TXS Industrial Design, Inc. dba Brandstand Products

TEST REPORT

SCOPE OF WORK
EMC TESTING–BPEBL2

REPORT NUMBER
250818071GZU-003

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TEST REPORT

Applicant Name & Address	:	TXS Industrial Design, Inc. dba Brandstand Products 1219 Digital Drive #100 Richardson US 75081 United States Of America
Manufacturing Site	:	Shenzhen Huntkey Electric Co., Ltd. Huntkey Industrial Park, Xue-Xiang Village, Banxue Road,Bantian, Shenzhen,Guangdong 518129 China
Intertek Report No:		250818071GZU-003
FCC ID:		2AFT4-BPEBLTR2

Test standards

47 CFR PART 15 Subpart C: 2024 section 15.247

Sample Description

Product	:	CubieBlue
Model No.	:	BPEBL2
Electrical Rating	:	125VAC, 12A, 60Hz, 1500W SINGLE USB-C OUTPUT(20W MAX): 5V⎓ 3A or 9V⎓ 2.22A or 12V⎓ 1.67A SINGLE USB-A OUTPUT(18W MAX): 5V⎓ 3A or 9V⎓ 2A or 12V⎓ 1.5A DOUBLE PORT USB-C+USB-A OUTPUT(15W MAX): 5V⎓ 3A VPR: L-N 1200V, L-G 1200V, N-G 1200V,In 3KA AC OUTPUT: 125VAC, 12A, 60Hz, 1500W
Serial No.	:	Test sample 1
Date Received	:	18 August 2025
Date Test Conducted	:	08 September 2025-19 September 2025

Prepared and Checked By

Elena Lei

Project Engineer

Approved By:

Dean Liu

Sr. Project Engineer

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CONTENT

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1.0 TEST RESULT SUMMARY

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	FCC PART 15 C Clause 15.247 (c) and Clause 15.203	FCC PART 15 C Clause 15.247 (c) and Clause 15.203	PASS
20 dB Bandwidth	FCC PART 15 C Clause 15.247 (a)(1)	ANSI C63.10: Clause 7.8.6 & 6.9.2	PASS
Carrier Frequencies Separated	FCC PART 15 C Clause 15.247(a)(1)	ANSI C63.10: Clause 7.8.2	PASS
Hopping Channel Number	FCC PART 15 C Clause 15.247(a)(1)(iii)	ANSI C63.10: Clause 7.8.3	PASS
Dwell Time	FCC PART 15 C Clause 15.247(a)(1)(iii)	ANSI C63.10: Clause 7.8.4	PASS
Pseudorandom Frequency Hopping Sequence	FCC PART 15 C Clause 15.247(a)(1)	FCC PART 15 C Clause 15.247(a)(1)	PASS
Maximum Peak Conducted Output Power	FCC PART 15 C Clause 15.247(b)(1)	ANSI C63.10: Clause 7.8.5	PASS
Out of Band Conducted Emissions	FCC PART 15 C Clause 15.247(d)	ANSI C63.10: Clause 7.8.7& 6.10	PASS
Radiated Emissions	FCC PART 15 C Clause 15.209 &15.247(d)	ANSI C63.10: Clause 7.8.8 & 6.4, 6.5 and 6.6	PASS
Band Edges Measurement	FCC PART 15 C Clause 15.247 (d) &15.205	ANSI C63.10: Clause 7.8.7& 6.10	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C Clause 15.207	ANSI C63.10: Clause 6.2	PASS

Remark:
N/A: not applicable. Refer to the relative section for the details.
EUT: In this whole report EUT means Equipment Under Test.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radio Frequency.
ANSI C63.10: the detail version is ANSI C63.10:2020 in the whole report.

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2.0 General Description

2.1 Product Description

Operating Frequency:	2402 MHz – 2480MHz
Type of Modulation:	GFSK, (π/4)-DQPSK, 8-DPSK
Number of Channels:	79 Channels
Channel Separation:	1 MHz
Dwell Time:	Per channel is less than 0.4s
Antenna Type:	Integral
Antenna Gain:	1.63 dBi
Speciality:	Bluetooth 3.0 or 2.1(2.0) with EDR
Function:	Speaker with BT function to transmit
Power Supply:	120VAC, 12A, 60Hz
Power cord:	AC supply cable

Remark: The device meets the requirements stated within Parts 15.247(g) & (h) in that they were developed under the Bluetooth protocol and operate as a true frequency hopping system. The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

EUT modulation and data packet during test:
For Normal mode:
The EUT has been tested on the Modulation of GFSK with DH1, DH3 and DH5 data packet.
For EDR mode:
1. The EUT has been tested on the Modulation of (π/4)-DQPSK with 2DH1, 2DH3 and 2DH5 data packet.
2. The EUT has been tested on the Modulation of 8-DPSK with 3DH1, 3DH3 and 3DH5 data packet.

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EUT channels and frequencies list:
Test frequencies are lowest channel 0: 2402 MHz, middle channel 39: 2441 MHz and highest channel 78: 2480 MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454	/	/
26	2428	53	2455	/	/

2.2 Related Submittal(s) Grants

This is an application for certification of Power supply audio which has 2.4GHz classic Bluetooth function.

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2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10:2013. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

2.4 Test Facility

All tests were performed at:
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China
Except Conducted Emissions was performed at:
Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China

A2LA Certificate Number 0078.10
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, AC power line was manipulated to produce worst case emissions. It was powered by AC 120V/60Hz supply.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. The spurious emissions more than 20 dB below the permissible value are not reported.

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For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

3.2 EUT Exercising Software

Description	Manufacturer	Model No.	SN/Version	Supplied by
For fixing frequency	Huntkey	FCC test	--	Huntkey

3.3 Special Accessories

No special accessories used

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3.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	20 dB Bandwidth	2.31%
	6dB Bandwidth	
	99% Bandwidth	
2	Carrier Frequencies Separated	2.31%
3	Dwell Time	1.19%
4	Maximum Peak Conducted Output Power	1.98 dB
5	Peak Power Spectral Density	1.98 dB
6	Out of Band Conducted Emissions	1.98 dB
7	Band edges measurement	1.98 dB
8	Radiated Emissions	3.64 dB (9 kHz-30 MHz)
		4.26 dB (30 MHz-1 GHz)
		4.96 dB (1 GHz-18 GHz)
		5.16 dB (18 GHz-40 GHz)
9	Conducted Emissions at Mains Terminals	2.23 dB
10	Temperature	0.81 °C
11	Humidity	1.73%
12	Time	1.19%

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty is calculated in accordance with ETSI TR 100 028-2001.
The measurement uncertainty is given with a confidence of 95%, k=2.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value

3.5 Equipment Modification

Any modifications installed previous to testing by TXS Industrial Design, Inc. dba Brandstand will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

3.6 Support Equipment List and Description

This product was tested with corresponding support equipment as below:
Support equipment

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Description	Model No.	Rating	Supplied by
Cement resistance*2	-	0.5Ω ,1Ω , 5Ω ,2Ω ,5Ω ,	Intertek
incandescent light bulb*2	--	100-240~, 50/60Hz,	Intertek

Cable

Description	Model No.	Connector type	Cable length/type	Supplied by
Power supply	--	AC	1.6 m(unshielded)	applicant
EUT to Adapter light bulb*2	--	AC	1 m(unshielded)	applicant
EUT to Adapter Cement resistance *2	--	DC	0.8 m(unshielded)	applicant

Remark:
After the frequency was fixed, Notebook and Fix board were removed out of the Chamber before test.

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4.0 Measurement Results

4.1 Antenna Requirement

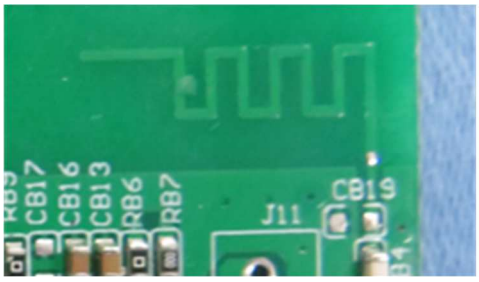
Standard requirement:

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

EUT Antenna

The antenna is an integral antenna and no consideration of replacement. The best-case gain of 1.63 dBi is provided by applicant.



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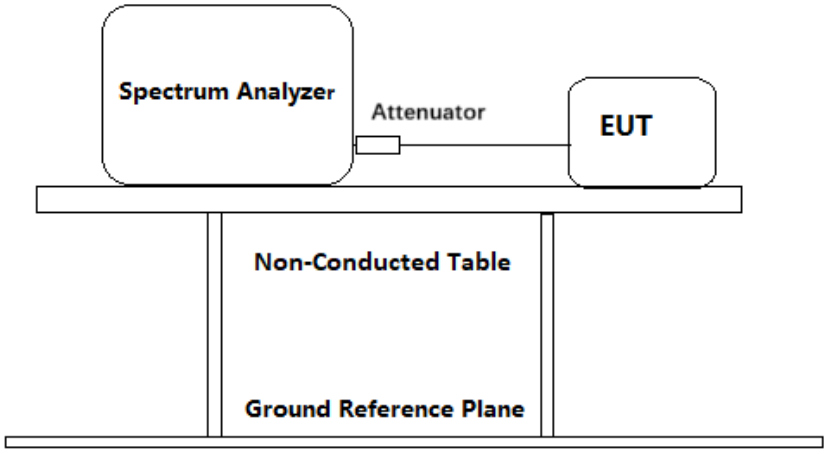
4.2 20 dB Bandwidth

Test Requirement:	FCC Part 15 C section 15.247 (a)(1) 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.
Test Method:	ANSI C63.10: Clause 7.8.6 & 6.9.2
Test Status:	Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data package. Compliance test in normal mode (DH1) and EDR mode (2DH1) and EDR mode (3DH1) as the worst case was found.

Test Configuration:



Test Procedure:

Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum. The transmitter was operated at its maximum carrier power measured under normal test conditions.

1. The instrument center frequency was set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer was between two times and five times the OBW(20 dB Bandwidth).
2. The nominal IF filter bandwidth (3 dB RBW) was in the range of 1% to 5% of the OBW, and VBW was approximately three times the RBW.
3. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope was more than [10 log (OBW/RBW)] below the reference

level.

4. Step 1) through step 3) might require iteration to adjust within the specified range.
5. The dynamic range of the instrument at the selected RBW was more than 10 dB below the target “−20 dB down” requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW was at least 30 dB below the reference value.
6. Peak detection and max hold mode (until the trace stabilizes) was used.
7. Used the 20dB bandwidth function of the instrument and reported the measured bandwidth.
8. The occupied bandwidth was reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division was clearly labeled. Tabular data was reported in addition to the plot(s).

Used Test Equipment List

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Test result:

20 dB OBW

Normal mode (DH1):

Test Channel	Bandwidth(MHz)	2/3 bandwidth(MHz)
Lowest	0.999	0.666
Middle	1.013	0.675
Highest	0.999	0.666

EDR mode (2DH1):

Test Channel	bandwidth	2/3 bandwidth
Lowest	1.259	0.839
Middle	1.259	0.839
Highest	1.259	0.839

EDR mode (3DH1):

Test Channel	bandwidth	2/3 bandwidth
Lowest	1.230	0.820
Middle	1.227	0.818
Highest	1.227	0.818

Test result: The unit does meet the FCC requirements.

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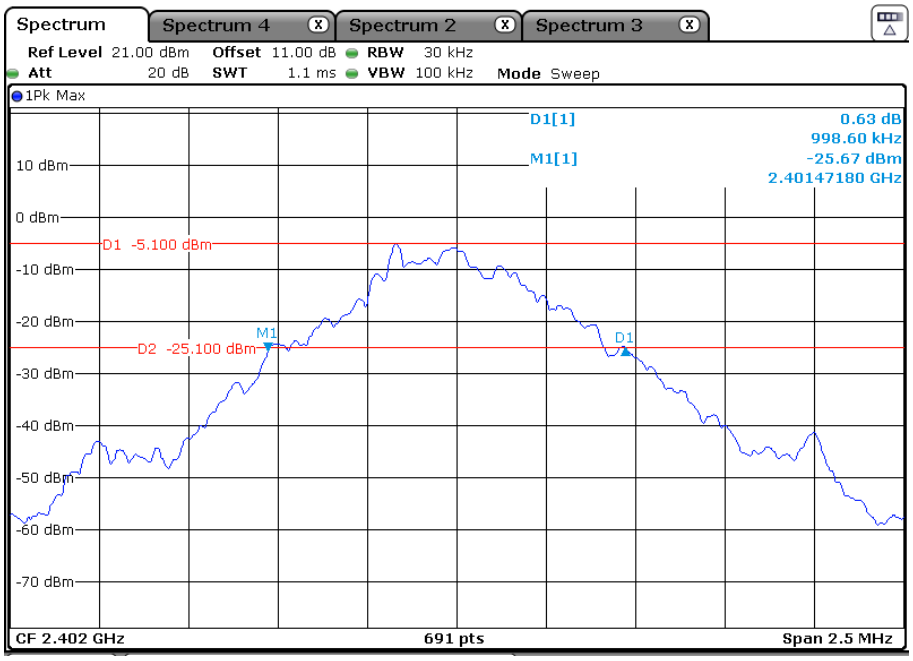
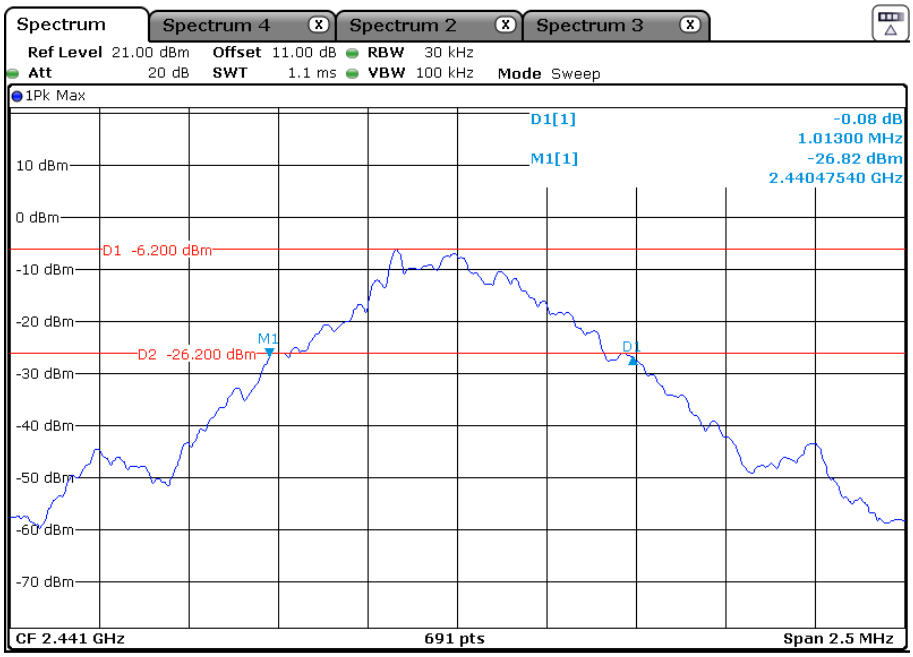
Result plot as follows:

Normal mode (DH1):

Lowest Channel(2.402 GHz):

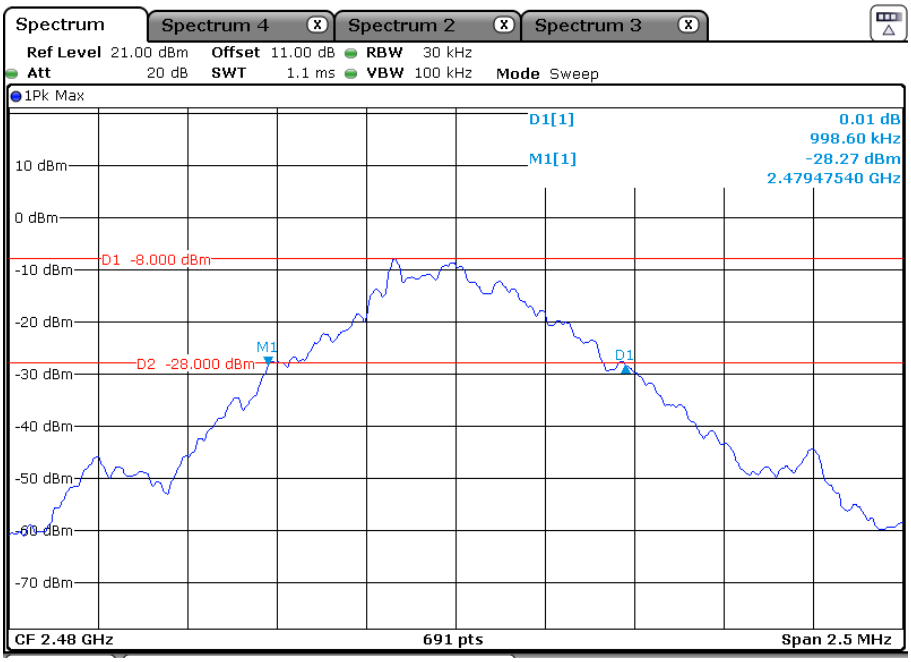


Middle Channel(2.441 GHz):



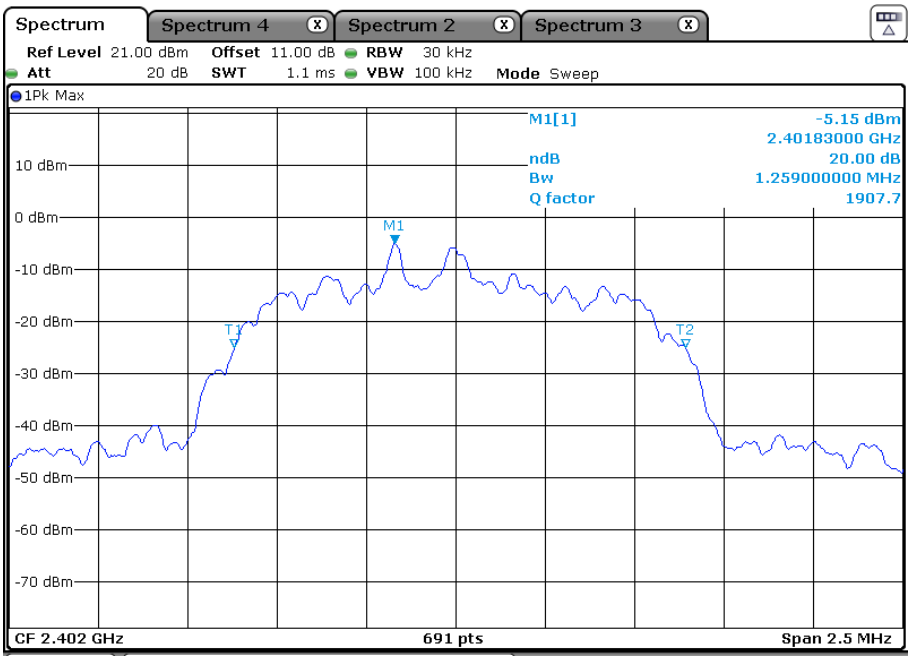
TEST REPORT

Highest Channel(2.480 GHz):



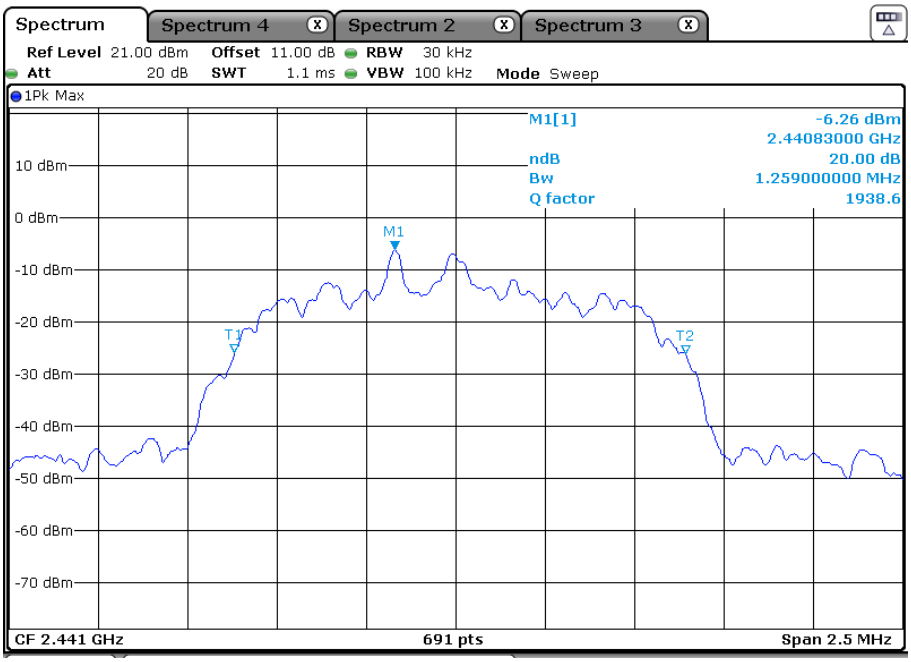
EDR mode (2DH1):

Lowest channel(2.402 GHz):

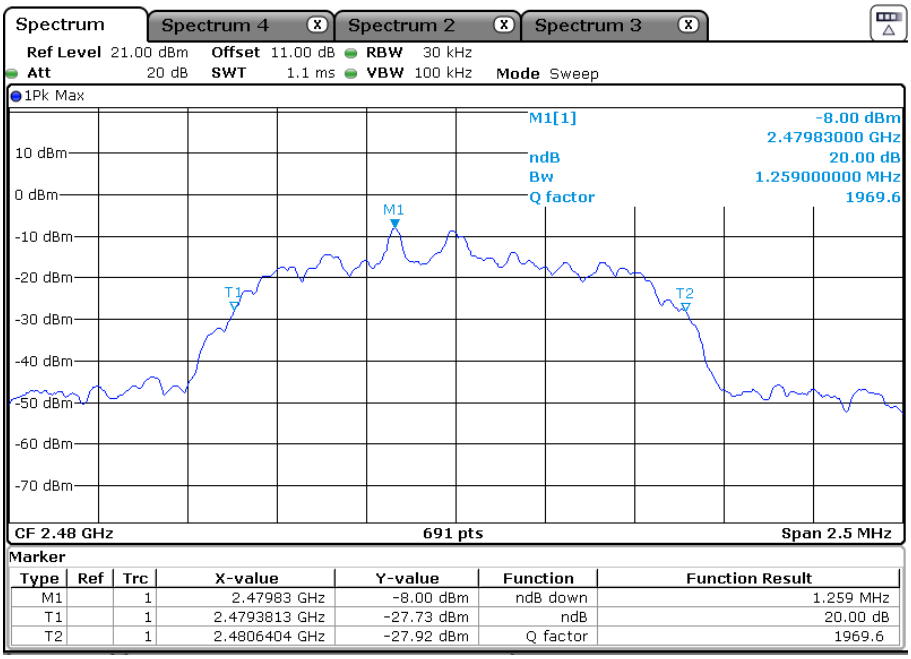


TEST REPORT

Middle channel(2.441 GHz):



Highest channel(2.480 GHz):



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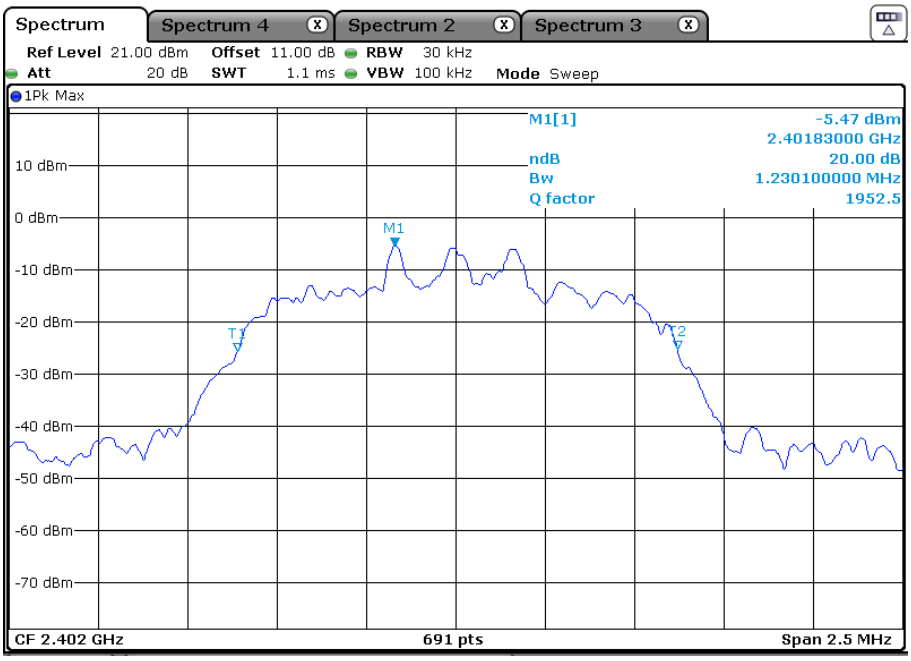
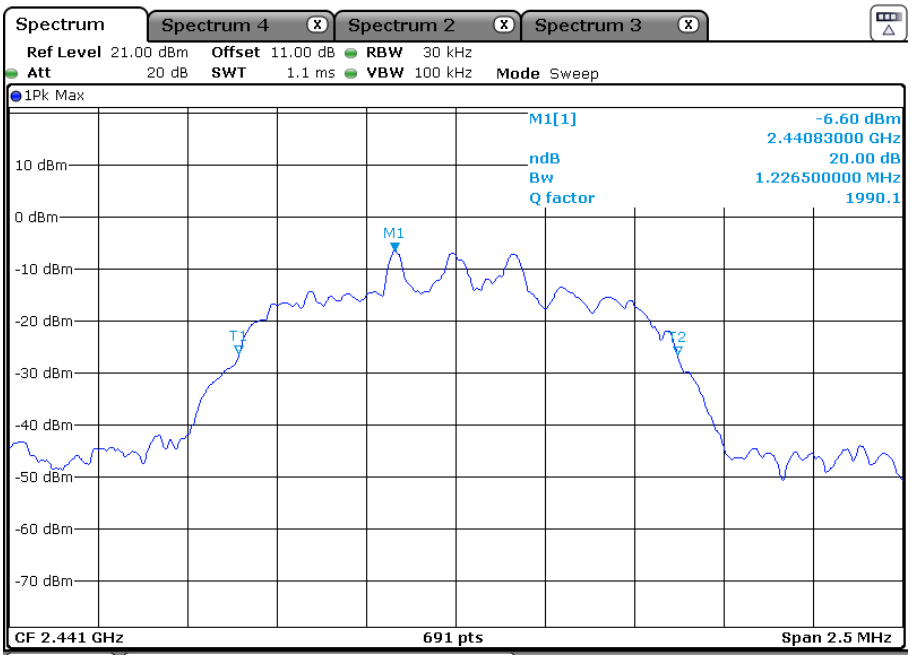
EDR mode (3DH1):

Lowest channel(2.402 GHz):

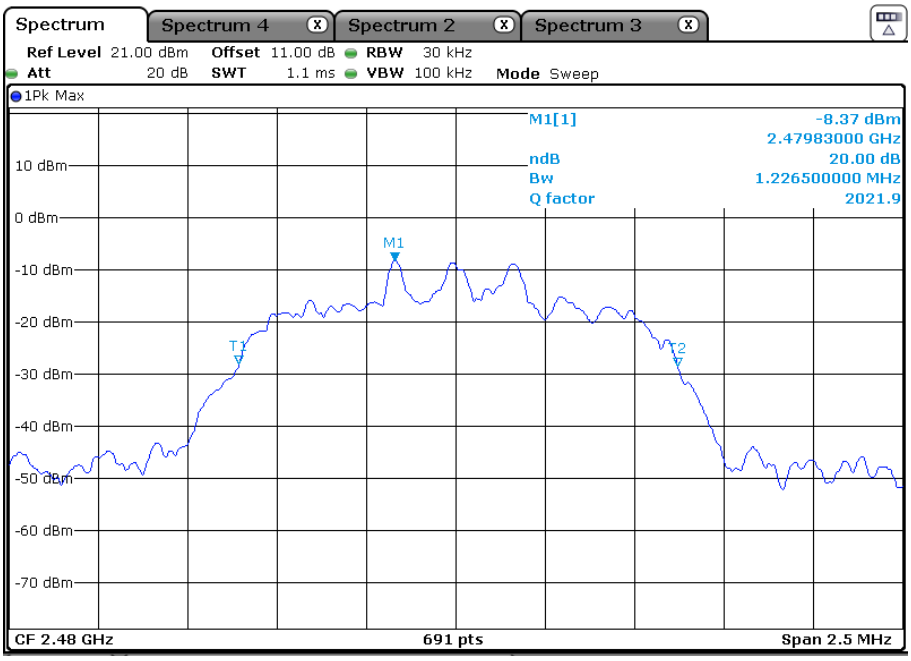


Middle channel(2.441 GHz):



TEST REPORT

Highest channel(2.480 GHz):



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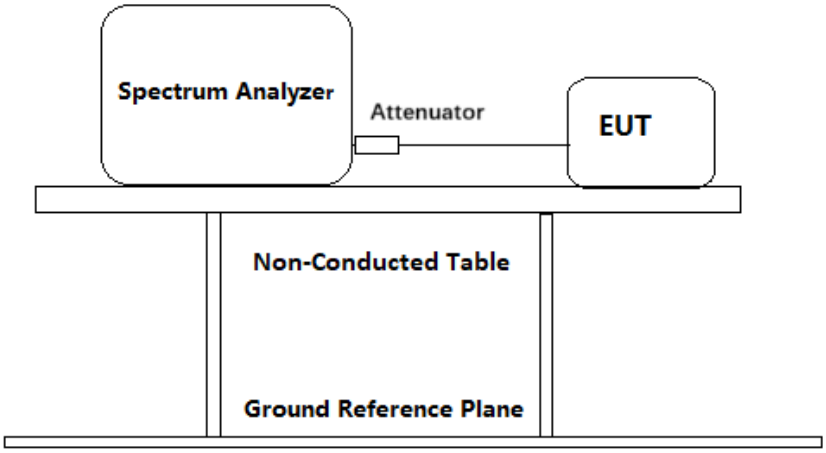
4.3 Carrier Frequencies Separated

Test Requirement:	FCC Part 15 C section 15.247 (a)(1) 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.
Test Method:	ANSI C63.10: Clause 7.8.2
Test Status:	Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel and hopping mode with different data packet. Compliance test in hopping with BDR mode (DH1) as the worst case was found.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Span: Wide enough to capture the peaks of two adjacent channels.
3. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
4. Video (or average) bandwidth (VBW) ≥ RBW
5. Sweep = auto; Detector Function = Peak. Trace = Max hold.
6. Allowed the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

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Used Test Equipment List

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Test result:

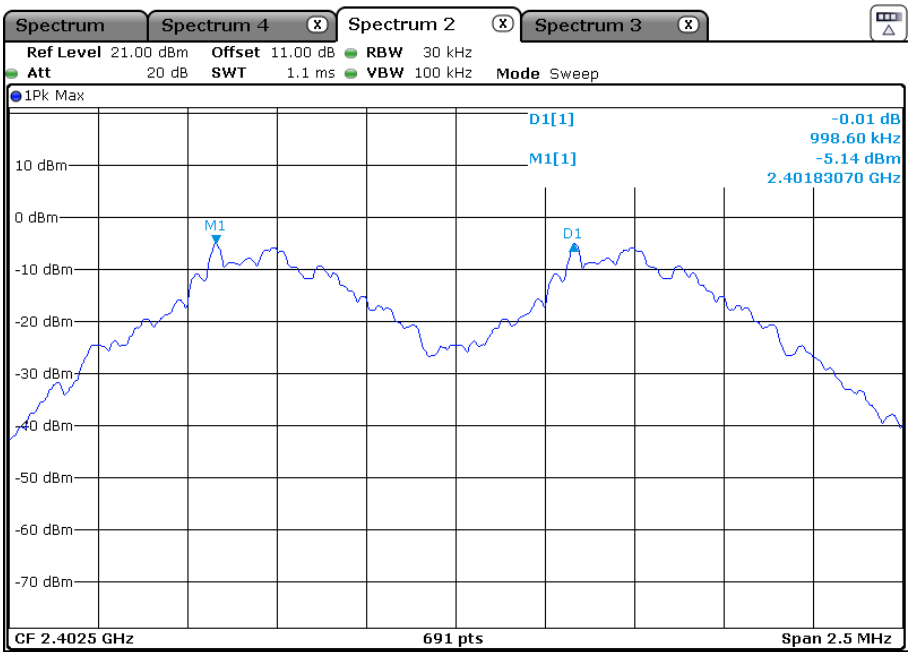
Test Channel	Carrier Frequencies Separated	Pass/Fail
Lower Channels (channel 0 and channel 1)	0.999MHz	Pass
Middle Channels (channel 39 and channel 40)	1.002MHz	Pass
Upper Channels (channel 77 and channel 78)	0.995MHz	Pass

Remark:

The limit is the maximum two-thirds of the 20 dB bandwidth: 839 KHz.

Result plot as follows:

Lowest Channels: Carrier Frequencies Separated:



Middle Channels: Carrier Frequencies Separated:

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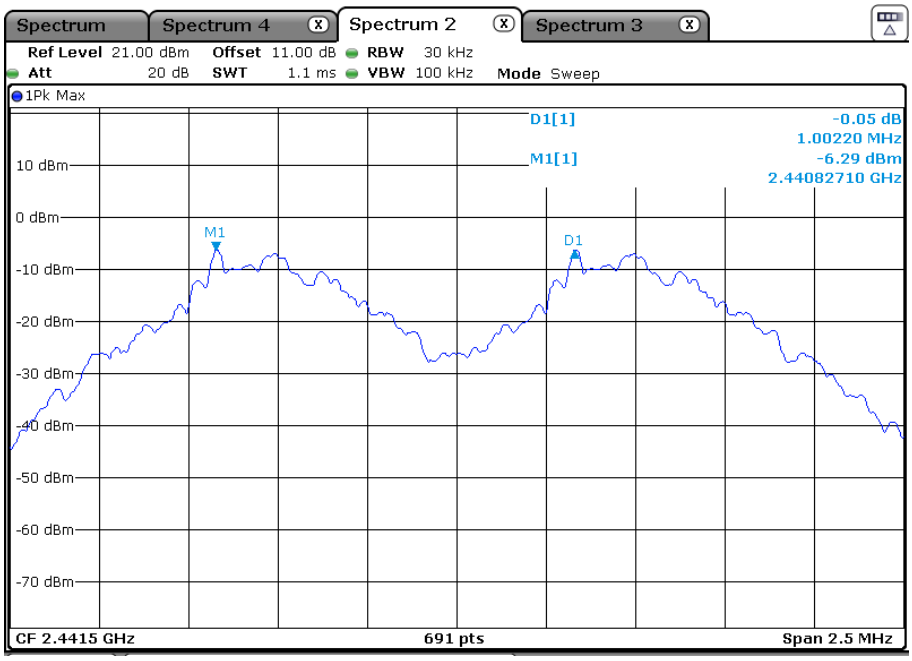
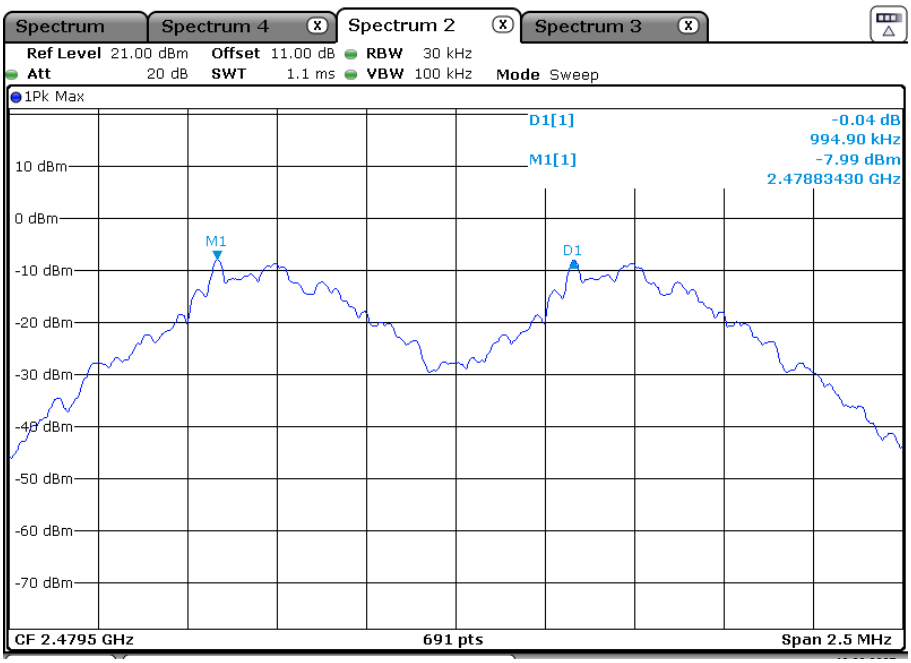


Highest Channels: Carrier Frequencies Separated:



Test result: The unit does meet the FCC requirements.

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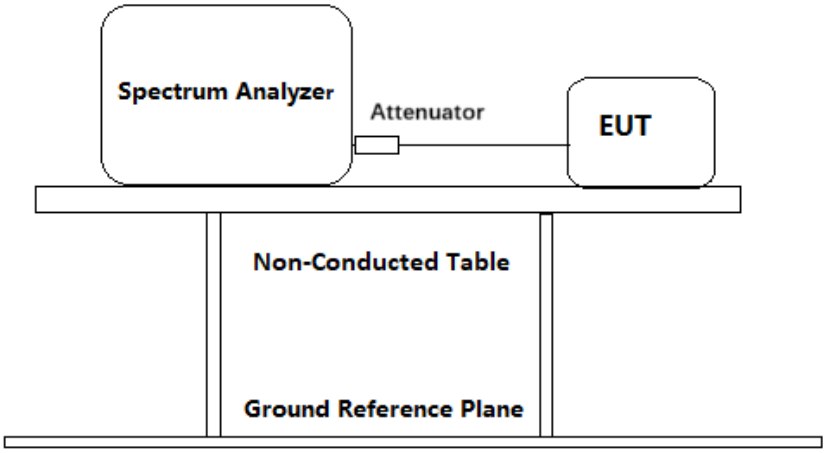
4.4 Hopping Channel Number

Test Requirement:	FCC Part15 C section 15.247 (a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Test Method:	ANSI C63.10: Clause 7.8.3
Test Status:	Pre-test the EUT in hopping mode with different data packet. Compliance test in normal mode (DH1) and EDR mode (2DH1) and EDR mode (3DH1) as the worst case was found.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
3. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. VBW ≥ RBW.
4. Sweep = auto; Detector Function = Peak. Trace = Max hold.
5. Allowed the trace to stabilize.

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.

Used Test Equipment List

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Test result: Total channels are 79 channels.

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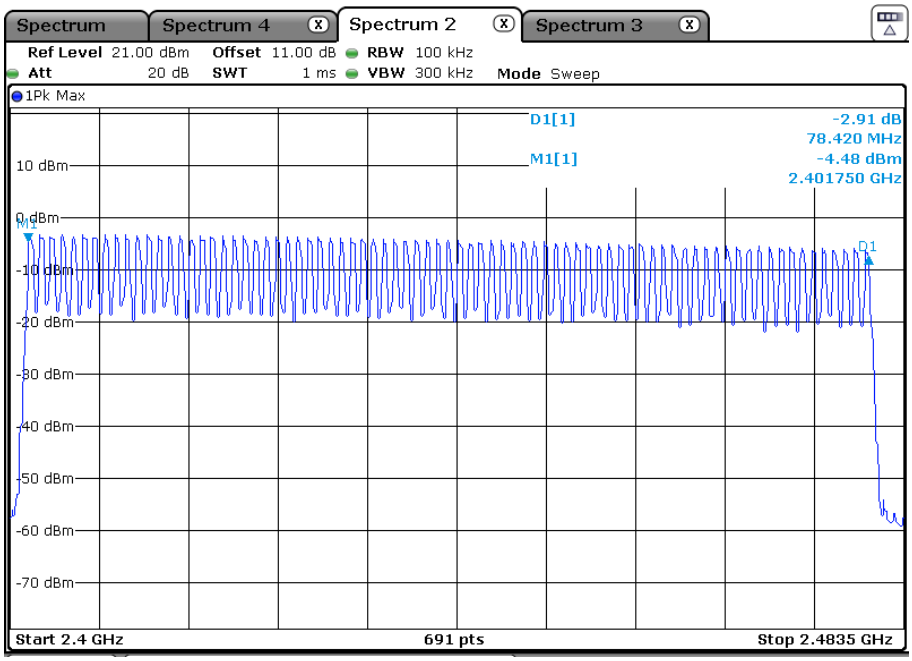
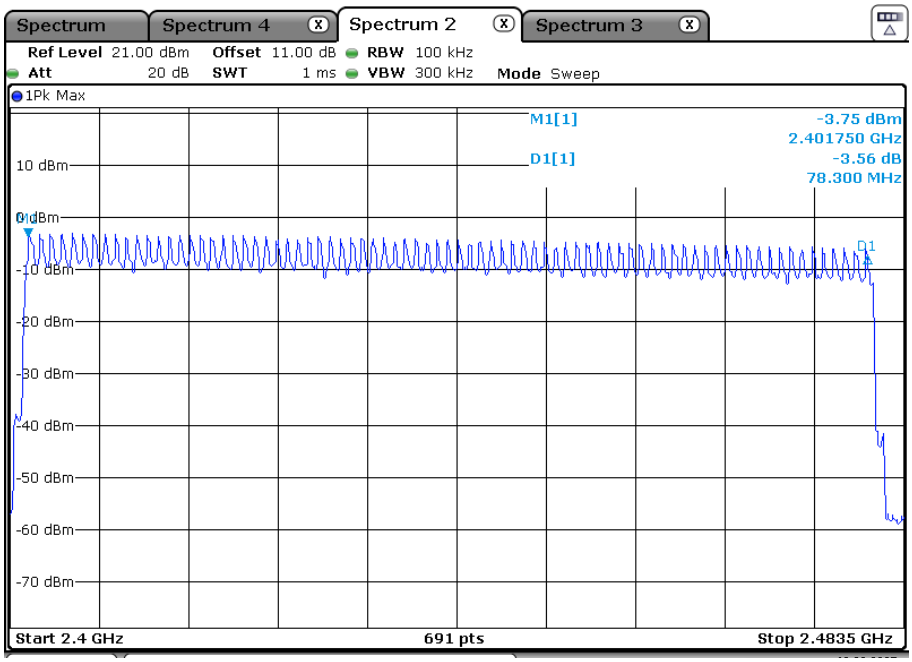
DH1



2DH1



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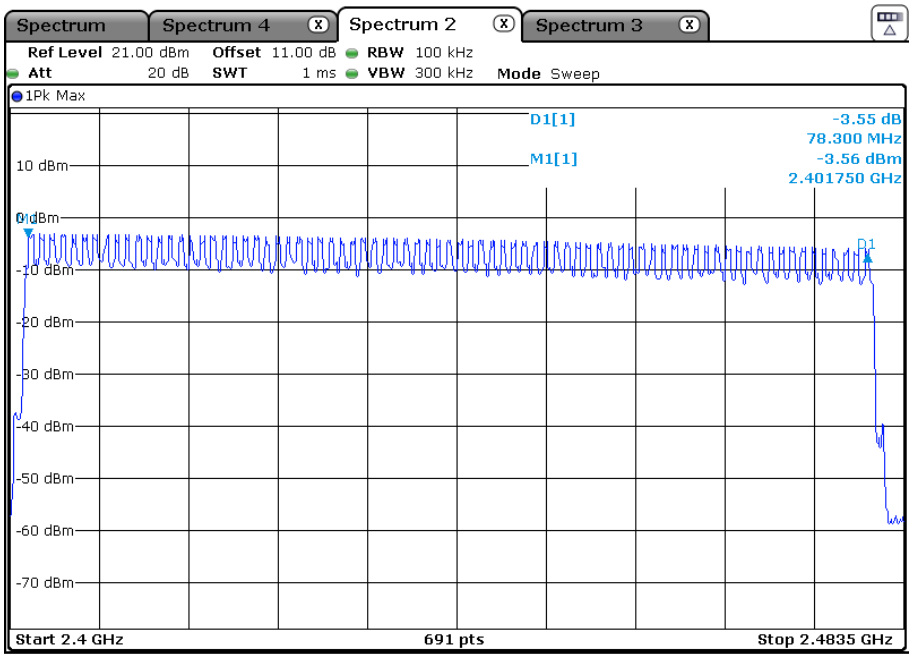
3DH1



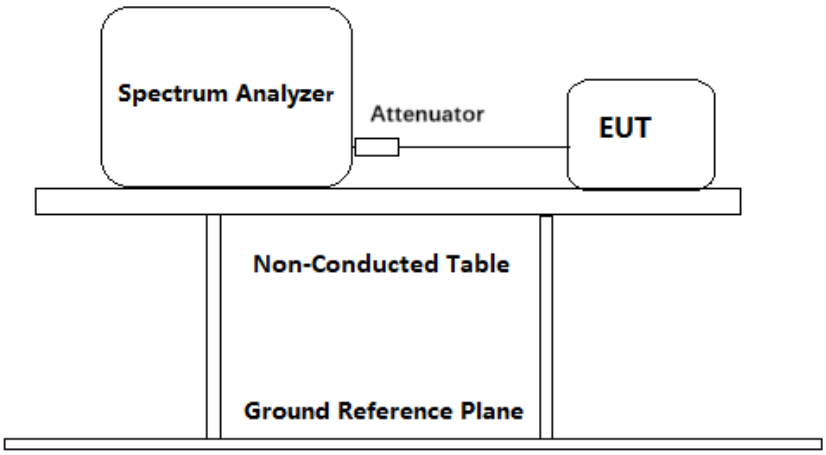
Test result: The unit does meet the FCC requirements.

TEST REPORT

4.5 Dwell Time

Test Requirement:	FCC Part 15 C section 15.247 (a)(1)(iii) 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10: Clause 7.8.4
Test Status:	Test the EUT in hopping mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet. Compliance test in hopping mode with BDR mode (DH1, DH3 and DH5) EDR mode (2DH1, 2DH3 and 2DH5,3DH1, 3DH3 and 3DH5) as the worst case were found.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0, centered on a hopping channel.
3. RBW shall be ⩽ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.
4. Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this.
5. Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.
6. Detector Function = Peak.
7. Trace = Clear-write, single sweep
8. Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

TEST REPORT

The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops.

The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

Used Test Equipment List
Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Test Result:

The test period: T= 0.4 s x 79 Channel = 31.6 s

Channel 39: 2.441 GHz										
DH1 time slot	=	0.407	(ms)	*	32	*	(31.6/3.16)	=	130.24	ms
DH3 time slot	=	1.667	(ms)	*	15	*	(31.6/3.16)	=	250.05	ms
DH5 time slot	=	2.912	(ms)	*	11	*	(31.6/3.16)	=	320.32	ms
2DH1 time slot	=	0.413	(ms)	*	32	*	(31.6/3.16)	=	132.16	ms
2DH3 time slot	=	1.667	(ms)	*	16	*	(31.6/3.16)	=	266.72	ms
2DH5 time slot	=	2.923	(ms)	*	11	*	(31.6/3.16)	=	321.53	ms
3DH1 time slot	=	0.413	(ms)	*	32	*	(31.6/3.16)	=	132.16	ms
3DH3 time slot	=	1.667	(ms)	*	16	*	(31.6/3.16)	=	266.72	ms
3DH5 time slot	=	2.929	(ms)	*	11	*	(31.6/3.16)	=	322.19	ms

The average time of occupancy in the specified 31.6 second period is equal to pulse width x (number of pulse in observation period) x (test period / observation period).

The results are not greater than 0.4 seconds.

The unit does meet the FCC requirements.

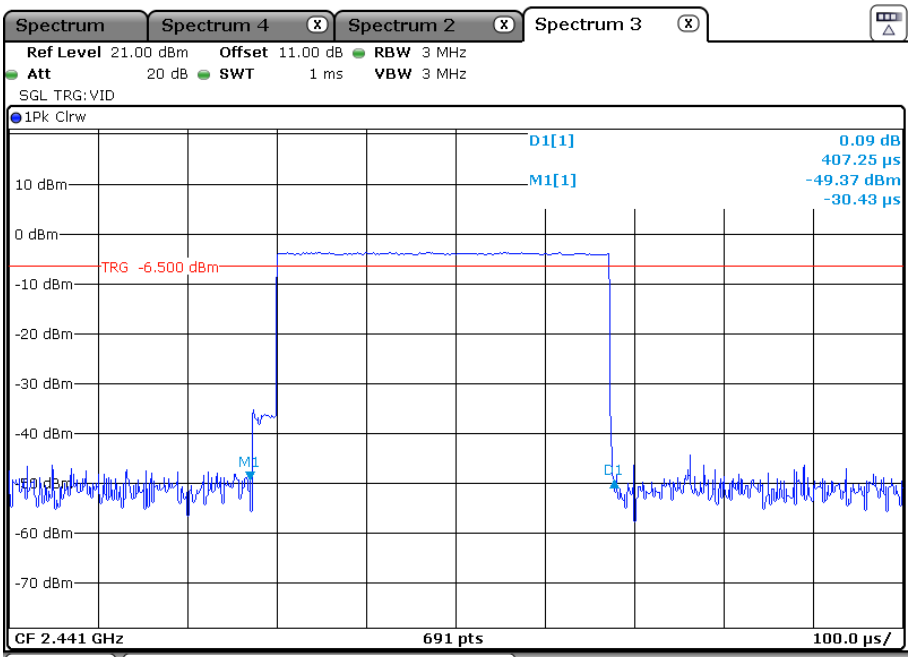
Result plot as follows:

The Middle channel: 2441MHz

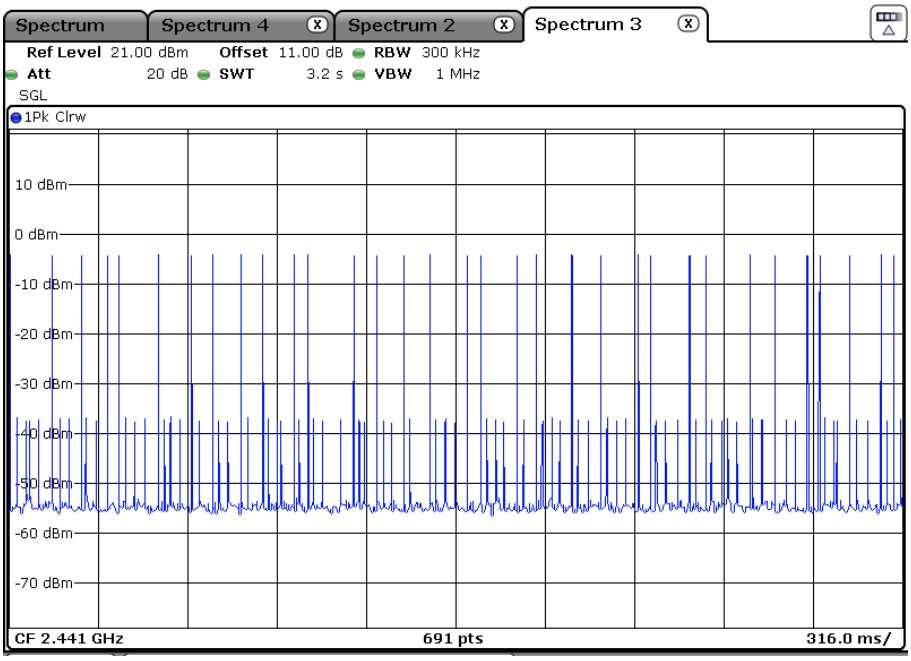
TEST REPORT

DH1

Pulse Width:



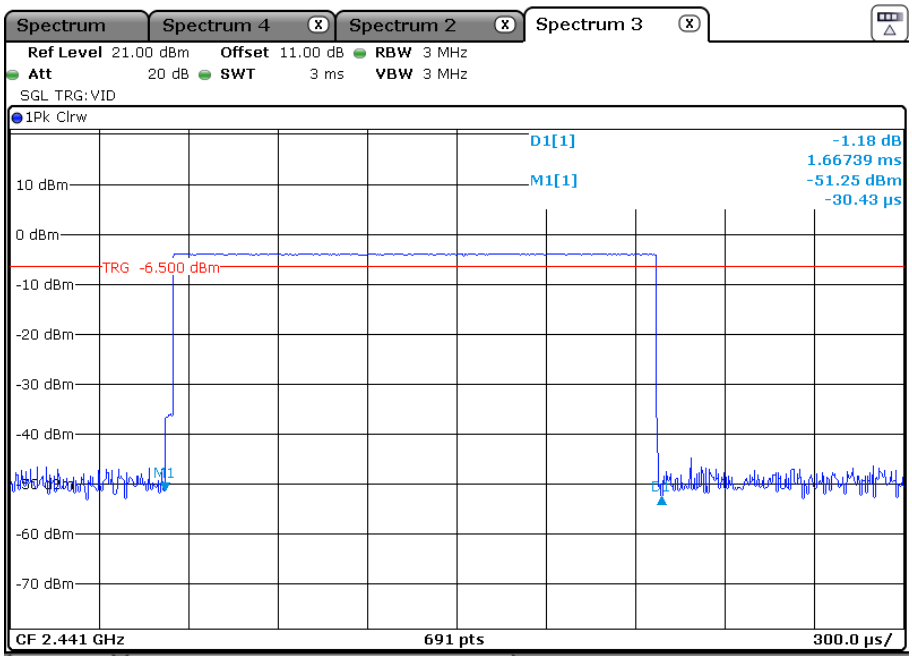
Number of Pulses in 3.16 S observation period:



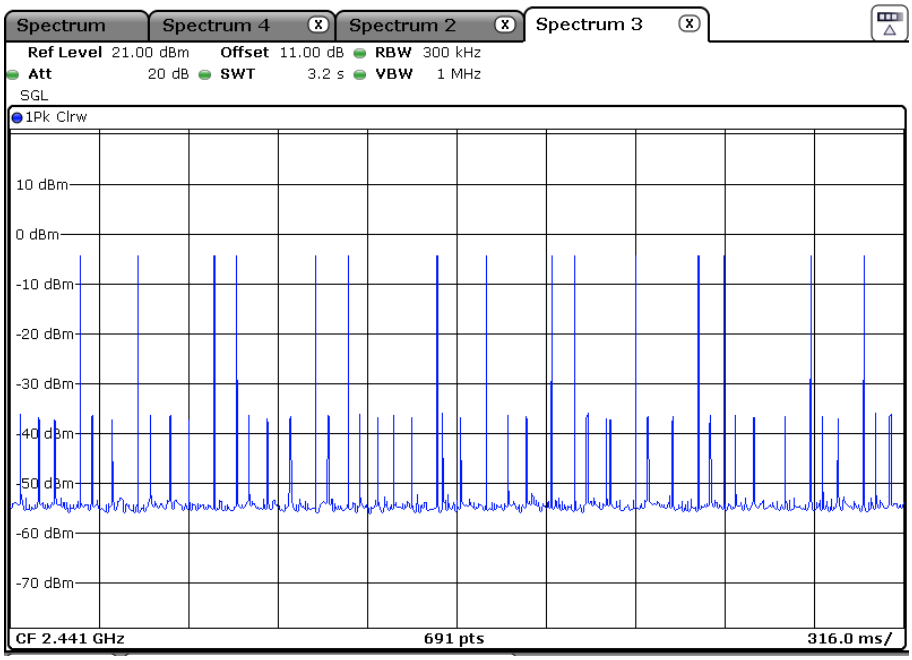
TEST REPORT

DH3

Pulse Width:



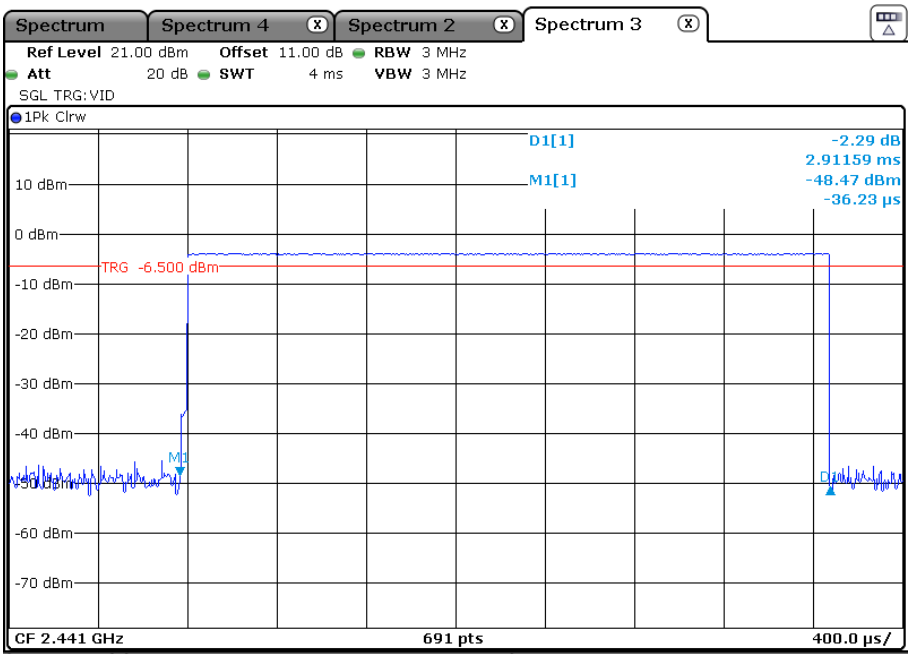
Number of Pulses in 3.16 S observation period:



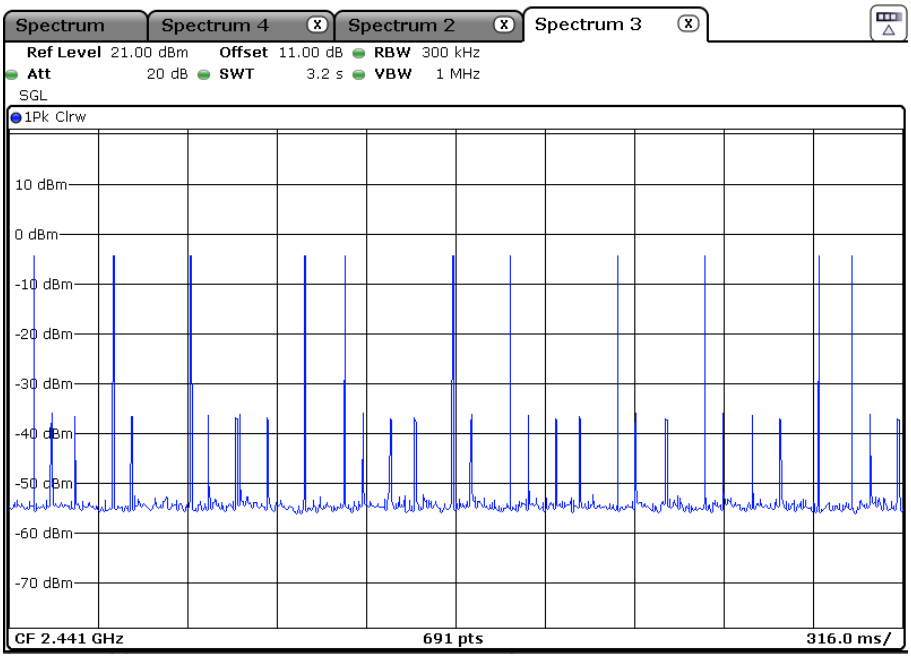
TEST REPORT

DH5

Pulse Width:



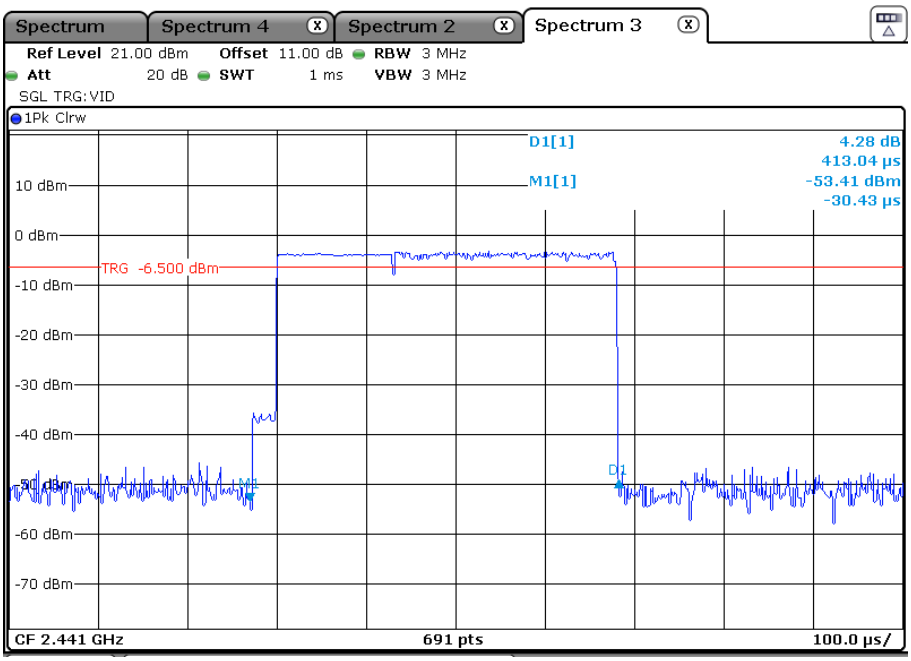
Number of Pulses in 3.16 S observation period:



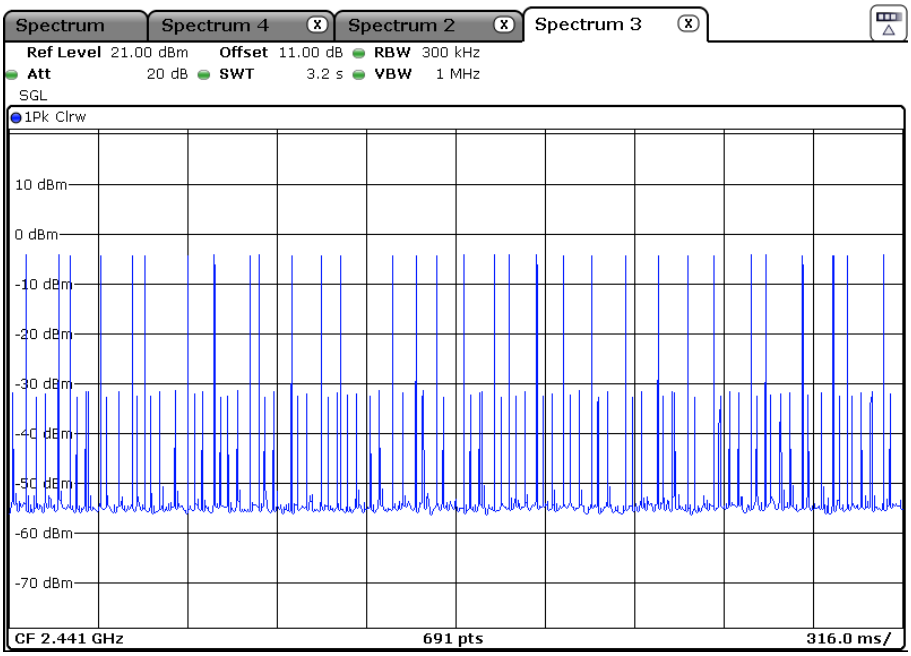
TEST REPORT

2DH1

Pulse Width:



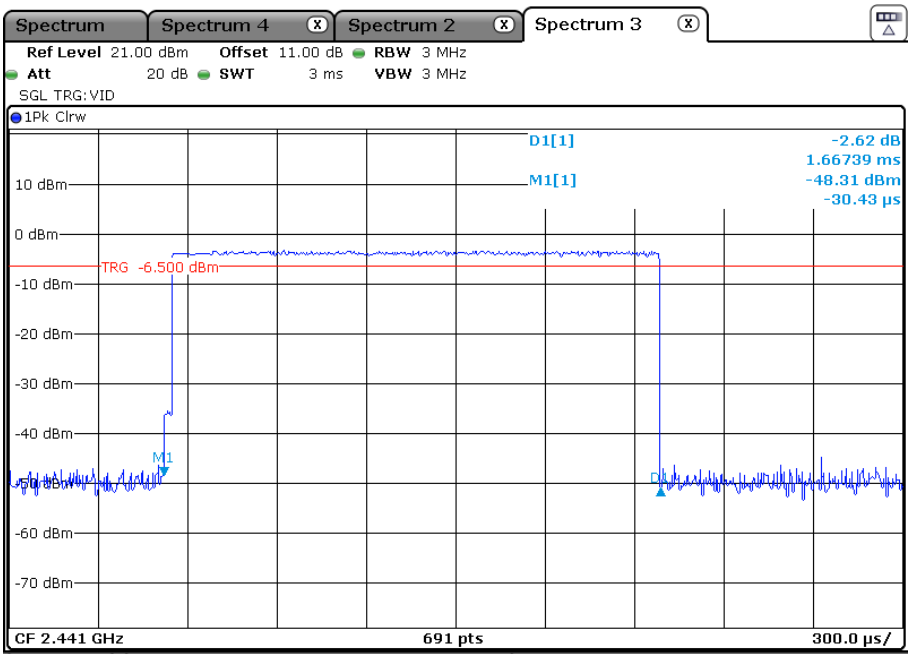
Number of Pulses in 3.16 S observation period:



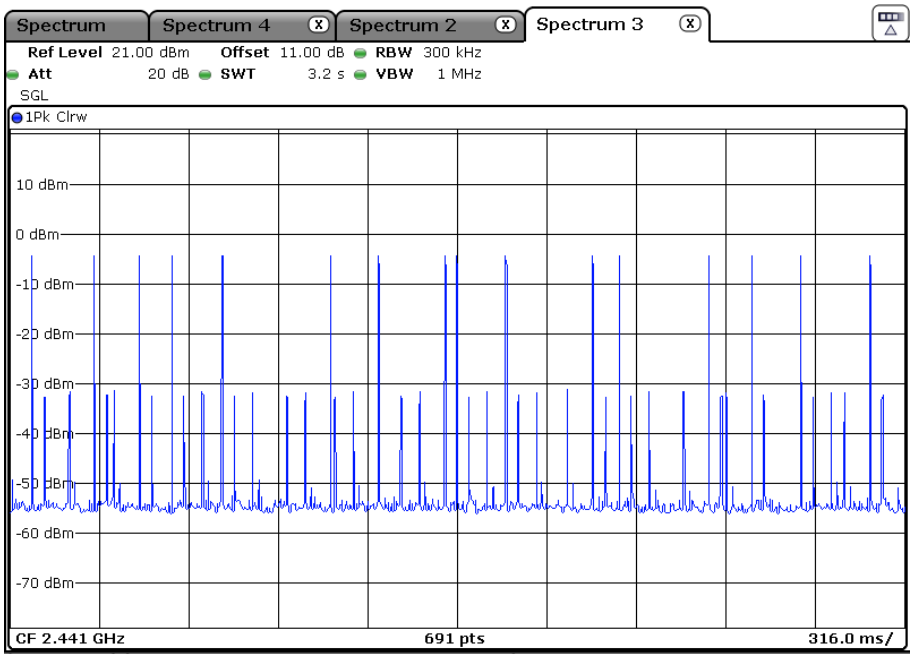
TEST REPORT

2DH3

Pulse Width:



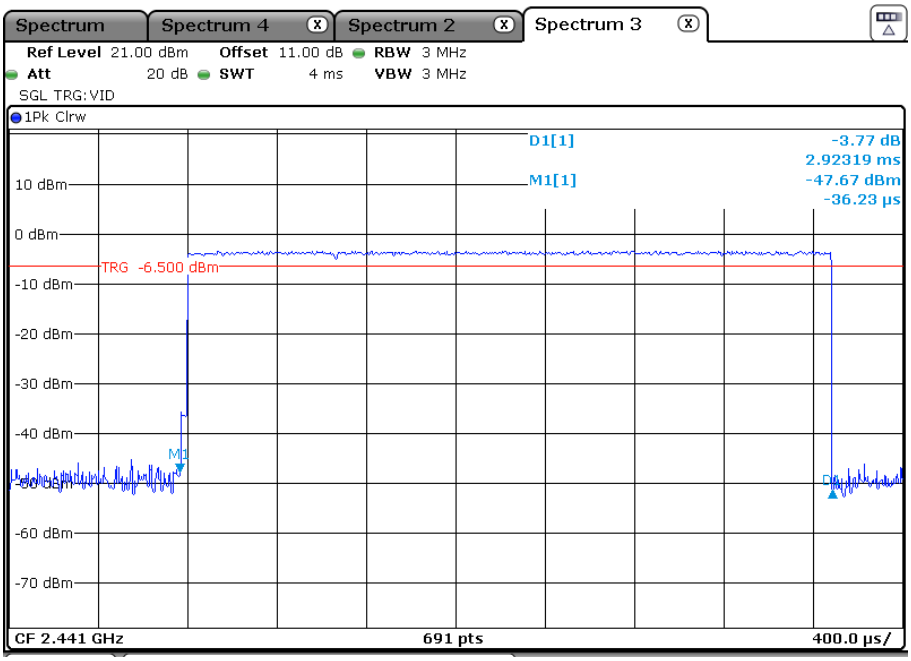
Number of Pulses in 3.16 S observation period:



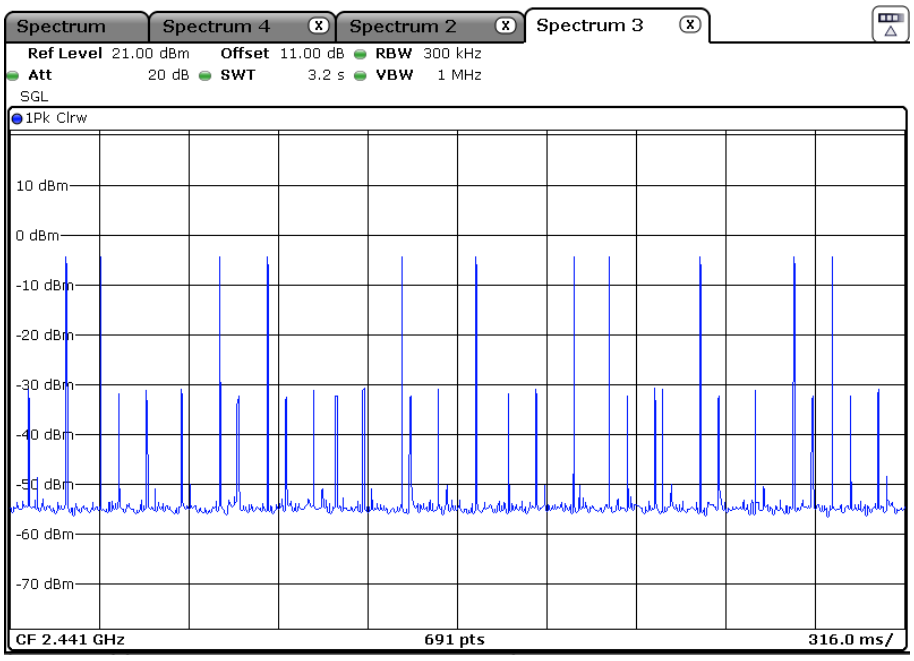
TEST REPORT

2DH5

Pulse Width:



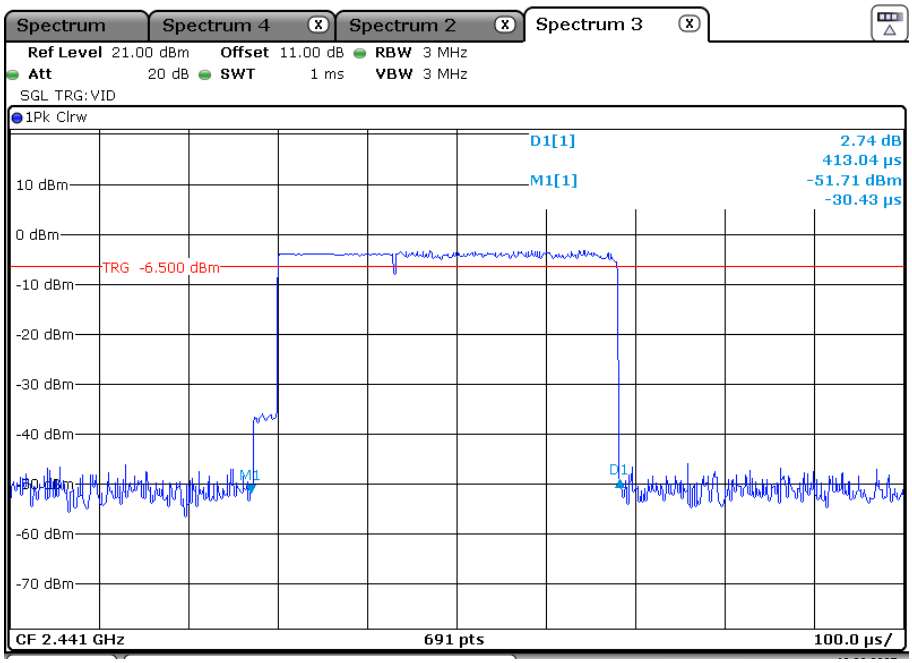
Number of Pulses in 3.16 S observation period:



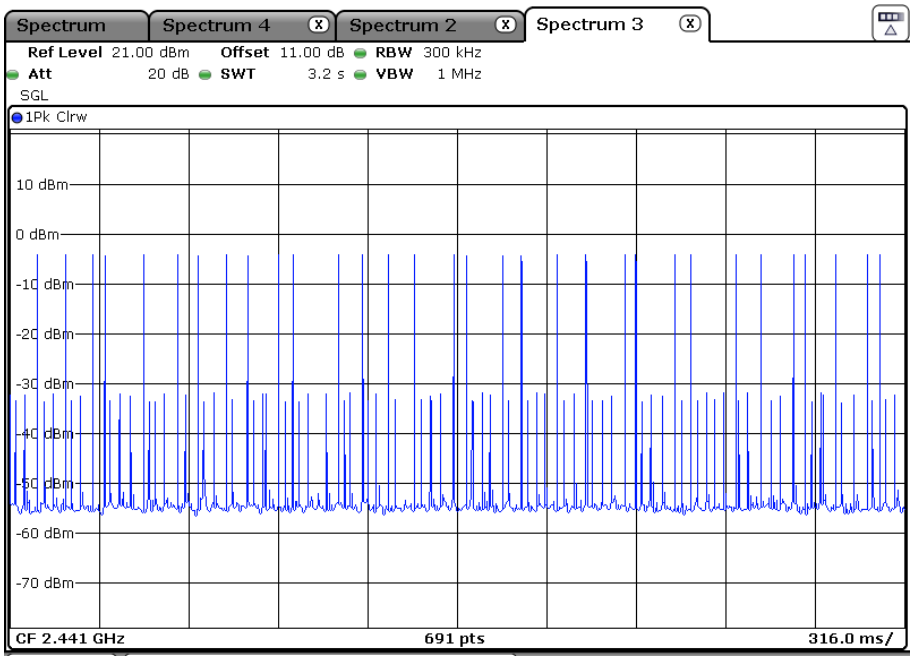
TEST REPORT

3DH1

Pulse Width:



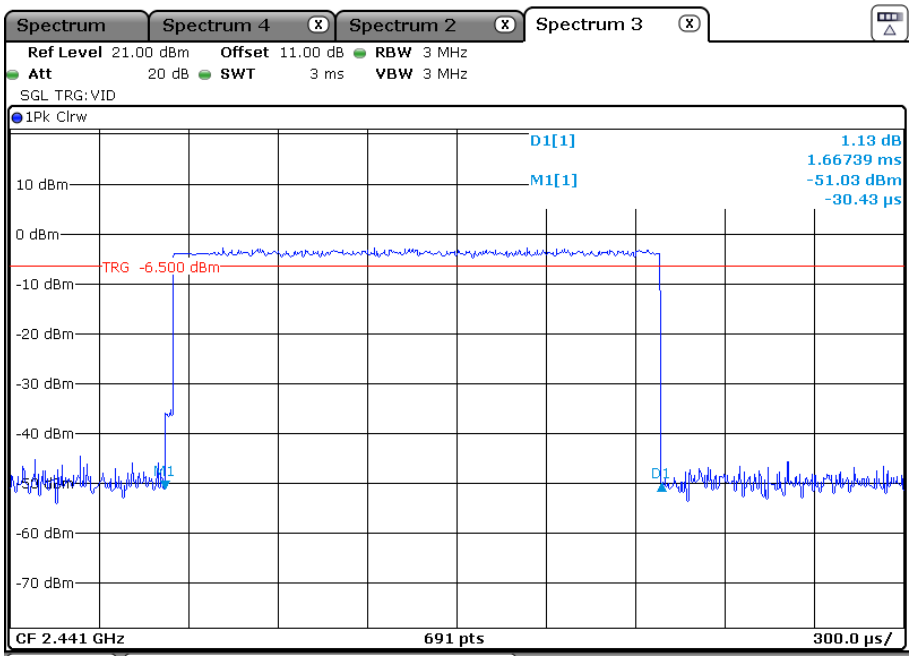
Number of Pulses in 3.16 S observation period:



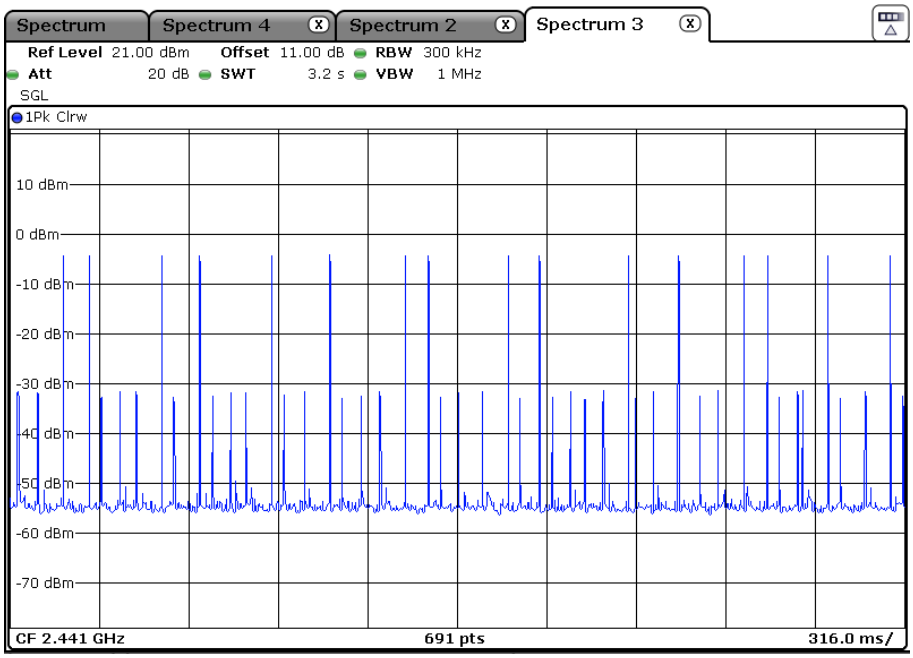
TEST REPORT

3DH3

Pulse Width:



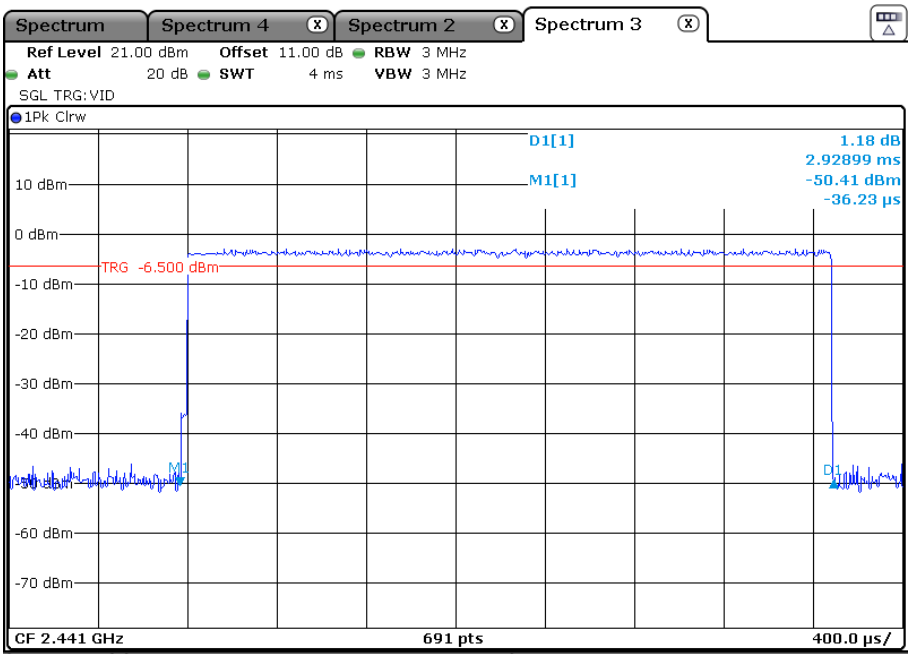
Number of Pulses in 3.16 S observation period:



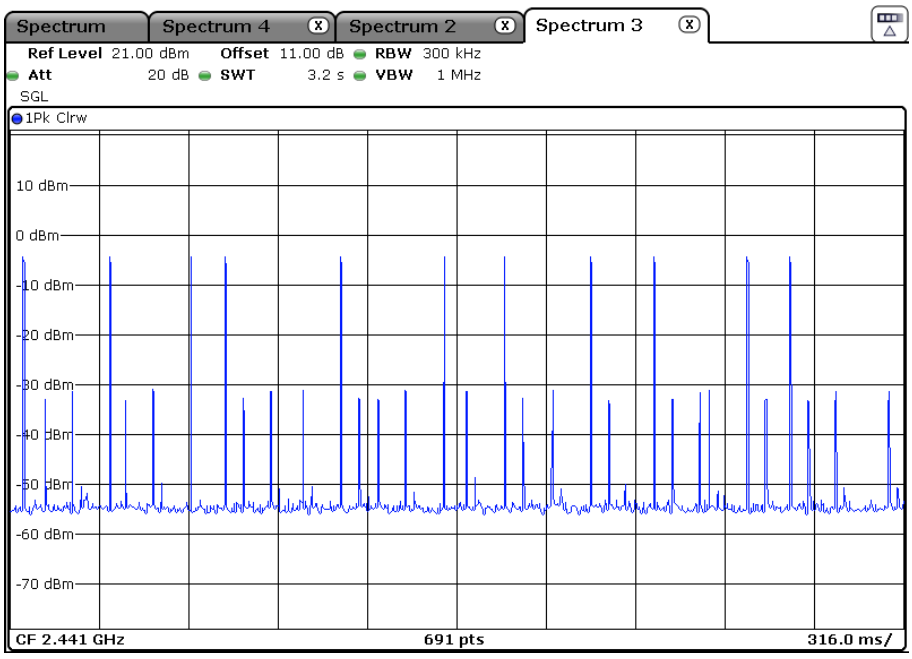
TEST REPORT

3DH5

Pulse Width:



Number of Pulses in 3.16 S observation period:



TEST REPORT

4.6 Pseudo random Frequency Hopping Sequence

4.6.1 Standard requirement

15.247(a)(1) requirement:
The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudo random ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

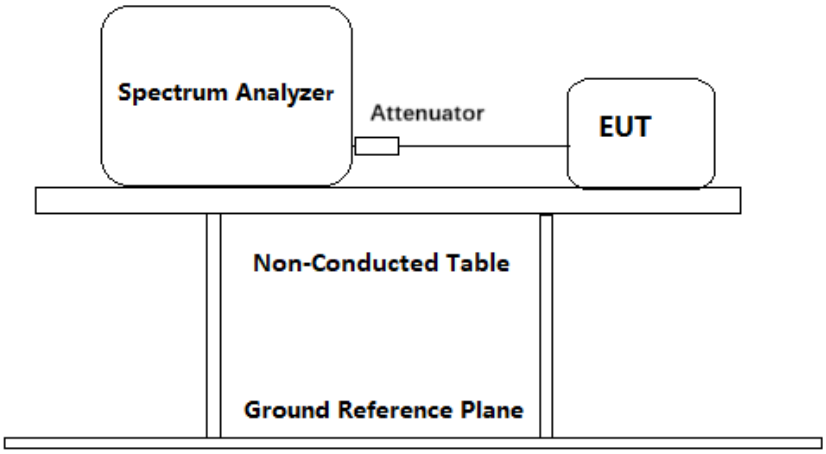
4.6.2 EUT Pseudo random Frequency Hopping Sequence

Bluetooth protocol is utilized by the EUT. It is shown that each frequency used equally on the average by the transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

4.7 Maximum Peak Conducted Output Power

Test Requirement:	FCC Part 15 C section 15.247 (b)(1)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. Refer to the result “Hopping channel number” of this report. The 1 watt (30.0 dBm) limit applies.
Test Method:	ANSI C63.10: Clause 7.8.5
Test Status:	Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet. transmitting mode with normal (DH1) and EDR mode (2DH1), EDR mode (3DH1) as the worst case was found.
Test Configuration:	

TEST REPORT



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
3. Set the spectrum analyzer: RBW = 3 MHz（RBW > 20 dB bandwidth of the emission being measured）, VBW = 3 MHz. Sweep = auto; Detector Function = Peak. Trace: Max hold.
4. Kept the EUT in transmitting at lowest, medium and highest channel with different data packet individually. Record the max value.

Used Test Equipment List:
Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

Test result:

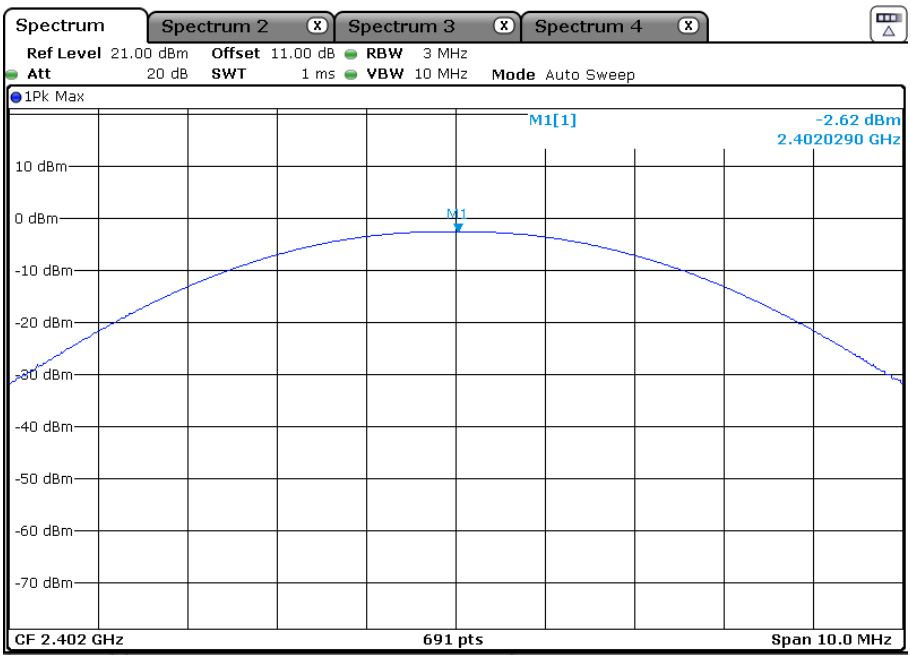
Normal mode (DH1):				
Test Channel	Fundamental Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Lowest	2402	-2.62	21	Pass
Middle	2441	-3.45	21	Pass
Highest	2480	-5.51	21	Pass
EDR mode(2DH1):				
Test Channel	Fundamental Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Lowest	2402	-2.16	21	Pass
Middle	2441	-3.30	21	Pass
Highest	2480	-5.11	21	Pass
EDR mode(3DH1):				
Test Channel	Fundamental Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Lowest	2402	-2.04	21	Pass
Middle	2441	-3.20	21	Pass
Highest	2480	-4.97	21	Pass

TEST REPORT

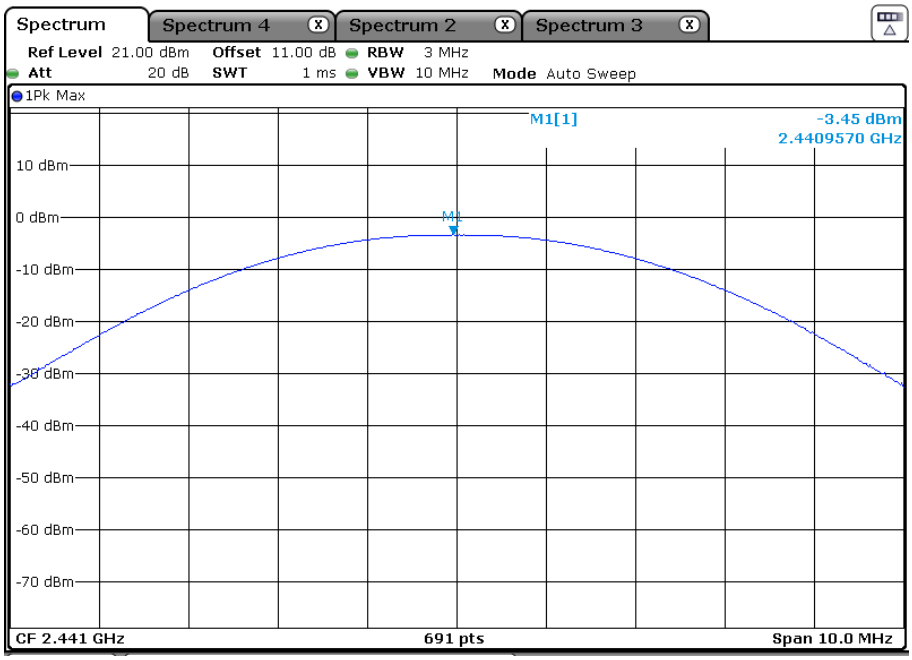
Result plot as follows:

Normal mode(DH1):

The Lowest Channel(2.402 MHz):



Middle Channel(2.441 GHz):



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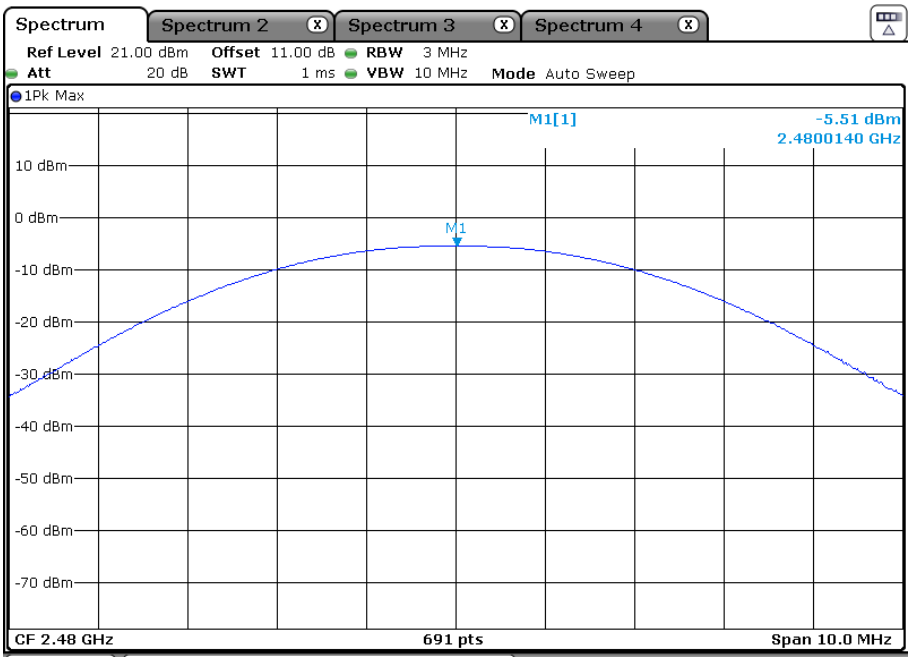
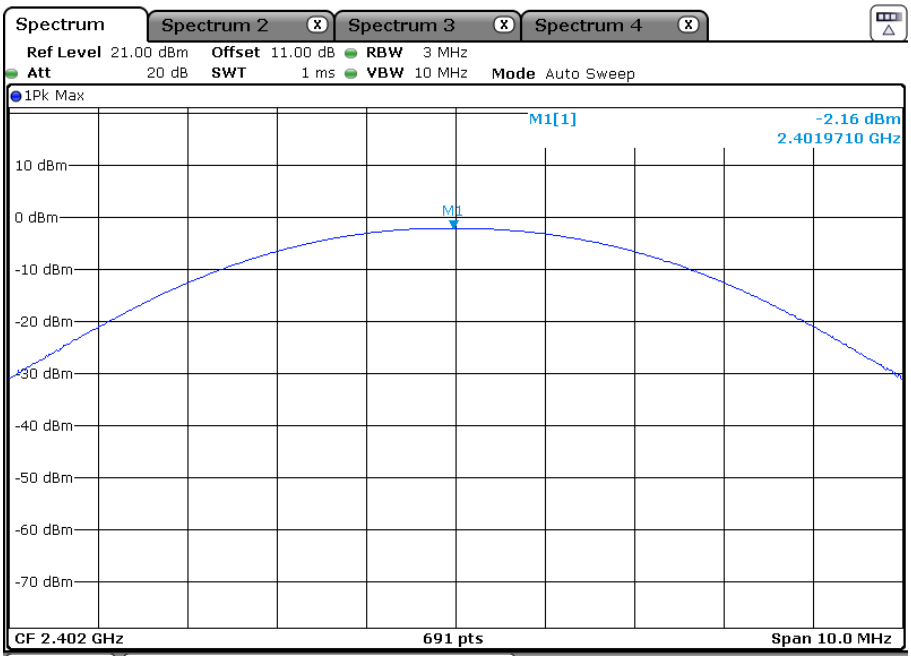
The Highest Channel(2.480 GHz):



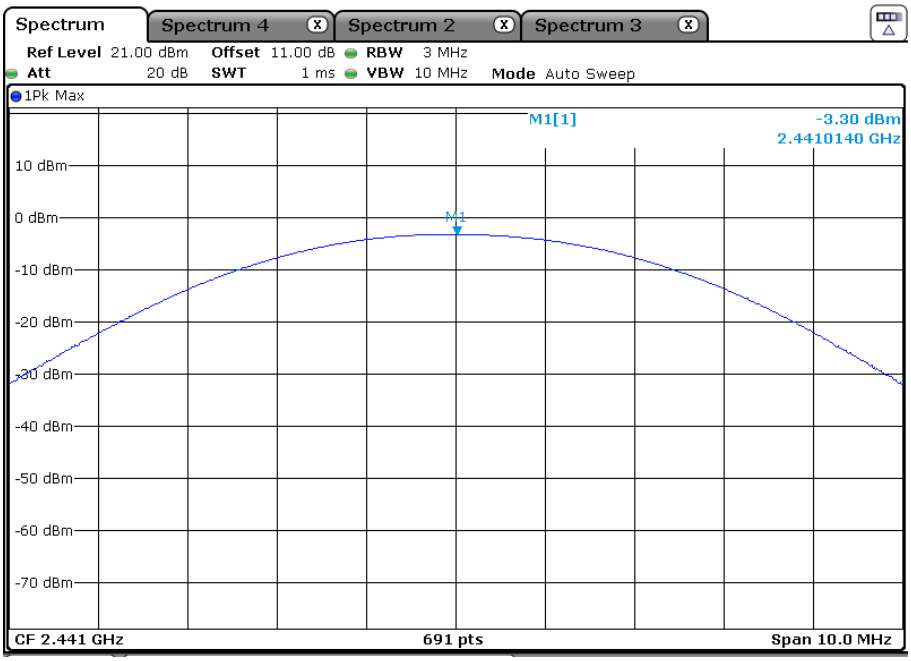
EDR mode (2DH1):

The Lowest channel(2.402 GHz):

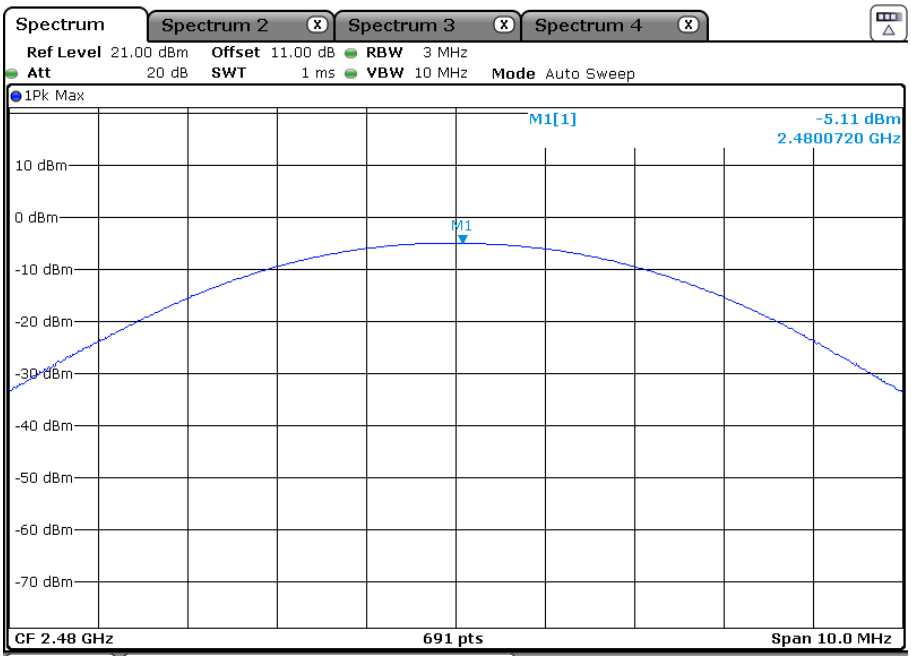


TEST REPORT

Middle channel(2.441 GHz):



The Highest channel(2.480 GHz):



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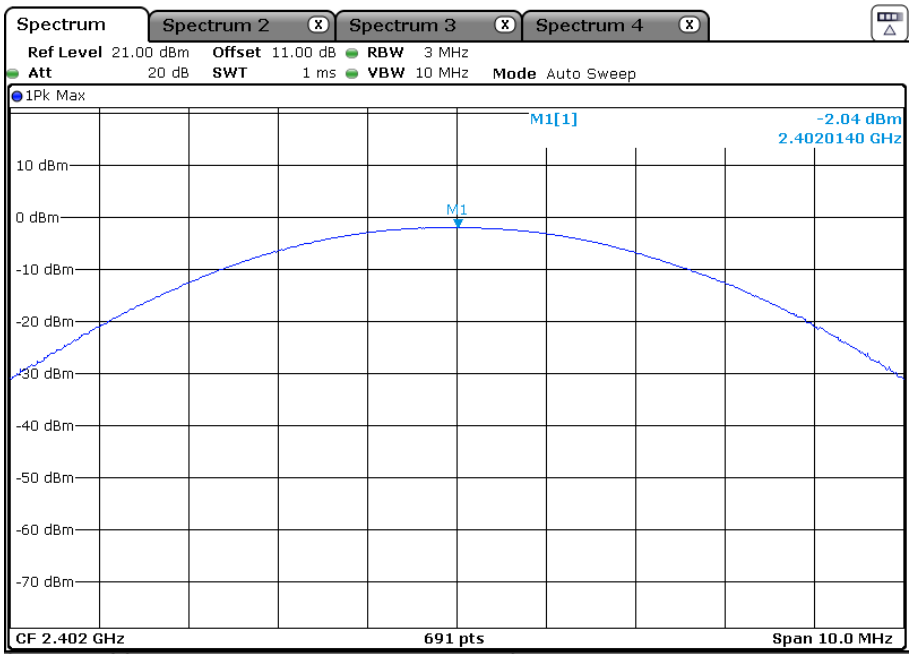
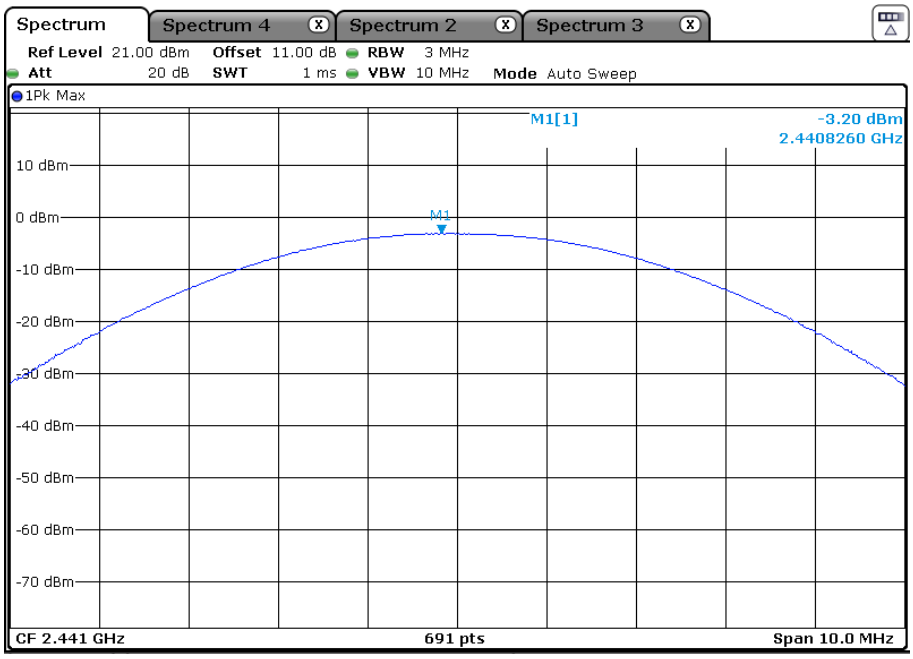
EDR mode (3DH1):

The Lowest channel(2.402 GHz):

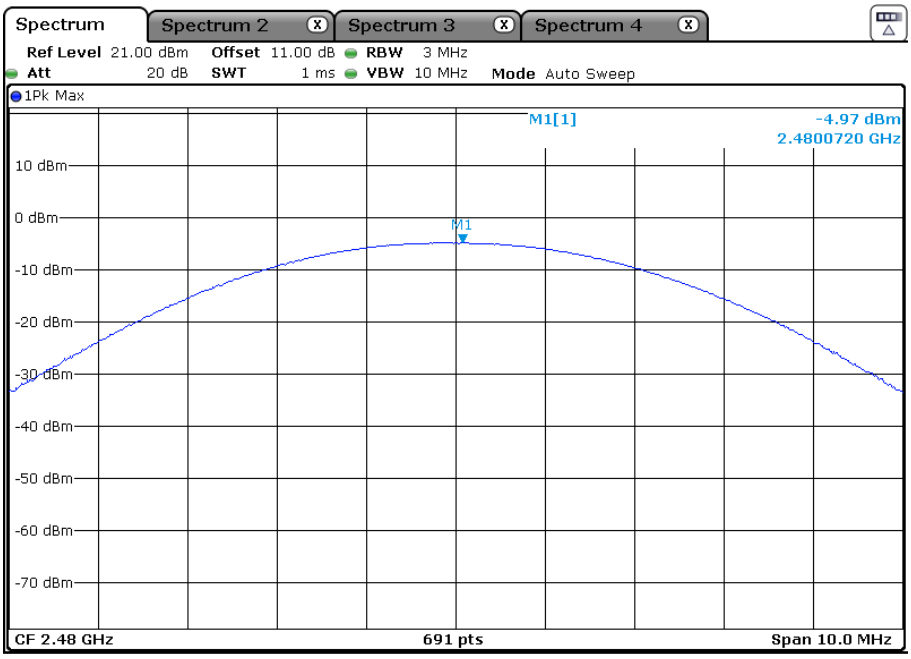


Middle channel(2.441 GHz):



TEST REPORT

The Highest channel(2.480 GHz):



TEST REPORT

4.8 Out of Band Conducted Emissions

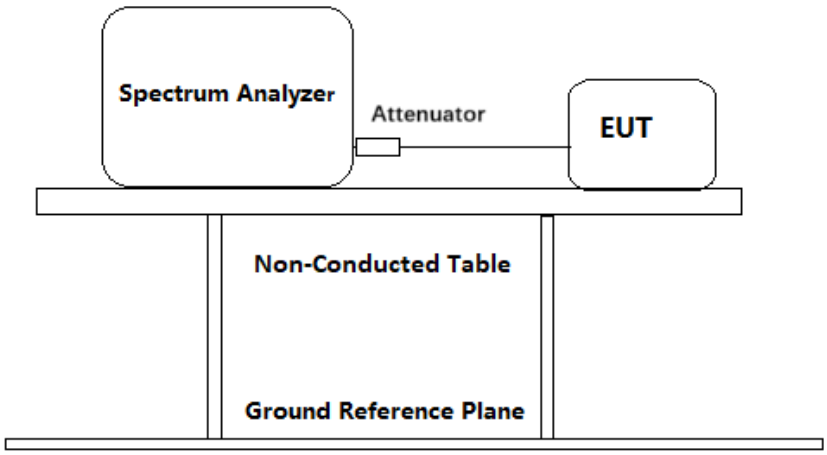
Test Requirement: FCC Part 15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, 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.

Test Method: ANSI C63.10: Clause 7.8.7 & 6.10

Test Status: Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet. transmitting mode with normal (DH1) and EDR mode (2DH1), EDR mode (3DH1) as the worst case was found.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW=100 kHz, VBW = 300 kHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Scan up through 10th harmonic.
3. Measured the Conducted unwanted Emissions of the test frequency with special test status.
4. Repeated until all the test status was investigated.

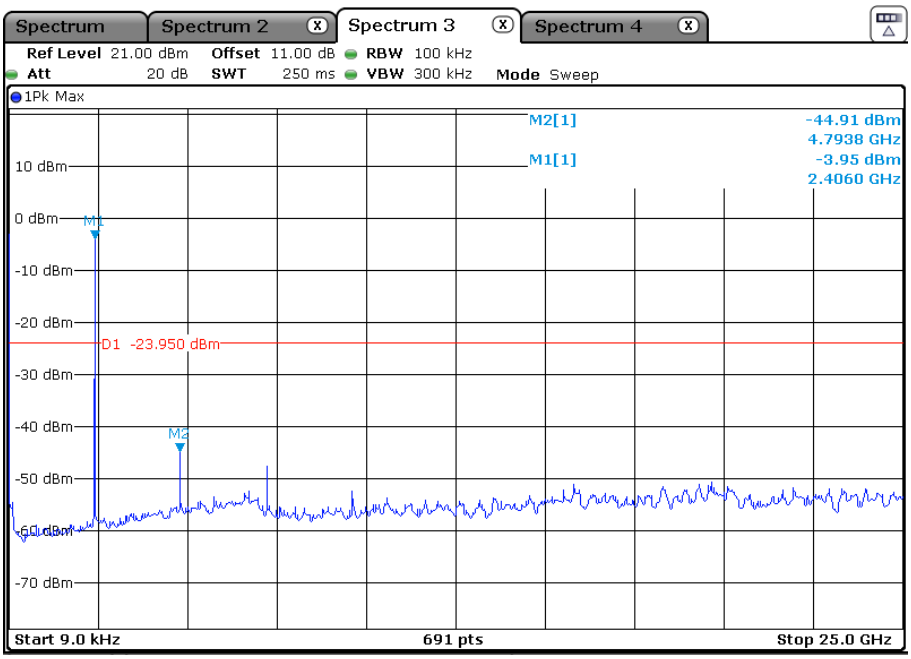
Used Test Equipment List:
Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details

TEST REPORT

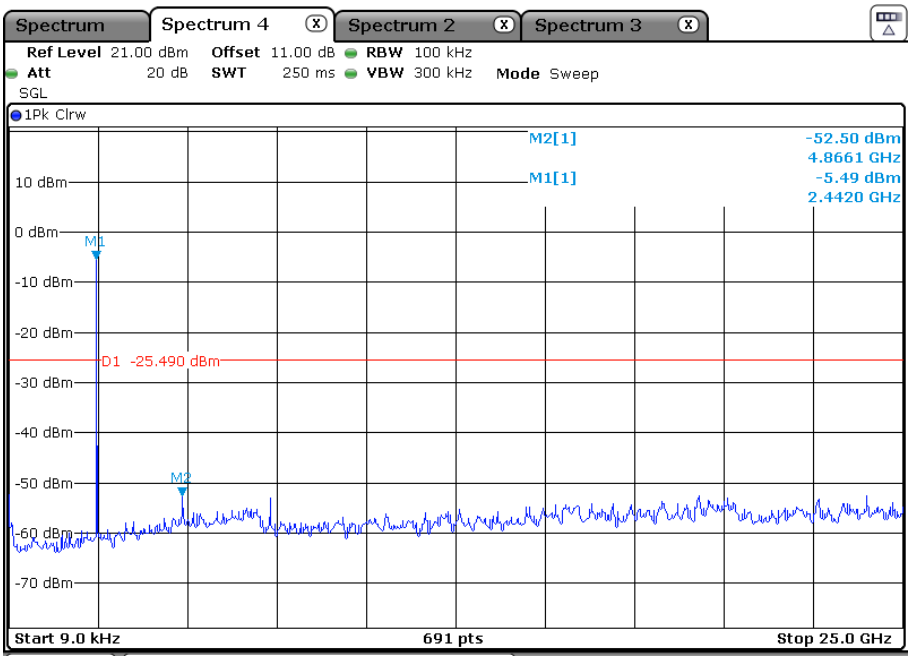
Result plot as follows:

DH1:

The Lowest Channel 2402MHz: 9kHz to 25 GHz

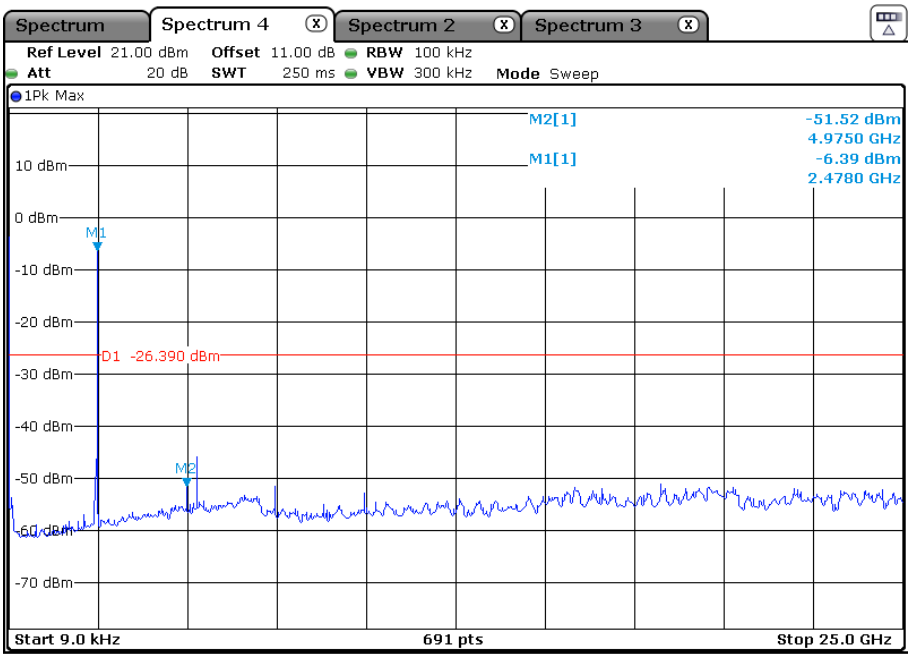


Middle Channel 2441MHz: 9kHz to 25 GHz



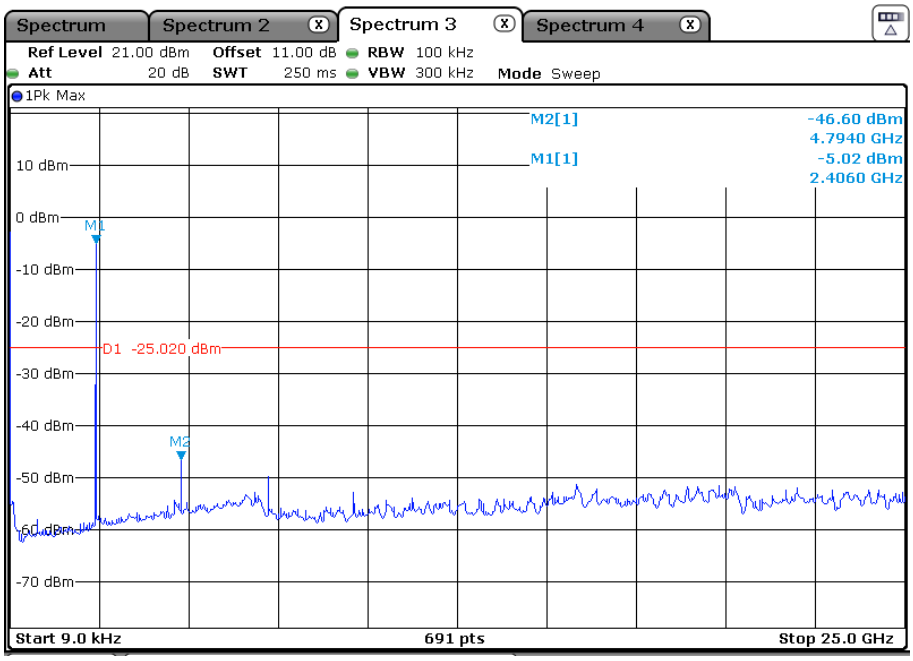
TEST REPORT

The Highest Channel 2480MHz: 9kHz to 25 GHz



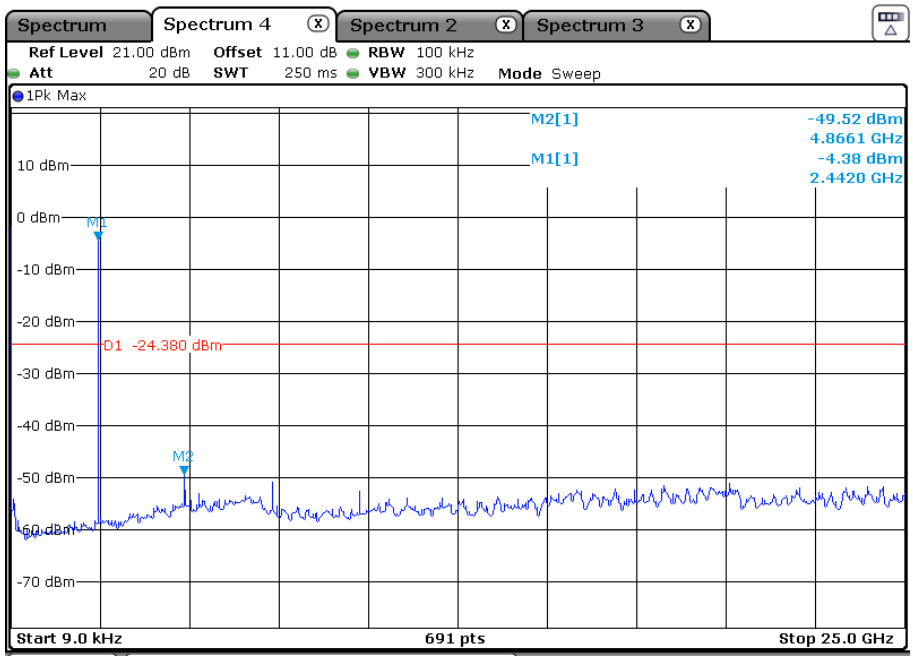
2DH1:

The Lowest Channel 2402MHz: 9kHz to 25 GHz

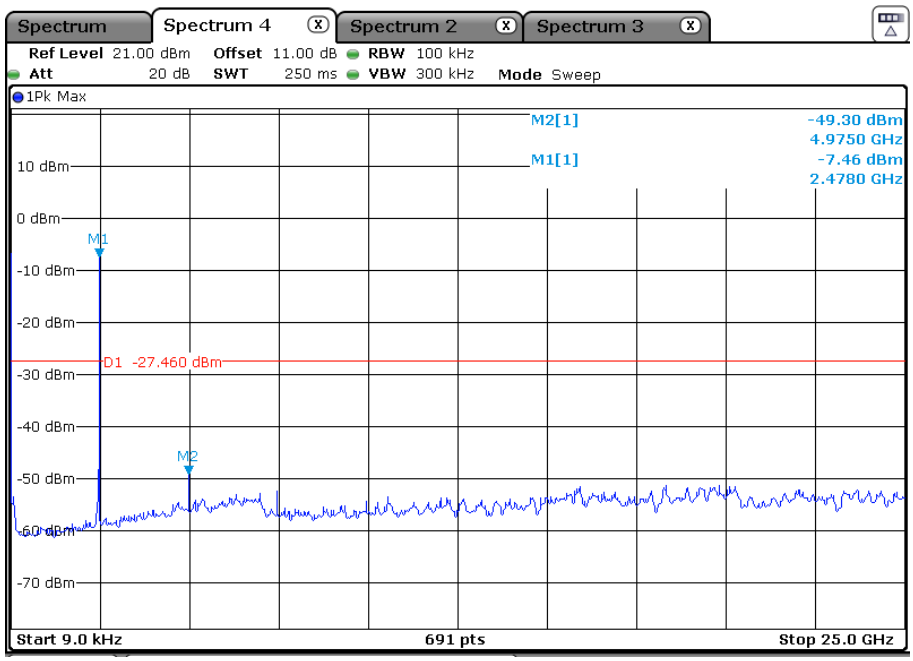


TEST REPORT

Middle Channel 2441MHz: 9kHz to 25 GHz



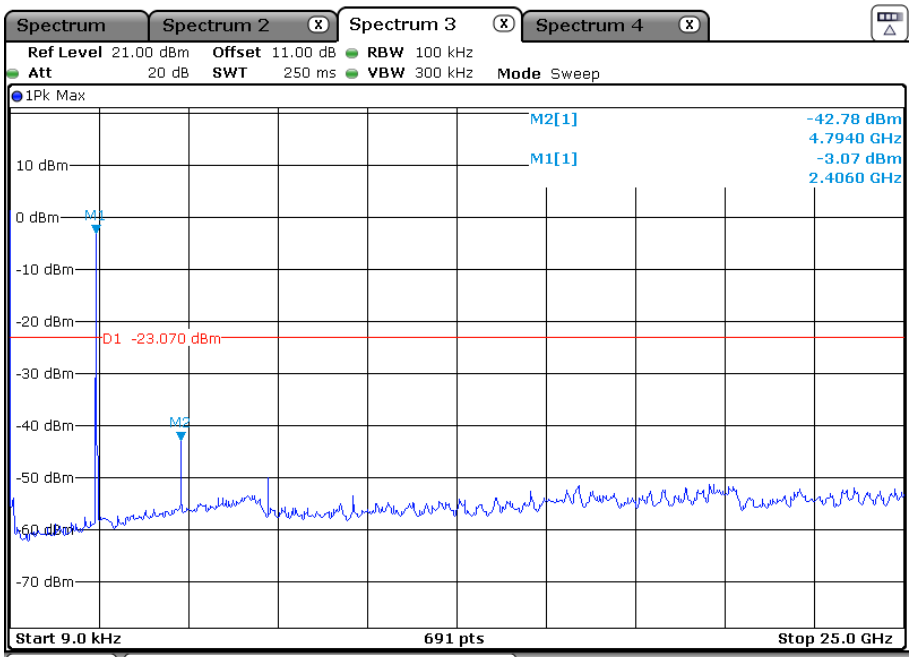
The Highest Channel 2480MHz: 9kHz to 25 GHz



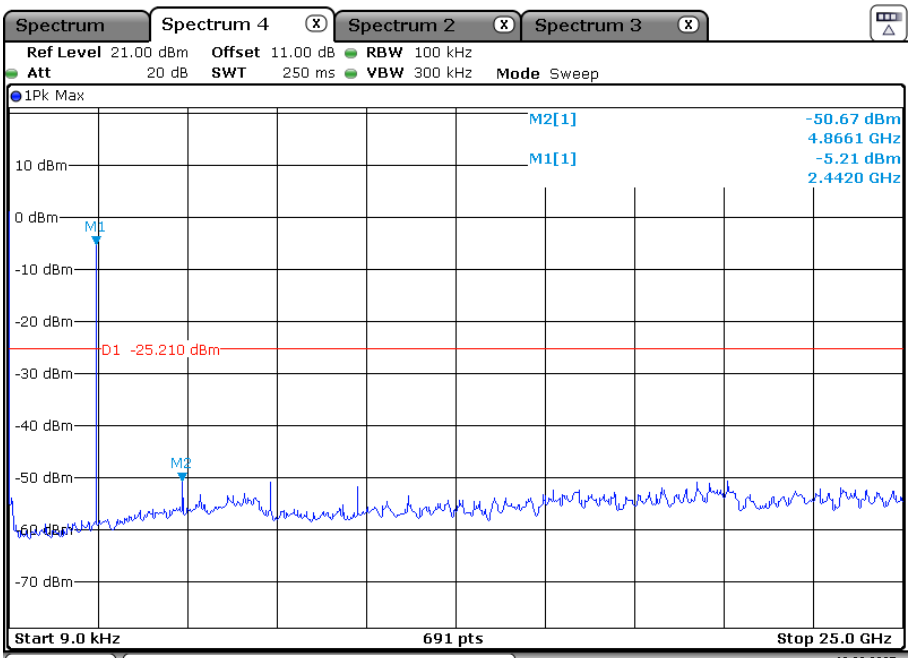
TEST REPORT

3DH1:

The Lowest Channel 2402MHz: 9kHz to 25 GHz

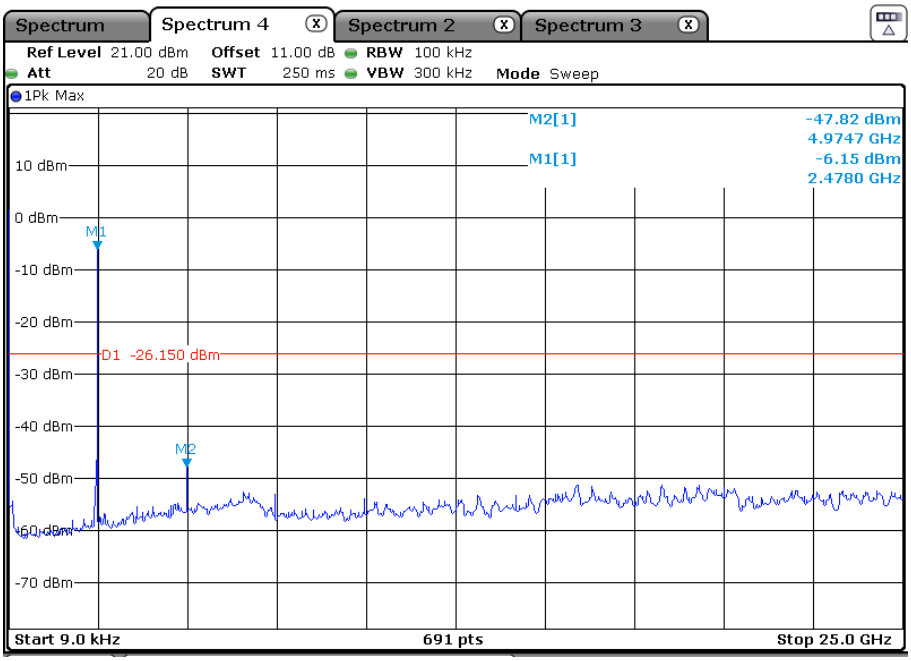


Middle Channel 2441MHz: 9kHz to 25 GHz



TEST REPORT

The Highest Channel 2480MHz: 9kHz to 25 GHz



TEST REPORT

4.9 Radiated Emissions

Test Requirement:	FCC Part 15 C section 15.247 (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c).
Test Method:	ANSI C63.10: Clause 7.8.8, 6.4, 6.5 and 6.6
Test Status:	Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet. Compliance test in continuous transmitting mode with normal (DH1) and EDR mode (2DH1), EDR mode (3DH1) as the worst case was found.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	Section 15.209 40.0 dBμV/m between 30MHz & 88MHz; 43.5 dBμV/m between 88MHz & 216MHz; 46.0 dBμV/m between 216MHz & 960MHz; 54.0 dBμV/m above 960MHz.
Detector:	For Peak and Quasi-Peak value: RBW = 1 MHz for f ≥ 1 GHz, 200 Hz for 9 kHz to 150 kHz 9 kHz for 150 kHz to 30 MHz 120 kHz for 30 MHz to 1GHz VBW ≥ RBW Sweep = auto Detector function = peak for f ≥ 1 GHz, QP for f < 1 GHz Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW=10 Hz Sweep = auto Trace = max hold
Field Strength Calculation:	The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below:

TEST REPORT

Where:

FS = RA + AF + CF - AG + PD + AV
FS = RA + Correct Factor + AV
FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
AF = Antenna Factor in dB
CF = Cable Attenuation Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in –dB
Correct Factor = AF + CF – AG + PD

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:
FS = RA + AF + CF - AG + PD + AV
Assume a receiver reading of 62.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBµV/m.
RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
AV = -10 dB
Correct Factor = 7.4 + 1.6 – 29.0 + 0 = -20 dB
FS = 62 + (-20) + (-10) = 32 dBµV/m

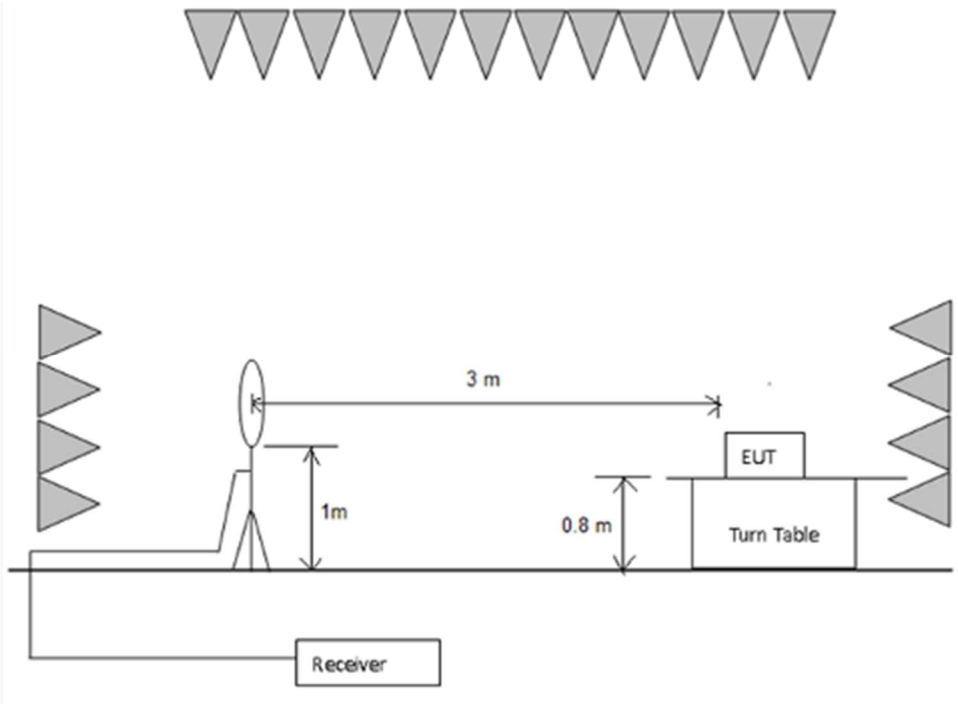
TEST REPORT

Section 15.205 Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

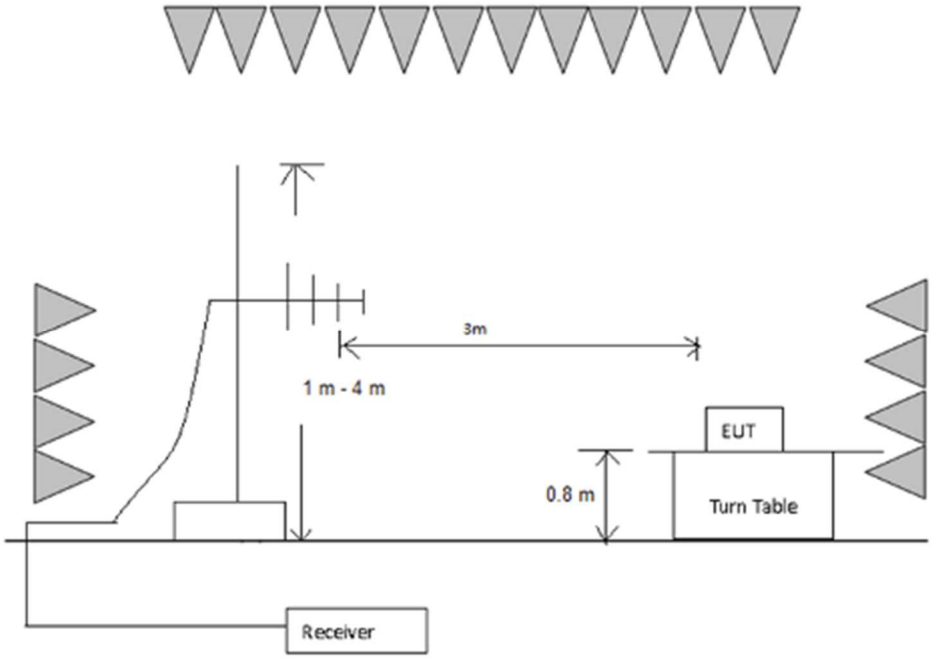
Test Configuration:

1) 9 kHz to 30 MHz emissions:

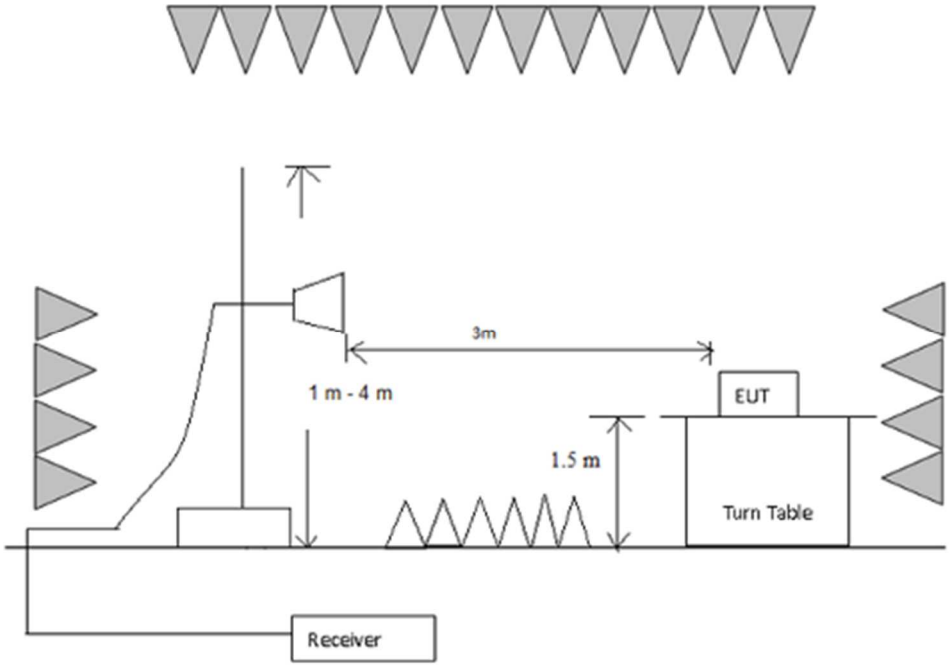


2) 30 MHz to 1 GHz emissions:

TEST REPORT



3) 1 GHz to 40 GHz emissions:



Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The lowest of the loop was positioned 1 m above the ground and positioned with its plane vertical at the special distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

TEST REPORT

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360º, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1 GHz to 25 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2010 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna. The measurement is performed with the EUT rotated 360º, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

4) The receiver was scanned from 9 kHz to 25 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Used Test Equipment List:

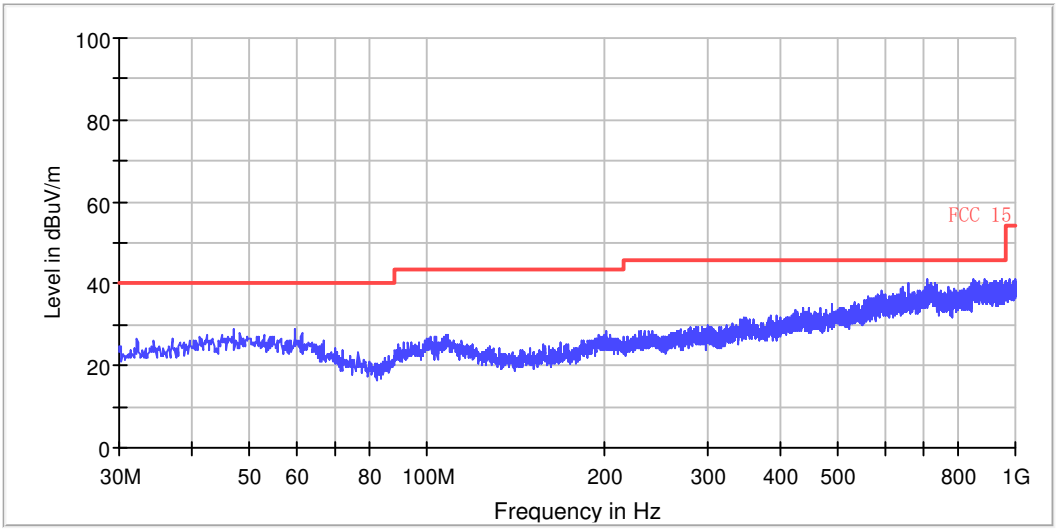
3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz）(RX), Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment List for details.

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

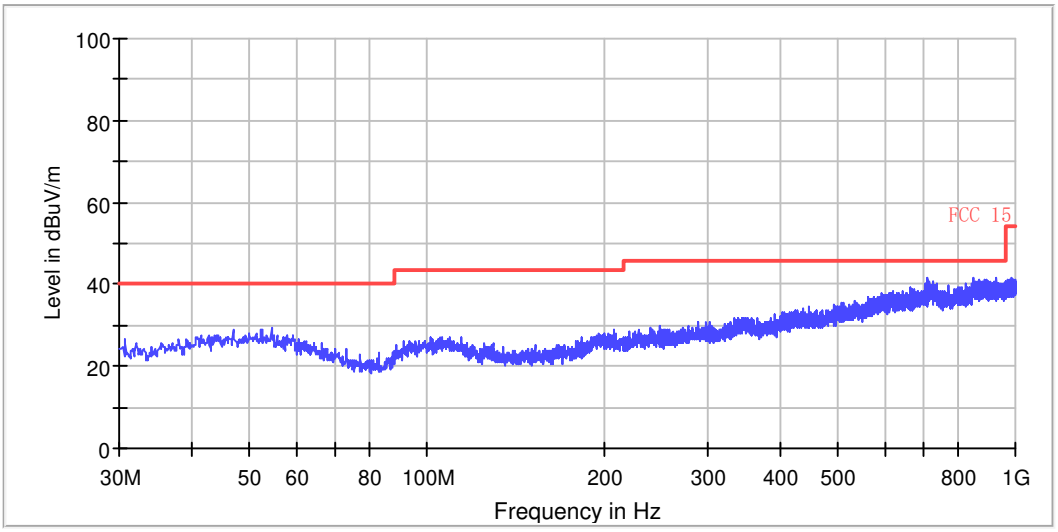
30 MHz~1 GHz Spurious Emissions. Pre-scan all modes, worst case is DH1 low channel

Vertical:



All emission levels are more than 6 dB below the limit.

Horizontal:



All emission levels are more than 6 dB below the limit.

TEST REPORT

1~25 GHz Radiated Emissions. Peak & Average Measurement
EDR mode (DH1)
Test at Lowest Channel (2.402 GHz) in transmitting status
Peak Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
4804.0	58.5	-0.4	58.1	74	H
9608.5	50.4	6.9	57.3	74	H
4804.0	53.2	-0.4	52.8	74	V
9608.5	55.2	6.9	62.1	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
4804.0	45.8	-0.4	45.4	54	H
9608.5	41.0	6.9	47.9	54	H
4804.0	/	-0.4	/	54	V
9608.5	39.6	6.9	46.5	54	V

Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Middle Channel (2.441 GHz) in transmitting status
Peak Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
4882.0	51.3	-0.2	51.1	74	H
9764.5	52.6	7.1	59.7	74	H
4882.0	50.7	-0.2	50.5	74	V
9764.5	53.2	7.1	60.3	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
4882.0	/	-0.2	/	54	H
9764.5	40.8	7.1	47.9	54	H
4882.0	/	-0.2	/	54	V
9764.5	42.0	7.1	49.1	54	V

TEST REPORT

Test at Highest Channel (2.480 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4858.5	46.8	-0.3	46.5	74	H
9920.5	52.8	7.3	60.1	74	H
4858.5	49.1	-0.3	48.8	74	V
9920.5	52.7	7.3	60.0	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4858.5	/	-0.3	/	54	H
9920.5	40.2	7.3	47.5	54	H
4858.5	/	-0.3	/	54	V
9920.5	39.2	7.3	46.5	54	V

Remark:

When Peak emission level was below AV limit, the AV emission level did not be recorded.

EDR mode (2DH1)

Test at Lowest Channel (2.402 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804.0	56.4	-0.4	56.0	74	H
9608.5	52.1	6.9	59.0	74	H
4804.0	53.0	-0.4	52.6	74	V
9608.5	53.4	6.9	60.3	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804.0	41.2	-0.4	40.8	54	H
9608.5	40.0	6.9	46.9	54	H
4804.0	/	-0.4	/	54	V
9608.5	40.5	6.9	47.4	54	V

Remark:

When Peak emission level was below AV limit, the AV emission level did not be recorded.

TEST REPORT

Test at Middle Channel (2.441 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.5	53.1	-0.3	52.8	74	H
9764.5	53.0	7.1	60.1	74	H
4880.5	51.7	-0.3	51.4	74	V
9764.5	52.7	7.1	59.8	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.5	/	-0.3	/	54	H
9764.5	41.3	7.1	48.4	54	H
4880.5	/	-0.3	/	54	V
9764.5	41.0	7.1	48.1	54	V

Test at Highest Channel (2.480 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4960.0	48.6	-0.1	48.5	74	H
9920.5	52.0	7.3	59.3	74	H
4960.0	48.5	-0.1	48.4	74	V
9920.5	51.6	7.3	58.9	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4960	/	-0.1	/	54	H
9920.5	40.3	7.3	47.6	54	H
4960	/	-0.1	/	54	V
9920.5	39.5	7.3	46.8	54	V

Remark:

When Peak emission level was below AV limit, the AV emission level did not be recorded.

TEST REPORT

EDR mode (3DH1)
Test at Lowest Channel (2.402 GHz) in transmitting status
Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804.0	52.9	-0.4	52.5	74	H
9608.5	46.8	6.9	53.7	74	H
4804.0	53.1	-0.4	52.7	74	V
9608.5	52.4	6.9	59.3	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804	/	-0.4	/	54	H
9608.5	/	6.9	/	54	H
4804	/	-0.4	/	54	V
9608.5	42.8	6.9	49.7	54	V

Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Middle Channel (2.441 GHz) in transmitting status
Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4882.0	52.5	-0.2	52.3	74	H
9764.5	52.6	7.1	59.7	74	H
4882.0	52.8	-0.2	52.6	74	V
9764.5	49.3	7.1	56.4	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4882.0	/	-0.2	/	54	H
9764.5	42.3	7.1	49.4	54	H
4882.0	/	-0.2	/	54	V
9764.5	39.1	7.1	46.2	54	V

TEST REPORT

Test at Highest Channel (2.480 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
1993.0	68.0	-9.1	58.9	74	H
9920.5	51.4	7.3	58.7	74	H
1727.5	66.5	-10.4	56.1	74	V
9920.5	51.7	7.3	59.0	74	V

Average Measurement:

Frequency (MHz)	Reading Level (dBµV)	Correct Factor	Emission Level (dBµV/m)	Limit (dBµV/m)	Antenna polarization
1993.0	47.2	-9.1	38.1	54	H
9920.5	41.5	7.3	48.8	54	H
1727.5	46.8	-10.4	36.4	54	V
9920.5	40.2	7.3	47.5	54	V

Remark:

When Peak emission level was below AV limit, the AV emission level did not be recorded.

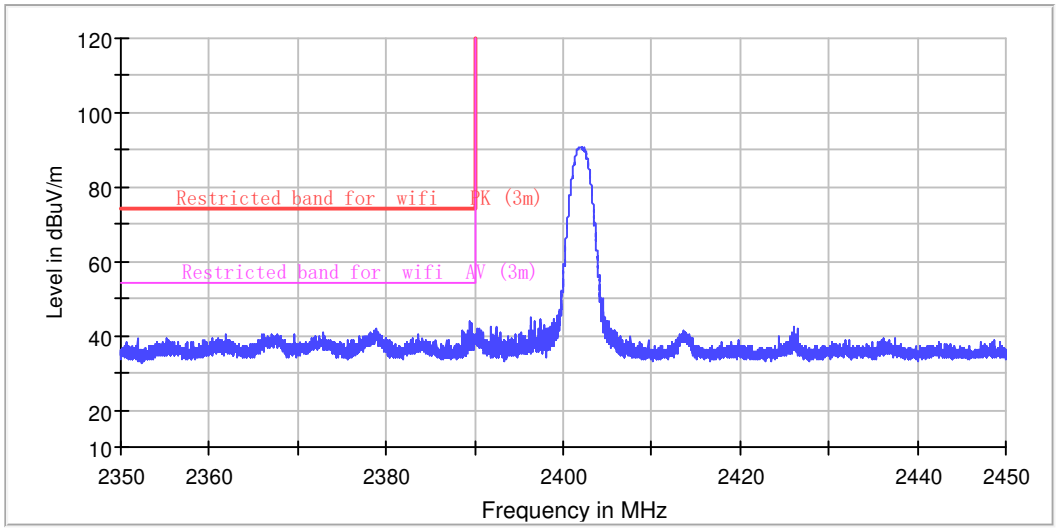
TEST REPORT

Band Edges Emission

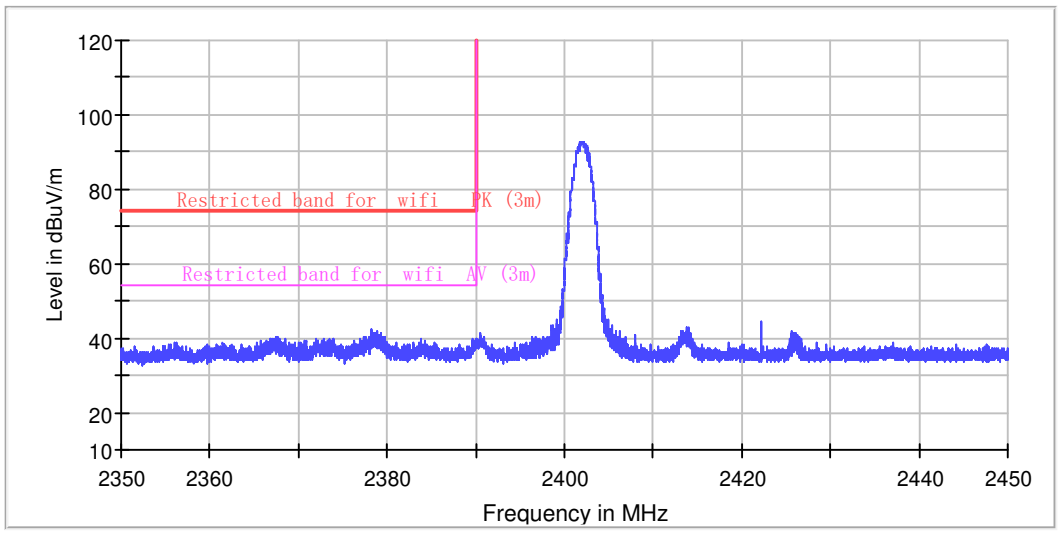
DH1

2402MHz

Vertical:



Horizontal:

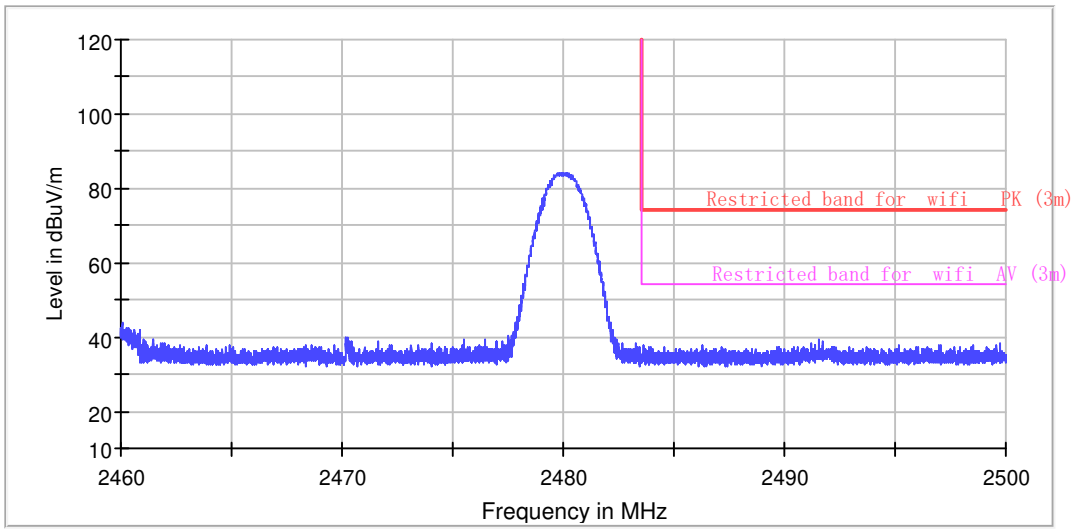


Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

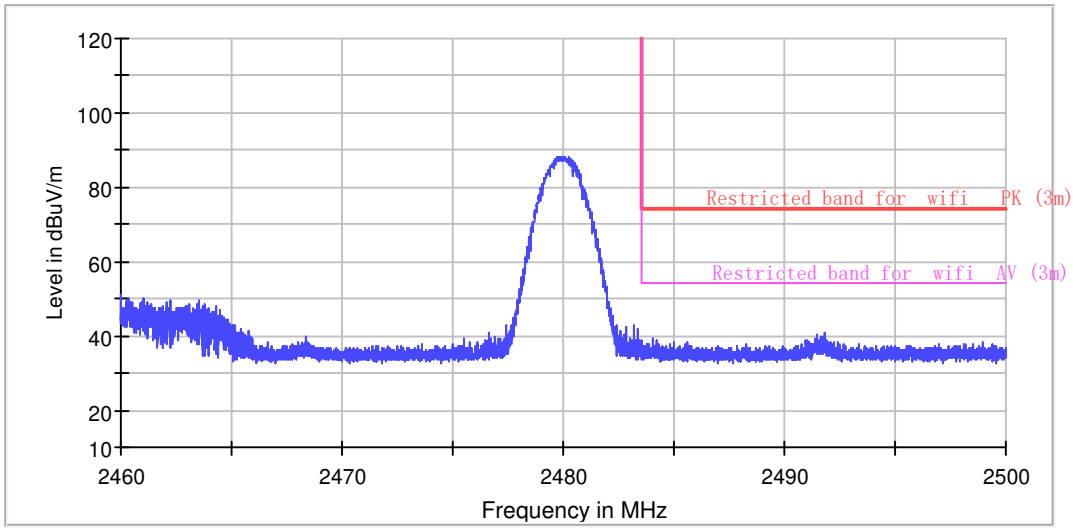
TEST REPORT

2480MHz

Vertical:



Horizontal:



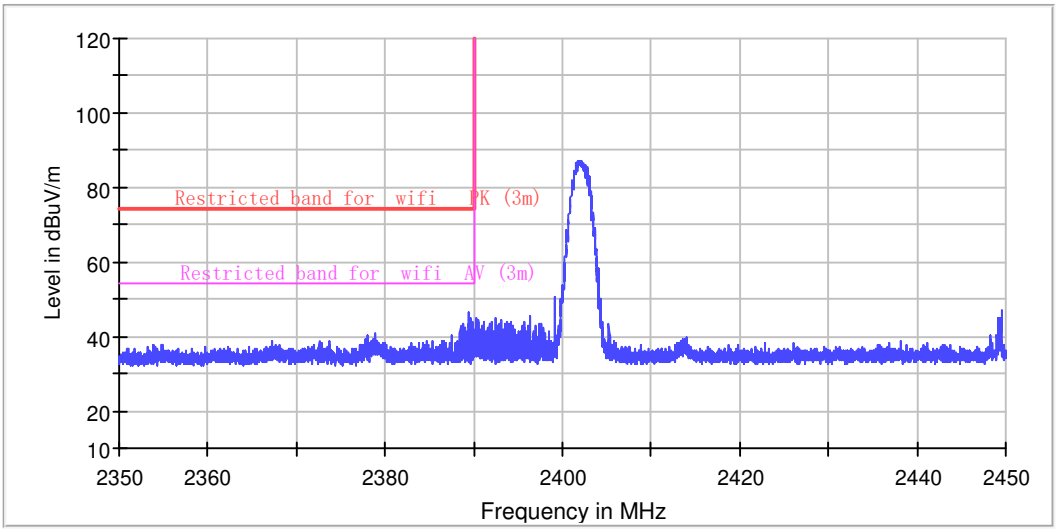
Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

TEST REPORT

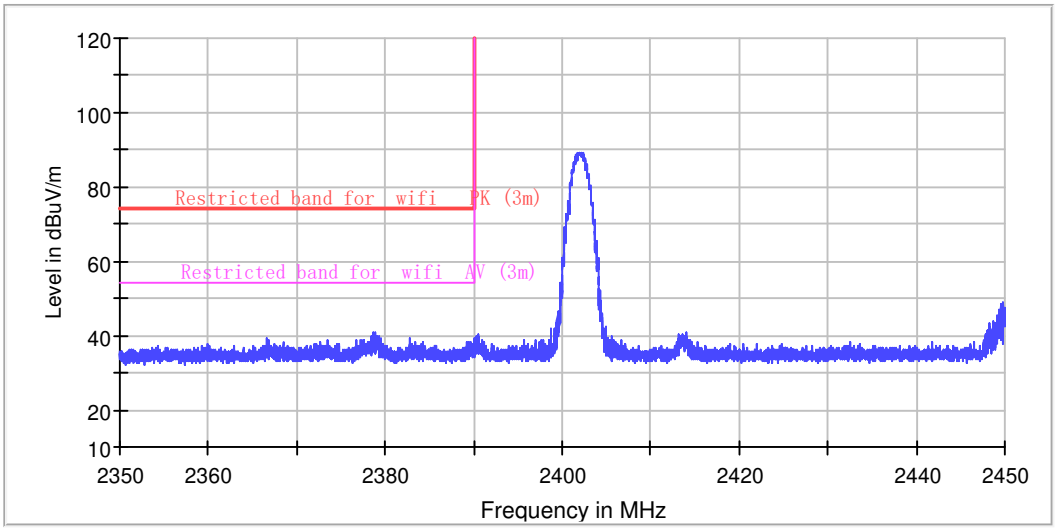
2DH1

2402MHz

Vertical:



Horizontal:

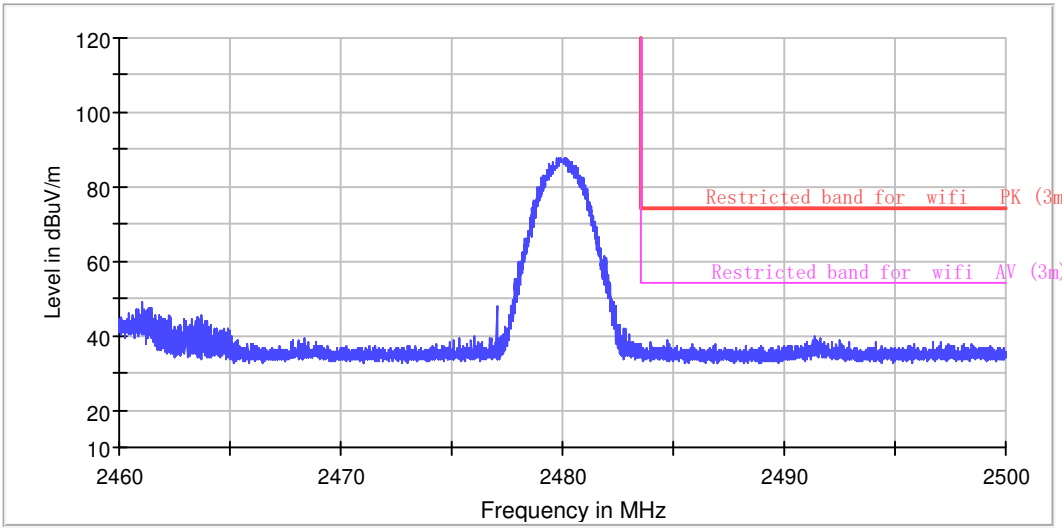


Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

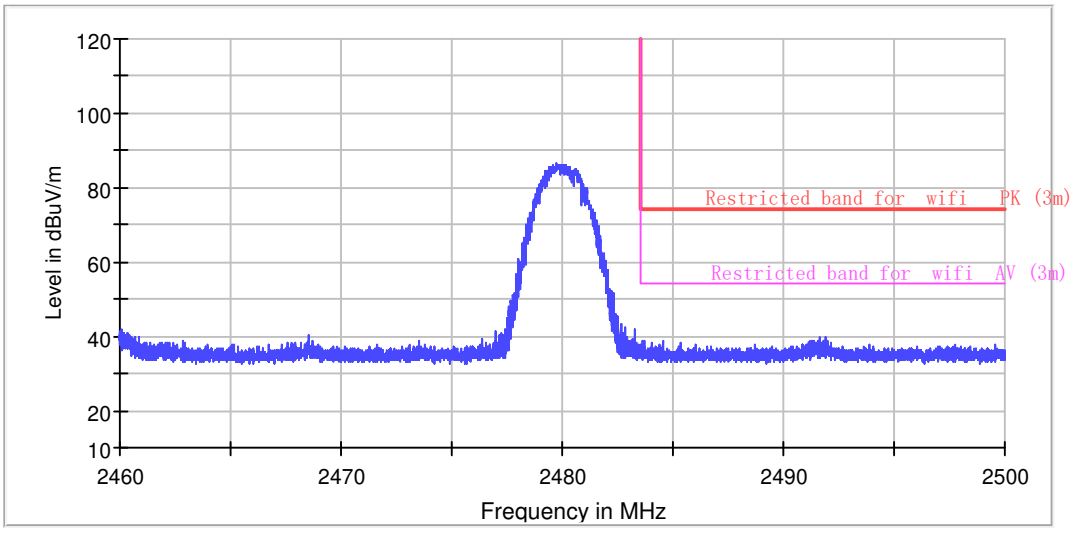
TEST REPORT

2480MHz

Vertical:



Horizontal:



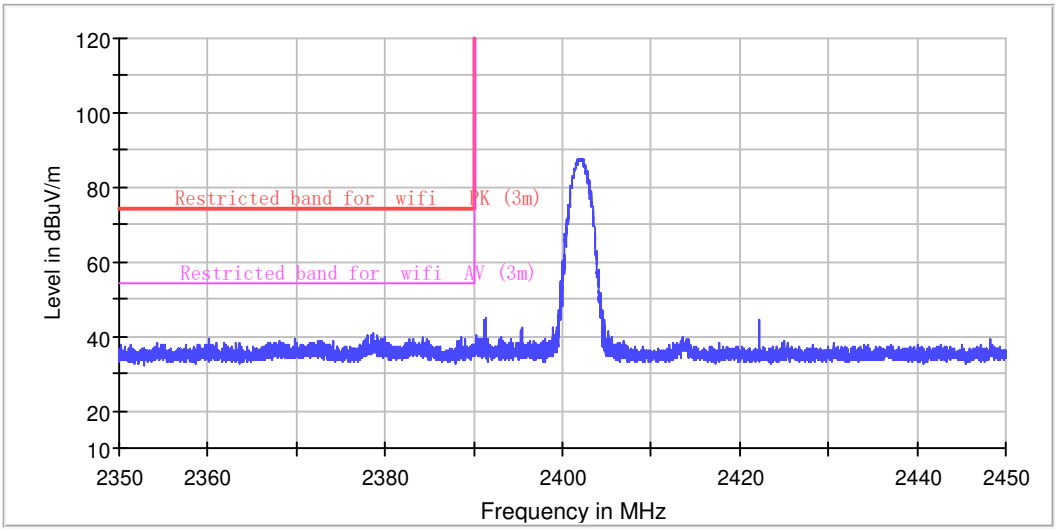
Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

TEST REPORT

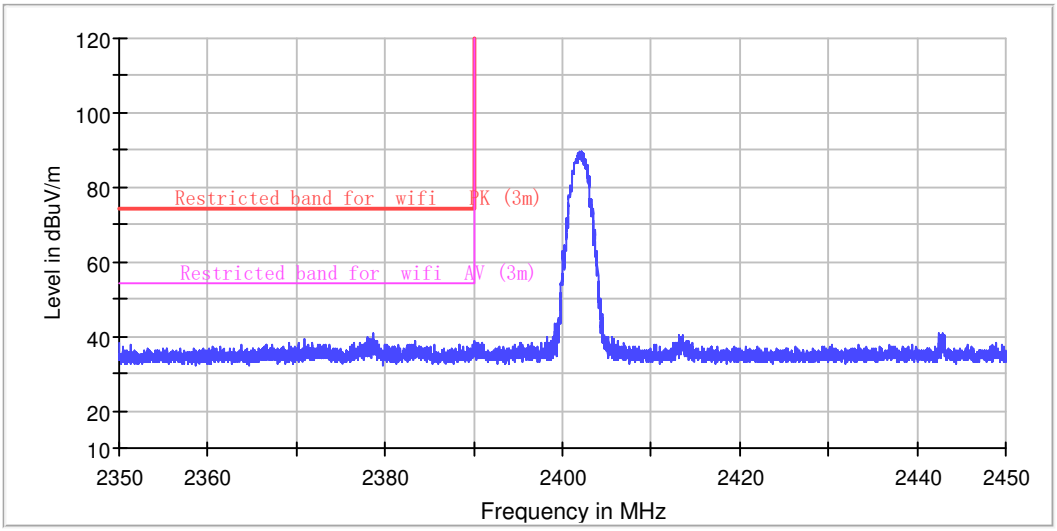
3DH1

2402MHz

Vertical:



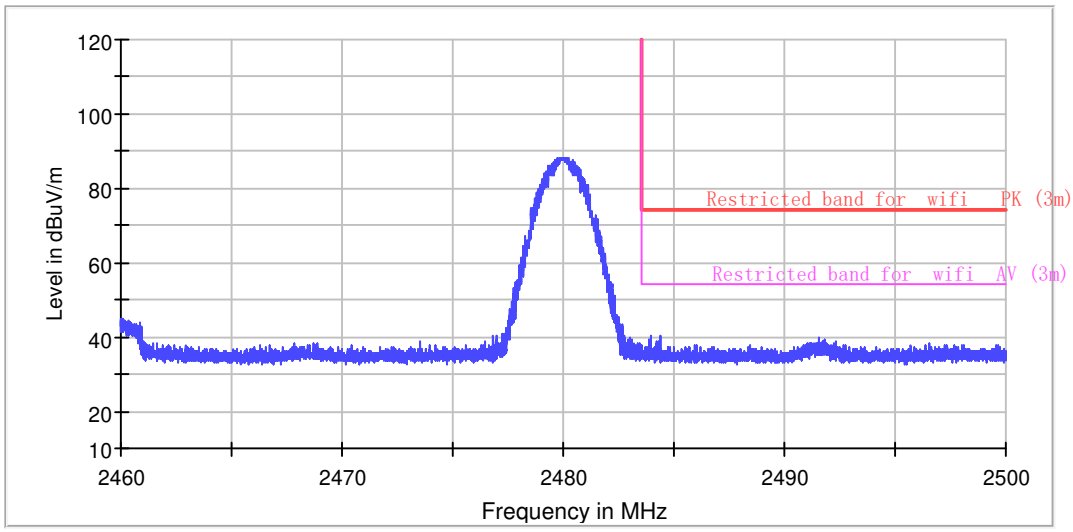
Horizontal:



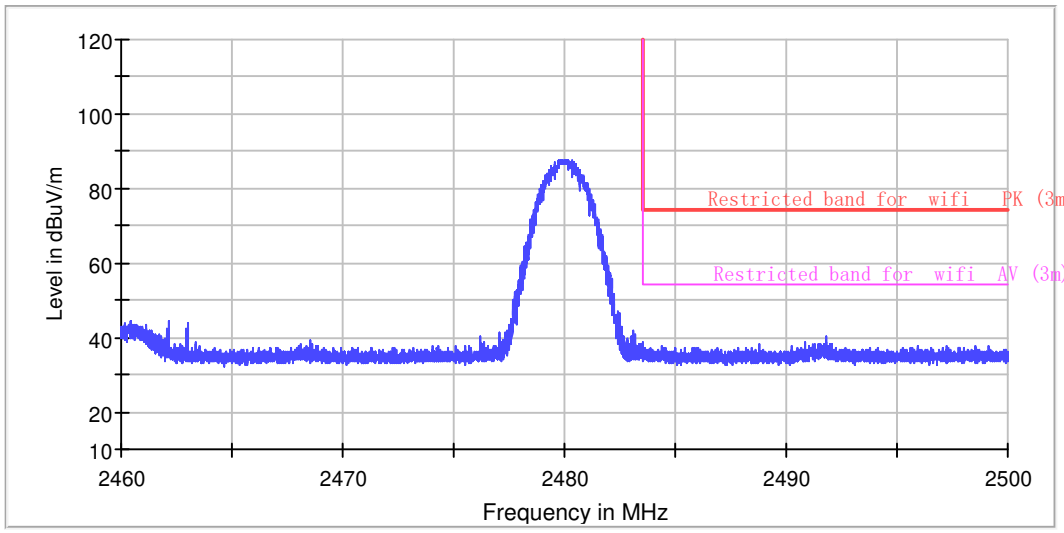
Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

TEST REPORT

2480MHz
Vertical:



Horizontal:



Remark:
When Peak emission level was below AV limit, the AV emission level did not be recorded.
All emission levels are more than 6 dB below the limit.

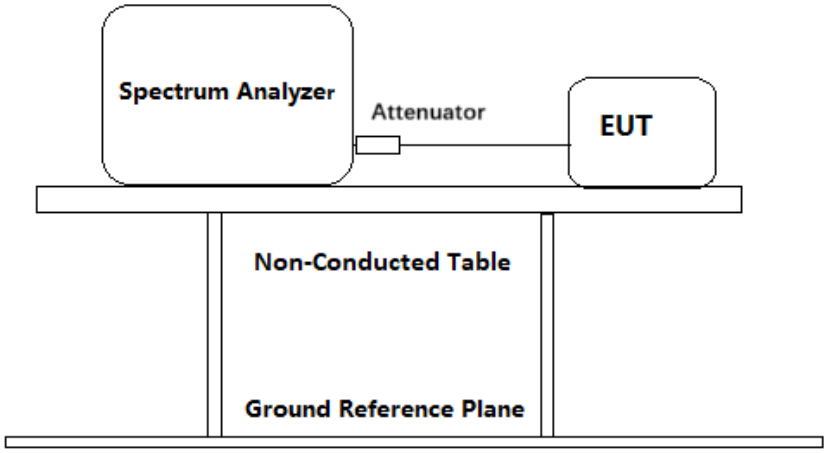
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier.
The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Preamplifier Factor.
As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

TEST REPORT

4.10 Band Edges Requirement

Test Requirement:	FCC Part 15 C section 15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. 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.
Frequency Band:	2400 MHz to 2483.5 MHz
Test Method:	ANSI C63.10: Clause 7.8.7 & 6.10
Test Status:	Pre-test the EUT in continuous transmitting mode at the lowest (2402 MHz), and highest (2480 MHz) channel and hopping mode with different data packet. Compliance test in continuous transmitting mode with normal (DH1) and EDR mode (2DH1), EDR mode (3DH1) as the worst case was found.
Test Configuration:	For Band Edges Emission in Radiated mode, Please refer to clause 4.9



Test Procedure: For Band Edges Emission in Radiated mode, Please refer to clause 4.7

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum.
2. Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with suitable frequency span including 100 kHz bandwidth from band edge.
3. Repeated until all the test status was investigated.
4. Reported the worst case.

Used Test Equipment List:

3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-

TEST REPORT

3 GHz）(RX), Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment List for details.

Test result with plots as follows:

For conducted mode:

The band edges was measured and recorded Result:

The Lower Edges attenuated more than 20dB.

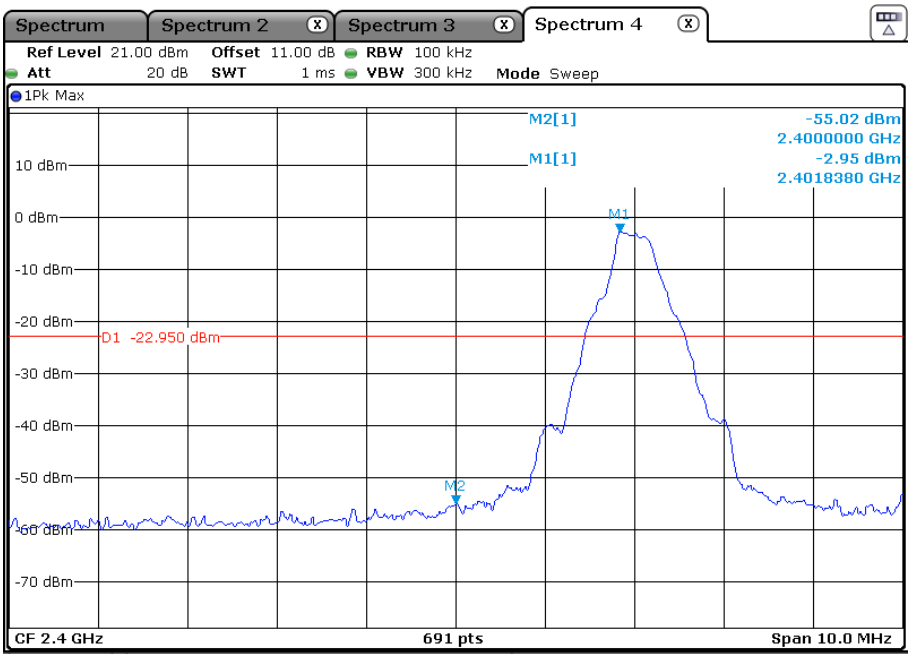
The Upper Edges attenuated more than 20dB.

Result plot as follows:

BDR mode (DH1):

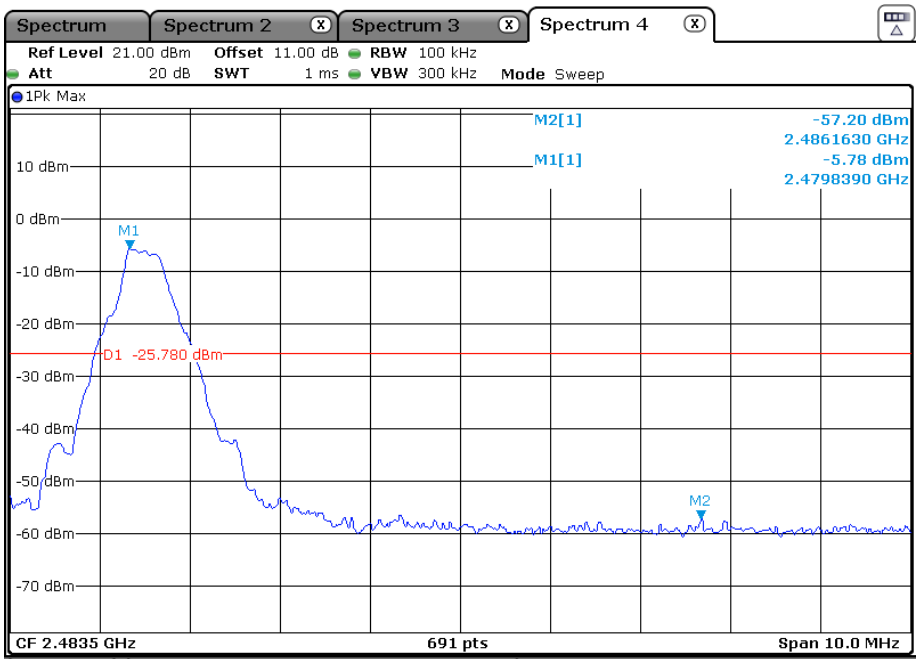
Hopping mode disabled:

Lowest channel: 2.402 GHz



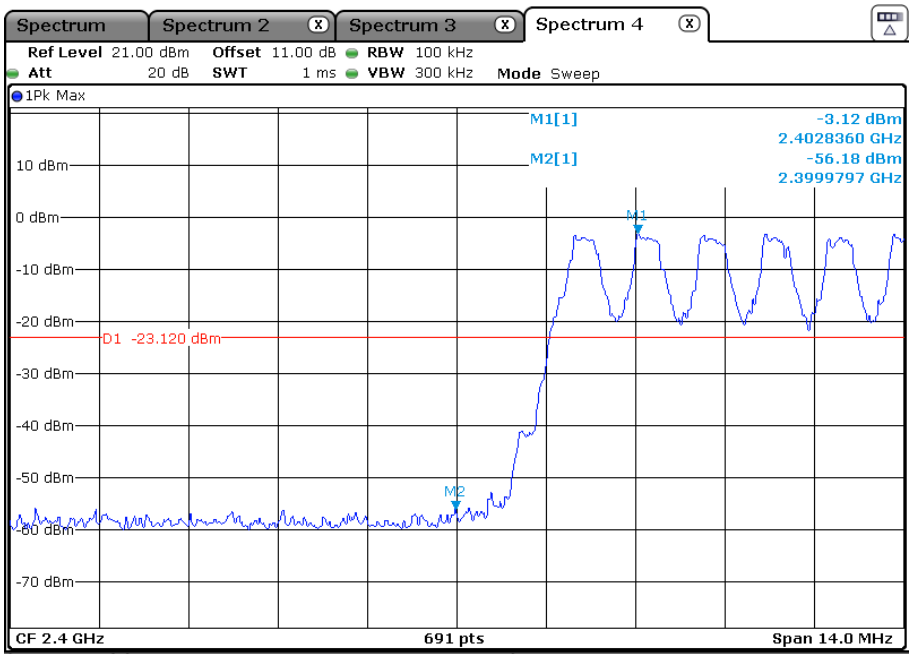
TEST REPORT

Highest Channel: 2.480 GHz:



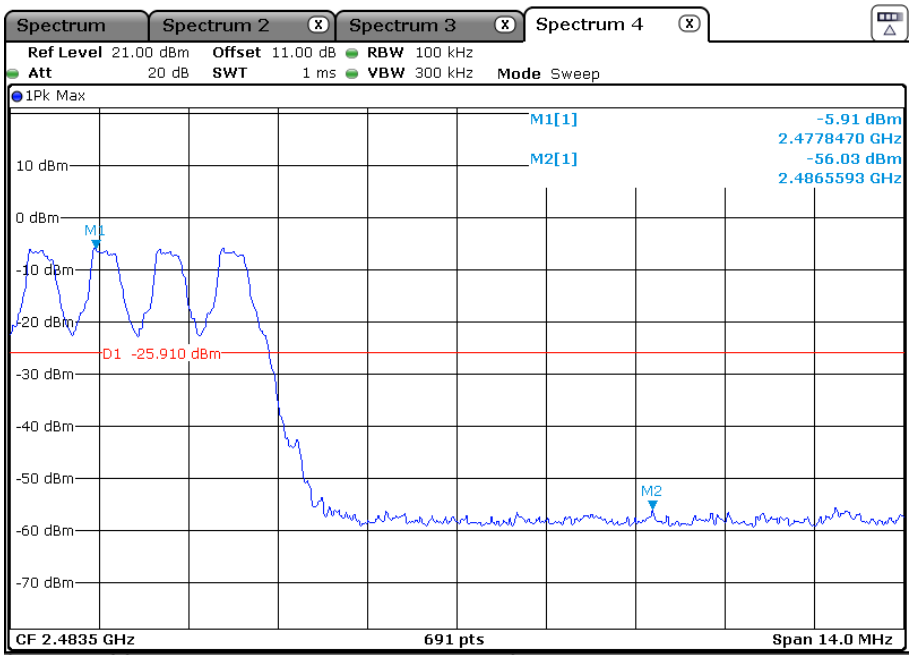
Hopping mode enabled:

Lowest channels:



TEST REPORT

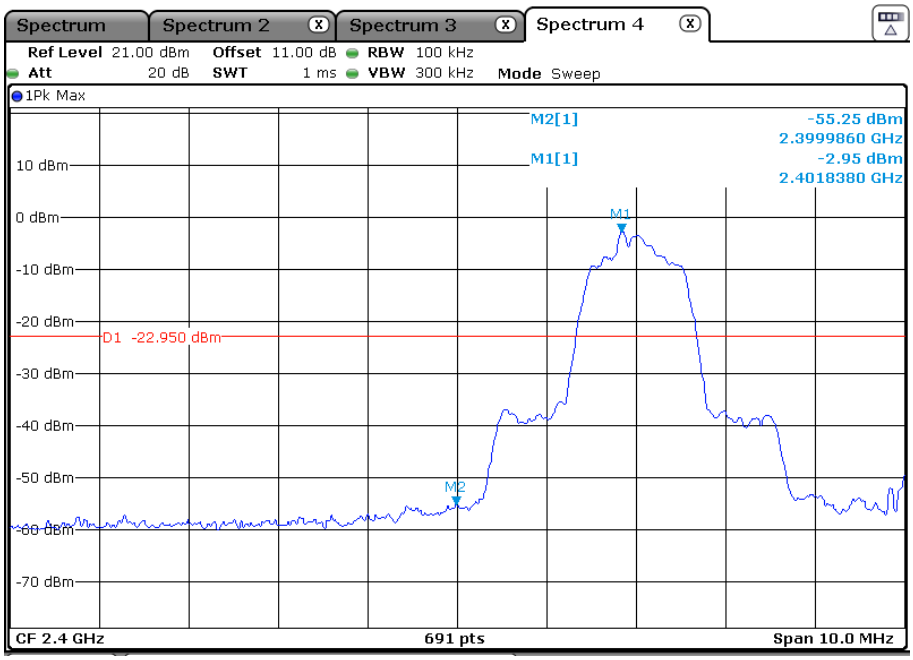
Highest channels:



EDR mode (2DH1):

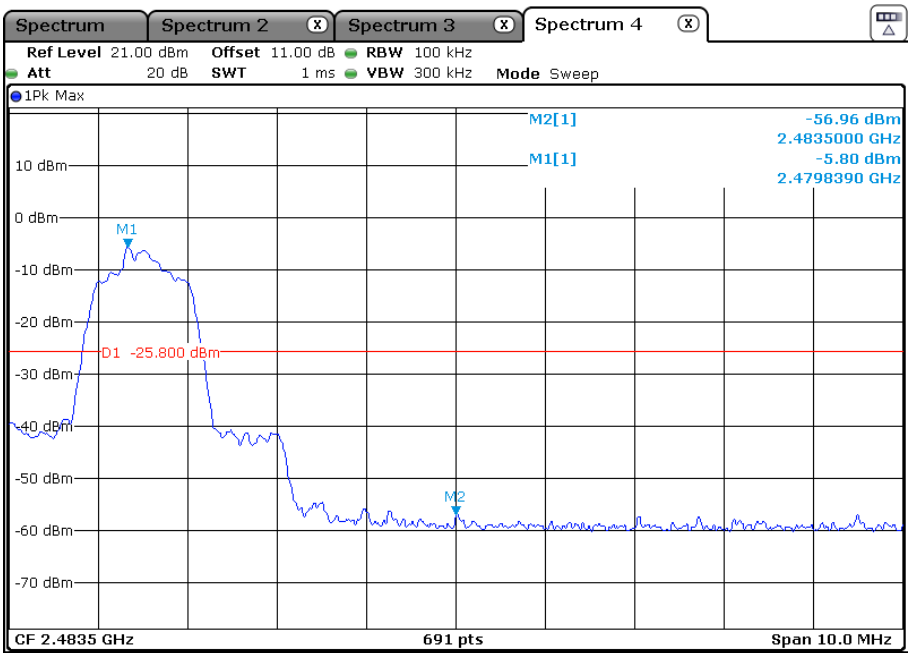
Hopping mode disabled:

Lowest channel: 2.402 GHz



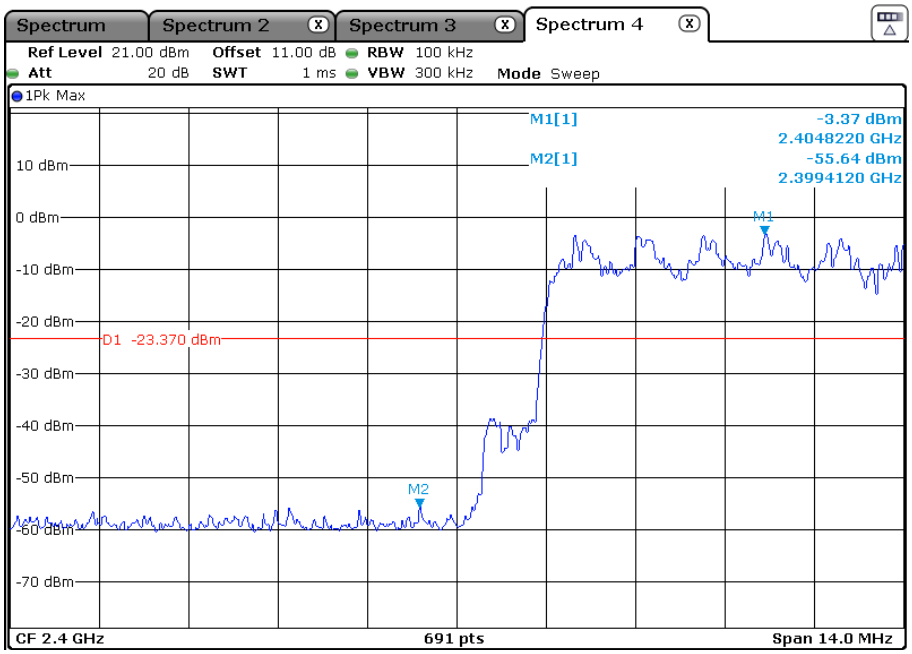
TEST REPORT

Highest Channel: 2.480 GHz:



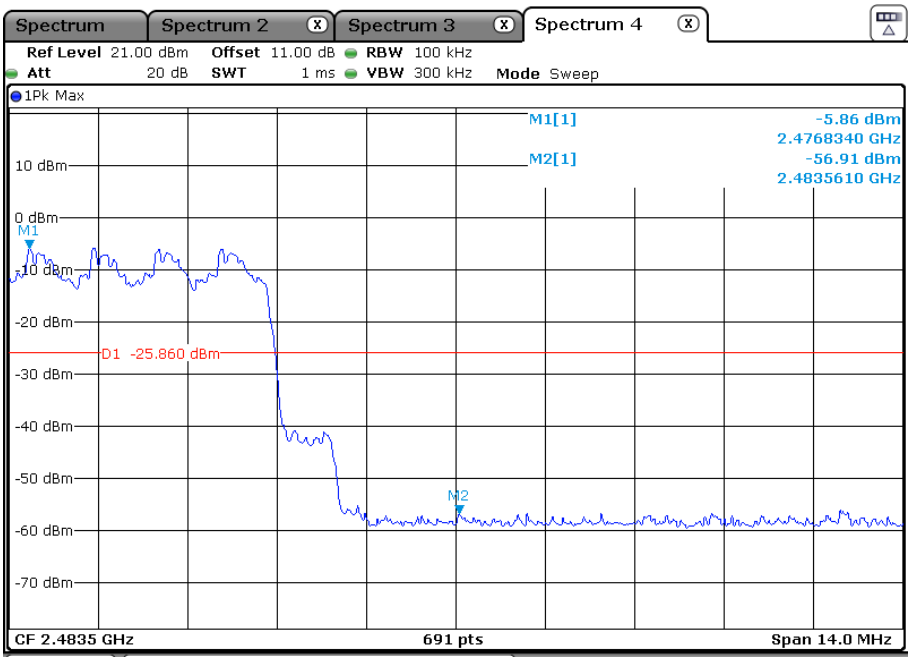
Hopping mode enabled:

Lowest channels:



TEST REPORT

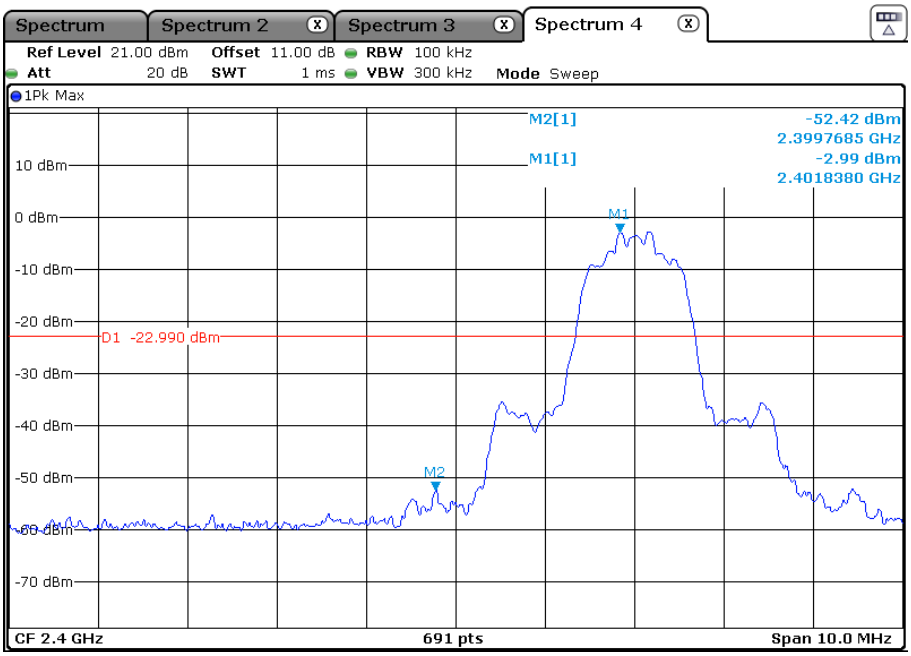
Highest channels:



EDR mode (3DH1):

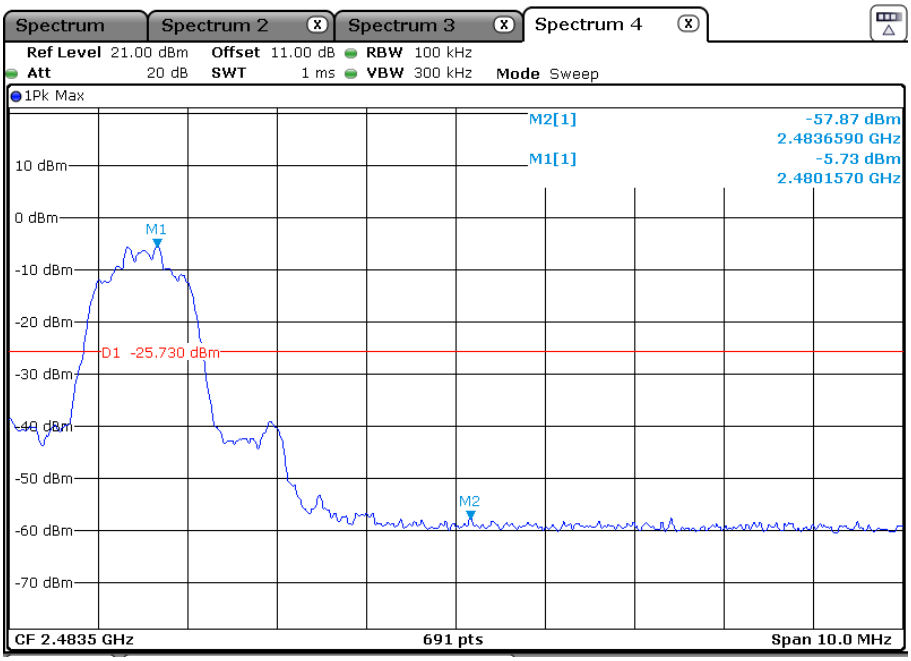
Hopping mode disabled:

Lowest channel: 2.402 GHz



TEST REPORT

Highest Channel: 2.480 GHz:

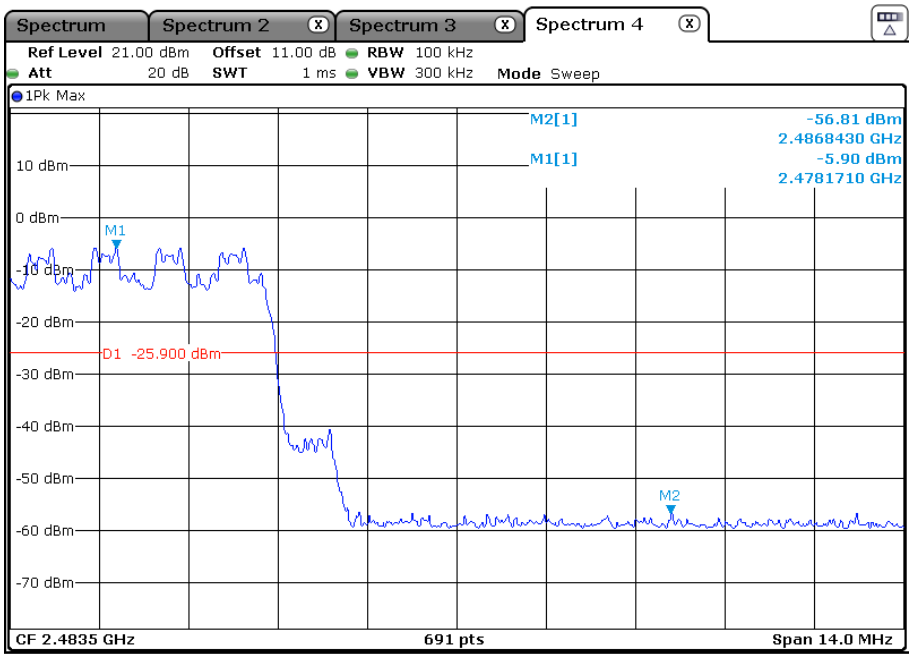


Hopping mode enabled:

Lowest channels:

TEST REPORT

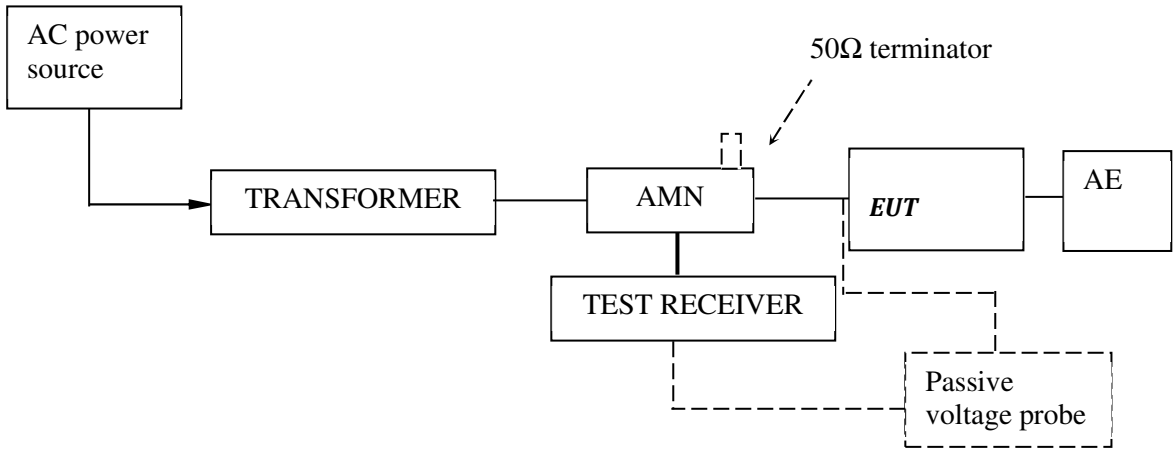
Highest channels:



TEST REPORT

4.11 Conducted Emission Test

Test Configuration:



Test Setup and Procedure:

Test was performed according to ANSI C63.10 Clause 6.2. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane).And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m

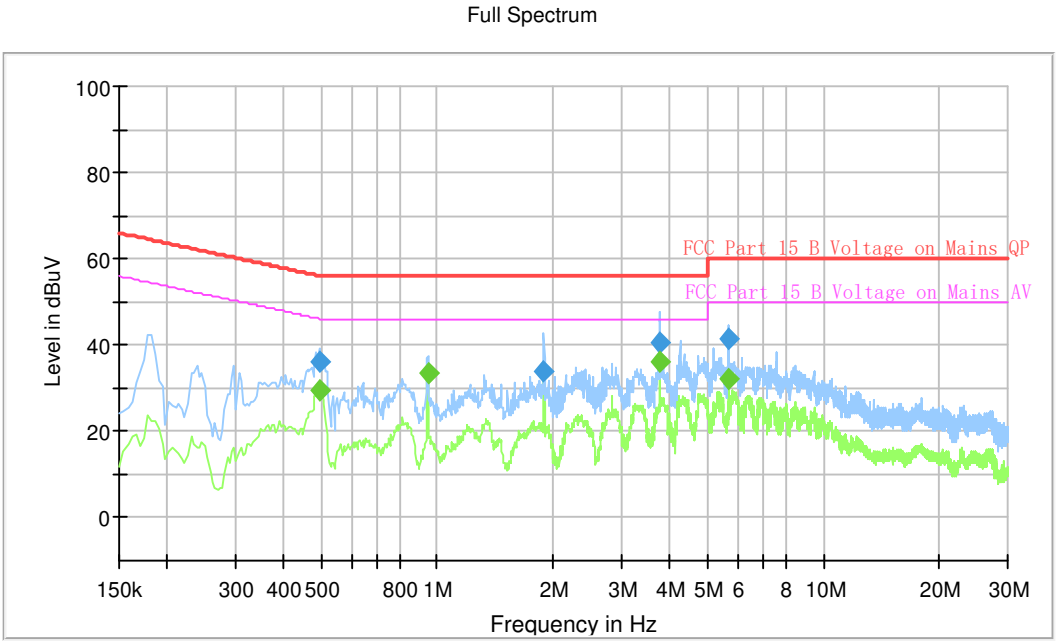
The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

Test Data and Curve

At main terminal: Pass

TEST REPORT

Tested Wire: Live Operation Mode: Transmitting



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.494000	---	29.38	46.10	16.72	1000.0	9.000	L1	ON	9.7
0.494000	36.15	---	56.10	19.95	1000.0	9.000	L1	ON	9.7
0.946000	---	33.35	46.00	12.65	1000.0	9.000	L1	ON	9.7
1.886000	33.72	---	56.00	22.28	1000.0	9.000	L1	ON	9.7
3.774000	40.44	---	56.00	15.56	1000.0	9.000	L1	ON	9.7
3.774000	---	36.24	46.00	9.76	1000.0	9.000	L1	ON	9.7
5.666000	---	32.12	50.00	17.88	1000.0	9.000	L1	ON	9.8
5.666000	41.66	---	60.00	18.34	1000.0	9.000	L1	ON	9.8

Remark:

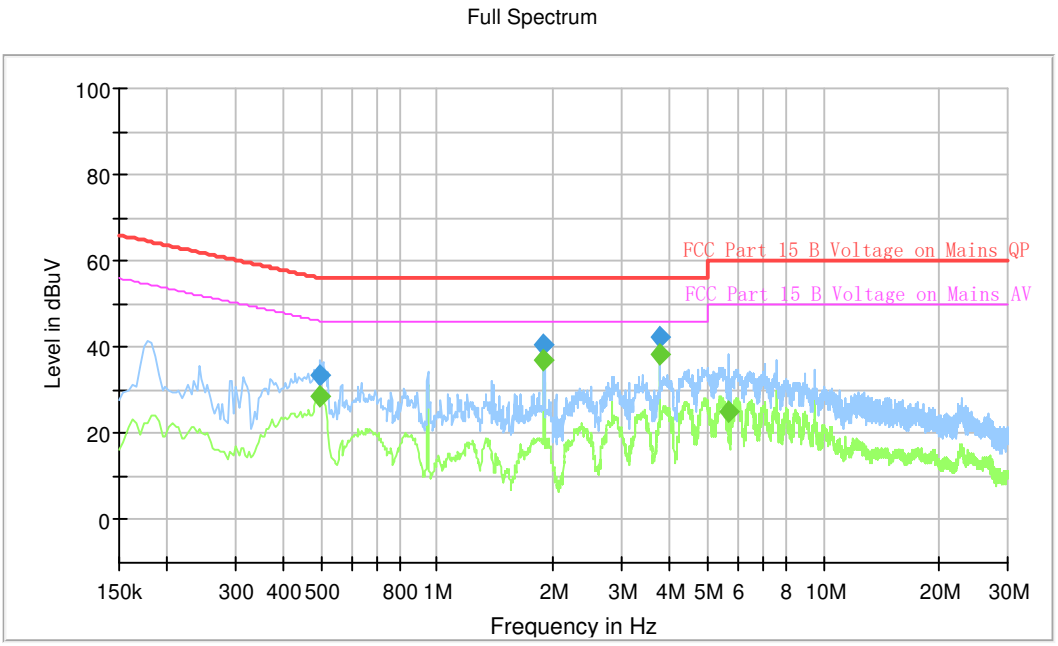
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Level (dBµV) = Corr. (dB) + Read Level (dBµV)

3. Margin (dB) = Limit (dBµV)- Level (dBµV)

TEST REPORT

Tested Wire: Neutral Operation Mode: Transmitting



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.494000	---	28.60	46.10	17.51	1000.0	9.000	N	ON	9.7
0.498000	33.59	---	56.03	22.44	1000.0	9.000	N	ON	9.7
1.890000	---	36.85	46.00	9.15	1000.0	9.000	N	ON	9.7
1.890000	40.49	---	56.00	15.51	1000.0	9.000	N	ON	9.7
3.778000	---	38.30	46.00	7.70	1000.0	9.000	N	ON	9.7
3.778000	42.36	---	56.00	13.64	1000.0	9.000	N	ON	9.7
5.666000	---	24.90	50.00	25.10	1000.0	9.000	N	ON	9.8

Remark:

1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Level (dBµV) = Corr. (dB) + Read Level (dBµV)

3. Margin (dB) = Limit (dBµV)- Level (dBµV)

TEST REPORT

5.0 Test Equipment List

Radiated Emission/Radio

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m^3	ETS• LINDGREN	2026-04-08	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2025-11-10	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2025-11-10	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2026-07-08	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz）(RX)	VULB 9163	SCHWARZBECK	2026-07-15	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2026-07-07	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2026-04-27	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2026-04-27	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2026-04-09	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2026-04-09	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2026-04-26	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2025-10-28	1Y
EM040-01	Band Reject/Notch Filter	WRHFV	Wainwright	N/A	1Y
EM040-02	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM040-03	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	2026-05-14	1Y
SA016-29	Climatic Test Chamber	MHU-80L	JIANQIAO	2026-01-05	1Y
EM046-05	Power Sensor	NPR6A	R&S	2026-04-13	1Y
EM046-06	Power Sensor	NPR6A	R&S	2026-05-14	1Y
EM031-04-01	EMC32	V10.01.00	R&S	N/A	N/A
EM045-01-10	10dB Attenuator	N/A	R&S	2025-12-24	1Y
EM046-06-01	Power Viewer	V11.0.5.11.2018	R&S	N/A	N/A

Conducted Disturbance-Mains Terminal(2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM031-04	EMI receiver	ESR3	R&S	05/01/2026	1Y
EM006-06	LISN	ENV216	R&S	01/09/2026	1Y
SA047-111	Digital Temperature-Humidity Recorder	RS210	YIJIE	20/10/2025	1Y
EM004-03	EMC shield Room	8m×4m×3m	Zhongyu	05/01/2026	1Y
EM031-04-01	EMC32	V10.01.00	R&S	N/A	N/A

**********End of the test report**********