



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

SoundBar

MODEL NUMBER: HW-N300

FCC ID: A3LHWN300

REPORT NUMBER: 4788419653.4-4

ISSUE DATE: April 18, 2018

Prepared for

**Samsung Electronics Co Ltd.
19 Chapin Rd., Building Pine Brook New Jersey United States 07058**

Prepared by

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Room 101, Building 10, Innovation Technology Park,
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Tel: +86 769 33817100
Fax: +86 769 33244054
Website: www.ul.com**



Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/18/2018	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	20dB Bandwidth And 99% Bandwidth	FCC 15.247 (a) (1)	Pass
2	Peak Conducted Output Power	FCC 15.247 (b) (1)	Pass
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1)	Pass
4	Number of Hopping Frequency	15.247 (a) (1) III	Pass
5	Time of Occupancy (Dwell Time)	15.247 (a) (1) III	Pass
6	Conducted Bandedge	FCC 15.247 (d)	Pass
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205	Pass
8	Conducted Emission Test For AC Power Port	FCC 15.207	Pass
9	Antenna Requirement	FCC 15.203	Pass



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1. ATTESTATION OF TESCT RESULTS

Applicant Information

Company Name: Samsung Electronics Co Ltd.

Address: 19 Chapin Rd., Building Pine Brook New Jersey United States
07058

Manufacturer Information

Company Name: SAMSUNG ELECTRONICS CO. LTD.

Address: #129 Samsung-Ro, Yeongtong-Gu Suwon-Si, Gyeonggi-Do
16677 Korea

EUT Description

EUT Name: SoundBar
Model: HW-N300
Series model: Please refer to the description of EUT in Page 9
Brand Name: SAMSUNG
Sample Status: Normal
Sample ID: 1533406
Sample Received Date: April 09, 2018
Date of Tested: April 10, 2018 ~ April 17, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS

Tested By:

Denny Huang
Engineer

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo
Laboratory Manager



2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB414788 D01 Radiated Test Site v01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. IAS (Lab Code: TL-702) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has demonstrated compliance with ISO/IEC Standard 17025:2005, General requirements for the competence of testing and calibration laboratories FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules IC(Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320. VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011
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Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.



4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Equipment	SoundBar		
EUT Description	The EUT is a loudspeaker box.		
Model Name	HW-N300		
Series Model	HW-N30***, HW-N31***, HW-NM30** ("*"represents any alphanumeric character or blank)		
Model Difference	All the modes have the same technical construction. Including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction. All models are identical with each other except for model designation.		
Product Description	Operation Frequency	2402 MHz ~ 2480 MHz	
	Modulation Type		Data Rate
	GFSK		1Mbps
	Π/4-DQPSK		2Mbps
	8-DPSK		3Mbps
Rated Power Input	AC110-120V, 50/60Hz, 50W		
Bluetooth Version	BT V4.2		
Hardware Version	40-SPH88N-HFA2H-SS		
Software Version	V03		

5.2. MAXIMUM OUTPUT POWER

Bluetooth Mode	Frequency (MHz)	Channel Number	Max Output Power (dBm)	EIRP (dBm)
GFSK	2402-2480	0-78[79]	6.603	8.603
8DPSK	2402-2480	0-78[79]	6.606	8.606

Note: Owing to the 8DPSK mode has the bigger output power, so this mode would be selected as the worst case mode in this report.

5.3. PACKET TYPE CONFIGURATION

Test Mode	Packet Type	Setting(Packet Length)
GFSK	DH1	27
	DH3	183
	DH5	339
Π/4-DQPSK	2-DH1	54
	2-DH3	367
	2-DH5	679
8DPSK	3-DH1	83
	3-DH3	552
	3-DH5	1021

**5.4. CHANNEL LIST**

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel Number	Test Channel
GFSK	CH 00, CH 39, CH 78	Low, Middle, High
8DPSK	CH 00, CH 39, CH 78	Low, Middle, High

5.6. THE WORSE CASE POWER SETTING PARAMETER

The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		HC_Data_Test		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 00	CH 39	CH 78
GFSK	1	15	15	15
8-DPSK	1	15	15	15



5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2402-2480	PCB Antenna	2.0

Test Mode	Transmit and Receive Mode	Description
GFSK	1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.
8DPSK	1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.

5.8. WORST-CASE CONFIGURATIONS

Bluetooth Mode	Modulation Technology	Modulation Type	Data Rate (Mbps)
BR	FHSS	GFSK	1Mbit/s
EDR	FHSS	8DPSK	3Mbit/s

Note: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.



5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	USB to Serial board	N/A	N/A	N/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	AUX	/	/	/	/
2	USB	/	/	/	/
3	Optical	/	/	/	/

Note 1: The USB port only use for playing music.

Note 2: All the ports listed above would be tested and reported in FCC part 15B report.

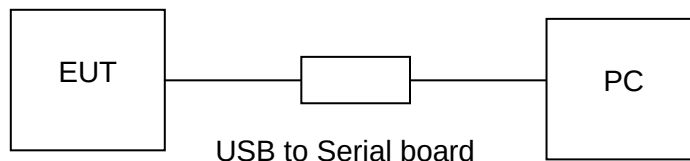
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
/	/	/	/	/

TEST SETUP

The EUT can work in an engineer mode with a software through a PC.

SETUP DIAGRAM FOR TESTS





5.10. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	EMI Test Receiver	R&S	ESR3	101961	Dec.12,2017	Dec.11,2018
☒	Two-Line V-Network	R&S	ENV216	101983	Dec.12,2017	Dec.11,2018
☒	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.12,2017	Dec.11,2018
Software						
Used	Description		Manufacturer	Name		Version
☒	Test Software for Conducted disturbance		Farad	EZ-EMC		Ver. UL-3A1
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.12,2017	Dec.11,2018
☒	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Jan.09, 2019
☒	Preamplifier	HP	8447D	2944A09099	Dec.12,2017	Dec.11,2018
☒	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12,2017	Dec.11,2018
☒	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Jan. 09, 2019
☒	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Jan.06, 2016	Jan.06, 2019
☒	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12,2017	Dec.11,2018
☒	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12,2017	Dec.11,2018
☒	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 25, 2019
Software						
Used	Description		Manufacturer	Name		Version
☒	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.12,2017	Dec.11,2018
☒	Power Meter	Keysight	N1911A	MY55416024	Dec.12,2017	Dec.11,2018
☒	Power Sensor	Keysight	N1921A	MY51100041	Dec.12,2017	Dec.11,2018



6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

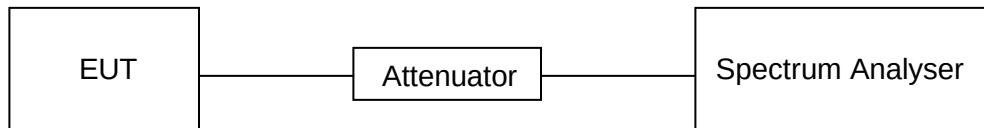
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



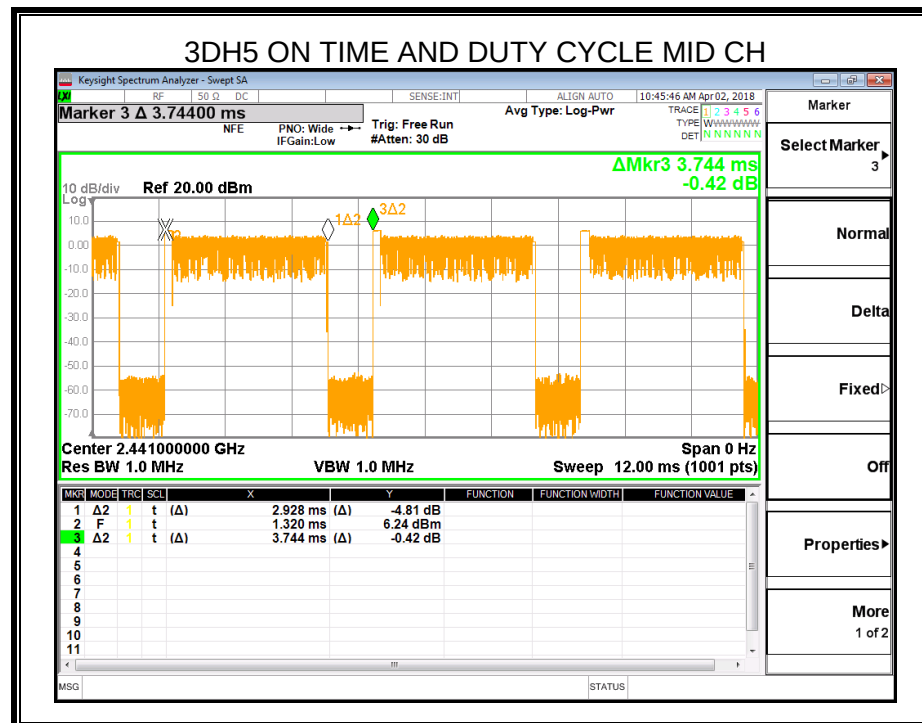
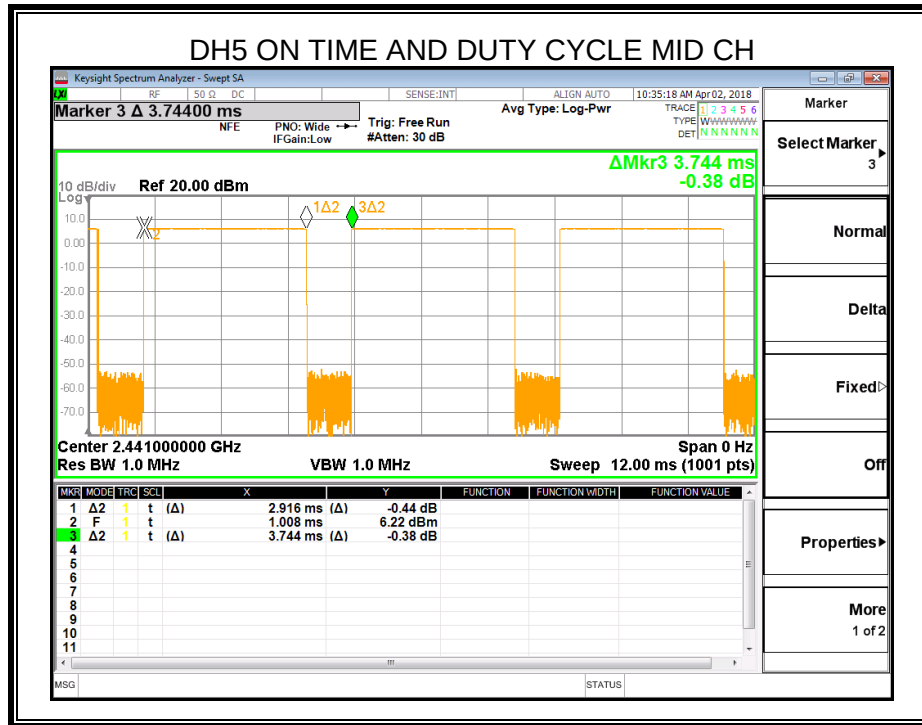
TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
GFSK	2.916	3.774	0.773	77	1.12	500
8DPSK	2.928	3.744	0.782	78	1.07	500

Note: Duty Cycle Correction Factor=10log(1/x).
Where: x is Duty Cycle(Linear)
Where: T is On Time (transmit duration)





6.2. 20 dB BANDWIDTH AND 99% BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1)	20dB Bandwidth	N/A	2400-2483.5

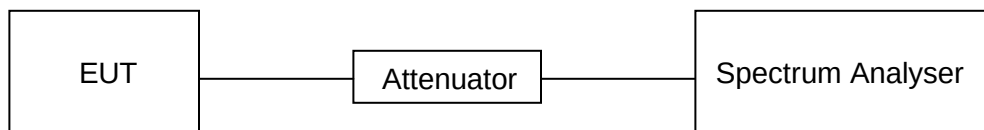
TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 20dB Bandwidth: 1% of the 20 dB bandwidth For 99% Bandwidth: 1% to 5% of the occupied bandwidth
VBW	For 20dB Bandwidth: $\geq$ RBW For 99% Bandwidth: approximately $3 \times$ RBW
Span	approximately 2 to 3 times the 20 dB bandwidth
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP





TEST ENVIRONMENT

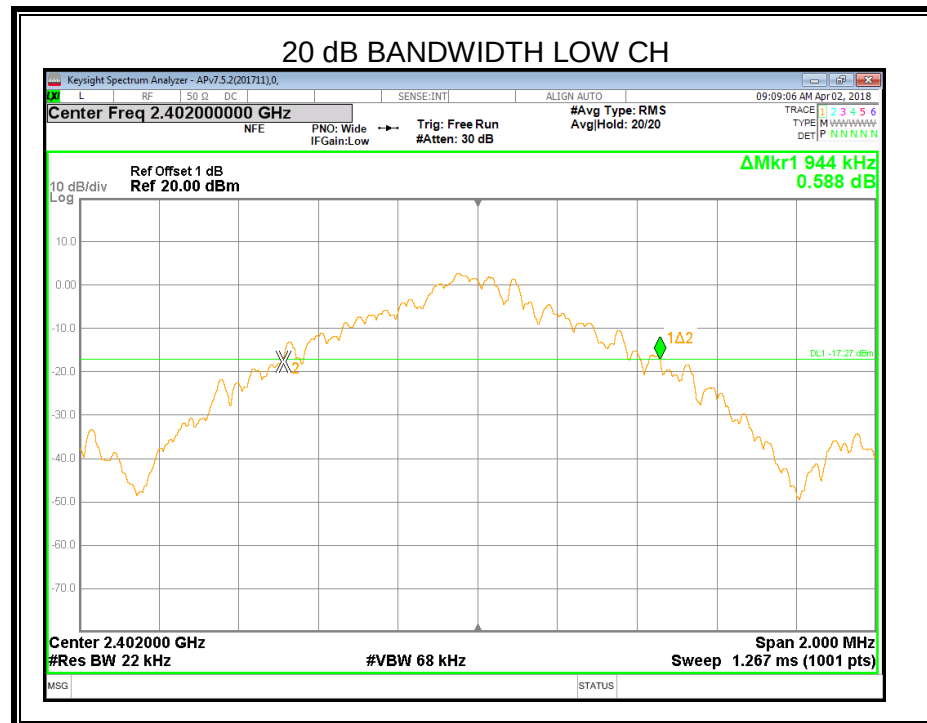
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

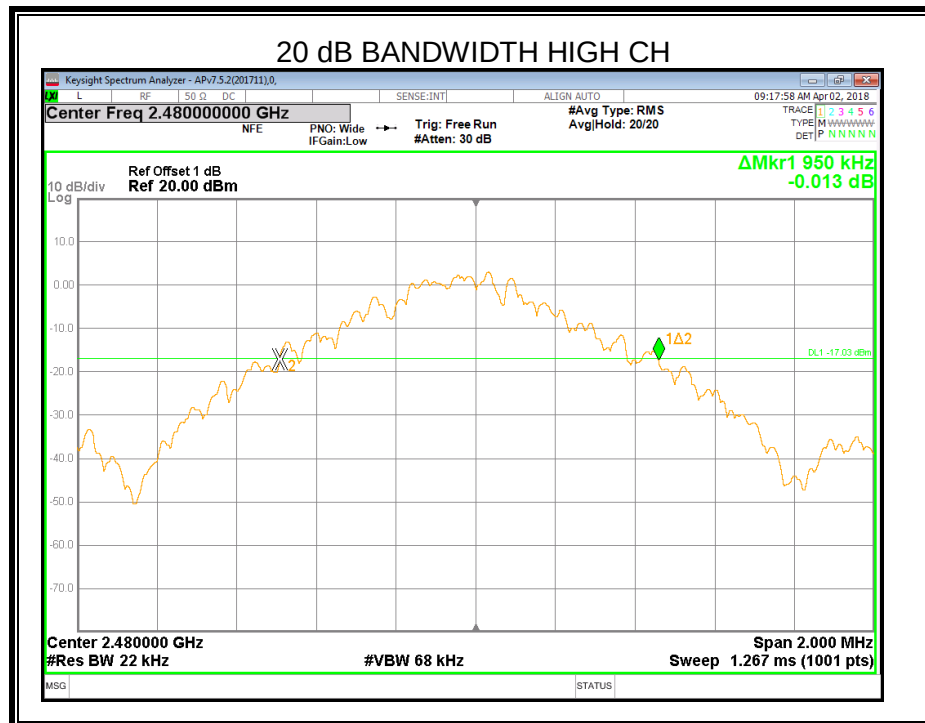
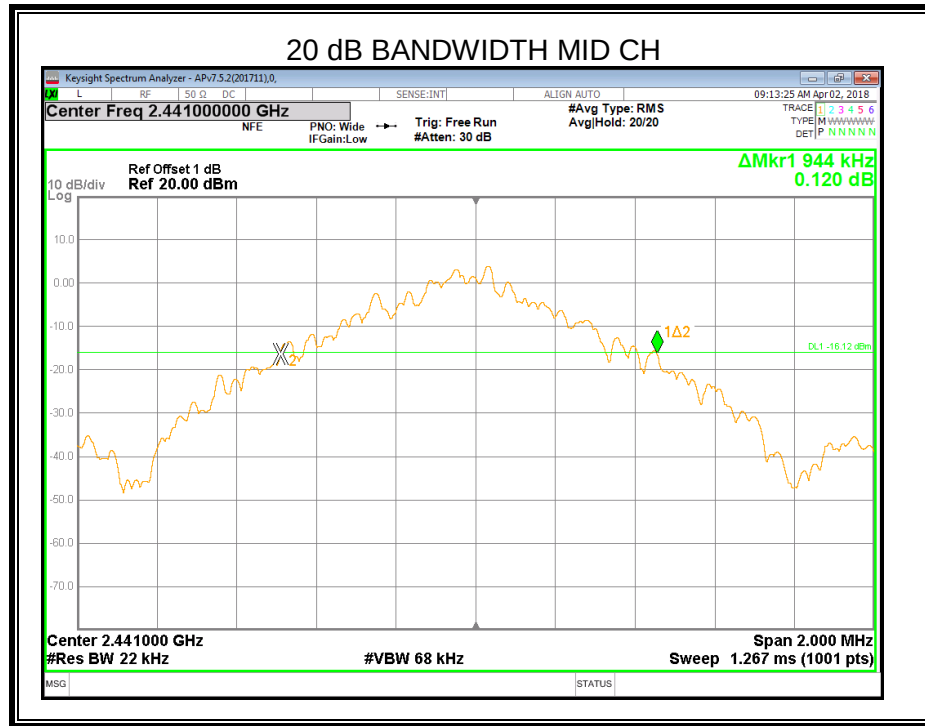
RESULTS

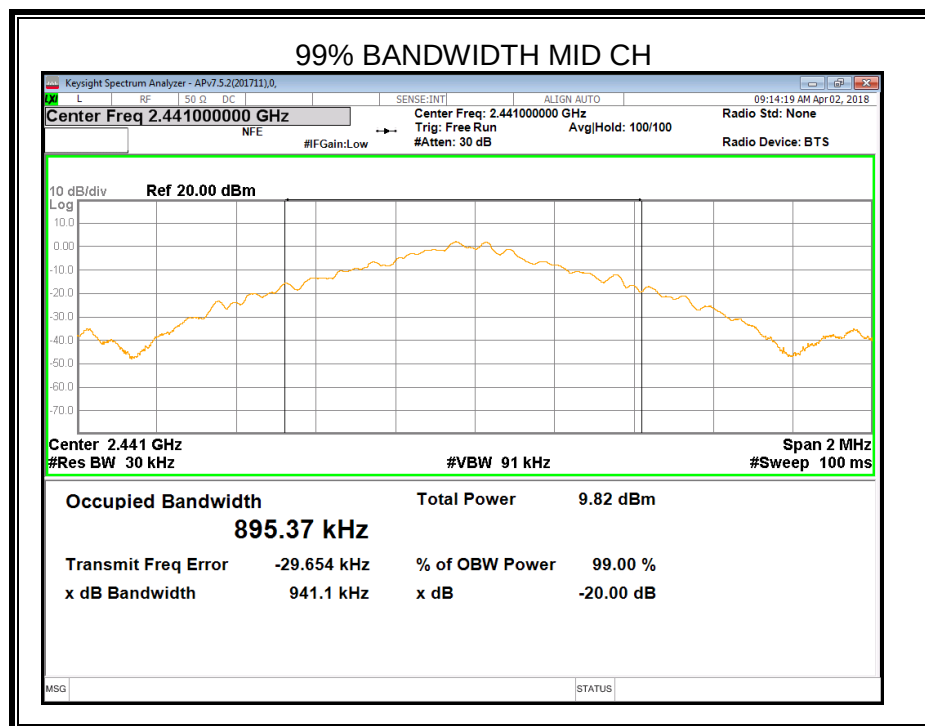
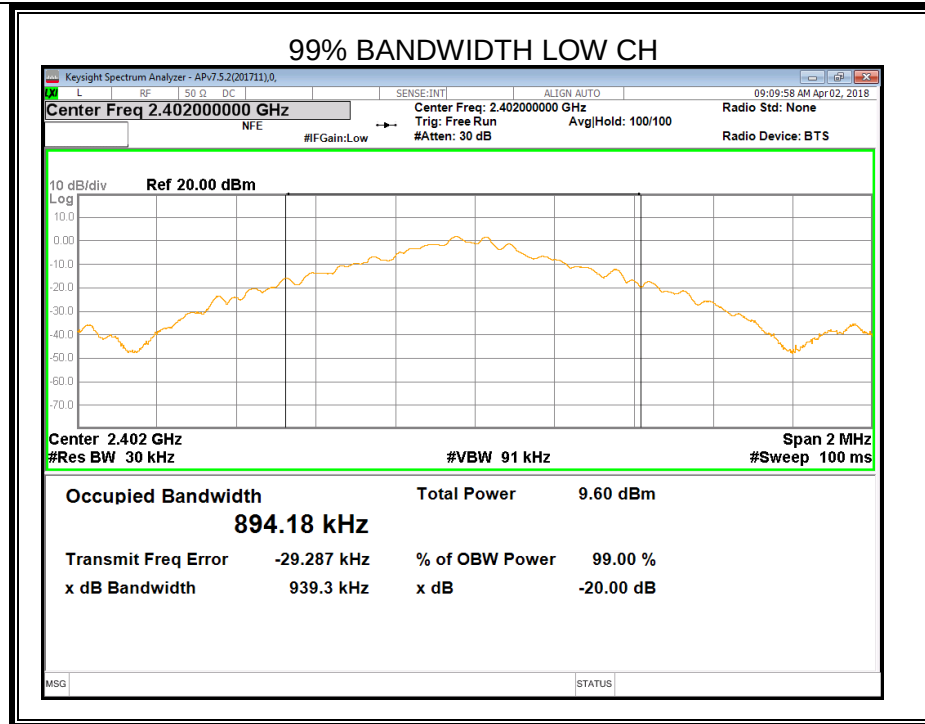
6.2.1. GFSK MODE

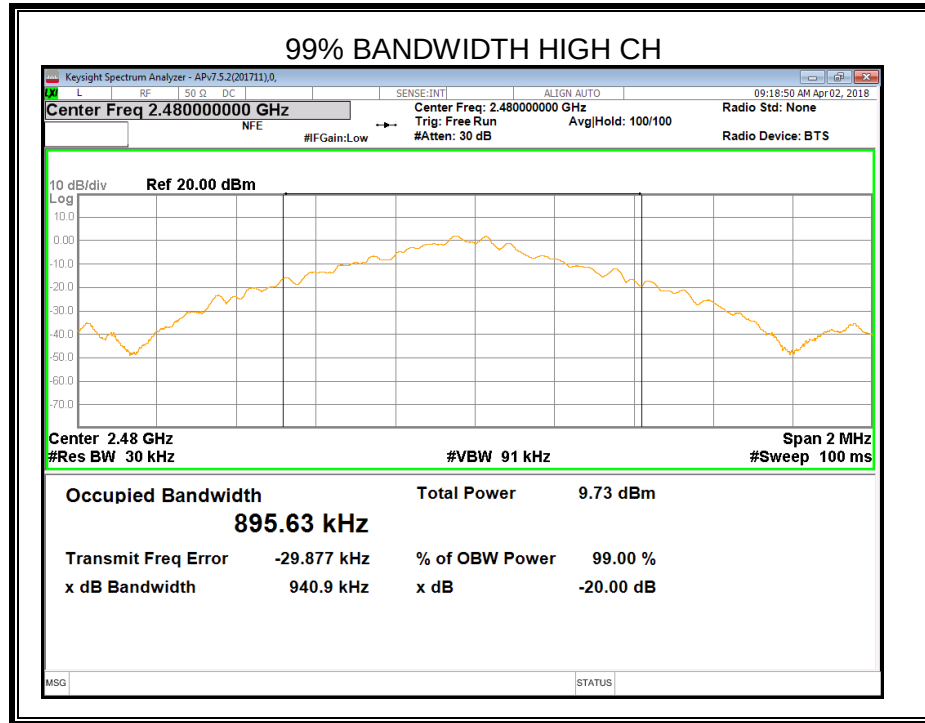
Channel	Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
Low	2402	0.944	0.894	PASS
Middle	2441	0.944	0.895	PASS
High	2480	0.950	0.896	PASS

Test Graph



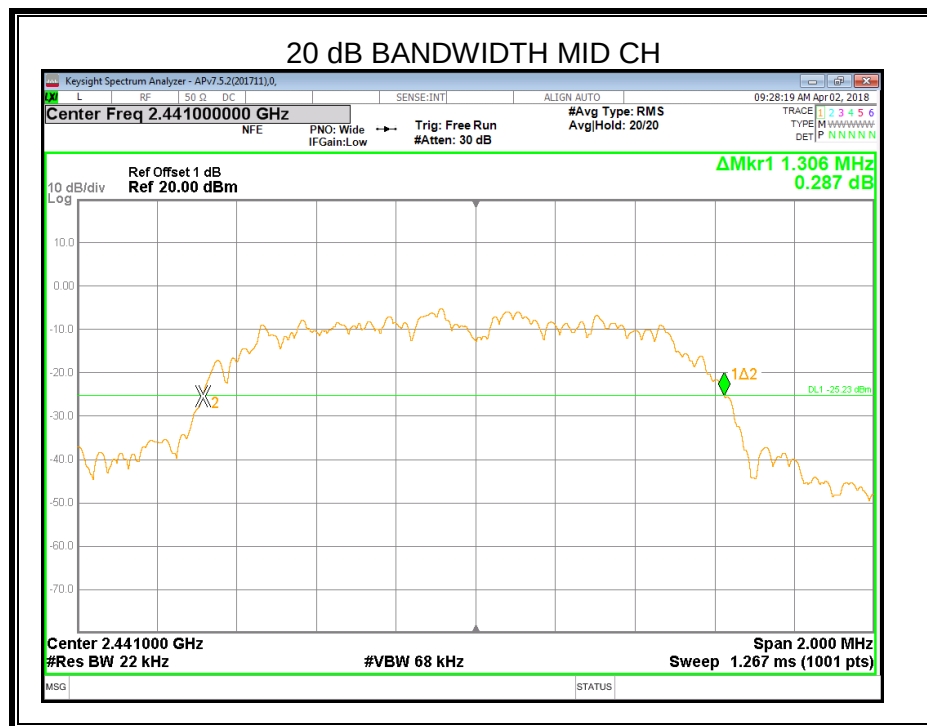
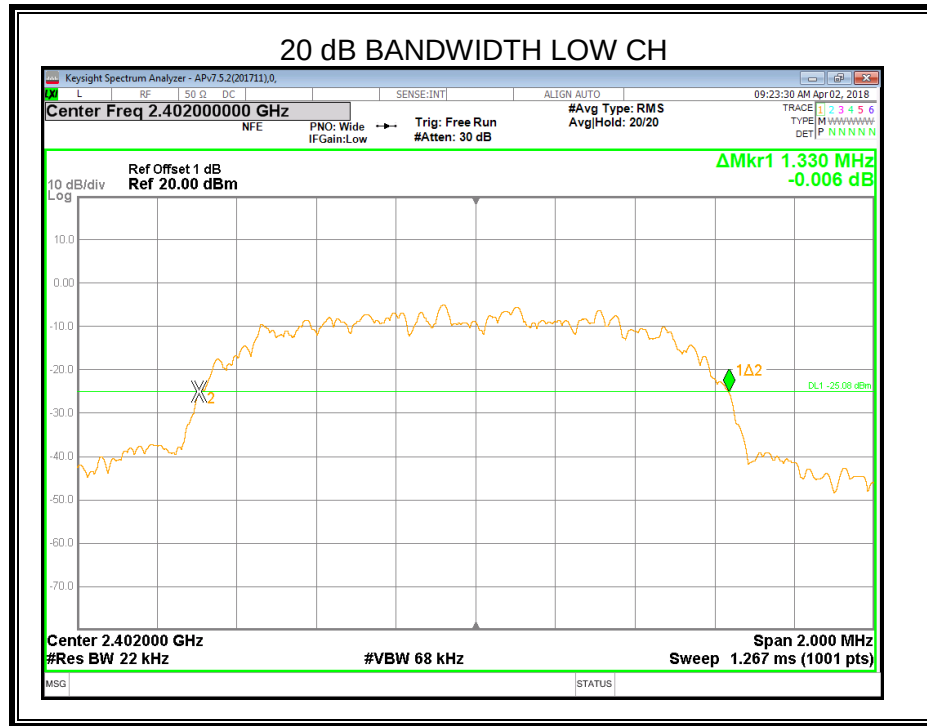


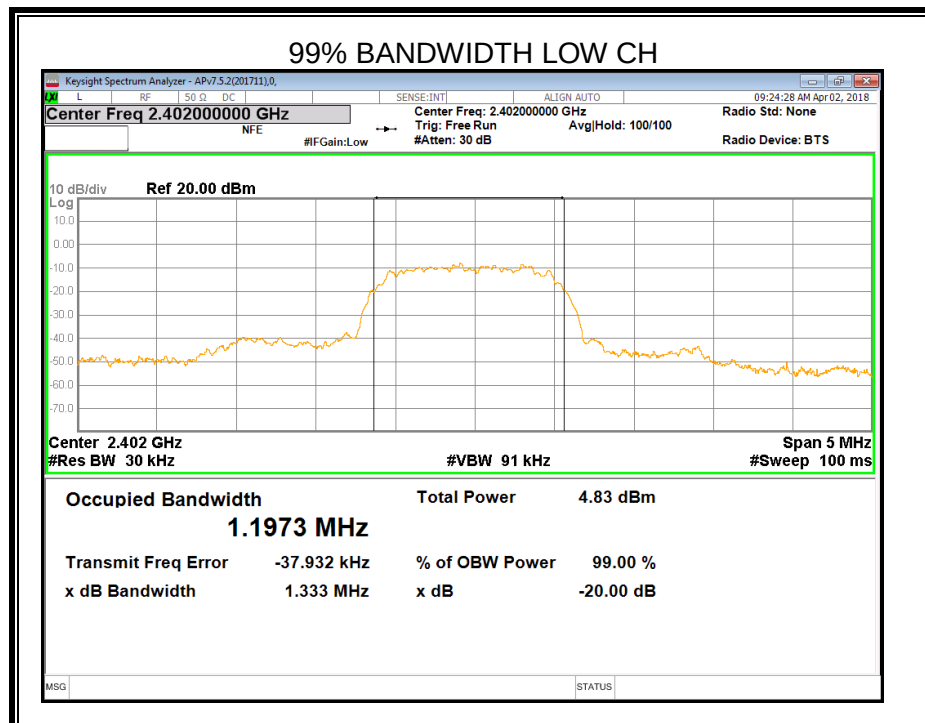
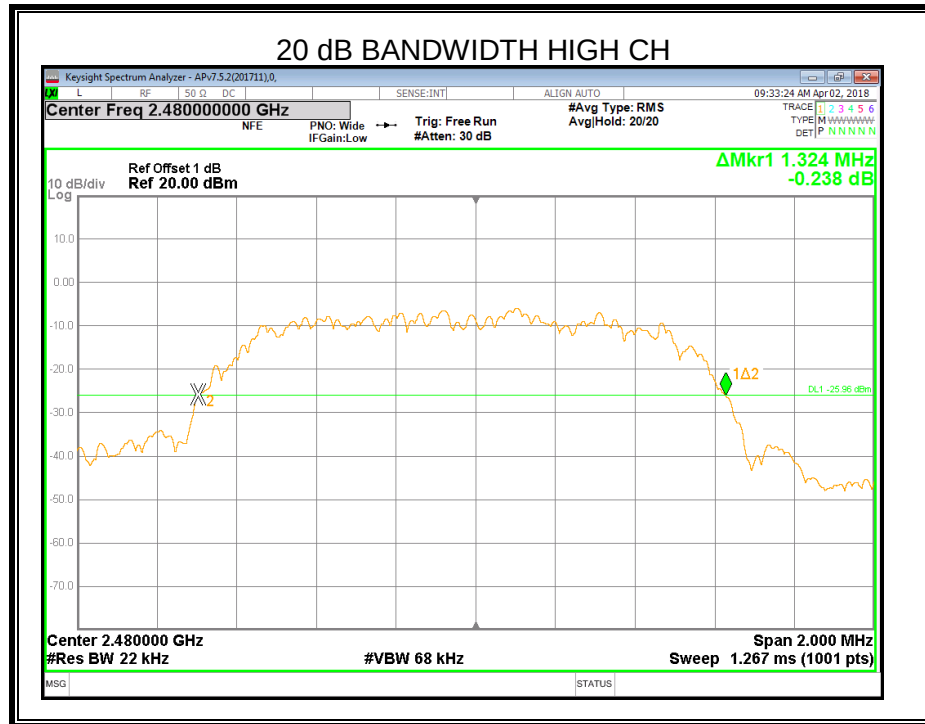


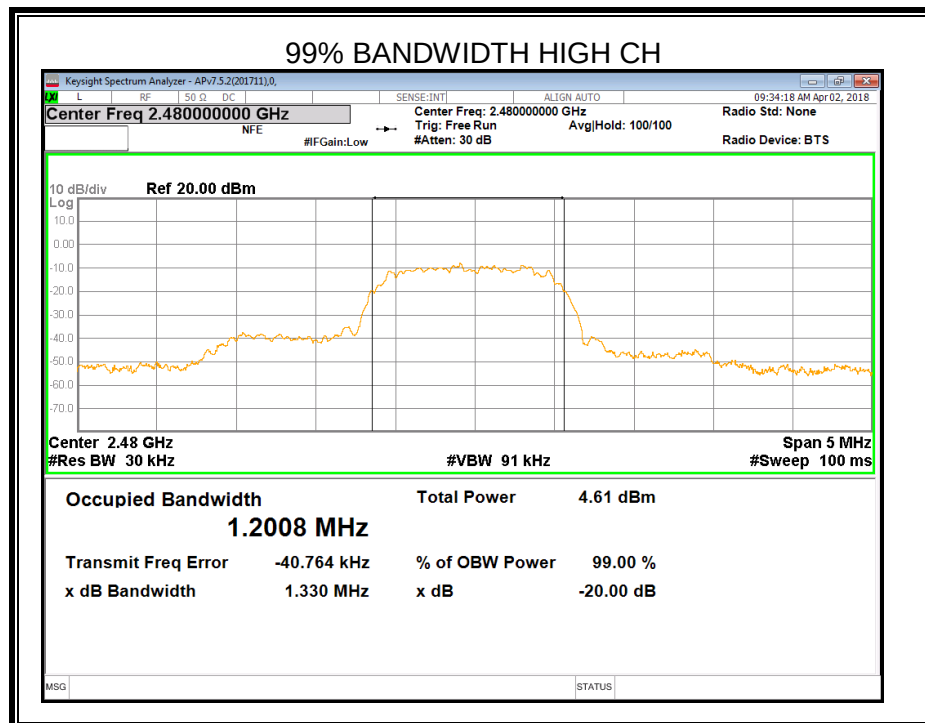
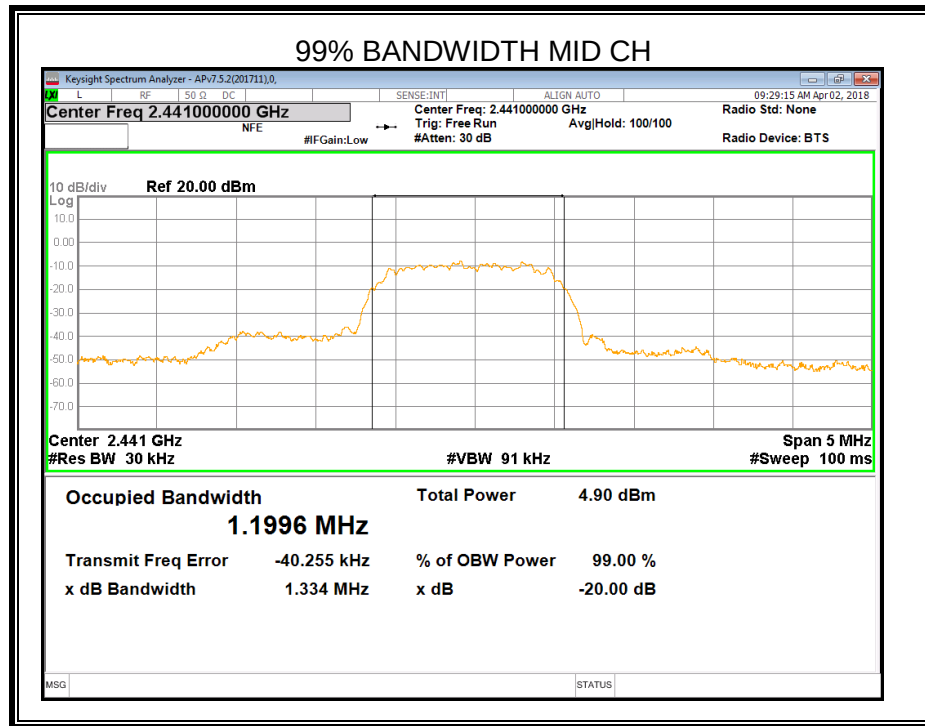


6.2.2. 8DPSK MODE

Channel	Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
Low	2402	1.330	1.1973	Pass
Middle	2441	1.306	1.1996	Pass
High	2480	1.324	1.2008	Pass









6.3. PEAK CONDUCTED OUTPUT POWER

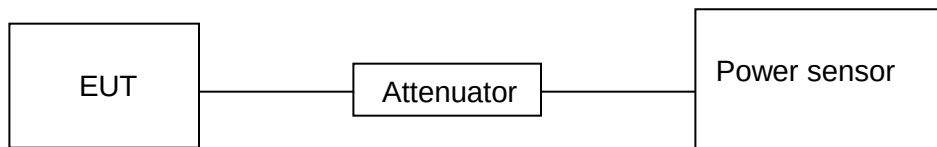
LIMITS

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (b) (1)	Peak Conducted Output Power	1 watt or 30dBm	2400-2483.5

TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure peak power each channel.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

RESULTS

**6.3.1. PEAK CONDUCTED OUTPUT POWER GFSK MODE**

Channel	Frequency	Maximum Conducted Output Power(PK)	EIRP	Result
	(MHz)	(dBm)	(dBm)	
Low	2402	6.603	8.603	Pass
Middle	2441	6.299	8.299	Pass
High	2480	6.202	8.202	Pass

Note: EIRP= Maximum Conducted Output Power + Antenna Gain

6.3.2. PEAK CONDUCTED OUTPUT POWER 8DPSK MODE

Channel	Frequency	Maximum Conducted Output Power(PK)	EIRP	Result
	(MHz)	(dBm)	(dBm)	
Low	2402	6.606	8.606	Pass
Middle	2441	6.314	8.314	Pass
High	2480	6.220	8.220	Pass

6.3.3. AVG CONDUCTED OUTPUT POWER GFSK MODE (WORST CASE)

Channel	Frequency	Maximum Conducted Output Power(AVG)	Result
	(MHz)	(dBm)	
Low	2402	6.32	Pass
Middle	2441	6.01	Pass
High	2480	5.98	Pass



6.4. CARRIER HOPPING CHANNEL SEPARATION

LIMITS

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1)	Carrier Hopping Channel Separation	25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.	2400-2483.5

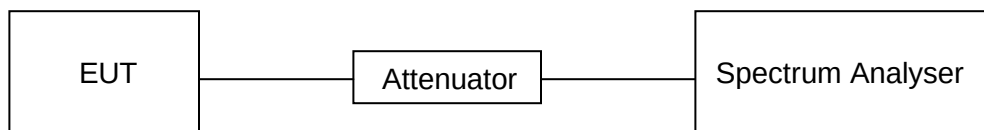
TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
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.
VBW	$\geq$ RBW
Trace	Max hold
Sweep time	Auto couple

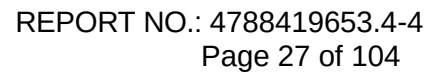
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ



6.4.1. GFSK MODE

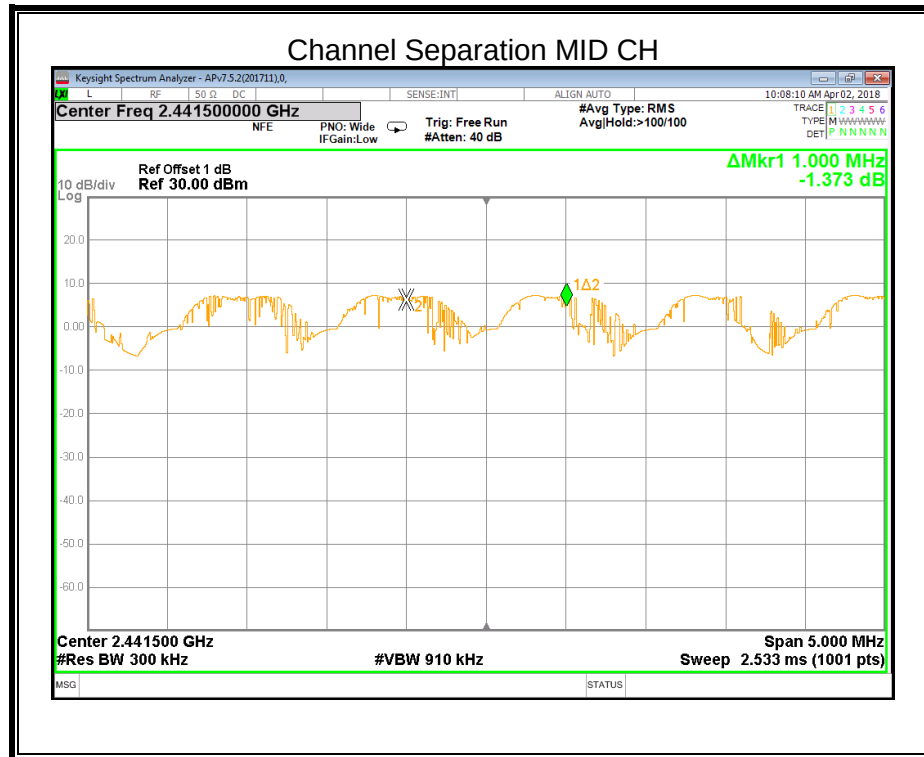
[illegible]

Note: For 20 dB Bandwidth of The Hopping Channel, please refer to clause 6.2.



6.4.2. 8DPSK MODE

Channel	Carrier Hopping Channel Separation (MHz)	Limit (MHz)	Result
Middle	1.0	≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel	PASS



Note: For 20 dB Bandwidth of The Hopping Channel, please refer to clause 6.2.



6.5. NUMBER OF HOPPING FREQUENCY

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247 (a) (1) III	Number of Hopping Frequency	at least 15 hopping channels

TEST PROCEDURE

Connect the EUT to the spectrum analyser and use the following settings:

Detector	Peak
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
Span	The frequency band of operation
Trace	Max hold
Sweep time	Auto couple

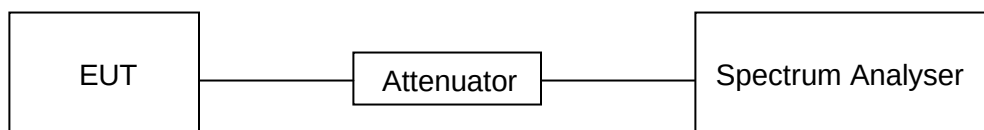
Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.

Count the quantity of peaks to get the number of hopping channels.

Normal Mode: 79 Channels observed.

AFH Mode: 20 Channels declared.

TEST SETUP



TEST ENVIRONMENT

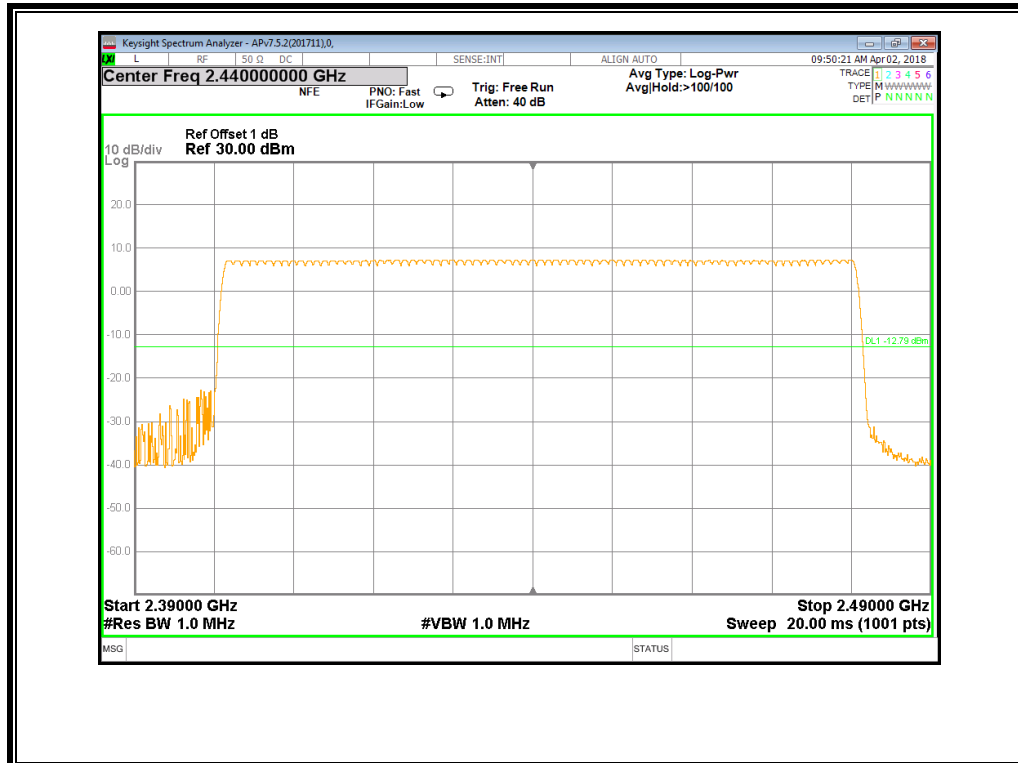
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

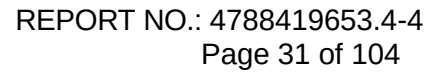


RESULTS

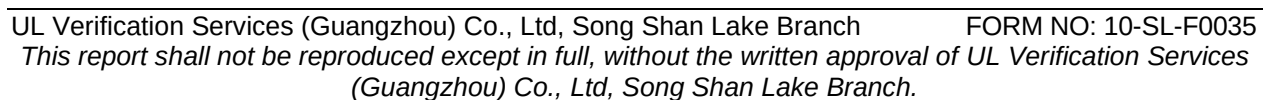
GFSK MODE

Hopping numbers	Limit	Results
79	>15	Pass





Hopping numbers	Limit	Results
79	>15	Pass





6.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247 (a) (1) III	Time of Occupancy (Dwell Time)	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.

TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1 MHz
VBW	≥RBW
Span	zero span
Trace	Max hold
Sweep time	As necessary to capture the entire dwell time per hopping channel

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
 $A \text{ Period Time} = (\text{channel number}) * 0.4$

For Normal Mode (79 Channel):

DH1 Time Slot: Reading * (1600/2)*31.6/(channel number)

DH3 Time Slot: Reading * (1600/4)*31.6/(channel number)

DH5 Time Slot: Reading * (1600/6)*31.6/(channel number)

For AFH Mode (20 Channel):

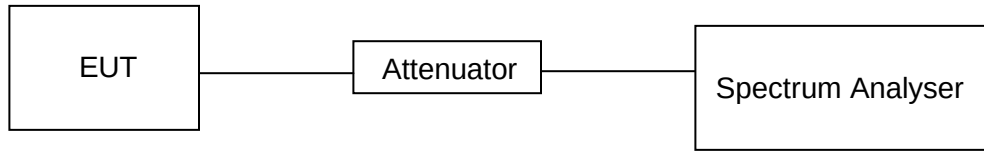
DH1 Time Slot: Reading * (1600/2)*8/(channel number)

DH3 Time Slot: Reading * (1600/4)*8/(channel number)

DH5 Time Slot: Reading * (1600/6)*8/(channel number)



TEST SETUP



TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

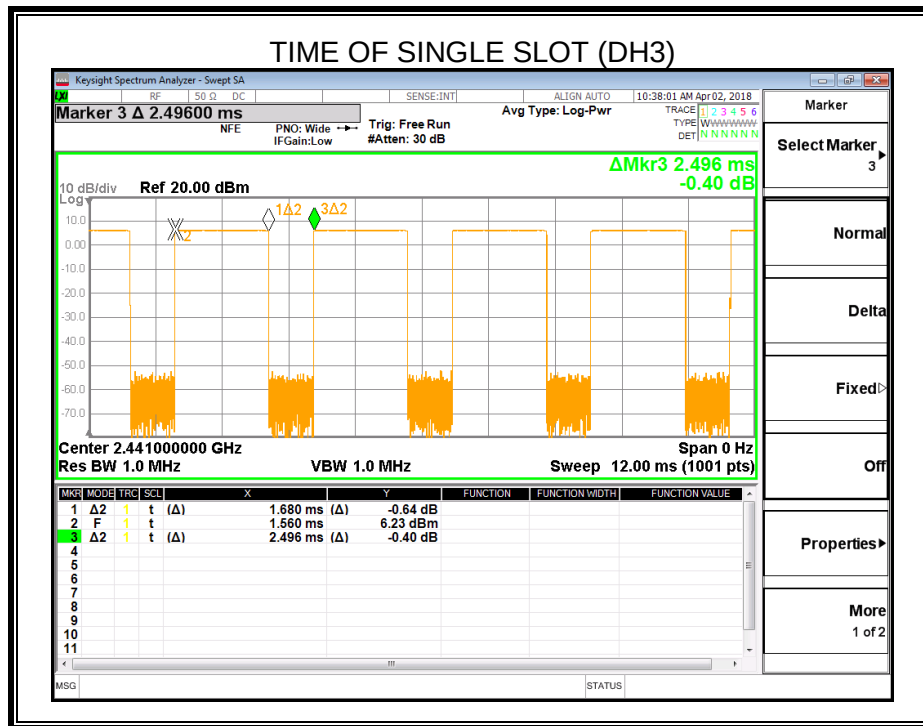
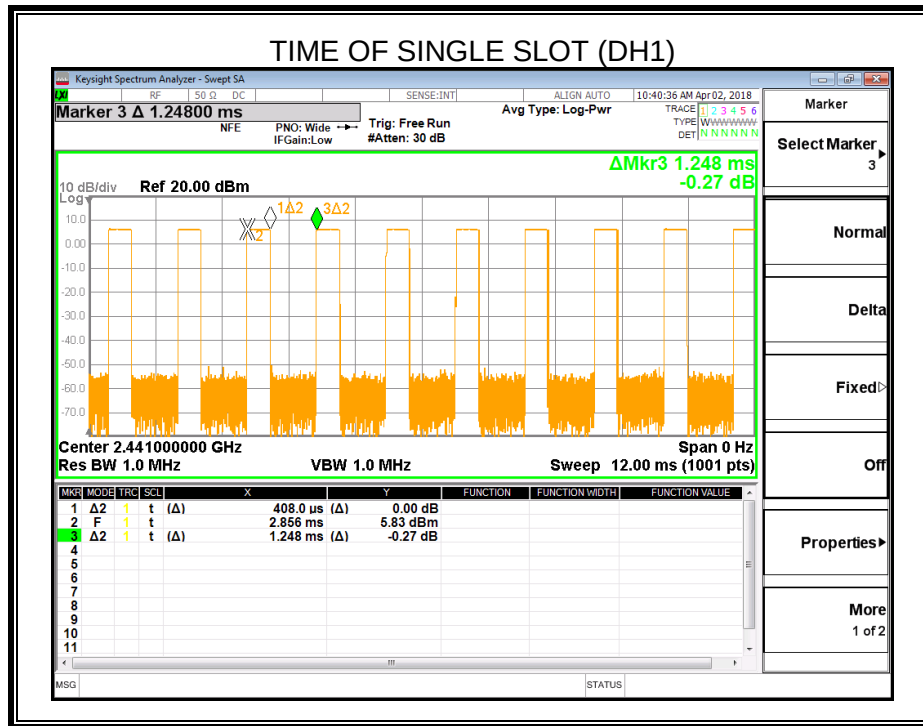
RESULTS

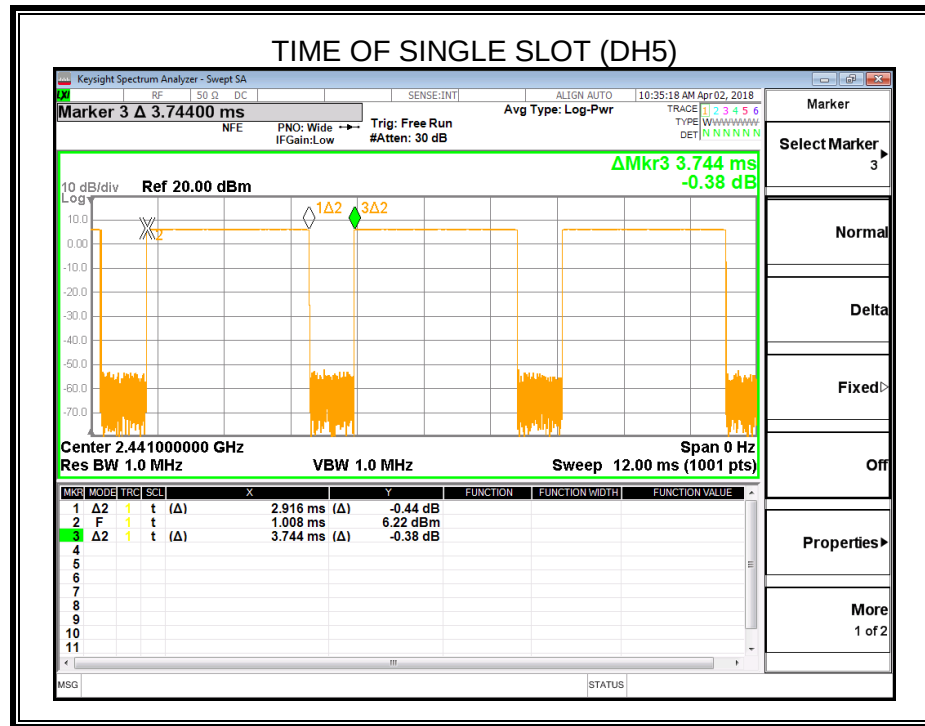
6.6.1. GFSK MODE

Normal Mode				
Packet	Channel	Burst Width [ms/hop/ch]	Dwell Time [s]	Results
DH1	MCH	0.408	0.131	PASS
DH3	MCH	1.680	0.269	PASS
DH5	MCH	2.916	0.311	PASS
AFH Mode				
DH1	MCH	0.408	0.131	PASS
DH3	MCH	1.680	0.269	PASS
DH5	MCH	2.916	0.311	PASS



Test Graph

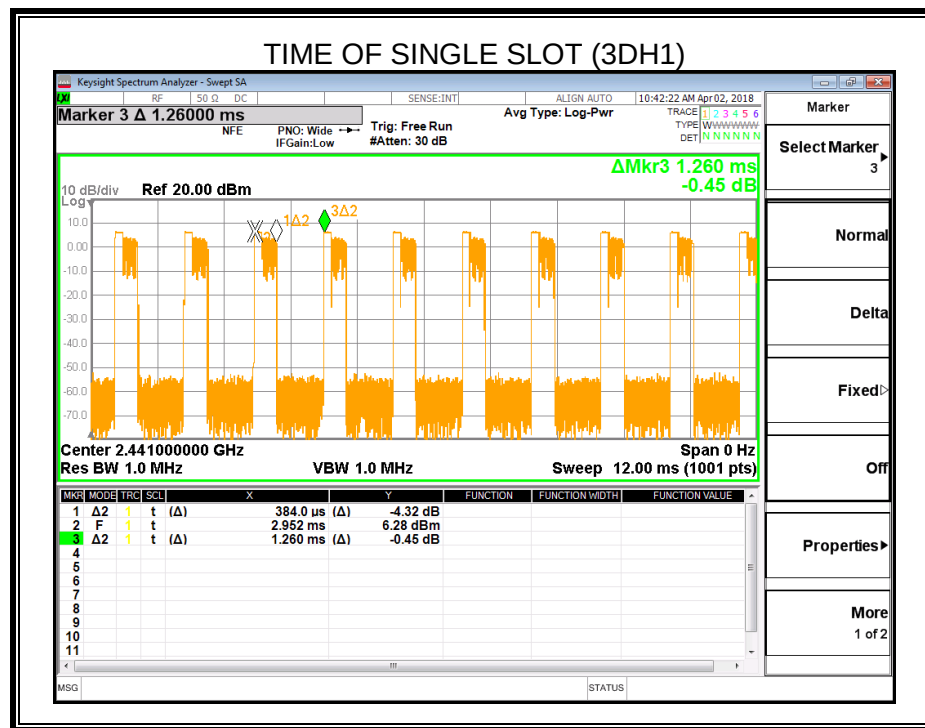


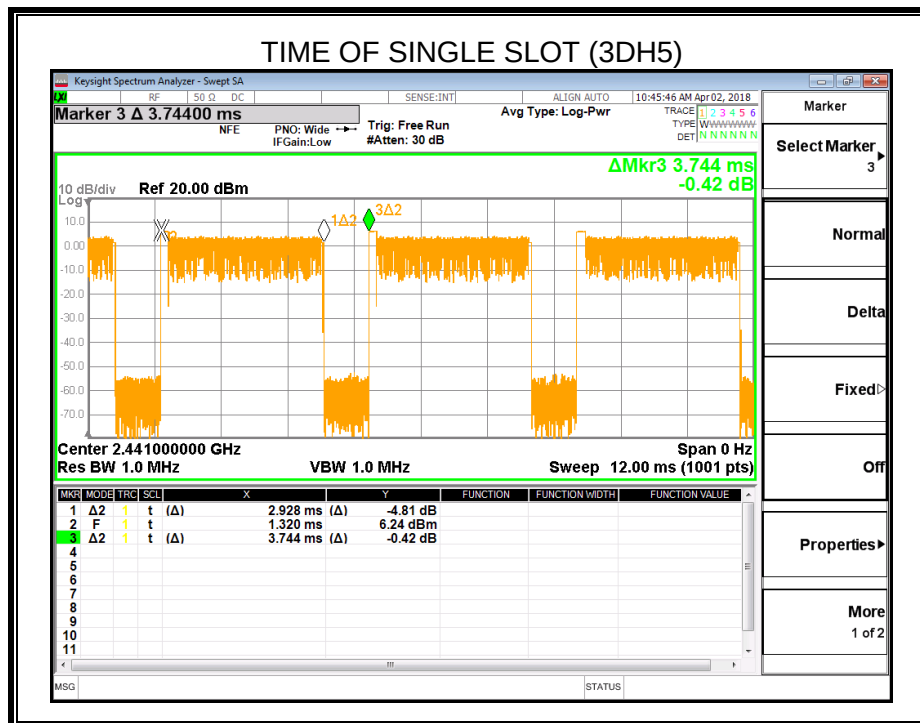
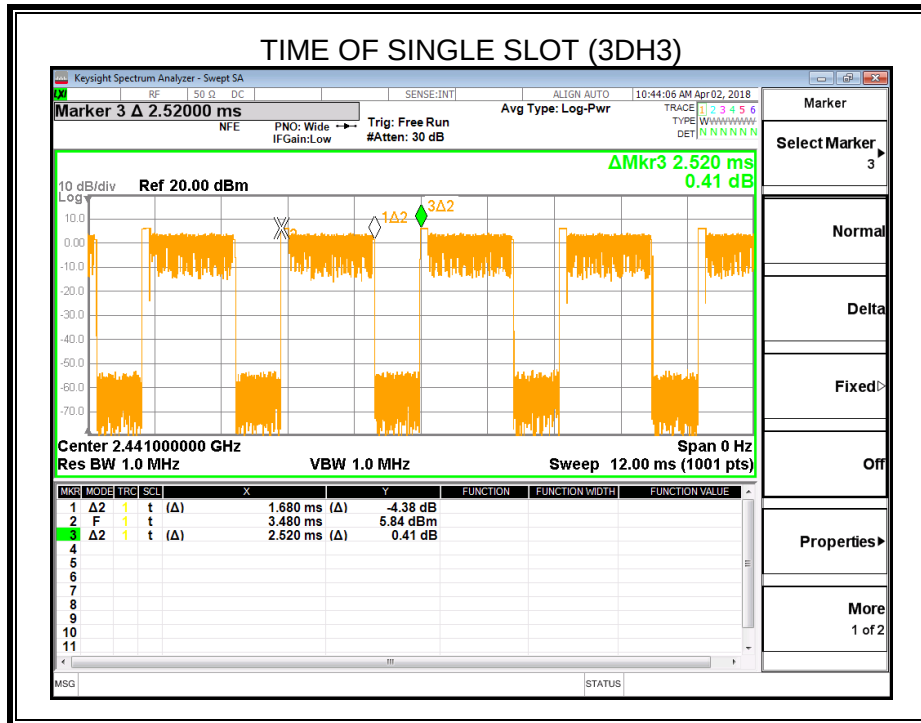


6.6.2. 8DPSK MODE

Normal Mode				
Packet	Channel	Burst Width [ms/hop/ch]	Dwell Time [s]	Results
3DH1	MCH	0.384	0.123	PASS
3DH3	MCH	1.680	0.269	PASS
3DH5	MCH	2.928	0.312	PASS
AFH Mode				
3DH1	MCH	0.384	0.123	PASS
3DH3	MCH	1.680	0.269	PASS
3DH5	MCH	2.928	0.312	PASS

Test Graph







6.7. CONDUCTED SPURIOUS EMISSION

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
FCC §15.247 (d)	Conducted Spurious Emission	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

For Bandedge Test:

- a) Connect the EMI receiver or spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).
- b) Set the EUT to the lowest frequency channel (for the hopping on test, the hopping sequence shall include the lowest frequency channel).
- c) Set the EUT to operate at maximum output power and 100% duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.
- d) If using the radiated method, then use the applicable procedure(s) of 6.4, 6.5, or 6.6, and orient the EUT and measurement antenna positions to produce the highest emission level.
- e) Perform the test as follows:
 - 1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
 - 2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.
 - 3) Attenuation: Auto (at least 10 dB preferred).
 - 4) Sweep time: Coupled.
 - 5) Resolution bandwidth: 100 kHz.
 - 6) Video bandwidth: 300 kHz.
 - 7) Detector: Peak.
 - 8) Trace: Max hold.
- f) Allow the trace to stabilize. For the test with the hopping function turned ON, this can take several minutes to achieve a reasonable probability of intercepting any emissions due to oscillator overshoot.

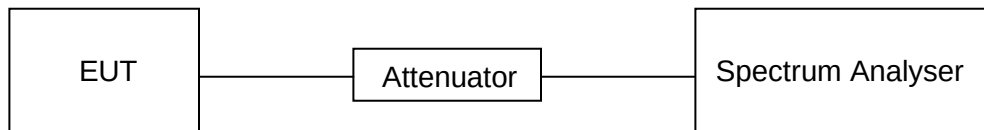


For Spurious Emission use the following settings:

Detector	Peak
RBW	100K
VBW	$\geq$ RBW
Span	wide enough to fully capture the emission being measured
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

TEST SETUP



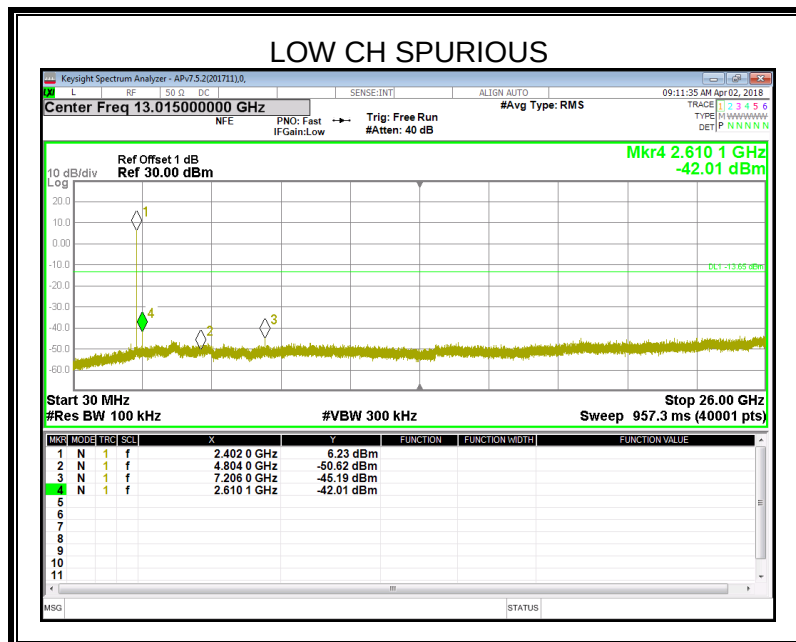
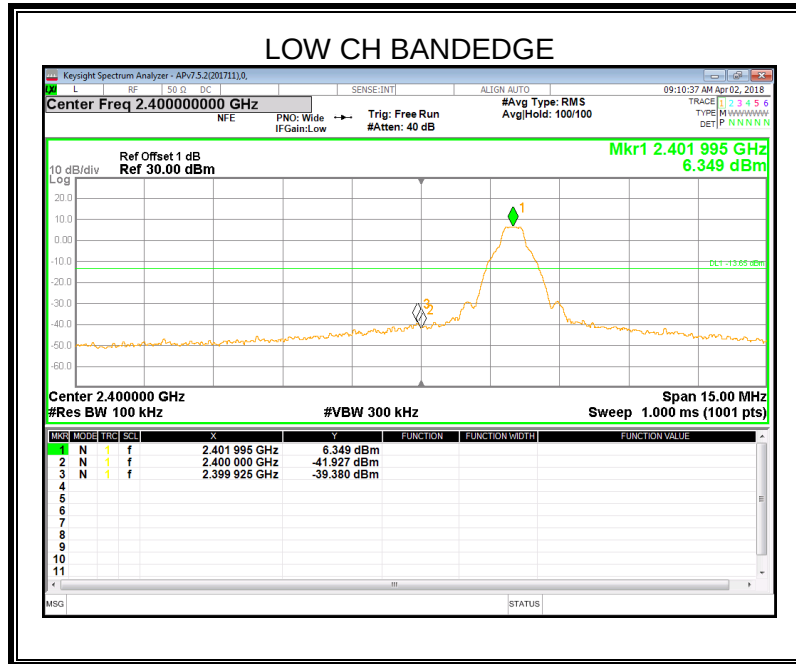
TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

RESULTS

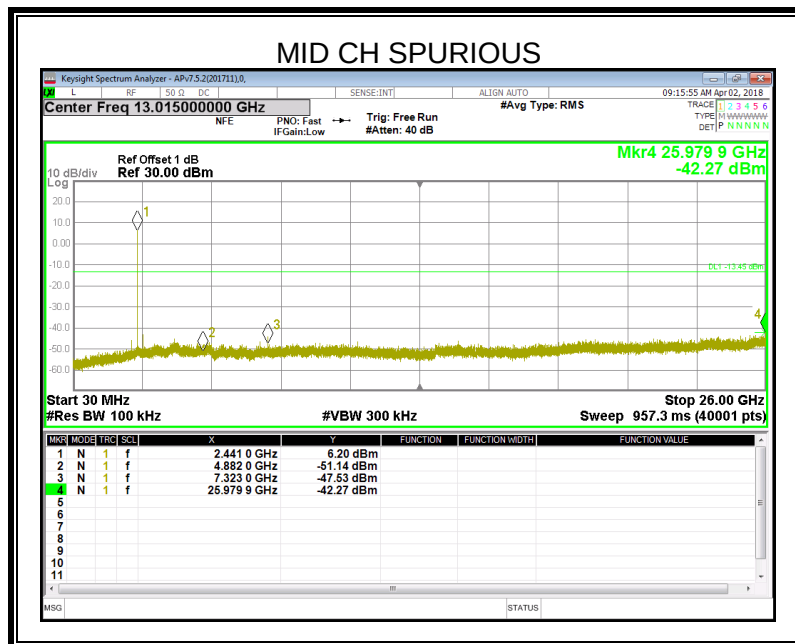
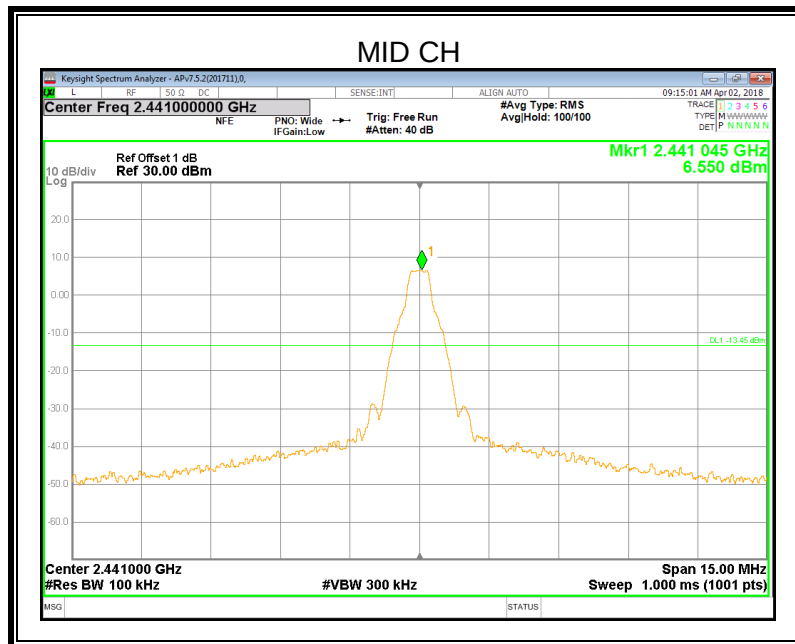
6.7.1. GFSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL



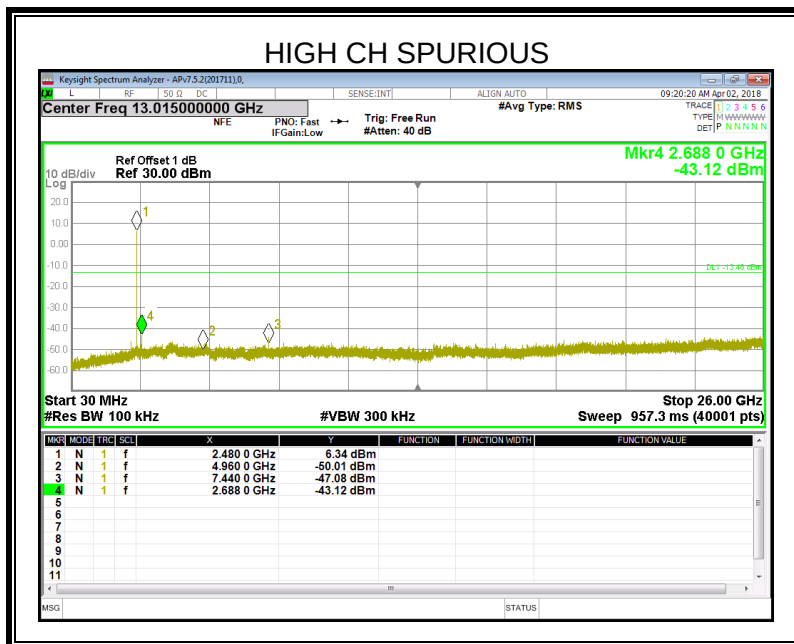
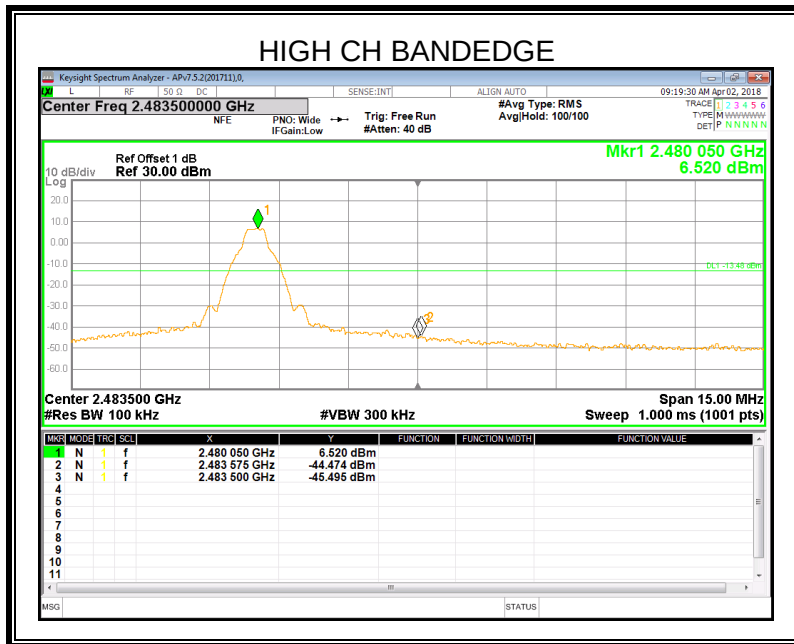


SPURIOUS EMISSIONS, MID CHANNEL



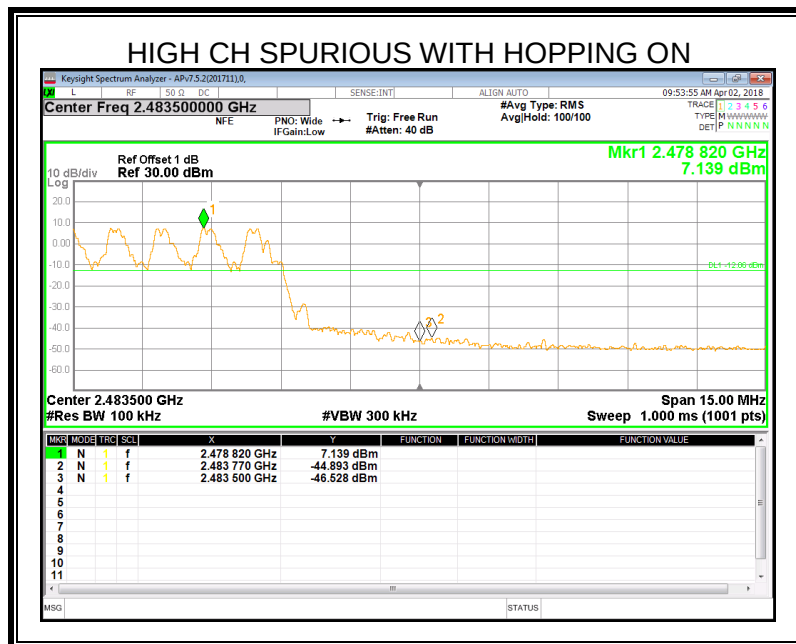
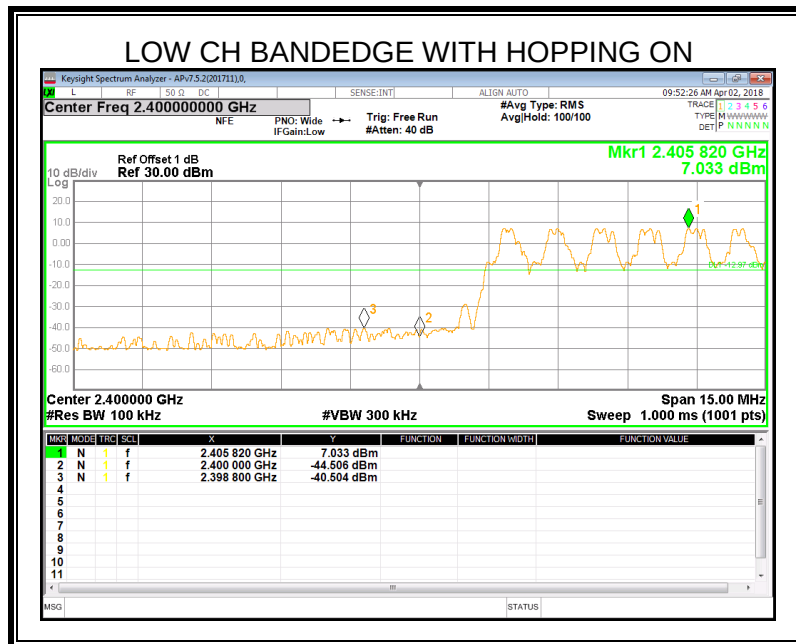


SPURIOUS EMISSIONS, HIGH CHANNEL



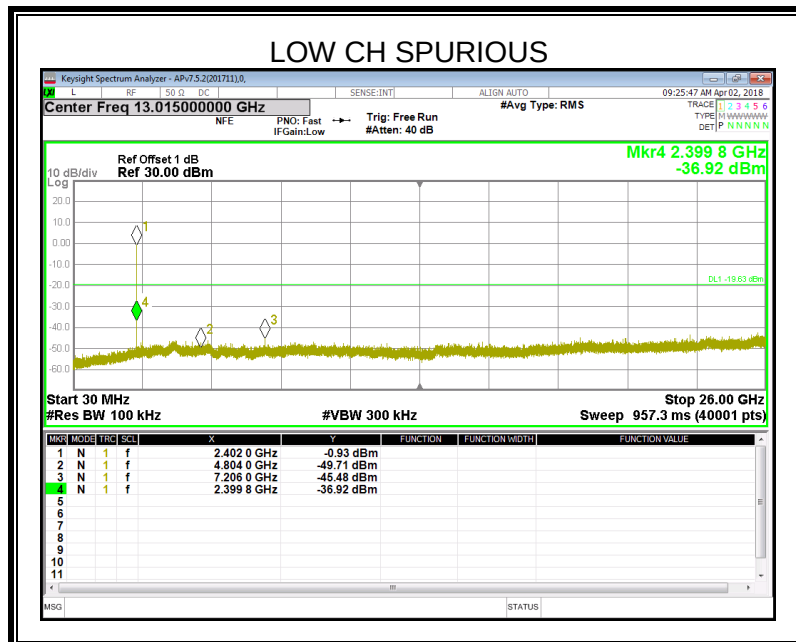
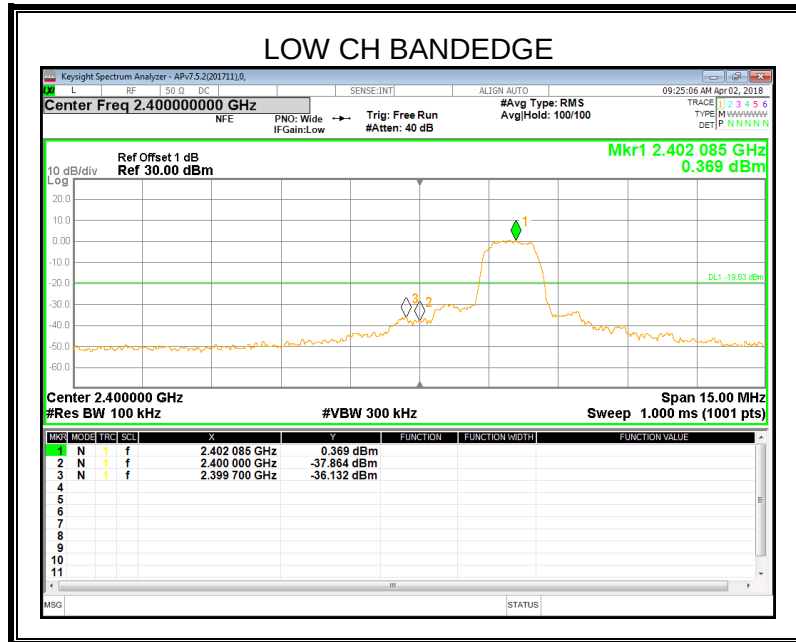


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



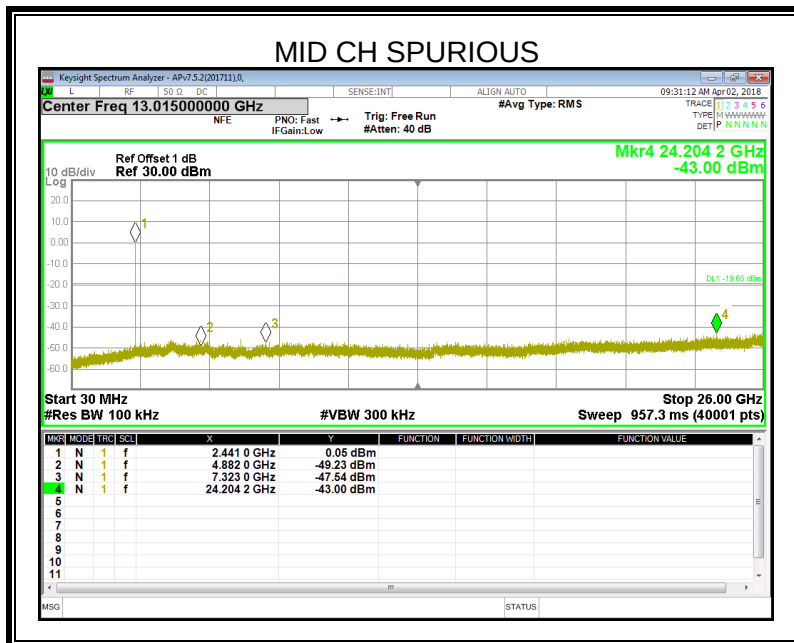
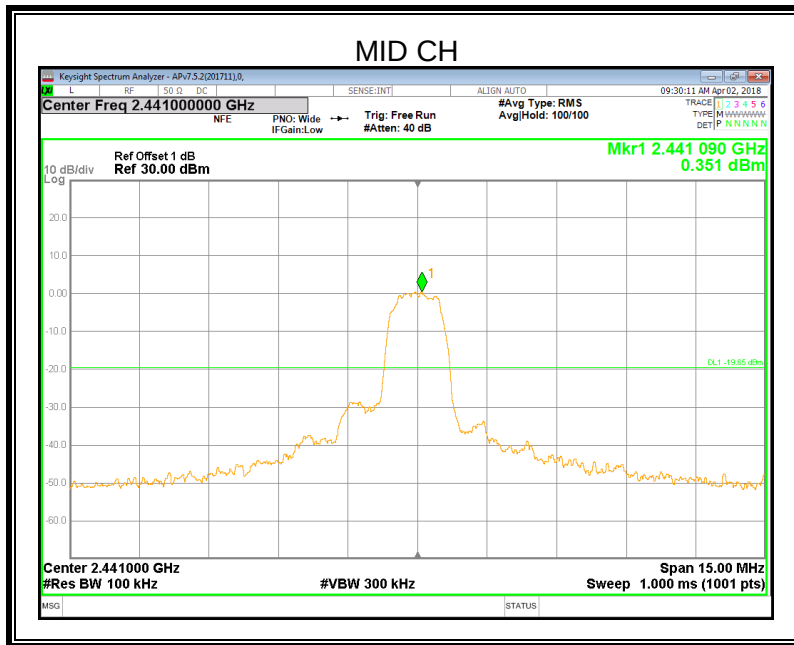
6.7.2. 8DPSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL



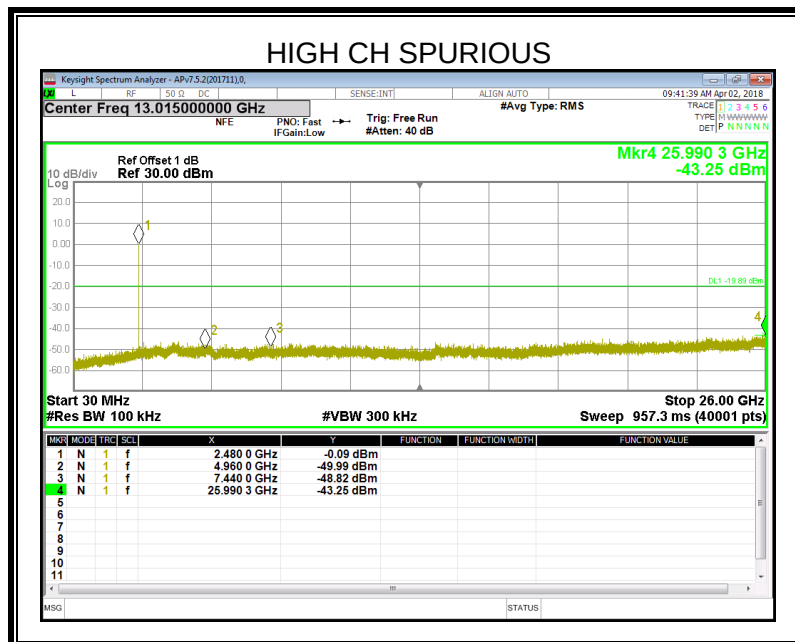
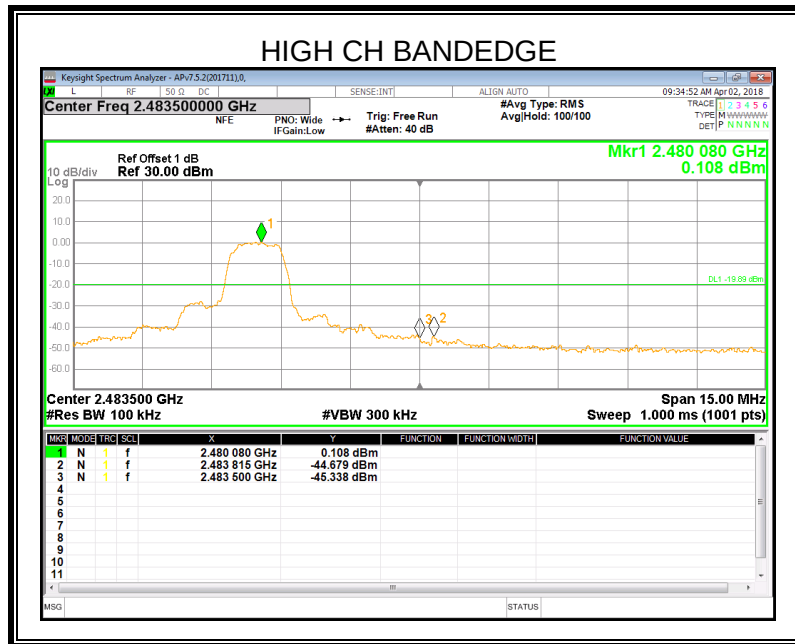


SPURIOUS EMISSIONS, MID CHANNEL



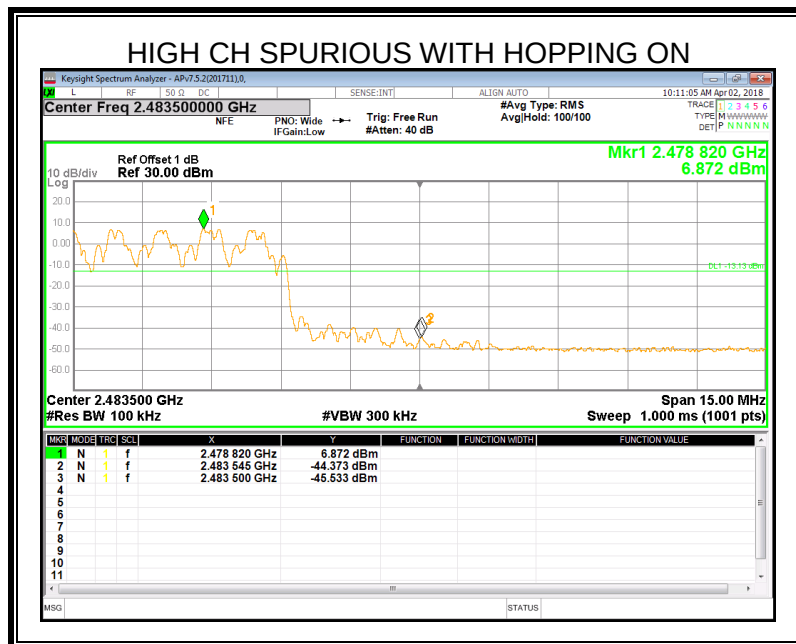
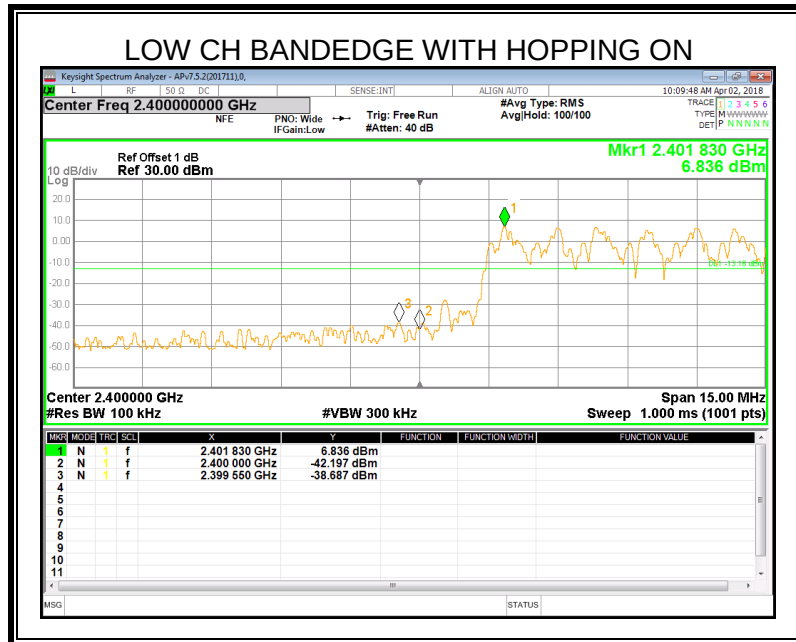


SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to SS-GEN Clause 8.9 and Clause 8.10

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.



Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Restricted bands of operation

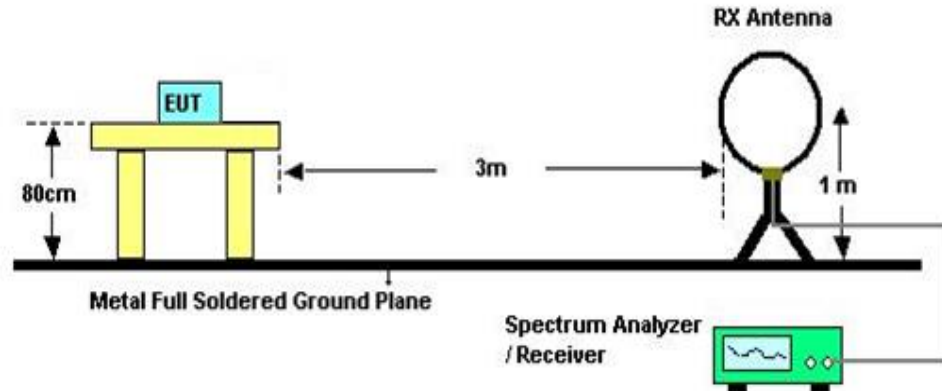
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218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

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST SETUP AND PROCEDURE

Below 30MHz

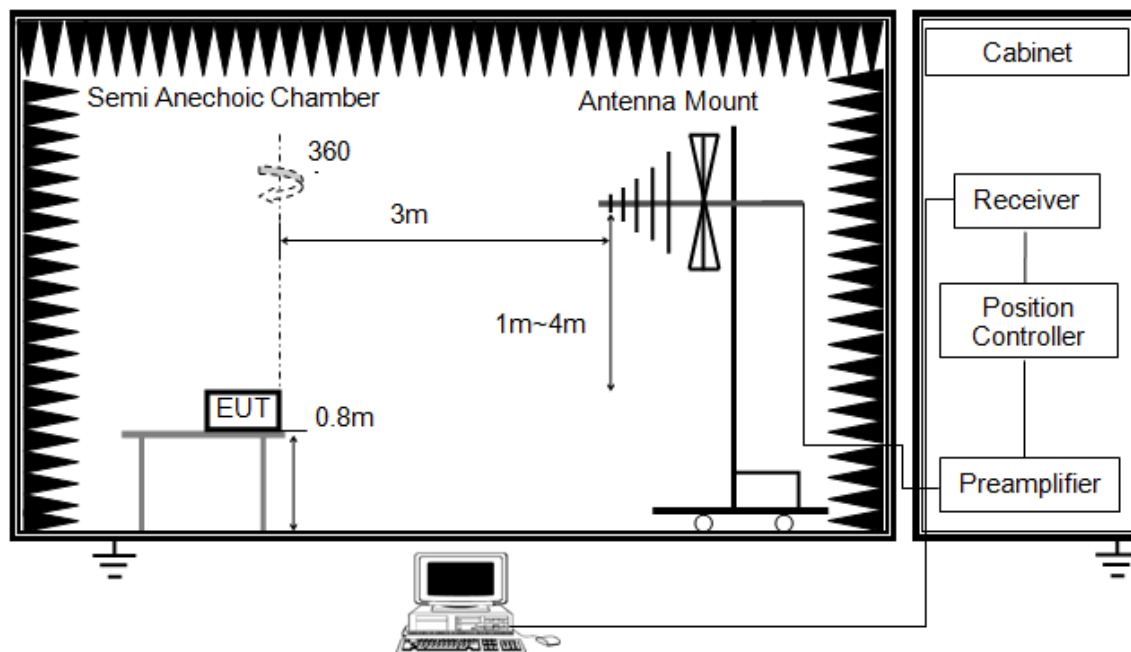


The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 and 414788 D01 Radiated Test Site v01.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. The radiated emission limits 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.
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Below 1G and above 30MHz

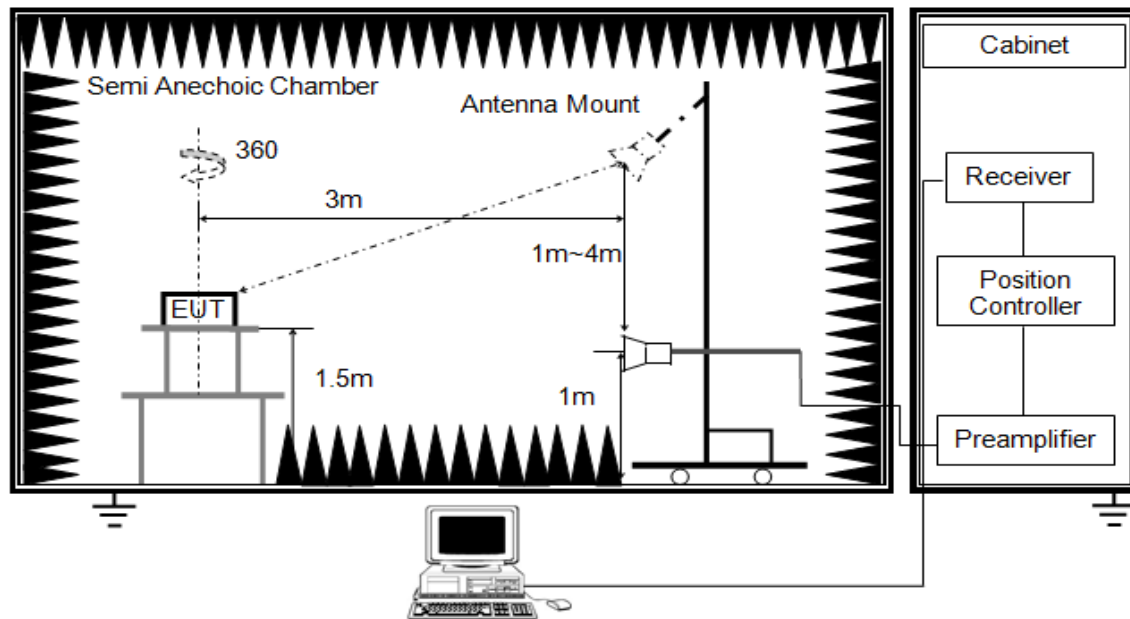


The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
6. For the actual test configuration, please refer to the related item in this test report.

Above 1G



RBW	1M
VBW	3M
Sweep	Auto
Detector	Peak: Peak AVG: See note 6
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For average power measurement, set the Detector to RMS, the detector and averaging type may be set for linear voltage averaging, while maintaining all of the other instrument settings, if the duty cycle of the EUT is less than 98%, the Duty Cycle Correction Factor shall be added to the measured emission levels. For the Duty Cycle and Correction Factor please refer to clause 6.1.ON TIME AND DUTY CYCLE.

Note: For all radiated measurements, lab had tested for stand-alone mode and all the external accessories attached to the EUT mode, only the worst data was recorded in the report.



TEST ENVIRONMENT

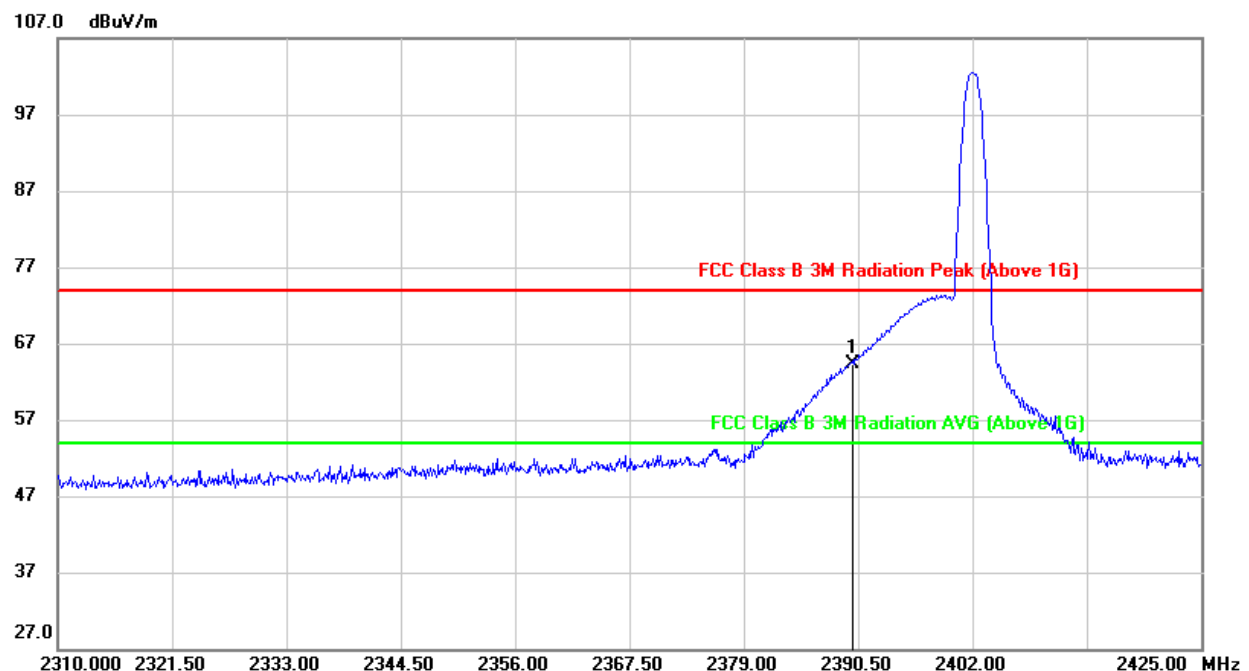
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

RESULTS

RESTRICTED BANDEDGE

7.1.1. GFSK MODE

PEAK RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

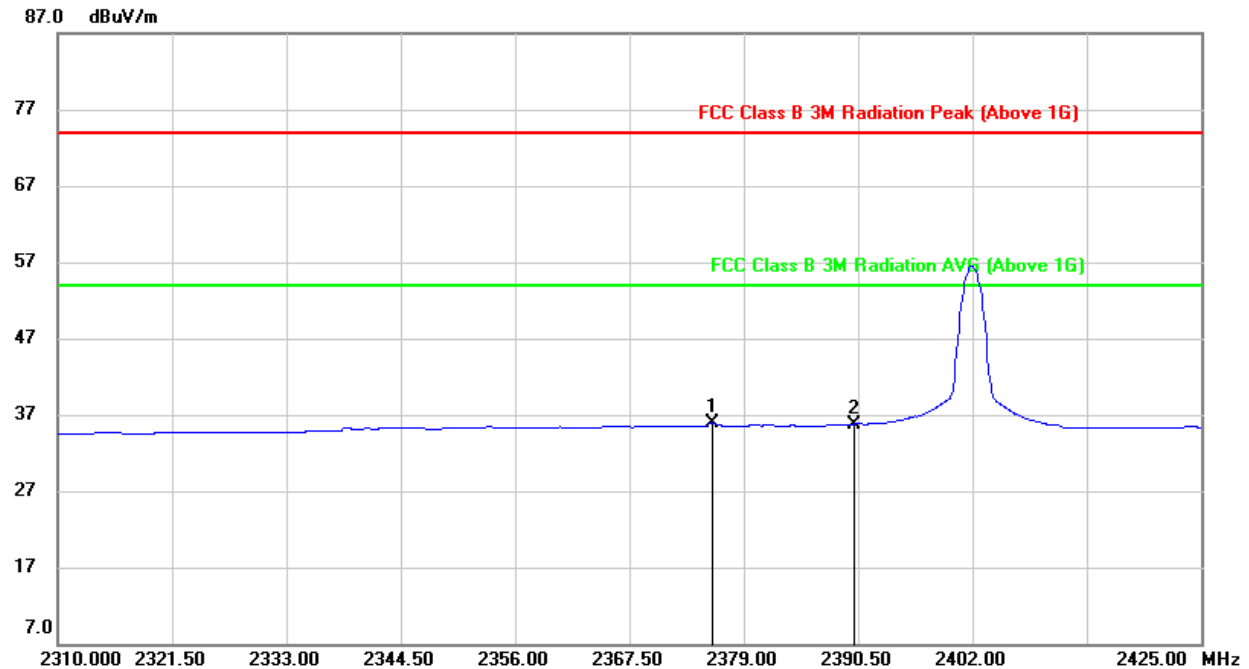


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	31.22	33.14	64.36	74.00	-9.64	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

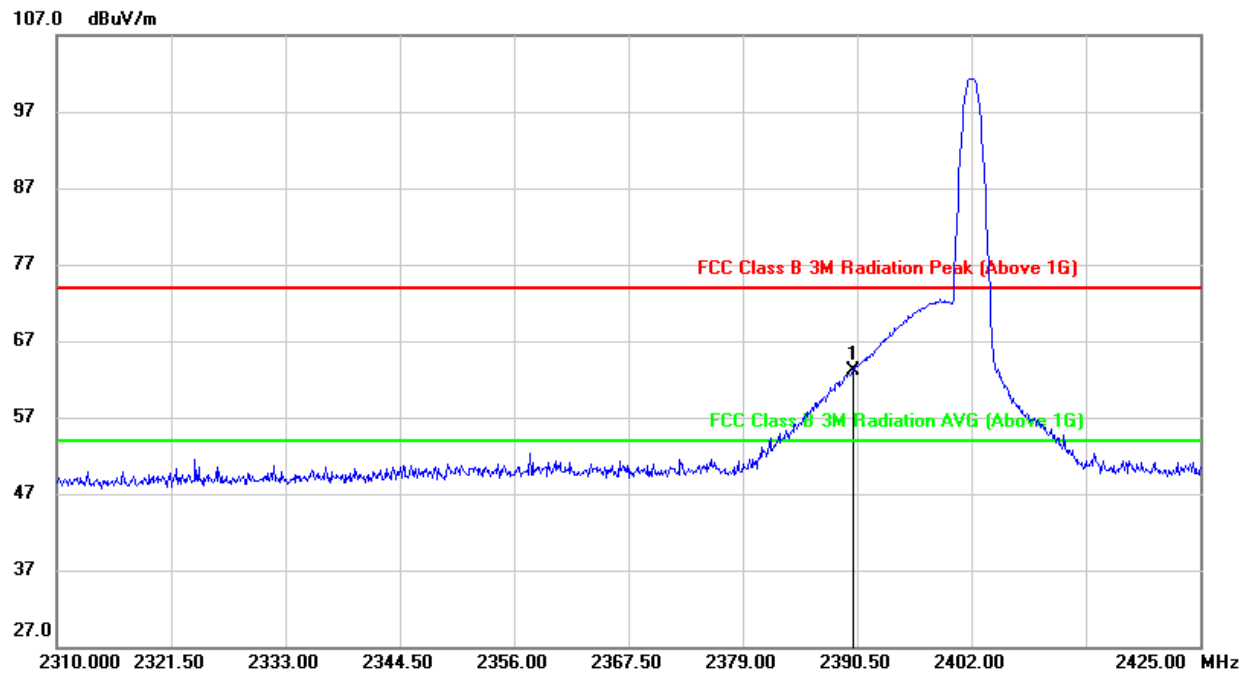


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2375.780	2.64	34.36	37.00	54.00	-17.00	AVG
2	2390.000	2.64	34.26	36.90	54.00	-17.10	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

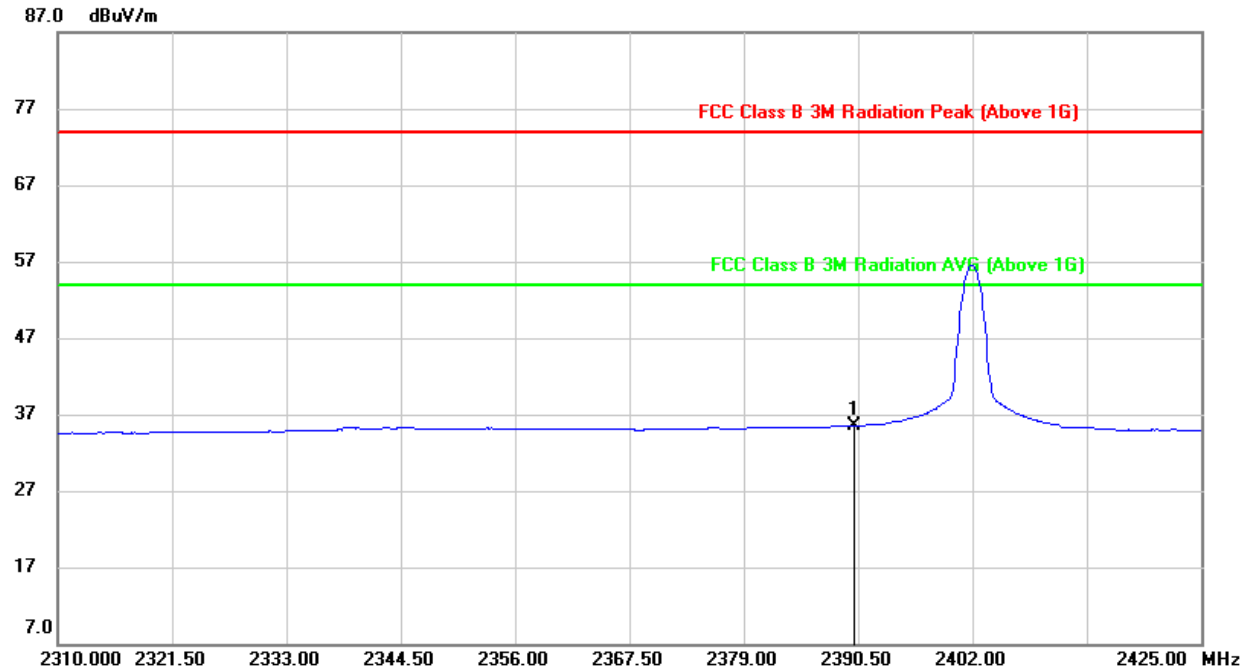


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.87	33.24	63.11	74.00	-10.89	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

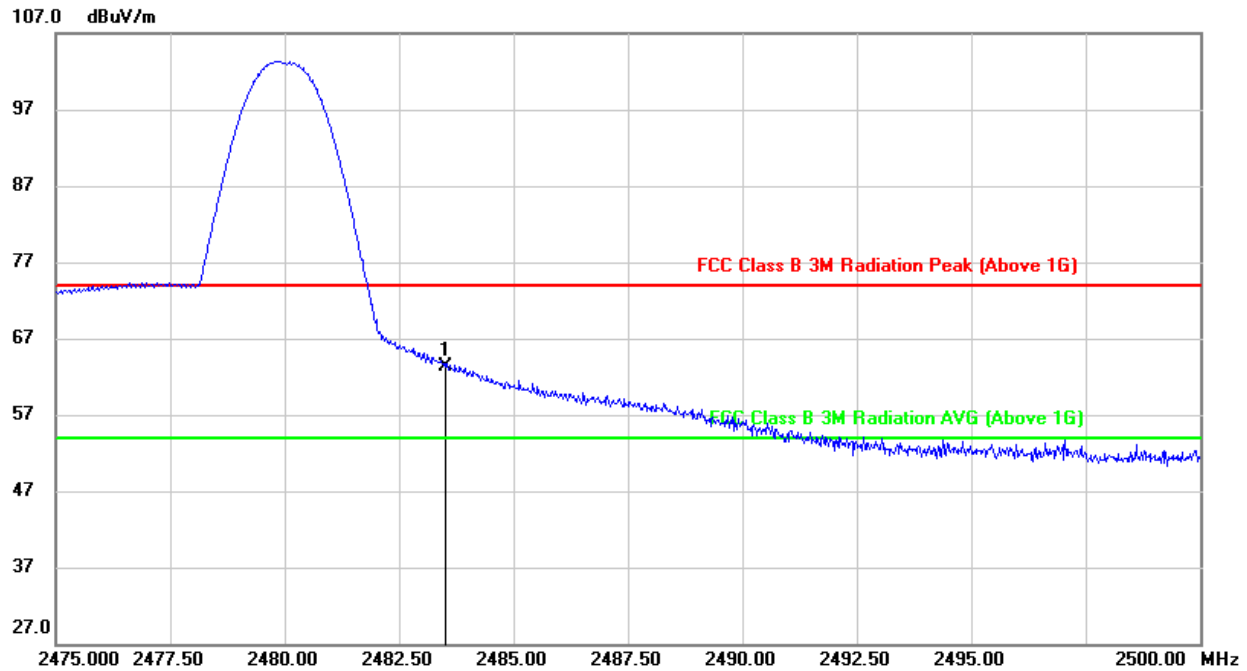


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	2.28	34.36	36.64	54.00	-17.36	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEGE (HIGH CHANNEL, HORIZONTAL)

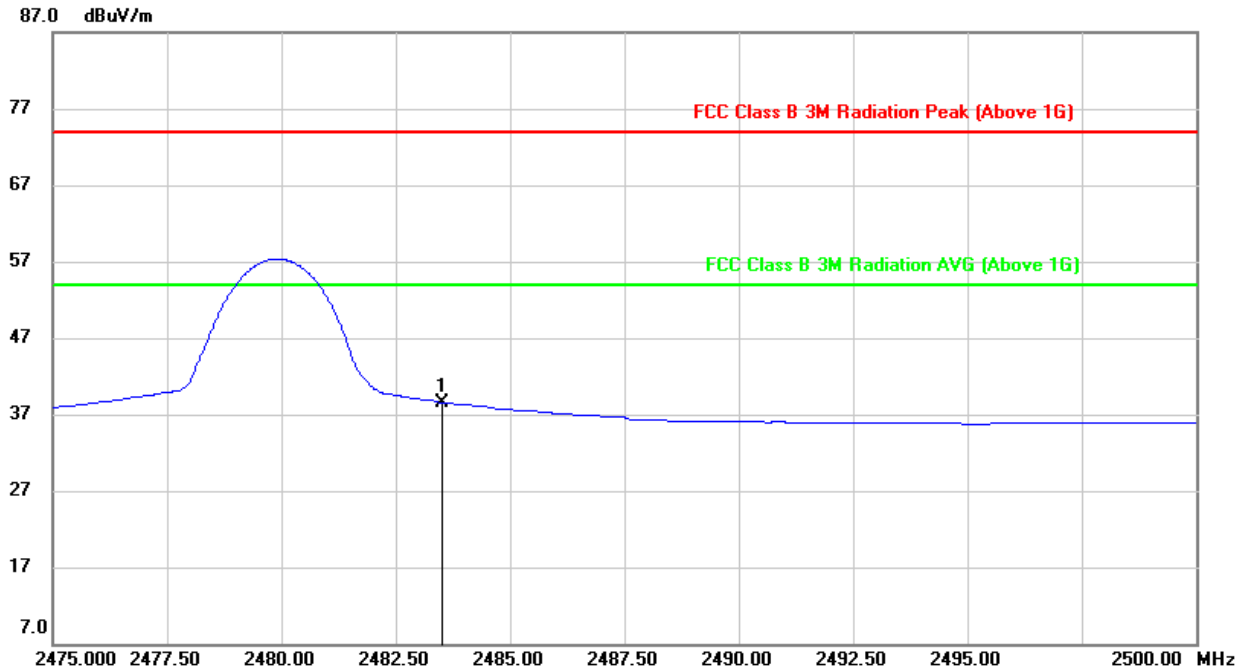


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	30.58	32.78	63.36	74.00	-10.64	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

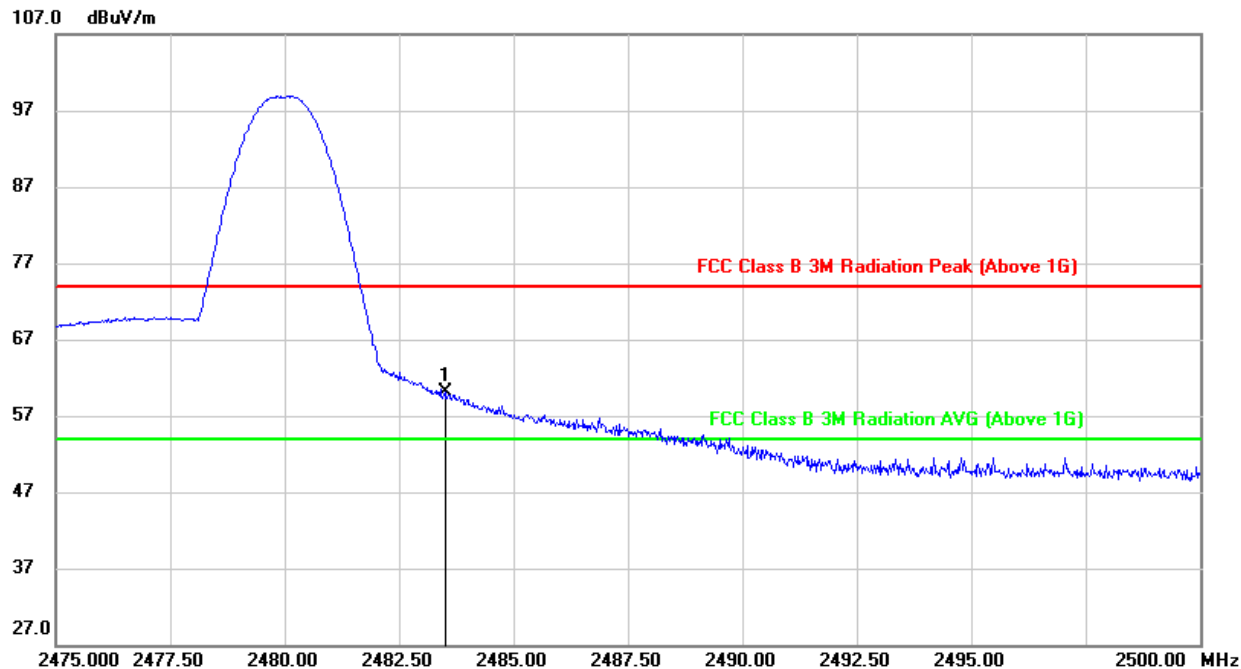


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	5.80	33.90	39.70	54.00	-14.30	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

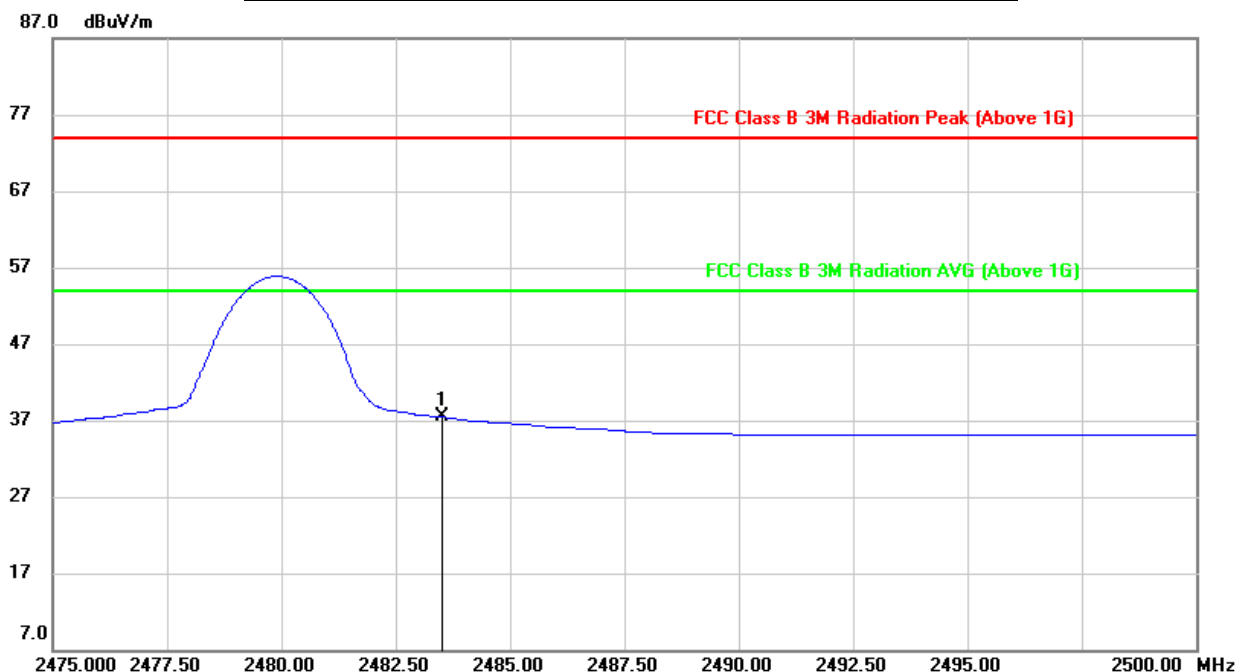


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	27.30	32.88	60.18	74.00	-13.82	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



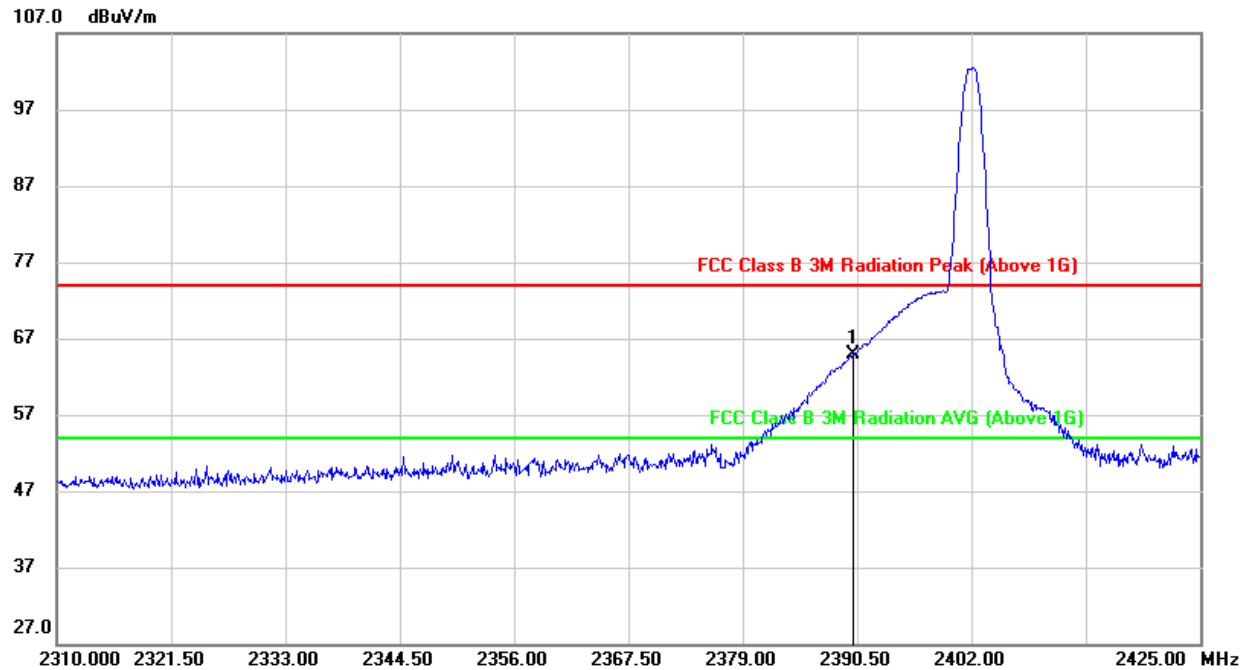
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	4.58	34.00	38.58	54.00	-15.42	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



7.1.1.2. 8DPSK MODE

PEAK RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

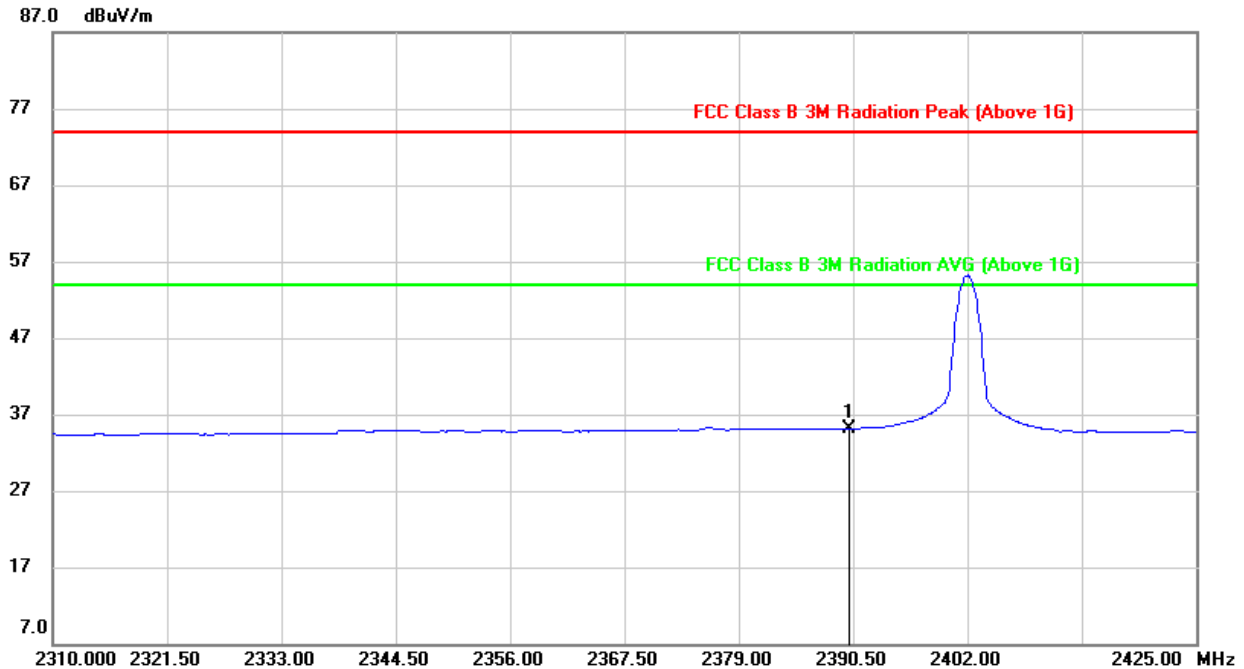


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	31.77	33.14	64.91	74.00	-9.09	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEGE (LOW CHANNEL, HORIZONTAL)

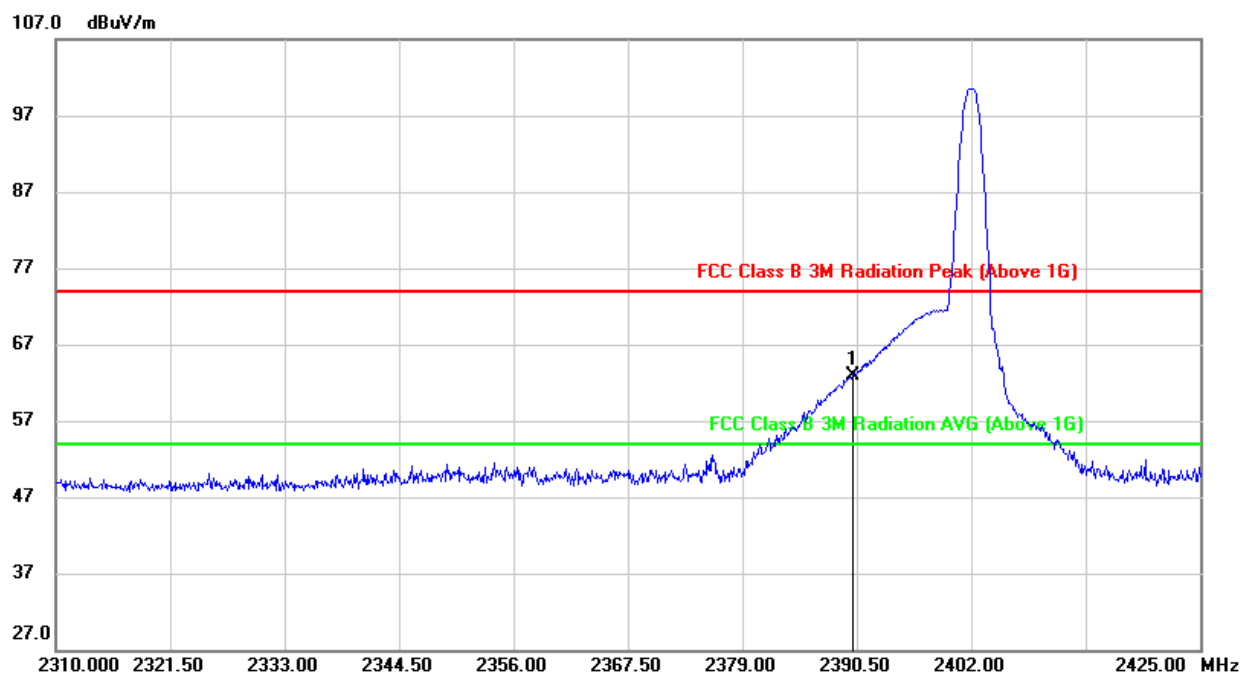


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	2.00	34.21	36.21	54.00	-17.79	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

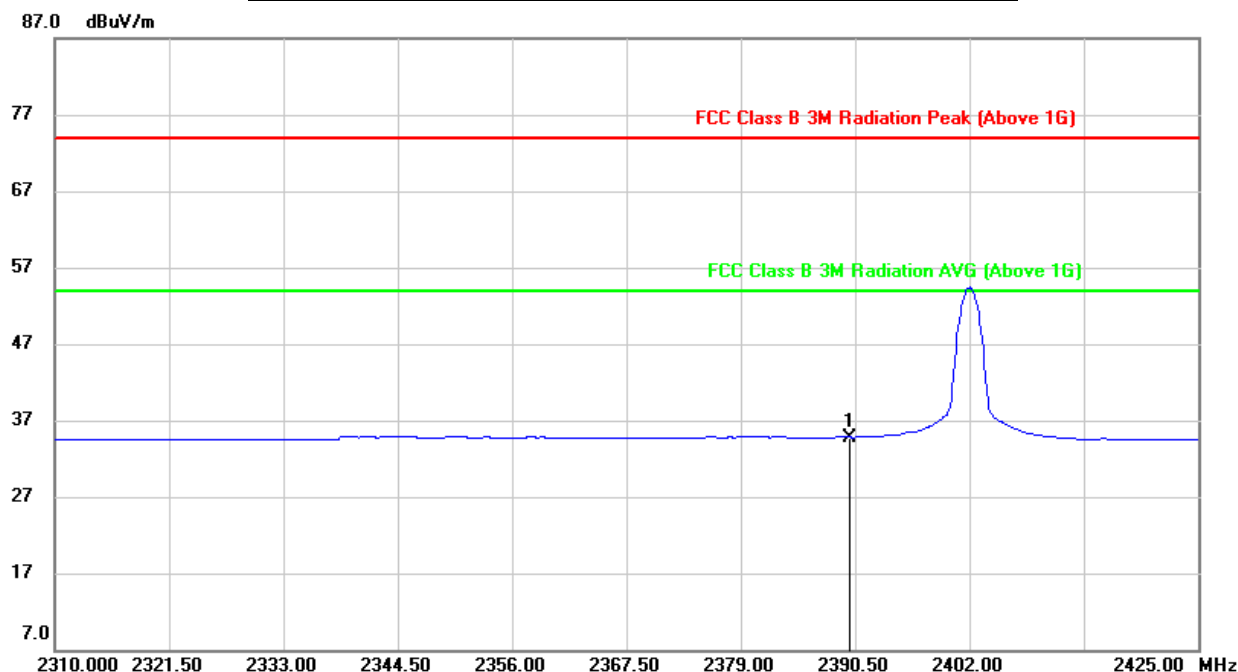


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.73	33.24	62.97	74.00	-11.03	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

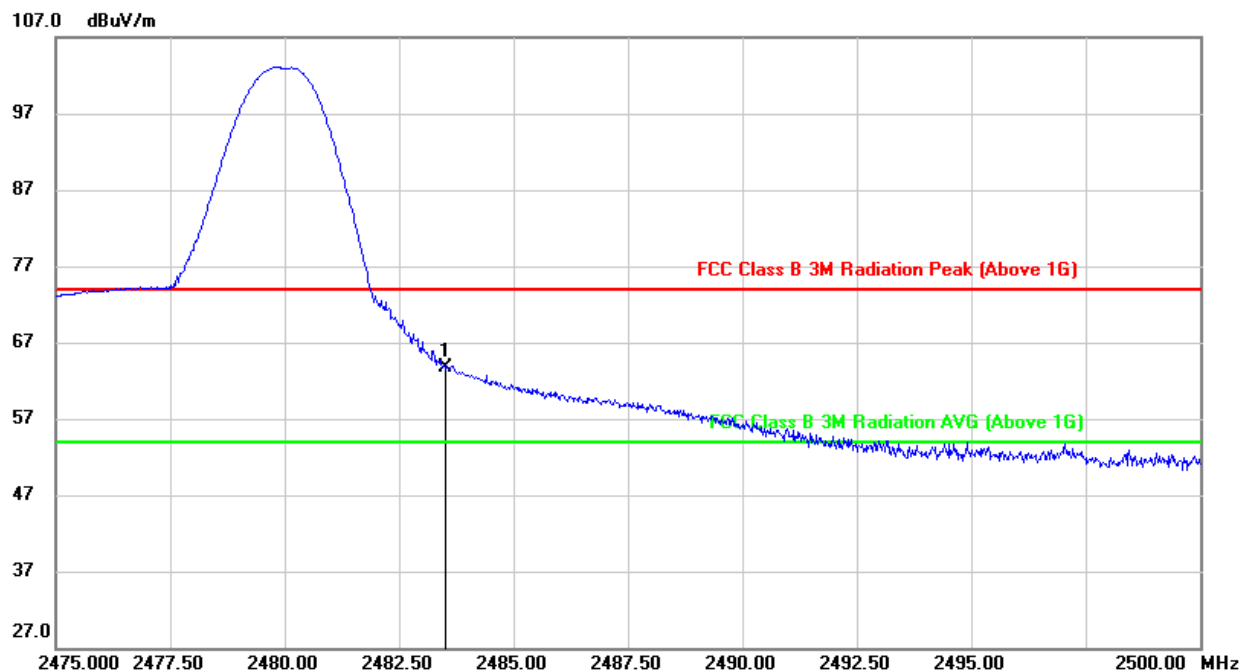


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	1.56	34.31	35.87	54.00	-18.13	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

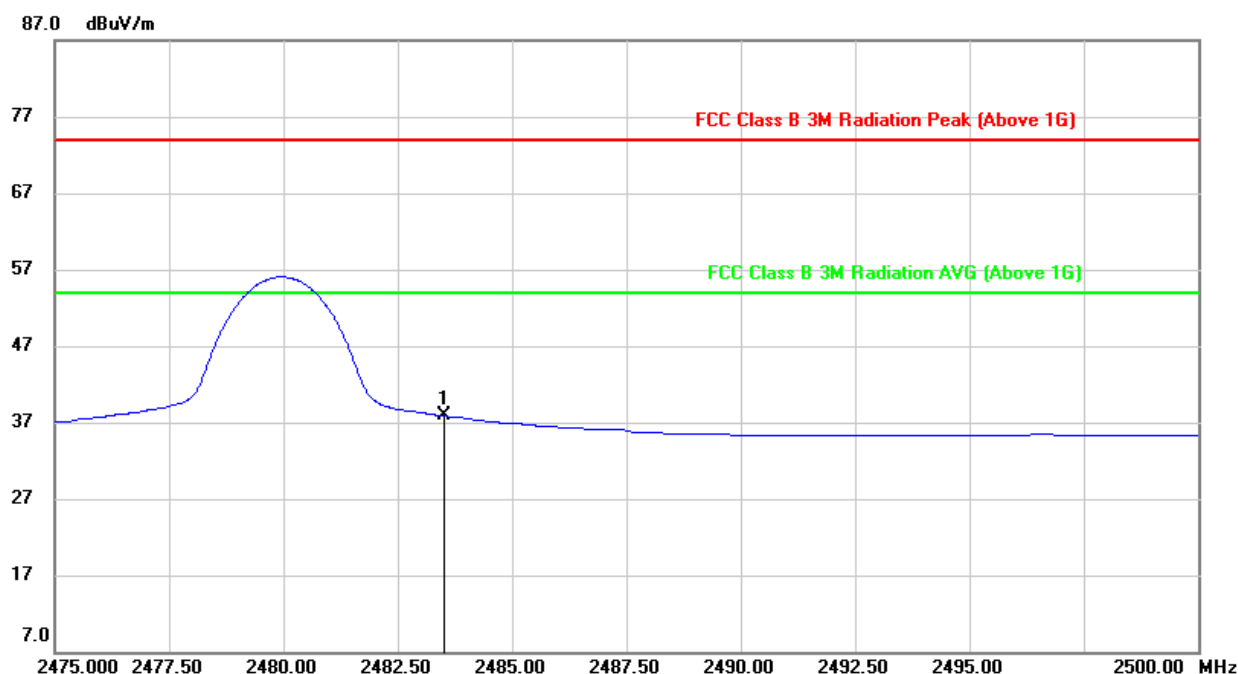


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	30.94	32.78	63.72	74.00	-10.28	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

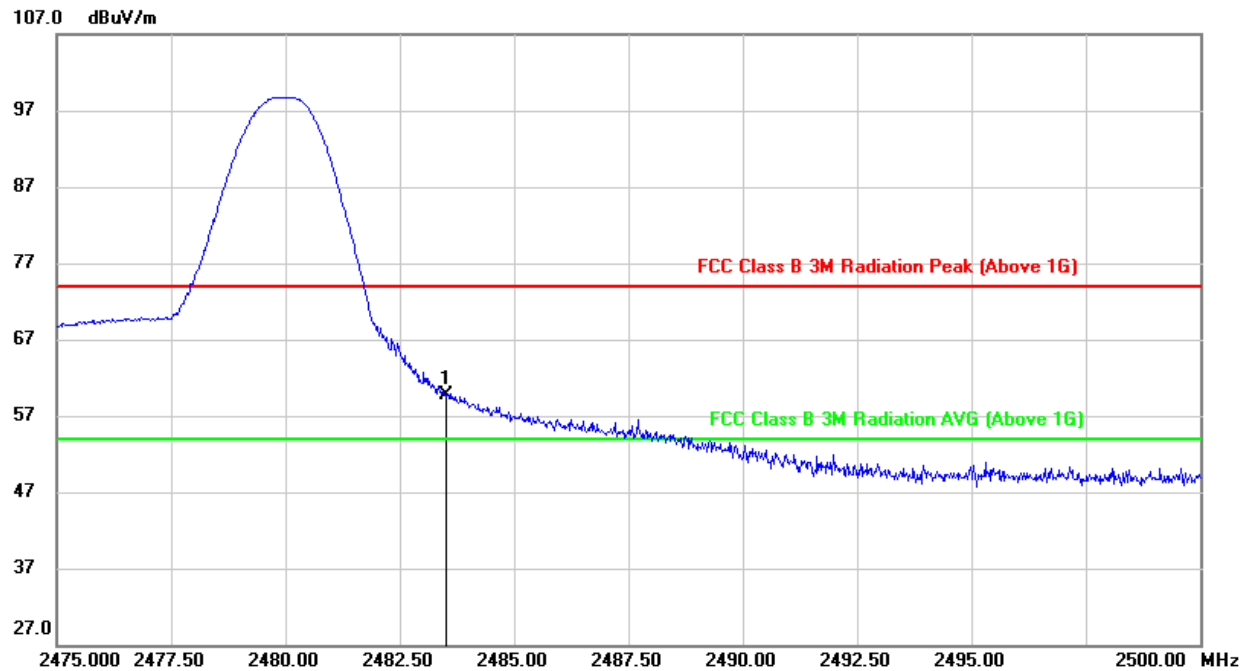


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	5.13	33.85	38.98	54.00	-15.02	AVG

- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



PEAK RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

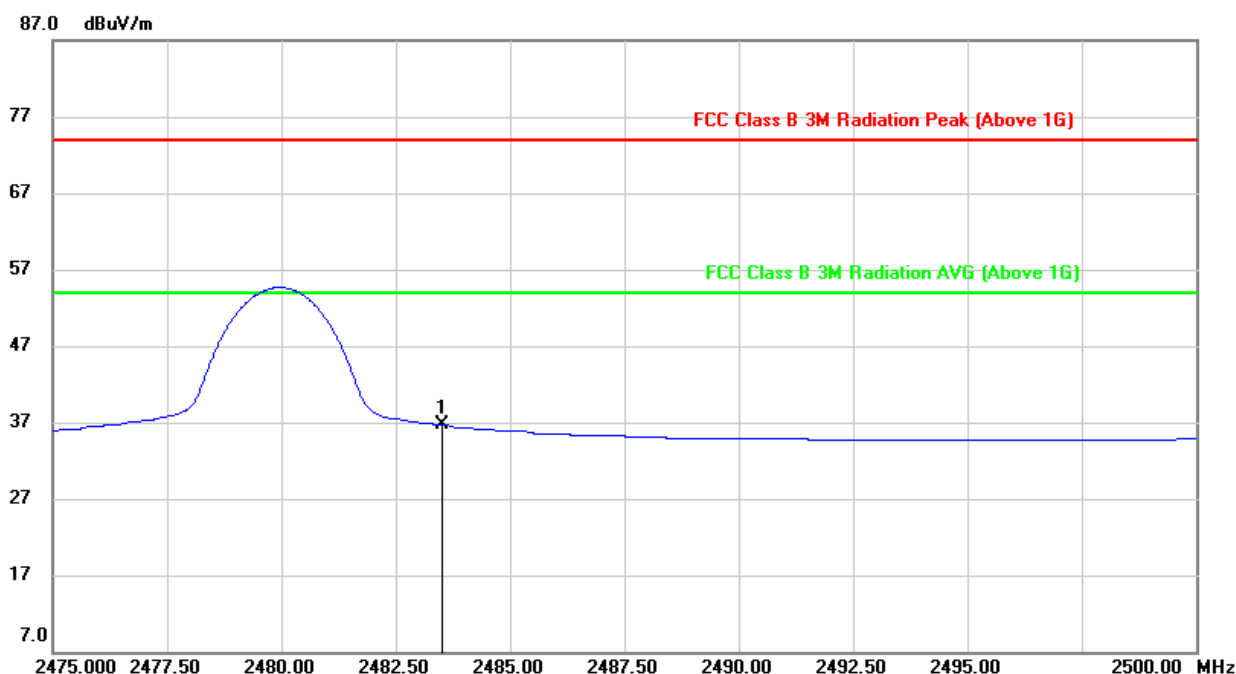


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	26.88	32.88	59.76	74.00	-14.24	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. Peak: Peak detector.



AVG RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	3.76	33.95	37.71	54.00	-16.29	AVG

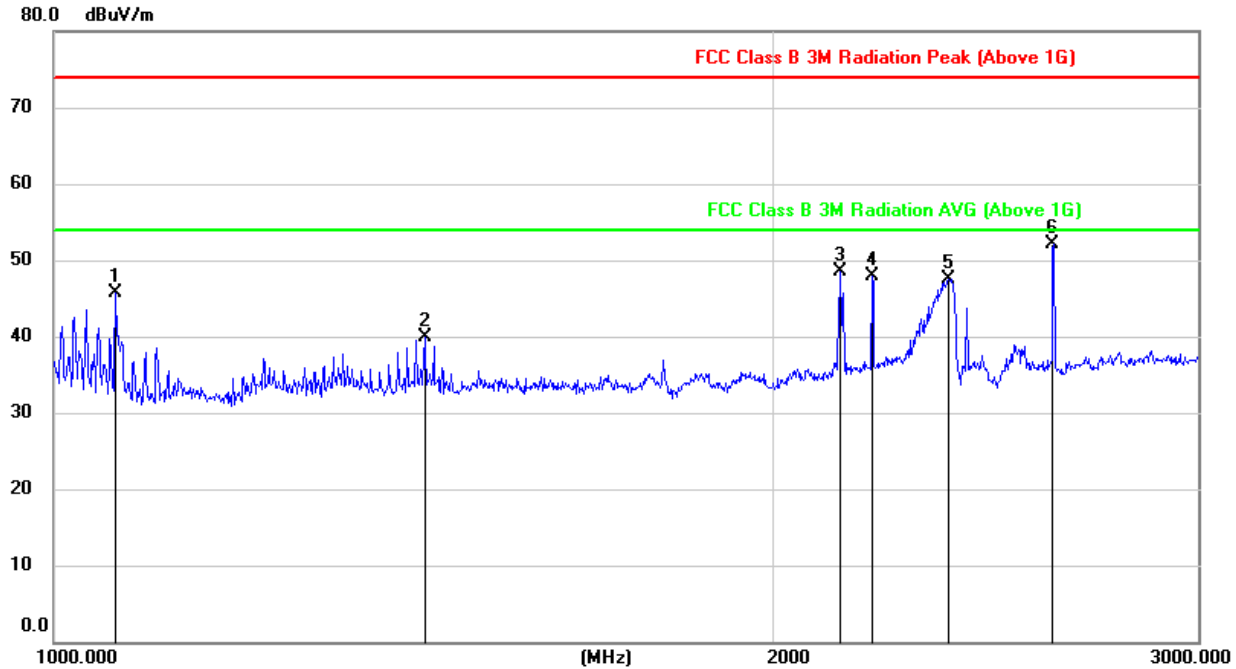
- Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.



7.2. SPURIOUS EMISSIONS (1~18GHz)

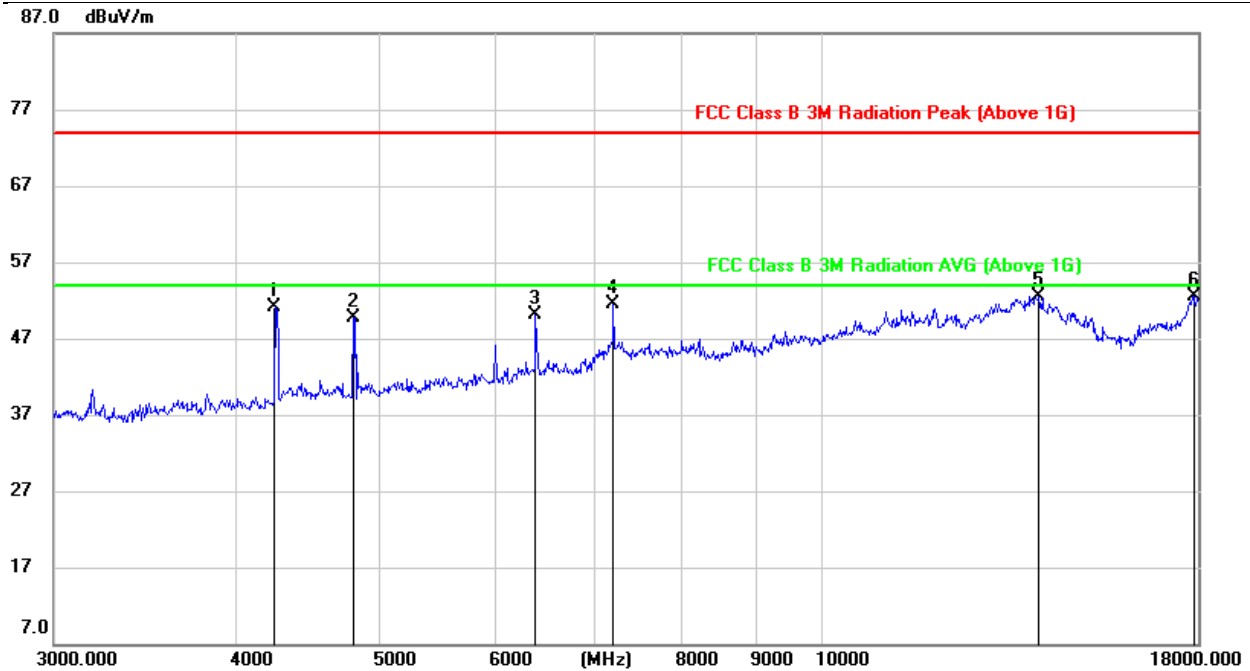
7.2.1. GFSK MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



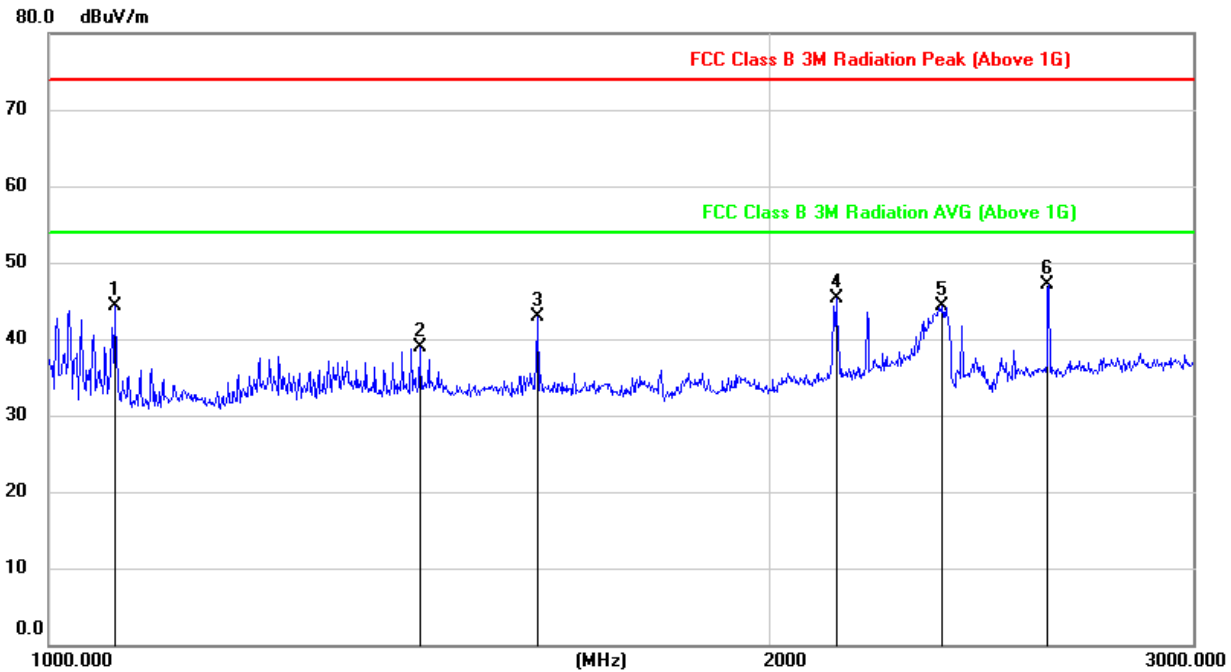
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1061.120	59.39	-13.62	45.77	74.00	-28.23	peak
2	1427.537	52.14	-12.18	39.96	74.00	-34.04	peak
3	2127.073	57.66	-9.23	48.43	74.00	-25.57	peak
4	2195.932	56.25	-8.34	47.91	74.00	-26.09	peak
5	2366.263	55.31	-7.87	47.44	74.00	-26.56	peak
6	2612.185	60.09	-8.04	52.05	74.00	-21.95	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



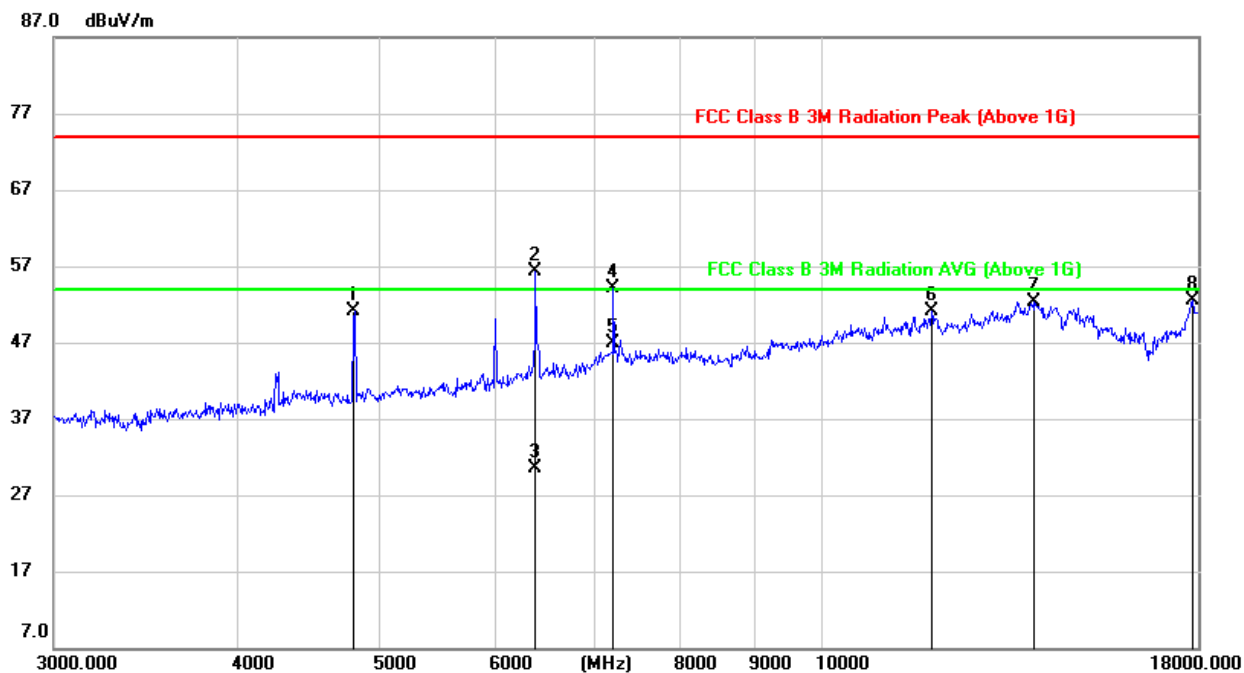
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4247.003	53.14	-2.00	51.14	74.00	-22.86	peak
2	4805.903	50.28	-0.49	49.79	74.00	-24.21	peak
3	6378.564	45.42	4.65	50.07	74.00	-23.93	peak
4	7205.054	43.76	7.76	51.52	74.00	-22.48	peak
5	14031.674	31.94	20.63	52.57	74.00	-21.43	peak
6	17935.612	25.80	26.79	52.59	74.00	-21.41	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1065.793	58.25	-13.92	44.33	74.00	-29.67	peak
2	1427.537	51.19	-12.35	38.84	74.00	-35.16	peak
3	1598.567	54.91	-12.06	42.85	74.00	-31.15	peak
4	2129.411	54.59	-9.30	45.29	74.00	-28.71	peak
5	2361.070	52.03	-7.73	44.30	74.00	-29.70	peak
6	2612.185	55.10	-8.07	47.03	74.00	-26.97	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

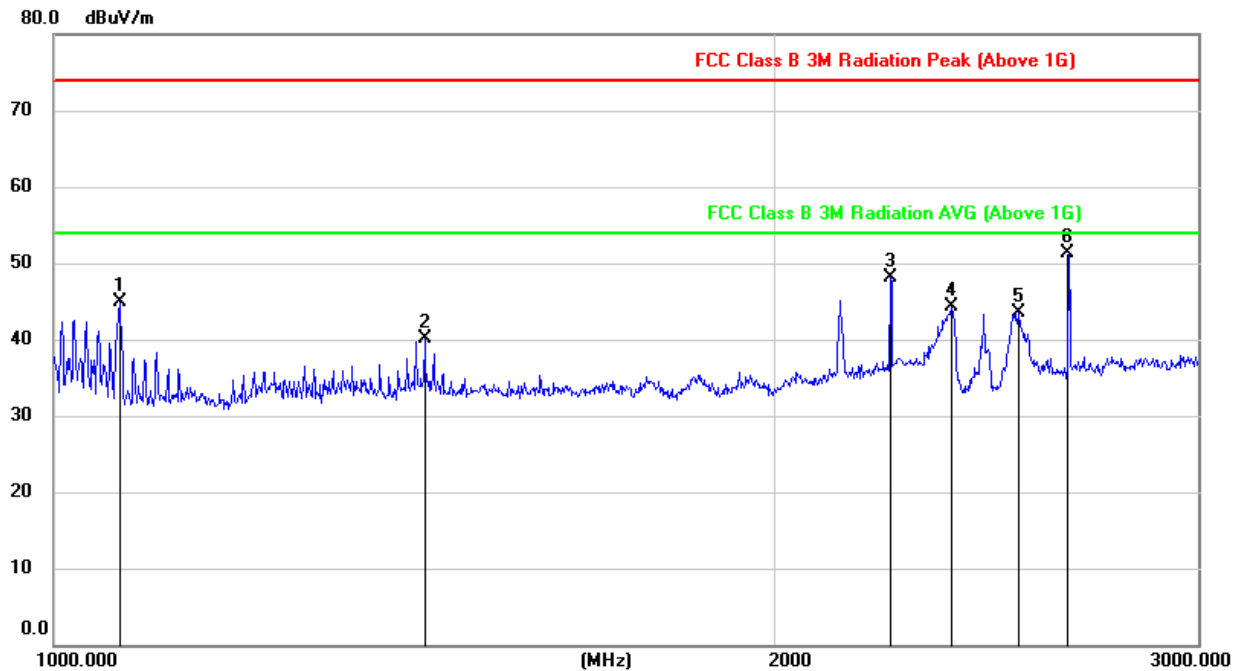


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4805.903	51.44	-0.40	51.04	74.00	-22.96	peak
2	6378.564	51.68	4.71	56.39	74.00	-17.61	peak
3	6378.564	25.84	5.83	31.67	54.00	-22.33	AVG
4	7205.054	46.35	7.84	54.19	74.00	-19.81	peak
5	7205.783	39.10	8.96	48.06	54.00	-5.94	AVG
6	11856.684	34.51	16.64	51.15	74.00	-22.85	peak
7	13931.468	31.56	20.81	52.37	74.00	-21.63	peak
8	17839.462	26.19	26.26	52.45	74.00	-21.55	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)
4. The DCCF already added in Correct Factor.

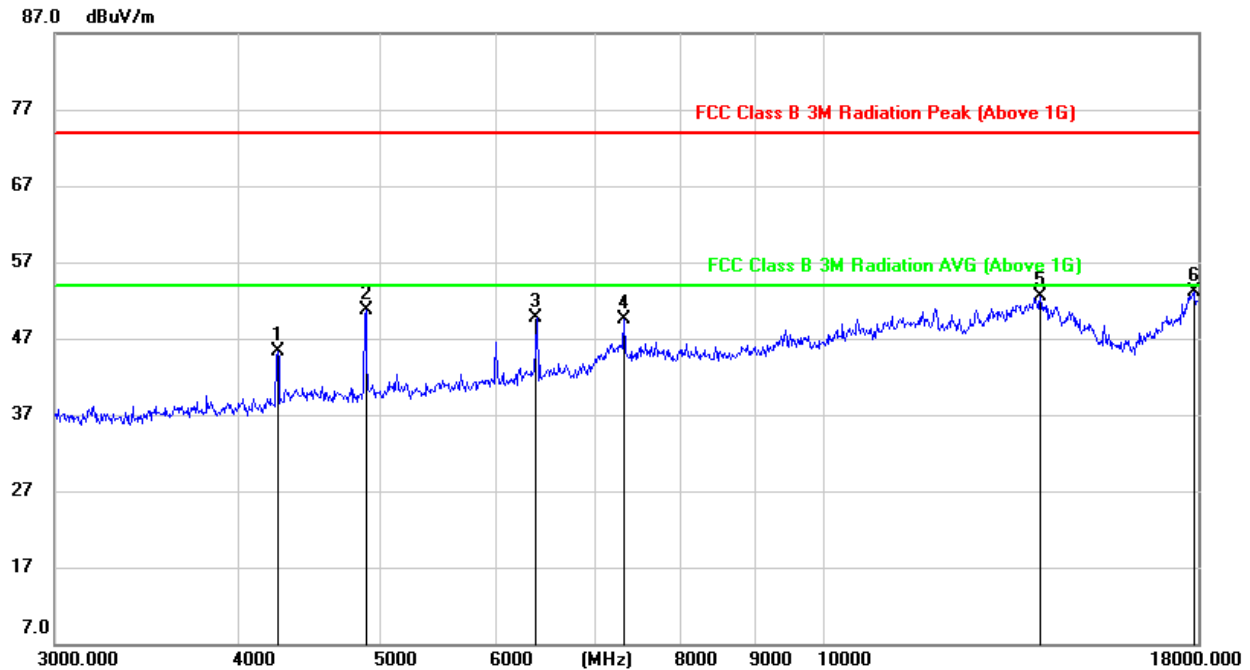


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1065.793	58.62	-13.62	45.00	74.00	-29.00	peak
2	1427.537	52.25	-12.18	40.07	74.00	-33.93	peak
3	2232.419	55.87	-7.84	48.03	74.00	-25.97	peak
4	2368.864	52.16	-7.89	44.27	74.00	-29.73	peak
5	2527.495	51.86	-8.38	43.48	74.00	-30.52	peak
6	2649.760	59.10	-7.86	51.24	74.00	-22.76	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

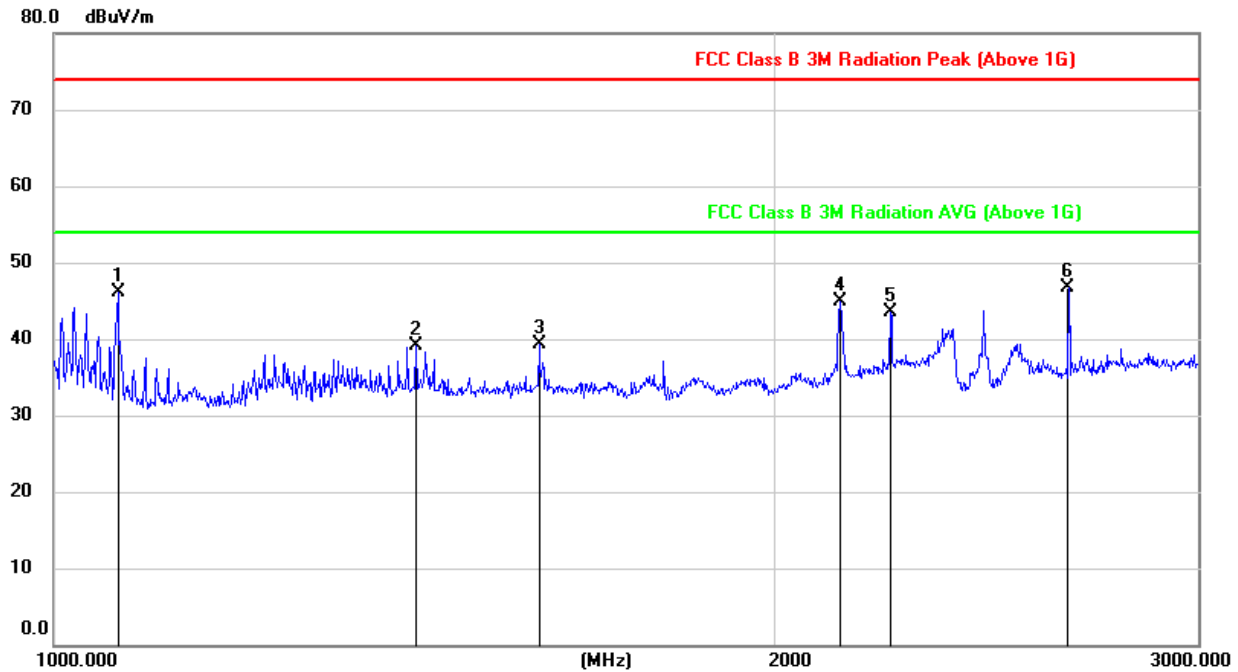


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	47.22	-1.95	45.27	74.00	-28.73	peak
2	4884.031	50.12	0.50	50.62	74.00	-23.38	peak
3	6390.003	45.11	4.65	49.76	74.00	-24.24	peak
4	7322.183	41.86	7.60	49.46	74.00	-24.54	peak
5	14056.838	31.95	20.64	52.59	74.00	-21.41	peak
6	17871.454	26.65	26.36	53.01	74.00	-20.99	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

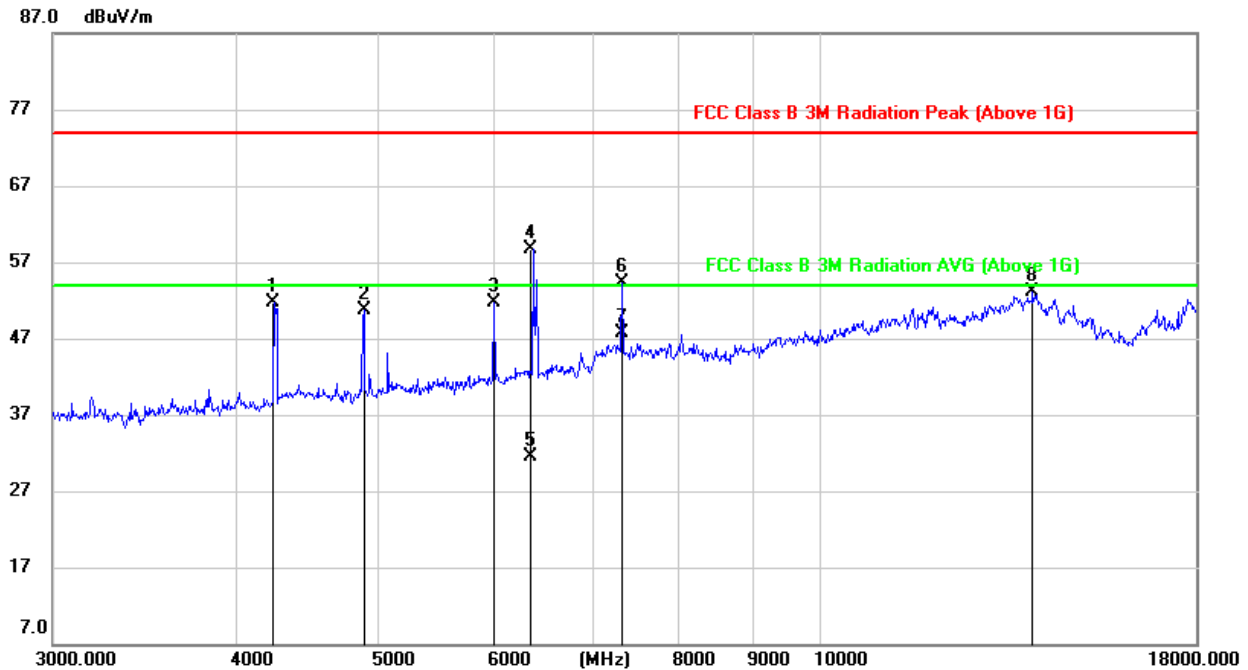


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	60.07	-13.92	46.15	74.00	-27.85	peak
2	1415.045	51.50	-12.40	39.10	74.00	-34.90	peak
3	1593.307	51.47	-12.09	39.38	74.00	-34.62	peak
4	2127.073	54.23	-9.33	44.90	74.00	-29.10	peak
5	2232.419	51.37	-7.84	43.53	74.00	-30.47	peak
6	2649.760	54.74	-7.96	46.78	74.00	-27.22	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4247.003	53.66	-1.90	51.76	74.00	-22.24	peak
2	4884.031	50.18	0.43	50.61	74.00	-23.39	peak
3	5990.839	48.36	3.30	51.66	74.00	-22.34	peak
4	6367.145	54.06	4.68	58.74	74.00	-15.26	peak
5	6367.145	26.87	5.80	32.67	54.00	-21.33	AVG
6	7322.183	46.61	7.65	54.26	74.00	-19.74	peak
7	7322.902	40.11	8.77	48.88	54.00	-5.12	AVG
8	13931.468	32.31	20.81	53.12	74.00	-20.88	peak

Note: 1. Measurement = Reading Level + Correct Factor.

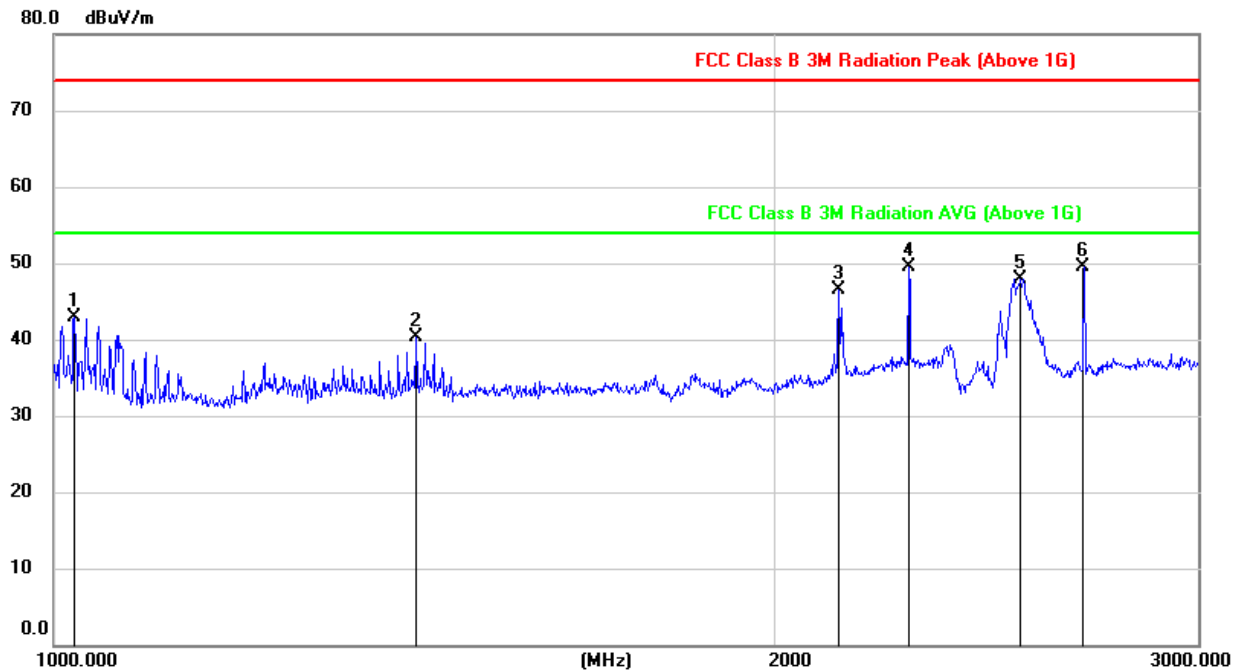
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.

3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)

4. The DCCF already added in Correct Factor.

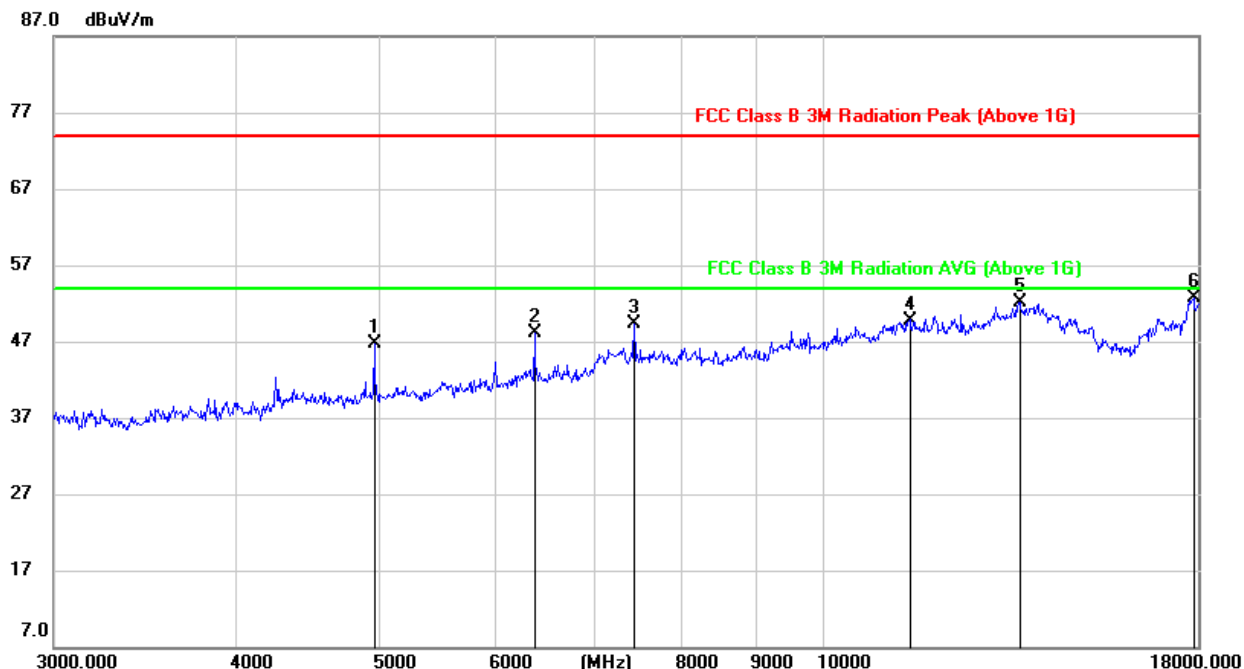


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



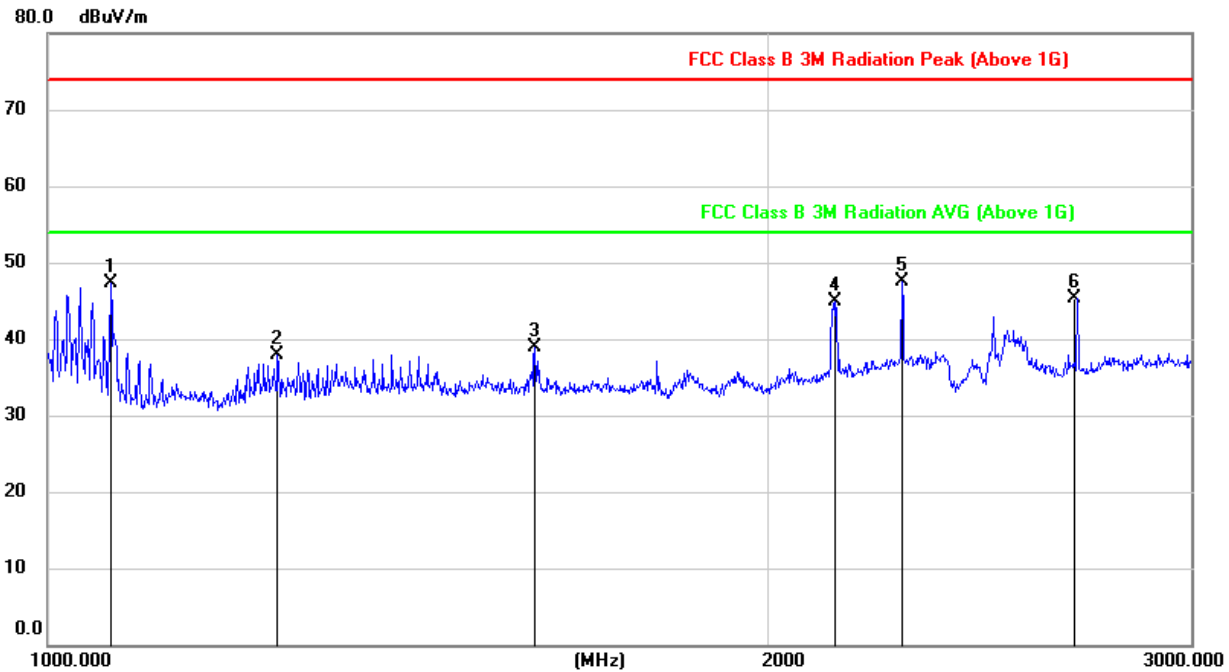
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1019.972	56.90	-13.98	42.92	74.00	-31.08	peak
2	1416.601	52.48	-12.13	40.35	74.00	-33.65	peak
3	2124.737	55.79	-9.25	46.54	74.00	-27.46	peak
4	2272.007	57.03	-7.50	49.53	74.00	-24.47	peak
5	2533.055	56.34	-8.37	47.97	74.00	-26.03	peak
6	2687.875	57.10	-7.67	49.43	74.00	-24.57	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



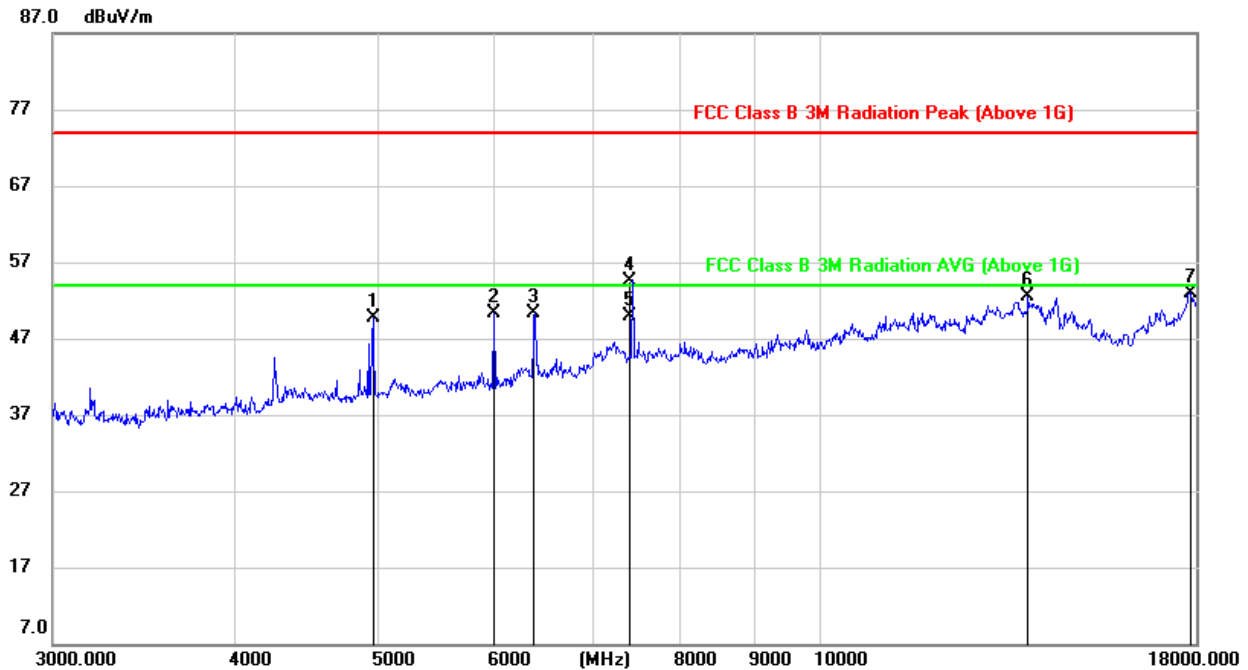
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4954.543	46.21	0.57	46.78	74.00	-27.22	peak
2	6367.146	43.53	4.65	48.18	74.00	-25.82	peak
3	7454.561	41.61	7.62	49.23	74.00	-24.77	peak
4	11459.836	33.92	15.88	49.80	74.00	-24.20	peak
5	13610.714	31.56	20.53	52.09	74.00	-21.91	peak
6	17871.454	26.34	26.36	52.70	74.00	-21.30	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1062.287	61.31	-13.92	47.39	74.00	-26.61	peak
2	1247.100	50.56	-12.75	37.81	74.00	-36.19	peak
3	1596.812	50.91	-12.08	38.83	74.00	-35.17	peak
4	2131.751	54.15	-9.26	44.89	74.00	-29.11	peak
5	2272.007	54.84	-7.42	47.42	74.00	-26.58	peak
6	2687.875	52.93	-7.69	45.24	74.00	-28.76	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4954.543	49.14	0.58	49.72	74.00	-24.28	peak
2	5990.839	46.95	3.30	50.25	74.00	-23.75	peak
3	6390.003	45.51	4.73	50.24	74.00	-23.76	peak
4	7439.905	47.08	6.40	53.48	74.00	-20.52	peak
5	7439.905	42.38	7.52	49.90	54.00	-4.10	AVG
6	13831.977	31.53	21.03	52.56	74.00	-21.44	peak
7	17839.462	26.62	26.26	52.88	74.00	-21.12	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.

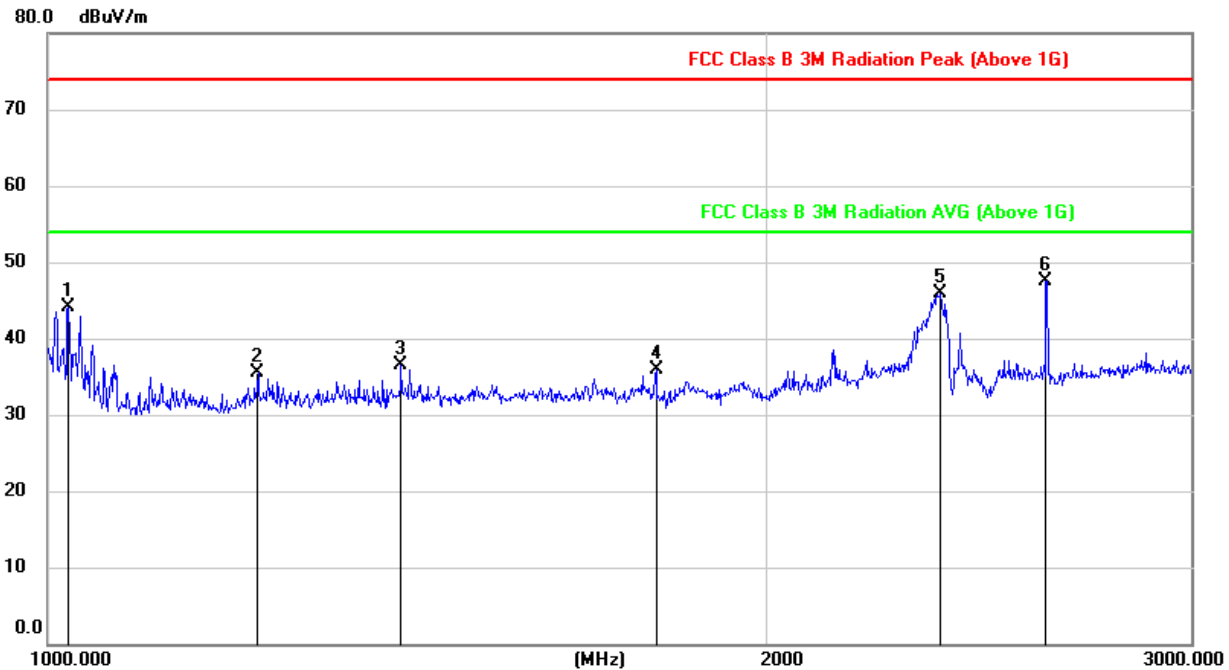
3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)

4. The DCCF already added in Correct Factor.



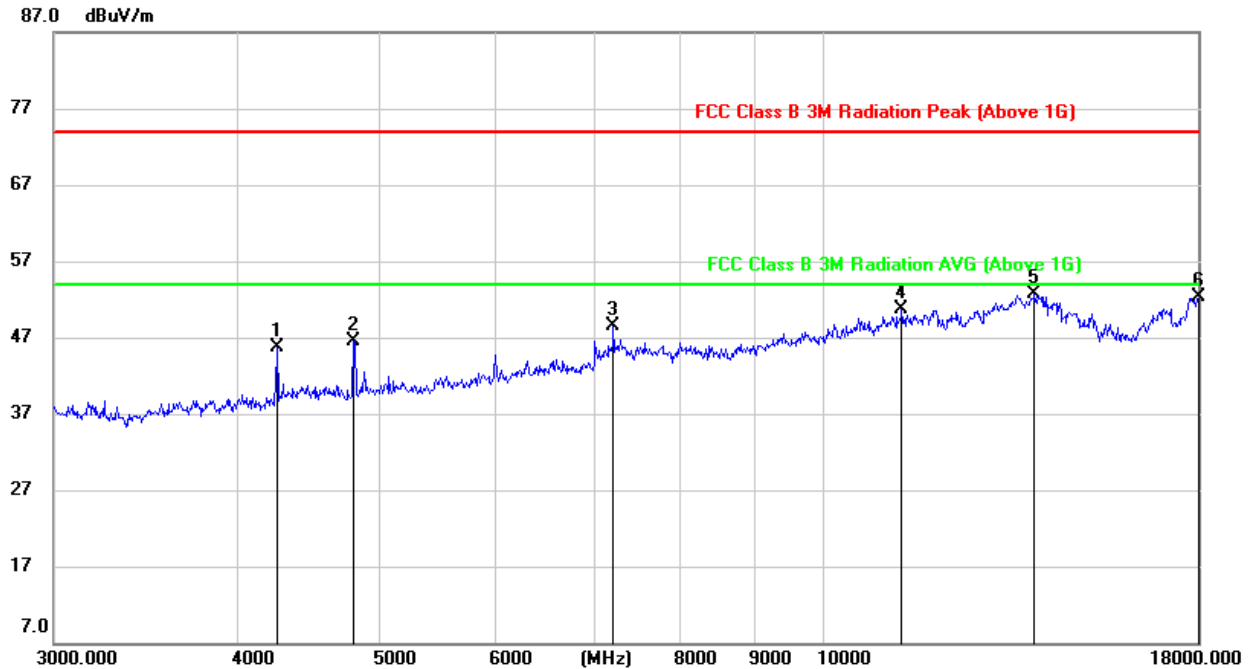
7.2.2. 8DPSK MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1019.972	58.17	-13.98	44.19	74.00	-29.81	peak
2	1224.025	48.36	-12.95	35.41	74.00	-38.59	peak
3	1404.205	48.59	-12.08	36.51	74.00	-37.49	peak
4	1795.997	46.99	-11.14	35.85	74.00	-38.15	peak
5	2361.070	53.72	-7.83	45.89	74.00	-28.11	peak
6	2612.185	55.56	-8.04	47.52	74.00	-26.48	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

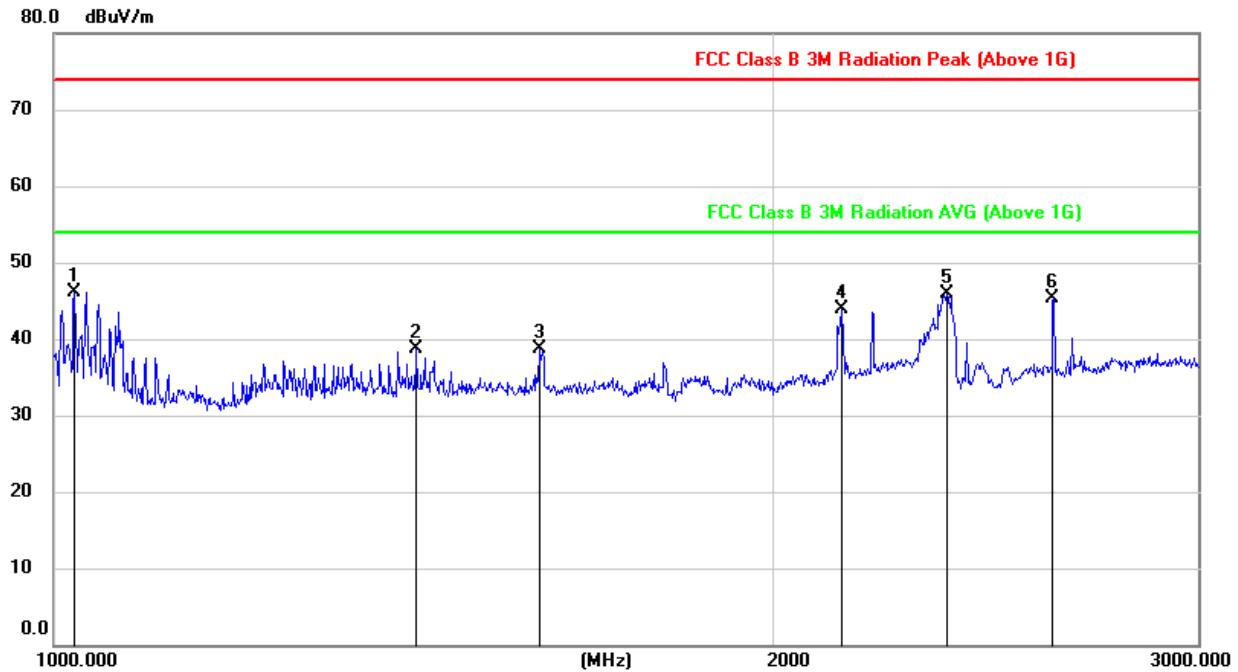


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	47.75	-1.95	45.80	74.00	-28.20	peak
2	4805.903	47.05	-0.49	46.56	74.00	-27.44	peak
3	7205.054	40.74	7.76	48.50	74.00	-25.50	peak
4	11317.000	35.38	15.35	50.73	74.00	-23.27	peak
5	13931.468	31.94	20.67	52.61	74.00	-21.39	peak
6	18000.000	25.26	27.06	52.32	74.00	-21.68	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

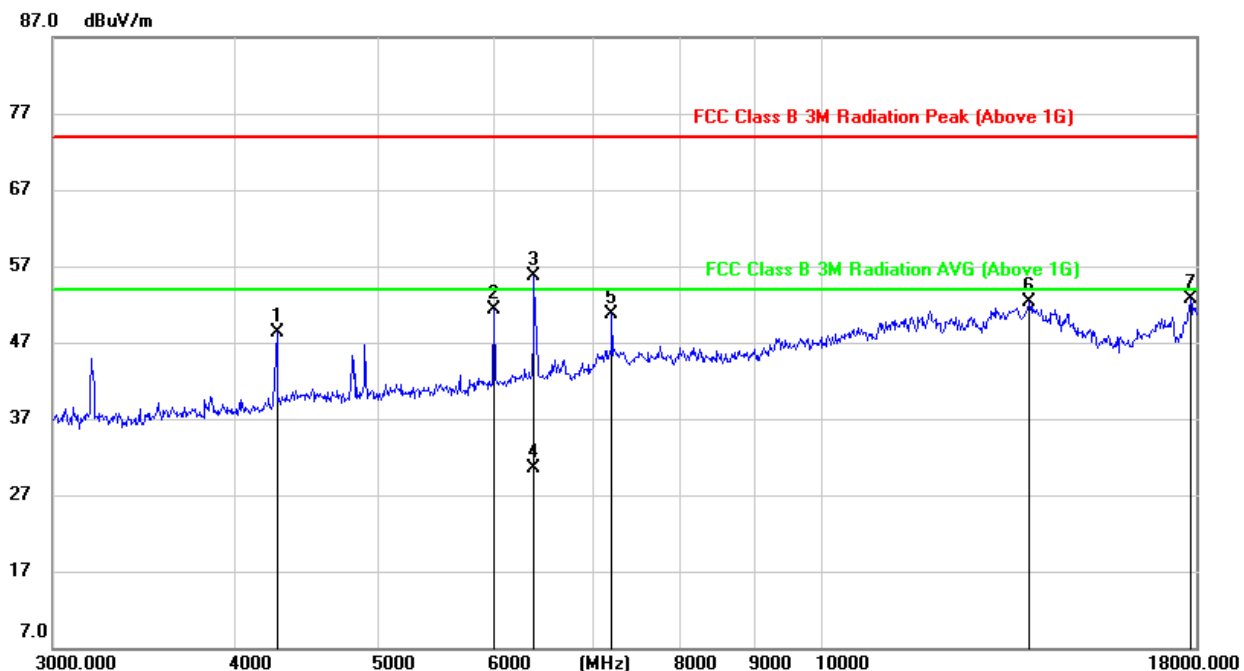


HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1019.972	60.17	-13.98	46.19	74.00	-27.81	peak
2	1416.601	51.06	-12.40	38.66	74.00	-35.34	peak
3	1593.307	50.78	-12.09	38.69	74.00	-35.31	peak
4	2131.751	53.10	-9.26	43.84	74.00	-30.16	peak
5	2361.070	53.69	-7.73	45.96	74.00	-28.04	peak
6	2612.185	53.45	-8.07	45.38	74.00	-28.62	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4262.250	50.13	-1.78	48.35	74.00	-25.65	peak
2	5990.839	48.00	3.30	51.30	74.00	-22.70	peak
3	6378.564	50.95	4.71	55.66	74.00	-18.34	peak
4	6378.564	25.83	5.78	31.61	54.00	-22.39	AVG
5	7205.054	42.93	7.84	50.77	74.00	-23.23	peak
6	13856.783	31.35	20.92	52.27	74.00	-21.73	peak
7	17839.462	26.35	26.26	52.61	74.00	-21.39	peak

Note: 1. Measurement = Reading Level + Correct Factor.

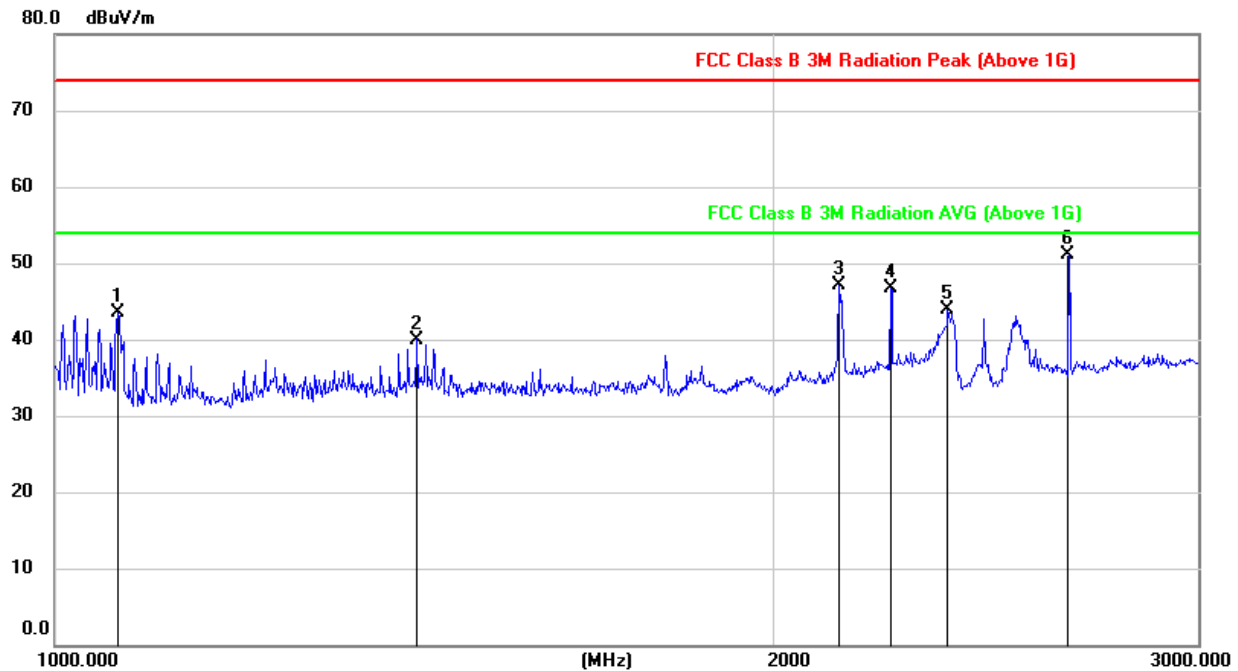
2. AVG: RMS detector, the detector and averaging type may be set for linear voltage averaging.

3. DCCF: Duty Cycle Correction Factor (Please refer to clause 6.1.ON TIME AND DUTY CYCLE)

4. The DCCF already added in Correct Factor.

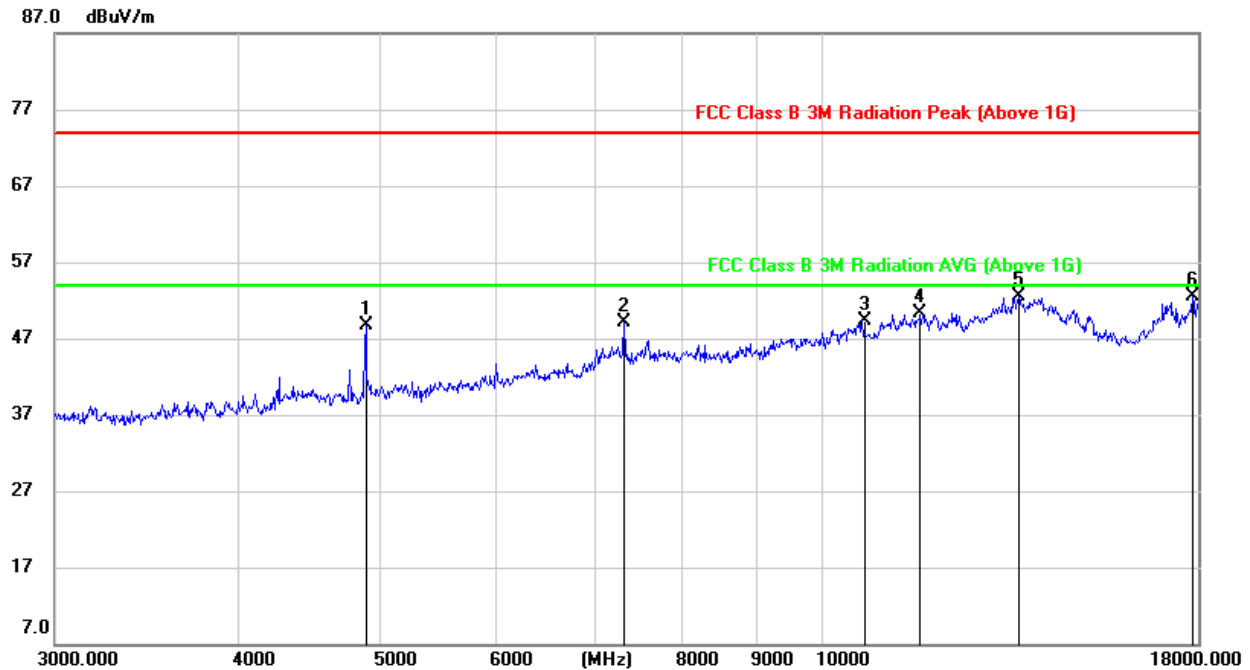


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1062.287	57.10	-13.62	43.48	74.00	-30.52	peak
2	1416.601	52.13	-12.13	40.00	74.00	-34.00	peak
3	2124.737	56.41	-9.25	47.16	74.00	-26.84	peak
4	2232.419	54.57	-7.84	46.73	74.00	-27.27	peak
5	2361.070	51.67	-7.83	43.84	74.00	-30.16	peak
6	2649.760	59.04	-7.86	51.18	74.00	-22.82	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

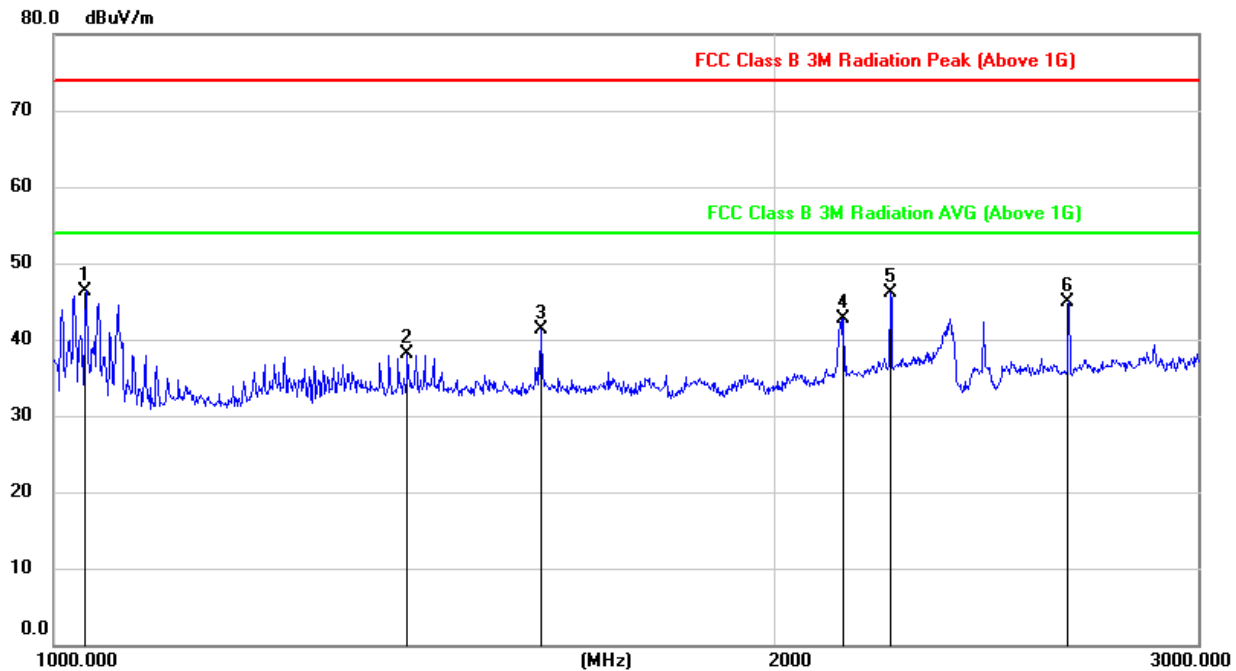


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4884.031	48.23	0.50	48.73	74.00	-25.27	peak
2	7322.183	41.47	7.60	49.07	74.00	-24.93	peak
3	10648.151	35.52	13.69	49.21	74.00	-24.79	peak
4	11687.942	34.51	15.85	50.36	74.00	-23.64	peak
5	13610.714	31.94	20.53	52.47	74.00	-21.53	peak
6	17839.462	26.04	26.49	52.53	74.00	-21.47	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

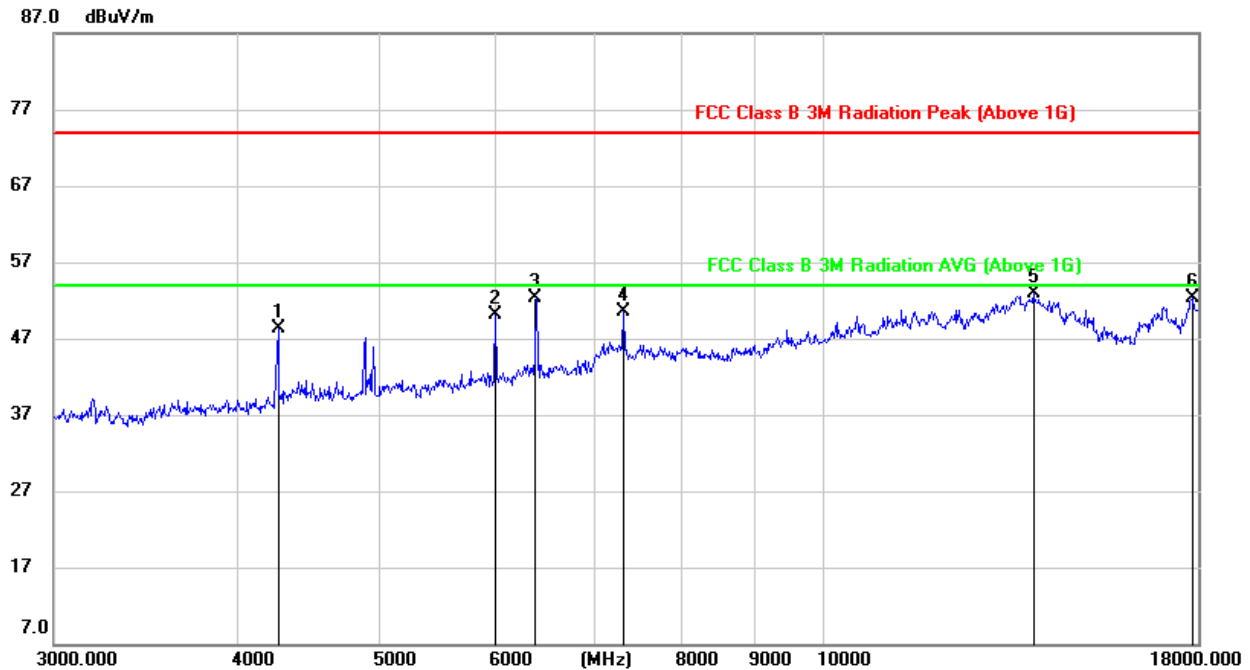


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1031.239	60.19	-13.96	46.23	74.00	-27.77	peak
2	1404.205	50.46	-12.44	38.02	74.00	-35.98	peak
3	1596.812	53.32	-12.08	41.24	74.00	-32.76	peak
4	2134.095	52.02	-9.23	42.79	74.00	-31.21	peak
5	2232.419	53.87	-7.84	46.03	74.00	-27.97	peak
6	2649.760	52.88	-7.96	44.92	74.00	-29.08	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

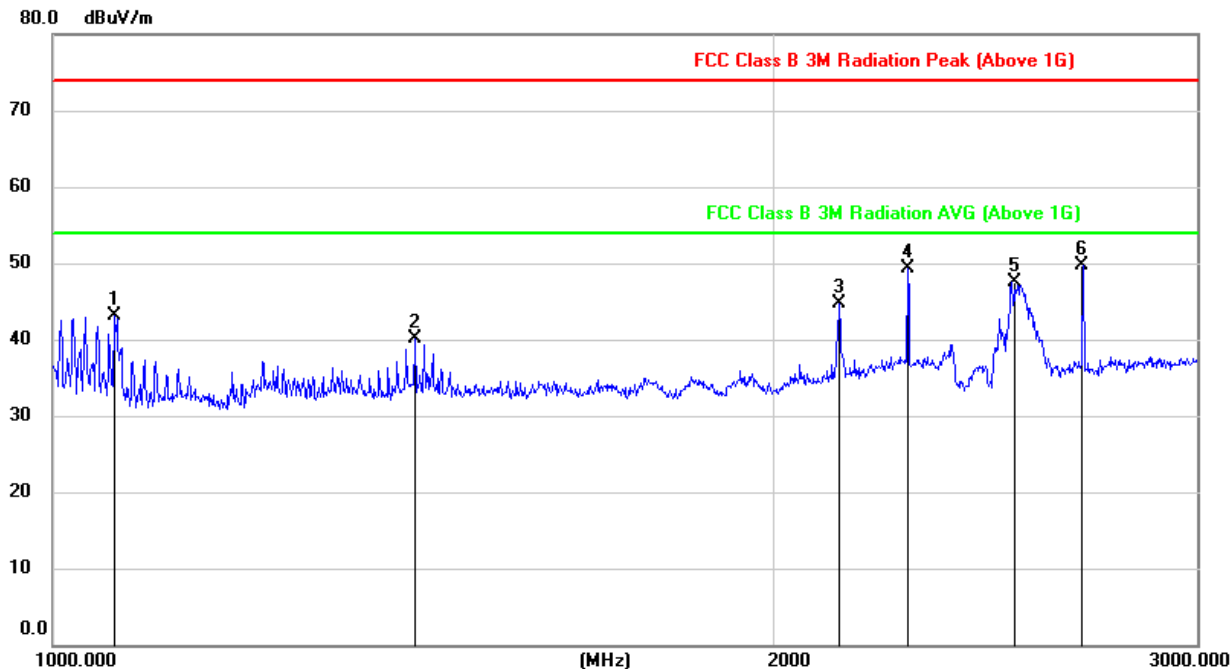


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4262.250	50.04	-1.78	48.26	74.00	-25.74	peak
2	5990.839	46.74	3.30	50.04	74.00	-23.96	peak
3	6390.003	47.65	4.73	52.38	74.00	-21.62	peak
4	7322.183	42.78	7.65	50.43	74.00	-23.57	peak
5	13906.528	32.11	20.84	52.95	74.00	-21.05	peak
6	17839.462	26.01	26.26	52.27	74.00	-21.73	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

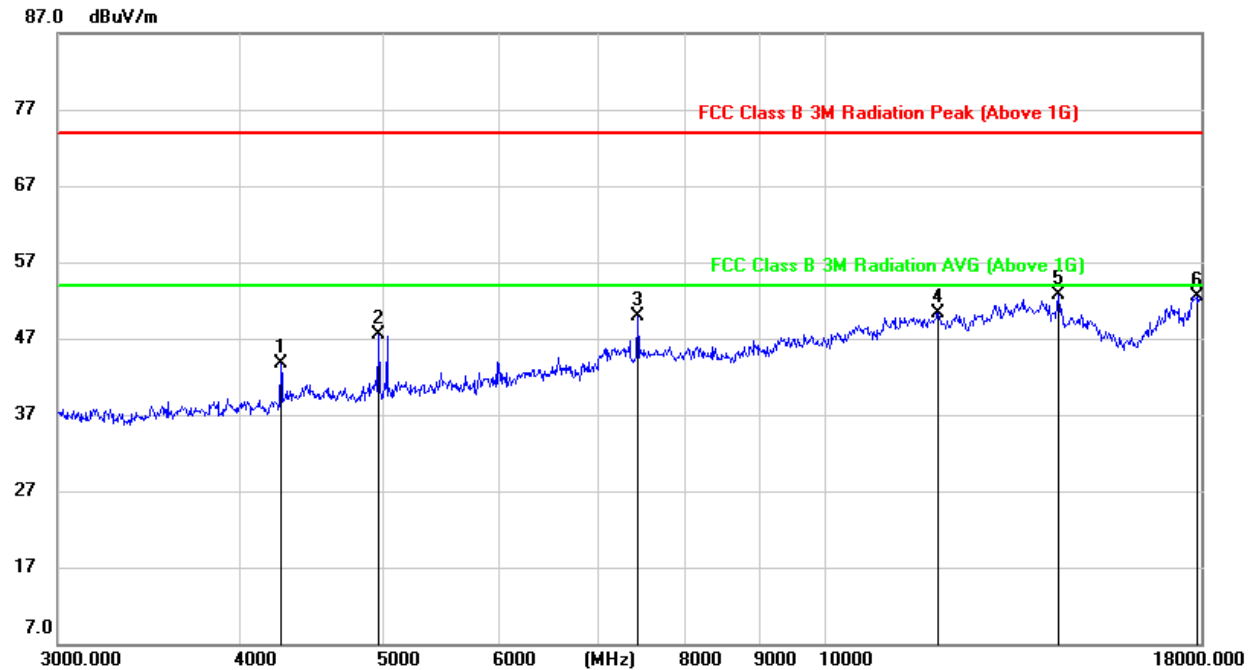


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1061.120	56.77	-13.62	43.15	74.00	-30.85	peak
2	1416.601	52.23	-12.13	40.10	74.00	-33.90	peak
3	2127.073	53.95	-9.23	44.72	74.00	-29.28	peak
4	2272.007	56.80	-7.50	49.30	74.00	-24.70	peak
5	2513.650	55.92	-8.38	47.54	74.00	-26.46	peak
6	2687.875	57.33	-7.67	49.66	74.00	-24.34	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

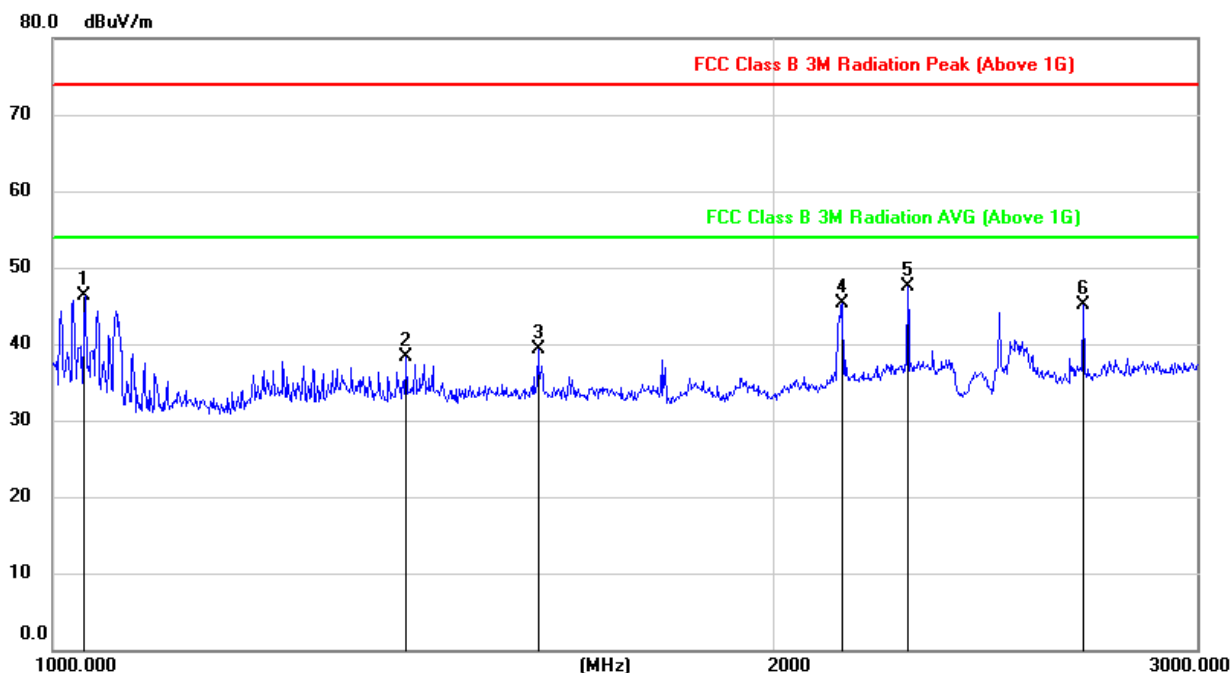


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	45.62	-1.95	43.67	74.00	-30.33	peak
2	4963.428	46.96	0.55	47.51	74.00	-26.49	peak
3	7454.561	42.32	7.62	49.94	74.00	-24.06	peak
4	11941.967	33.87	16.48	50.35	74.00	-23.65	peak
5	14388.105	32.65	19.98	52.63	74.00	-21.37	peak
6	17871.455	26.13	26.36	52.49	74.00	-21.51	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

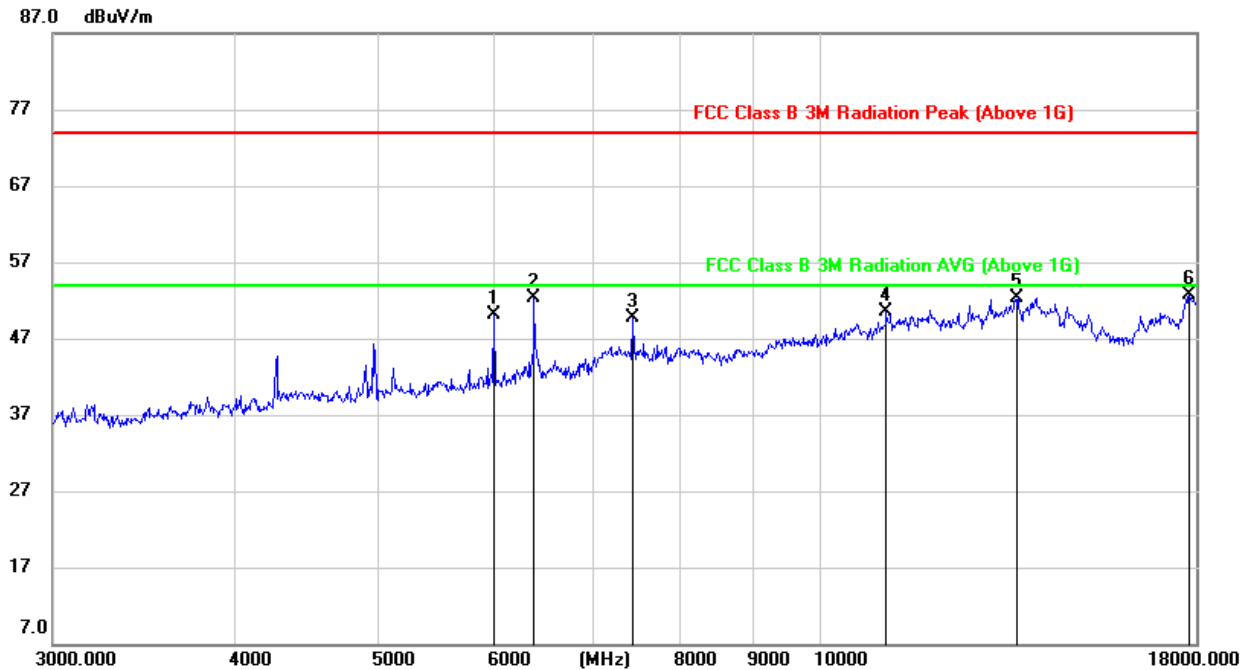


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1031.239	60.19	-13.96	46.23	74.00	-27.77	peak
2	1404.205	50.83	-12.44	38.39	74.00	-35.61	peak
3	1593.307	51.39	-12.09	39.30	74.00	-34.70	peak
4	2134.095	54.56	-9.23	45.33	74.00	-28.67	peak
5	2272.007	54.83	-7.42	47.41	74.00	-26.59	peak
6	2690.830	52.84	-7.67	45.17	74.00	-28.83	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5990.839	46.89	3.30	50.19	74.00	-23.81	peak
2	6378.564	47.64	4.71	52.35	74.00	-21.65	peak
3	7454.561	41.99	7.72	49.71	74.00	-24.29	peak
4	11096.133	35.57	14.98	50.55	74.00	-23.45	peak
5	13610.714	31.81	20.43	52.24	74.00	-21.76	peak
6	17807.526	25.89	26.76	52.65	74.00	-21.35	peak

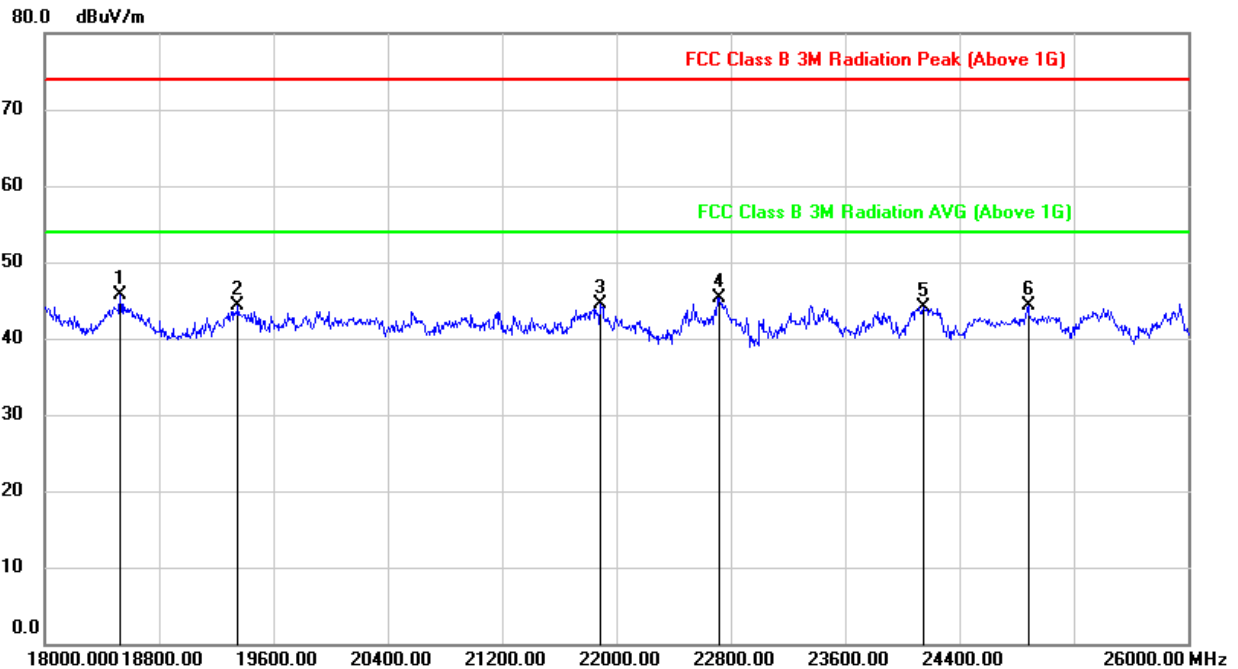
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.



7.3. SPURIOUS EMISSIONS 18G ~ 26GHz

7.3.1. 8DPSK MODE

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18528.000	50.91	-5.26	45.65	74.00	-28.35	peak
2	19352.000	49.86	-5.57	44.29	74.00	-29.71	peak
3	21888.000	48.93	-4.41	44.52	74.00	-29.48	peak
4	22720.000	49.09	-3.71	45.38	74.00	-28.62	peak
5	24144.000	46.91	-2.79	44.12	74.00	-29.88	peak
6	24880.000	46.53	-2.20	44.33	74.00	-29.67	peak

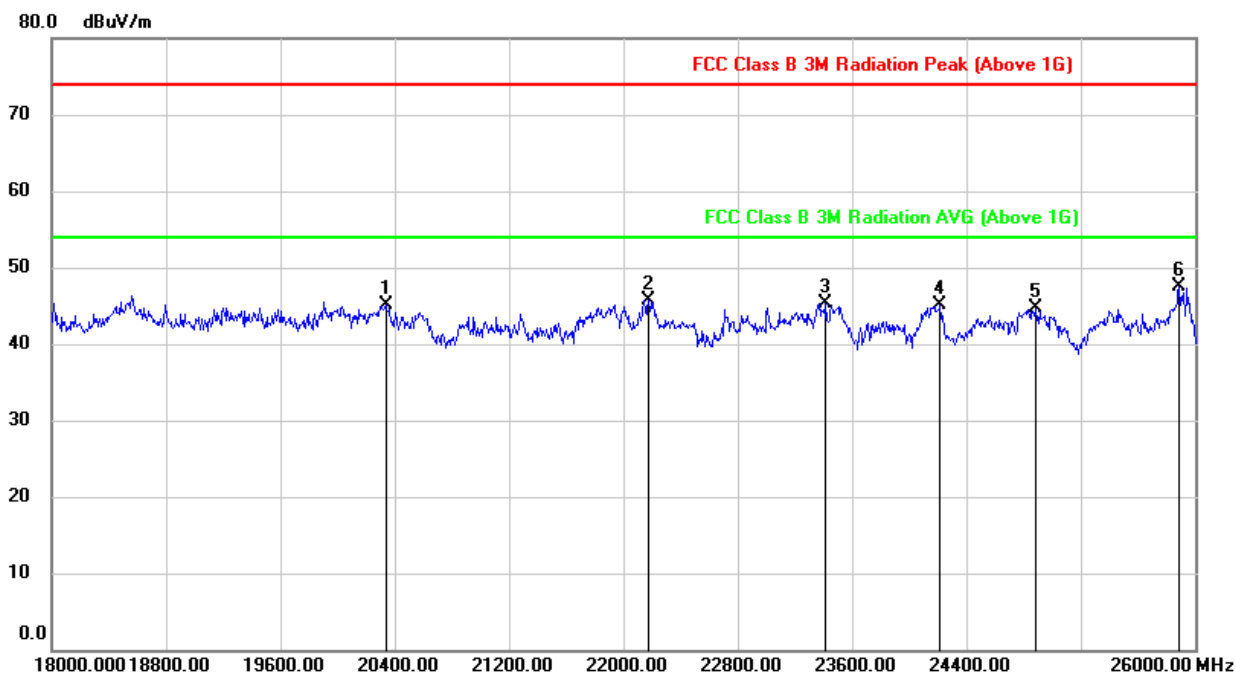
Note: 1. Peak Result= Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. All the modes had been tested, but only the worst data were recorded in the report.



SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20336.000	50.58	-5.52	45.06	74.00	-28.94	peak
2	22176.000	49.98	-4.29	45.69	74.00	-28.31	peak
3	23416.000	48.56	-3.22	45.34	74.00	-28.66	peak
4	24216.000	47.92	-2.83	45.09	74.00	-28.91	peak
5	24880.000	46.90	-2.20	44.70	74.00	-29.30	peak
6	25888.000	48.37	-0.85	47.52	74.00	-26.48	peak

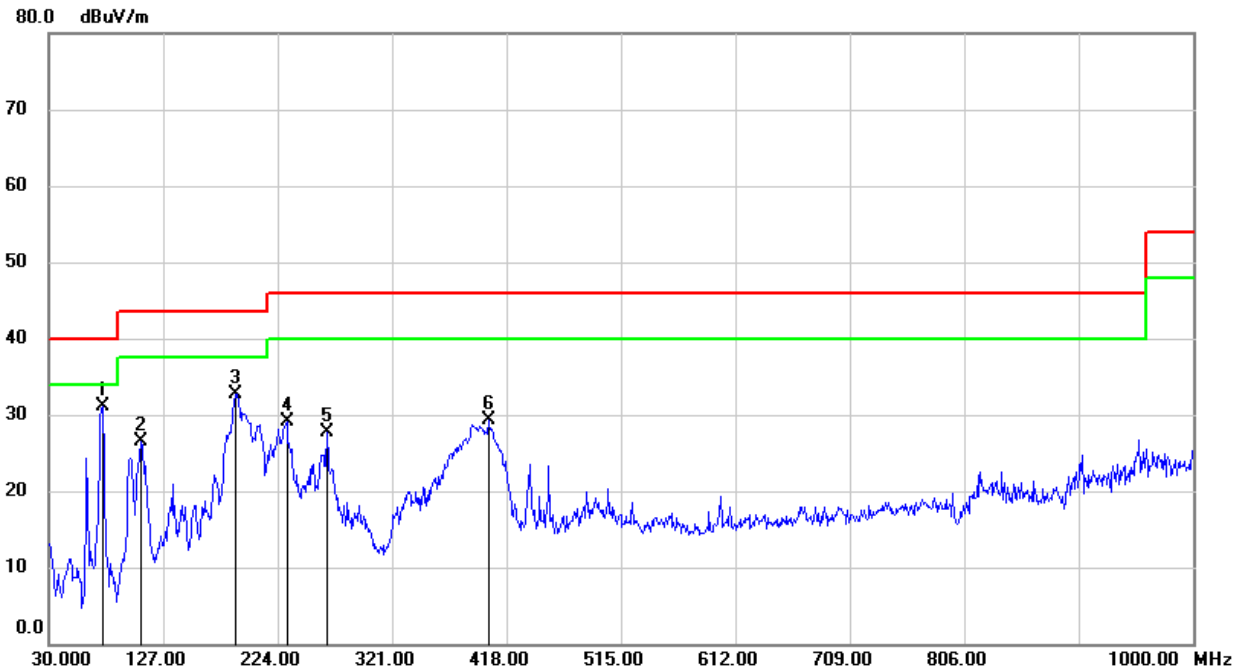
Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. All the modes had been tested, but only the worst data were recorded in the report.



7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

7.4.1. 8DPSK MODE

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

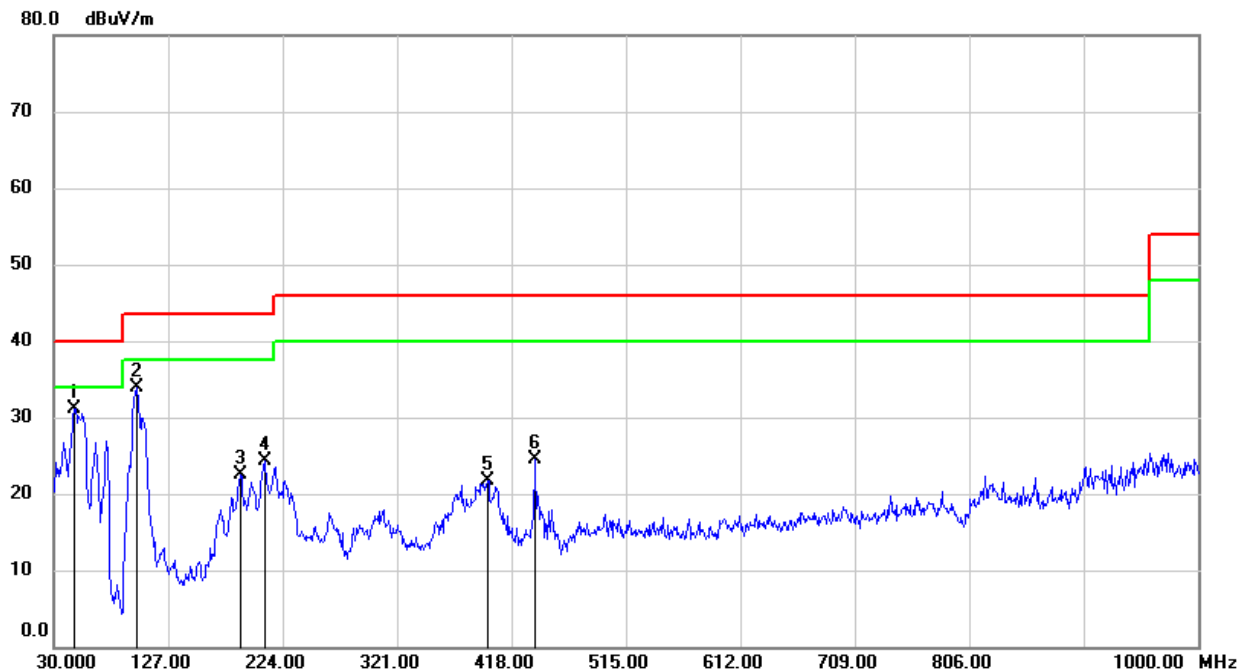


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	75.5899	51.66	-20.50	31.16	40.00	-8.84	QP
2	107.6000	47.18	-20.67	26.51	43.50	-16.99	QP
3	188.1100	48.87	-16.17	32.70	43.50	-10.80	QP
4	231.7600	46.13	-16.99	29.14	46.00	-16.86	QP
5	265.7100	44.11	-16.38	27.73	46.00	-18.27	QP
6	402.4800	42.44	-13.14	29.30	46.00	-16.70	QP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.4600	50.63	-19.47	31.16	40.00	-8.84	QP
2	99.8399	55.40	-21.48	33.92	43.50	-9.58	QP
3	188.1100	38.60	-16.17	22.43	43.50	-21.07	QP
4	209.4500	40.48	-16.21	24.27	43.50	-19.23	QP
5	397.6300	34.95	-13.24	21.71	46.00	-24.29	QP
6	437.4000	37.02	-12.56	24.46	46.00	-21.54	QP

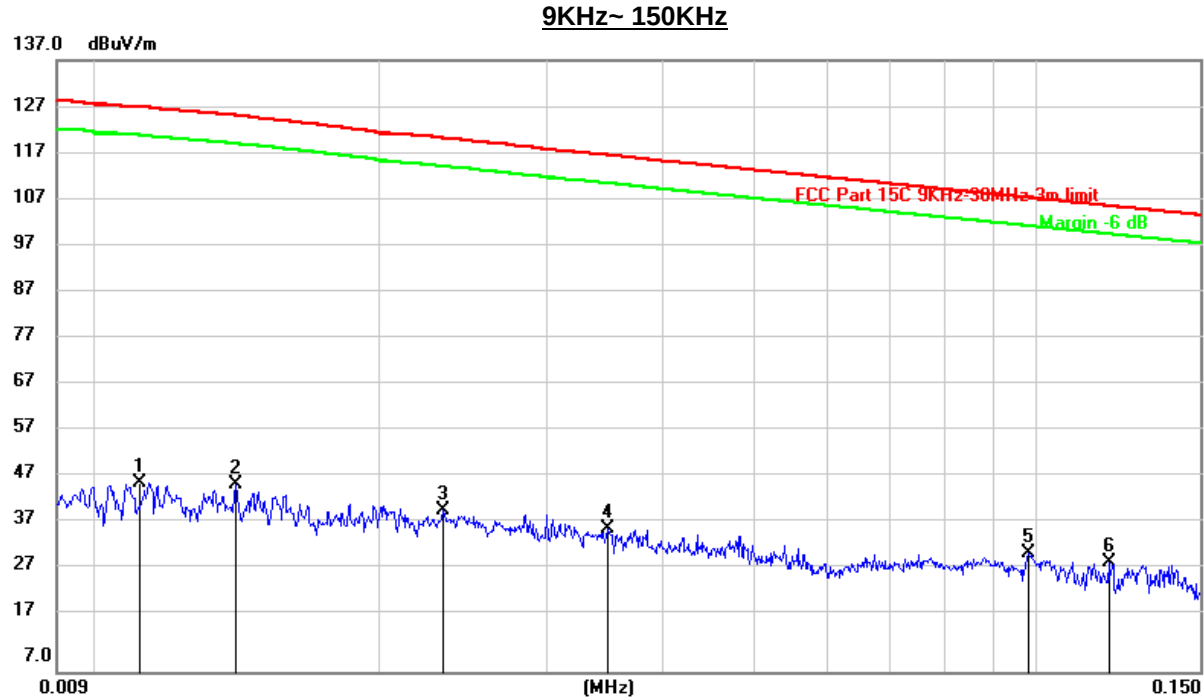
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto



7.5. SPURIOUS EMISSIONS BELOW 30M

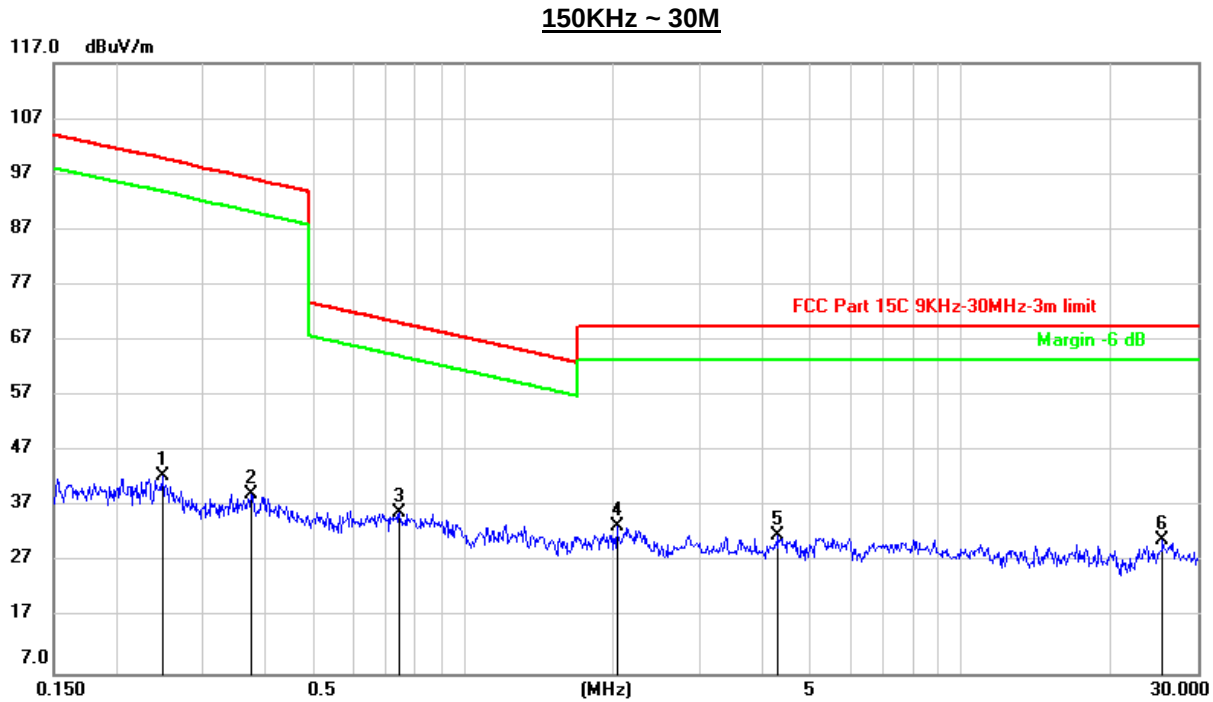
7.5.1. 8DPSK MODE

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0111	27.02	20.22	47.24	126.94	-79.70	peak
2	0.0140	26.47	20.25	46.72	125.19	-78.47	peak
3	0.0233	20.85	20.31	41.16	120.42	-79.26	peak
4	0.0349	17.17	20.31	37.48	116.84	-79.36	peak
5	0.0984	11.87	20.23	32.10	107.75	-75.65	peak
6	0.1198	10.03	20.30	30.33	106.04	-75.71	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.



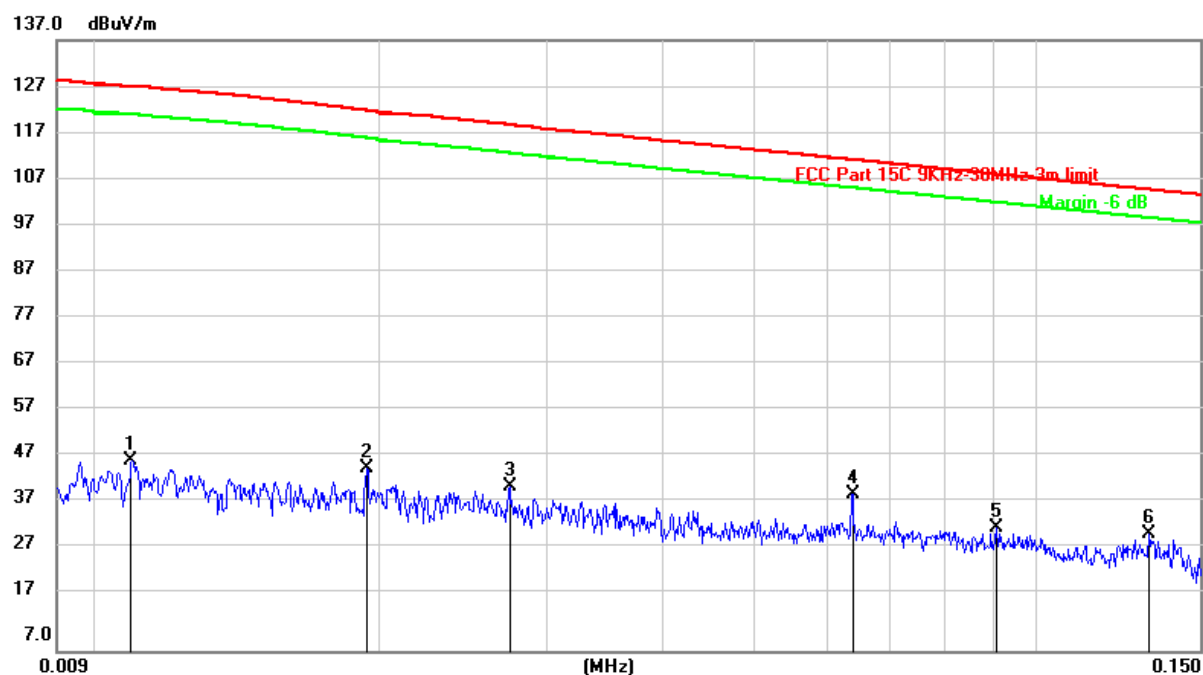
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.2479	22.41	20.32	42.73	99.89	-57.16	peak
2	0.3729	19.11	20.28	39.39	96.24	-56.85	peak
3	0.7429	15.57	20.36	35.93	70.20	-34.27	peak
4	2.0333	12.67	20.74	33.41	69.54	-36.13	peak
5	4.2918	10.80	20.99	31.79	69.54	-37.75	peak
6	25.4557	9.44	21.61	31.05	69.54	-38.49	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.



SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

9KHz~ 150KHz

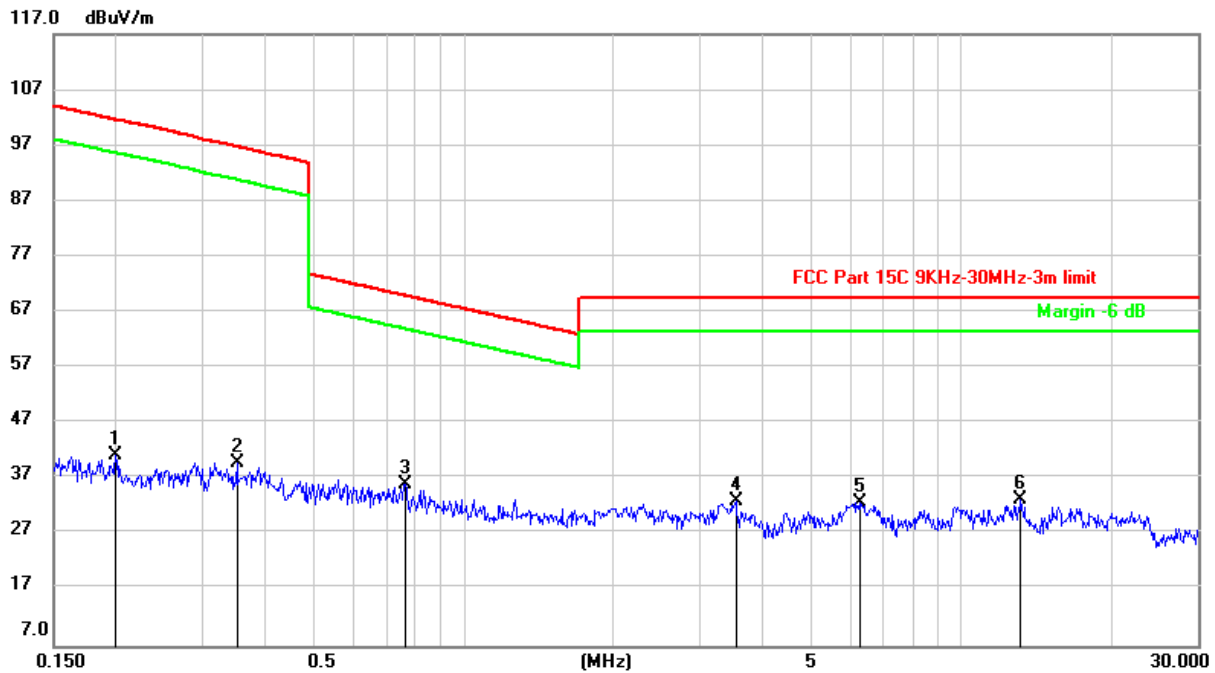


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0108	27.24	20.22	47.46	127.12	-79.66	peak
2	0.0193	25.46	20.30	45.76	122.00	-76.24	peak
3	0.0274	21.60	20.31	41.91	118.98	-77.07	peak
4	0.0637	19.88	20.31	40.19	111.54	-71.35	peak
5	0.0908	12.84	20.26	33.10	108.45	-75.35	peak
6	0.1322	11.61	20.35	31.96	105.19	-73.23	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.



150KHz ~ 30M



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1995	20.85	20.37	41.22	101.60	-60.38	peak
2	0.3502	19.48	20.29	39.77	96.81	-57.04	peak
3	0.7630	15.66	20.36	36.02	69.97	-33.95	peak
4	3.5278	11.97	20.98	32.95	69.54	-36.59	peak
5	6.2519	11.84	20.89	32.73	69.54	-36.81	peak
6	13.1966	12.20	20.97	33.17	69.54	-36.37	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

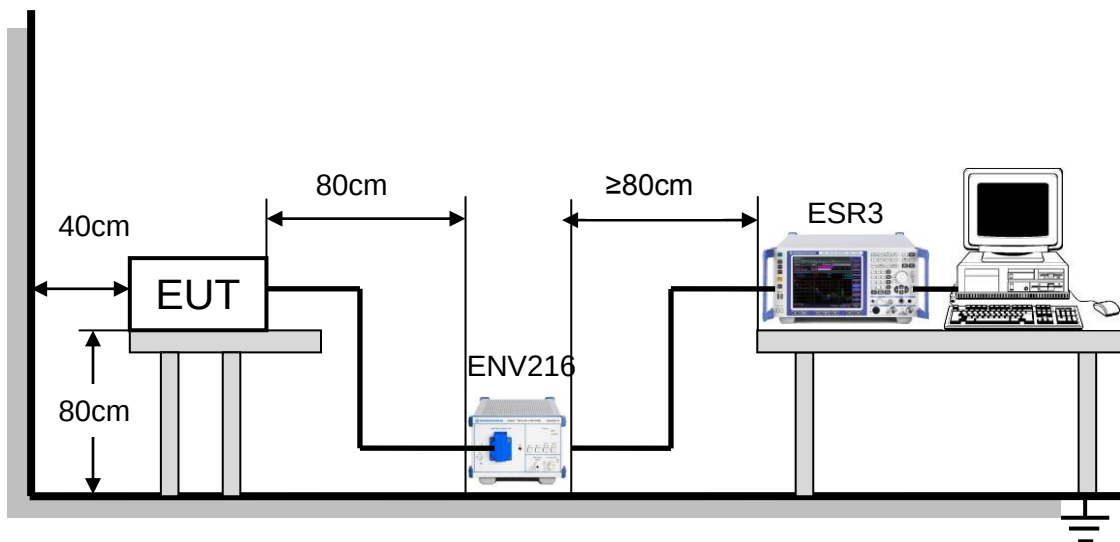
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a).

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE

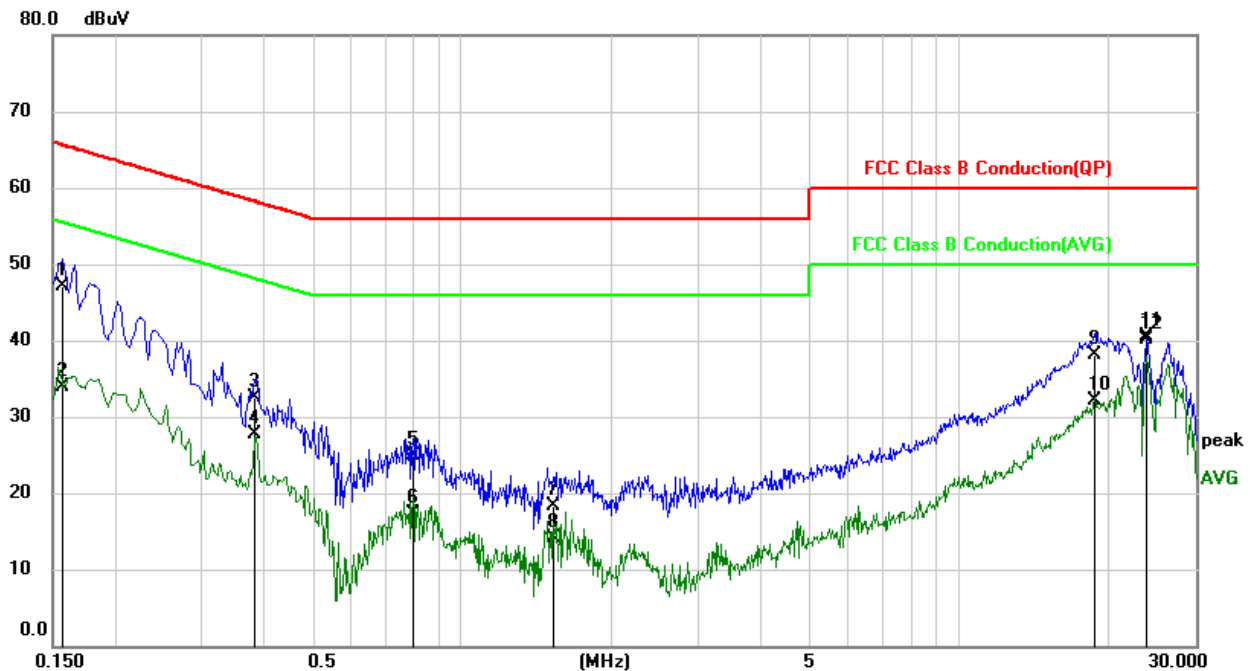


The EUT is put on a table of non-conducting material that is 0.8m high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). An EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013, conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/60HZ

**RESULTS****8DPSK MODE TEST RESULTS (MID CHANNEL, WORST-CASE CONFIGURATION)****LINE N RESULTS**

No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	37.56	9.64	47.20	65.57	-18.37	QP
2	0.1580	24.18	9.64	33.82	55.57	-21.75	AVG
3	0.3827	22.83	9.62	32.45	58.22	-25.77	QP
4	0.3827	17.99	9.62	27.61	48.22	-20.61	AVG
5	0.7990	15.36	9.63	24.99	56.00	-31.01	QP
6	0.7990	7.69	9.63	17.32	46.00	-28.68	AVG
7	1.5328	8.65	9.64	18.29	56.00	-37.71	QP
8	1.5328	4.51	9.64	14.15	46.00	-31.85	AVG
9	18.7306	28.31	9.72	38.03	60.00	-21.97	QP
10	18.7306	22.38	9.72	32.10	50.00	-17.90	AVG
11	23.9837	30.88	9.66	40.54	60.00	-19.46	QP
12	23.9837	30.45	9.66	40.11	50.00	-9.89	AVG

Note: 1. Result = Reading +Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

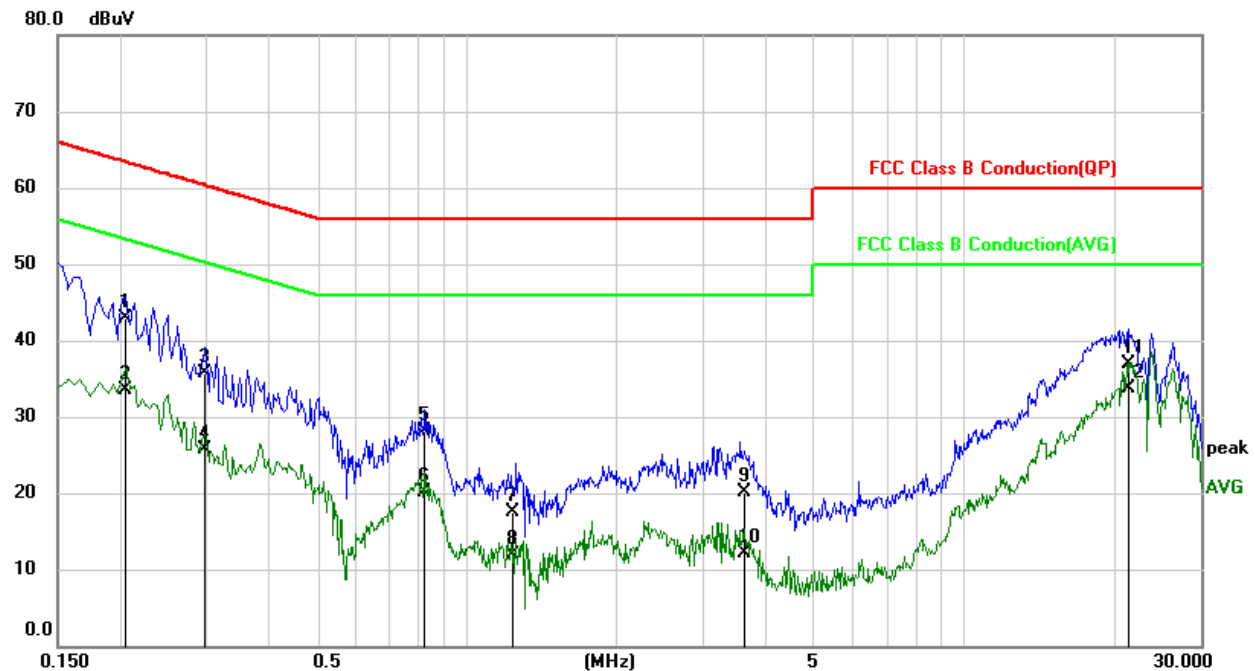
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).

4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

5. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.



LINE L RESULTS



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2057	33.39	9.44	42.83	63.38	-20.55	QP
2	0.2057	24.13	9.44	33.57	53.38	-19.81	AVG
3	0.2964	26.27	9.43	35.70	60.34	-24.64	QP
4	0.2964	16.32	9.43	25.75	50.34	-24.59	AVG
5	0.8229	18.71	9.43	28.14	56.00	-27.86	QP
6	0.8229	10.76	9.43	20.19	46.00	-25.81	AVG
7	1.2307	8.18	9.42	17.60	56.00	-38.40	QP
8	1.2307	2.45	9.42	11.87	46.00	-34.13	AVG
9	3.6002	10.58	9.46	20.04	56.00	-35.96	QP
10	3.6002	2.64	9.46	12.10	46.00	-33.90	AVG
11	21.4229	27.36	9.61	36.97	60.00	-23.03	QP
12	21.4229	24.11	9.61	33.72	50.00	-16.28	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.
5. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.



9. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector

EUT has a PCB antenna without antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT