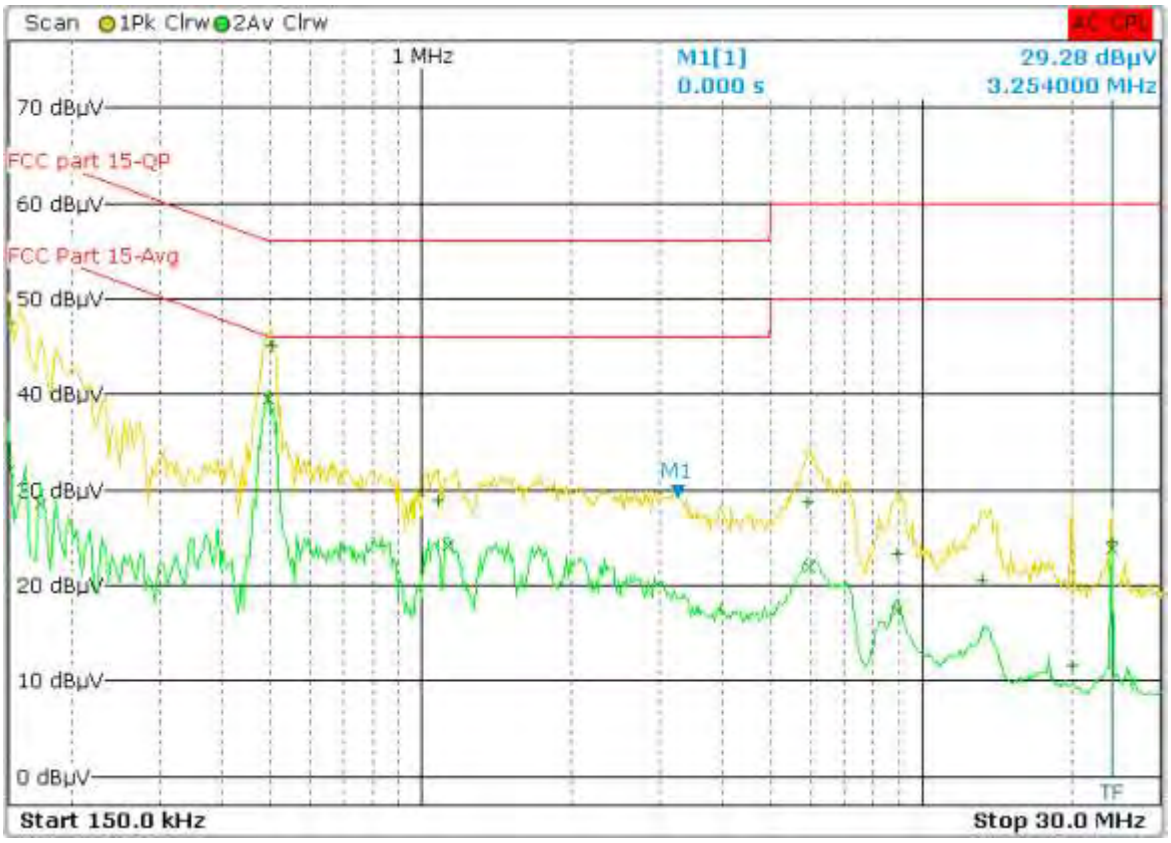
Limit of section 15.207

Frequency of emission	QP Limit	AV Limit
(MHz)	(dBµV)	(dBµV/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency

Test Result: LINE Graphs and Tables

110v AC , 60Hz



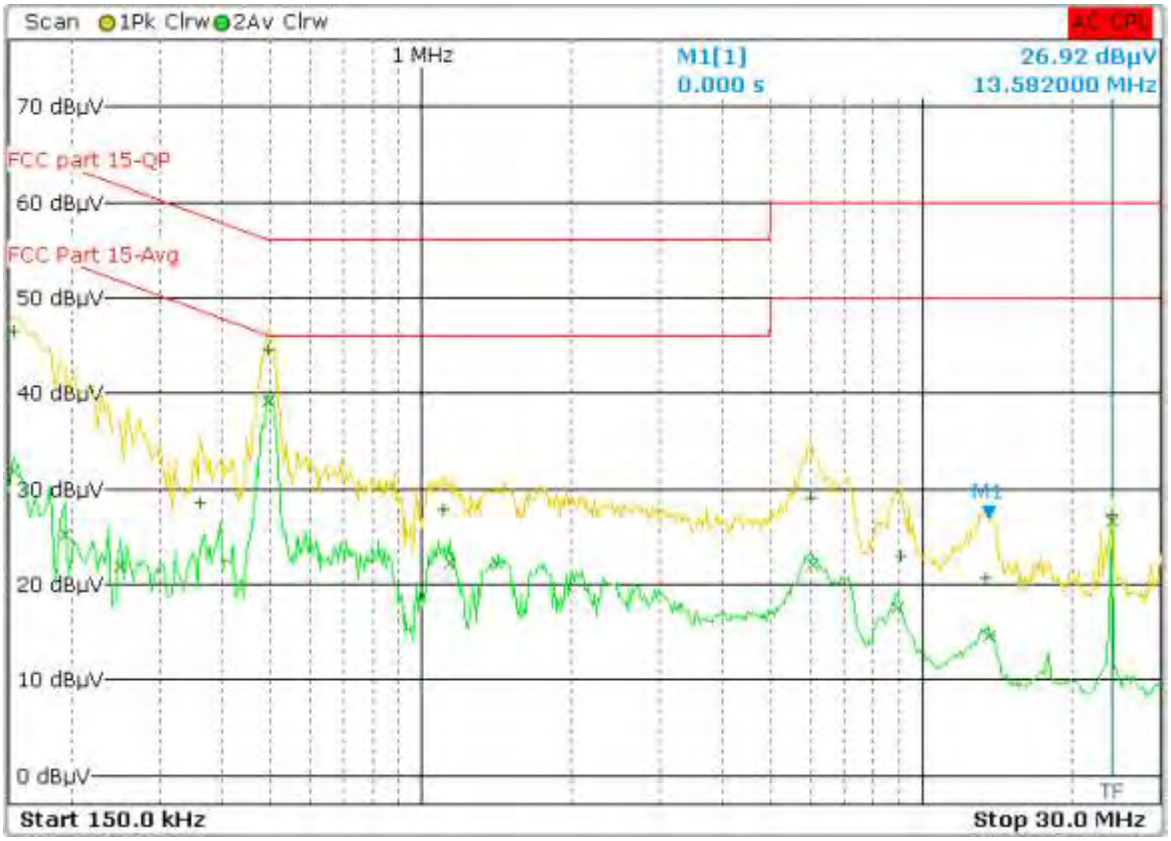
Line Graph

Trace	Frequency	Level (dBµV)	Phase Detector	Delta Limit/dB
2	494.000000000 kHz	39.59	Average	-6.51
1	502.000000000 kHz	45.03	Quasi Peak	-10.97
1	150.000000000 kHz	47.51	Quasi Peak	-18.49
2	1.134000000 MHz	24.19	Average	-21.81
2	150.000000000 kHz	31.97	Average	-24.03
2	24.026000000 MHz	23.82	Average	-26.18
2	174.000000000 kHz	28.57	Average	-26.20
1	1.082000000 MHz	28.93	Quasi Peak	-27.07
2	5.982000000 MHz	22.00	Average	-28.00
1	5.930000000 MHz	28.67	Quasi Peak	-31.33
2	8.922000000 MHz	17.32	Average	-32.68
1	24.026000000 MHz	24.57	Quasi Peak	-35.43
1	8.958000000 MHz	23.30	Quasi Peak	-36.70
1	13.226000000 MHz	20.53	Quasi Peak	-39.47
1	20.038000000 MHz	11.62	Quasi Peak	-48.38

Line Table

Test Result: Neutral Graphs and Tables

110v AC , 60Hz



Neutral Graph

Trace	Frequency	Level (dBµV)	Phase Detector	Delta Limit/dB
2	494.000000000 kHz	39.1	Average	-7
1	494.000000000 kHz	44.65	Quasi Peak	-11.45
1	154.000000000 kHz	46.55	Quasi Peak	-19.23
2	24.026000000 MHz	26.59	Average	-23.41
2	1.138000000 MHz	22.28	Average	-23.72
2	1.430000000 MHz	22.17	Average	-23.83
2	154.000000000 kHz	31.84	Average	-23.94
2	6.046000000 MHz	22.17	Average	-27.83
1	1.110000000 MHz	27.78	Quasi Peak	-28.22
2	194.000000000 kHz	25.25	Average	-28.61
2	250.000000000 kHz	21.91	Average	-29.85
1	362.000000000 kHz	28.54	Quasi Peak	-30.14
1	5.990000000 MHz	29.07	Quasi Peak	-30.93
2	8.950000000 MHz	17.57	Average	-32.43
1	24.026000000 MHz	27.26	Quasi Peak	-32.74
2	13.582000000 MHz	14.54	Average	-35.46
1	9.062000000 MHz	23.05	Quasi Peak	-36.95
1	13.398000000 MHz	20.73	Quasi Peak	-39.27

Neutral Table

8 LIST OF TABLES

9 LIST OF FIGURES

Power level setting used for testing in QRCT tool:

Mode	Channel	Frequency (MHZ)	Data Rate(Mbps)	Tx Power Level	Power (dBm)
BT Classic (EDR - 1Mbps)	0	2402	BT_DH5	10	20
	39	2441		10	20
	78	2480		10	20
BT Classic (EDR - 2Mbps)	0	2402	BT2_DH5	10	20
	39	2441		10	20
	78	2480		10	20
BT Classic (EDR - 3Mbps)	0	2402	BT3_DH5	10	20
	39	2441		10	20
	78	2480		10	20

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