



**FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2**

CERTIFICATION TEST REPORT

For

BT Headset

MODEL NUMBER: HSA-G002H

FCC ID: 2AAP8G002H

IC: 9043A-G002H

REPORT NUMBER: 4788225412-1

ISSUE DATE: April 3, 2018

Prepared for

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	4/03/2018	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	20dB Bandwidth And 99% Bandwidth	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a)	Pass
2	Peak Conducted Output Power	FCC 15.247 (b) (1) RSS-247 Clause 5.1 (b)	Pass
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (b)	Pass
4	Number of Hopping Frequency	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass
5	Time of Occupancy (Dwell Time)	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass
6	Conducted Bandedge	FCC 15.247 (d) RSS-247 Clause 5.5	Pass
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
8	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Pass
9	Antenna Requirement	FCC 15.203 RSS-GEN Clause 8.3	Pass



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1. ATTESTATION OF TESCT RESULTS

Applicant Information

Company Name: Guoguang Electric Co.,Ltd.
Address: No.8 Jinghu Road, Xinhua Street, Huadu Reg, Guangzhou, China

Manufacturer Information

Company Name: Guoguang Electric Co.,Ltd.
Address: No.8 Jinghu Road, Xinhua Street, Huadu Reg, Guangzhou, China

EUT Description

Product Name BT Headset
Brand Name /
Model Name HSA-G002H
Sample ID 1455149
Sample Status Normal
Sample Received date March 01, 2018
Date Tested March 01, 2018 ~ March 30, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 4	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 DA 00-705, KDB414788 D01 Radiated Test Site v01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>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.</p> <p>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</p> <p>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</p> <p>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.</p> <p>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</p>
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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	BT Headset		
Model Name	HSA-G002H		
Product Description (Bluetooth)	Operation Frequency	2402 MHz ~ 2480 MHz	
	Modulation Type	Data Rate	
	GFSK	1Mbps	
	π/4-DQPSK	2Mbps	
	8DPSK	3Mbps	
Rated Power Input	DC 5V		
Battery	3.7V, 250mAh		
Bluetooth Version	V4.2		
Hardware Version	V4.0		
Software Version	V31		

5.2. MAXIMUM OUTPUT POWER

Bluetooth Mode	Frequency (MHz)	Channel Number	Max Output Power (dBm)	EIRP (dBm)
GFSK	2402-2480	0-78[79]	-0.801	-0.801
8DPSK	2402-2480	0-78[79]	-0.813	-0.813

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		Non Signal Test		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 00	CH 39	CH 78
GFSK	1	Default	Default	Default
8-DPSK	1	Default	Default	Default



5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2402-2480	integral antenna	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	USB	USB	Unshielded	0.7	N/A

Note: The USB port only use for charging.

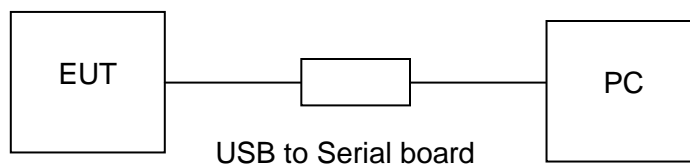
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

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



6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

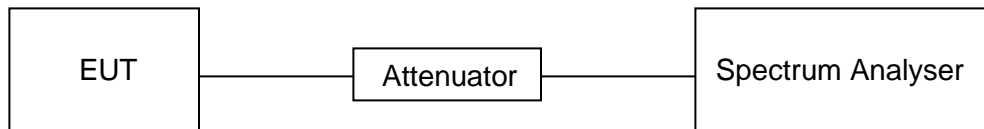
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



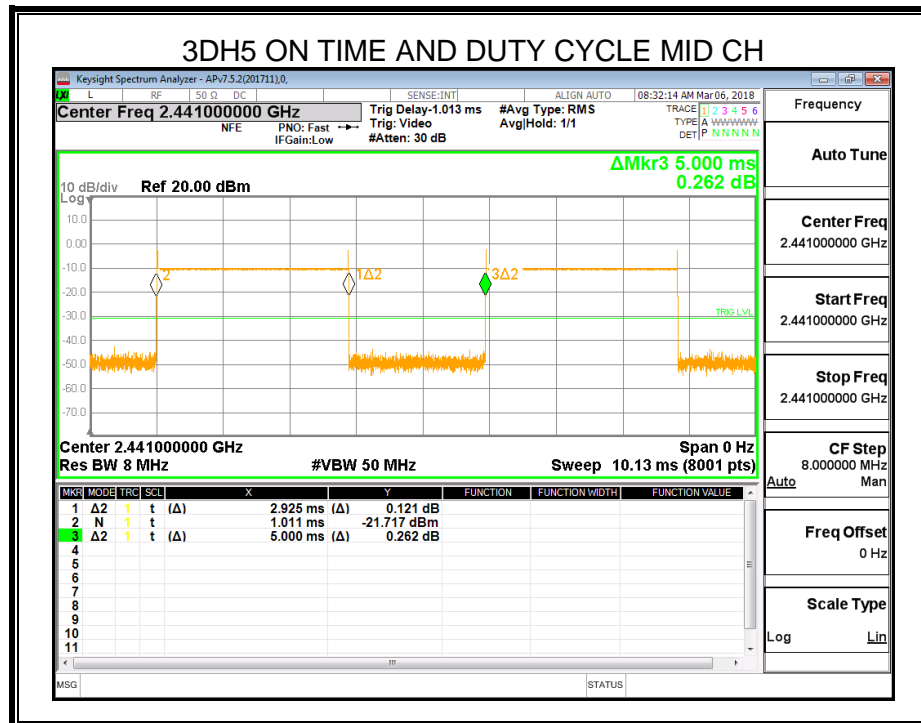
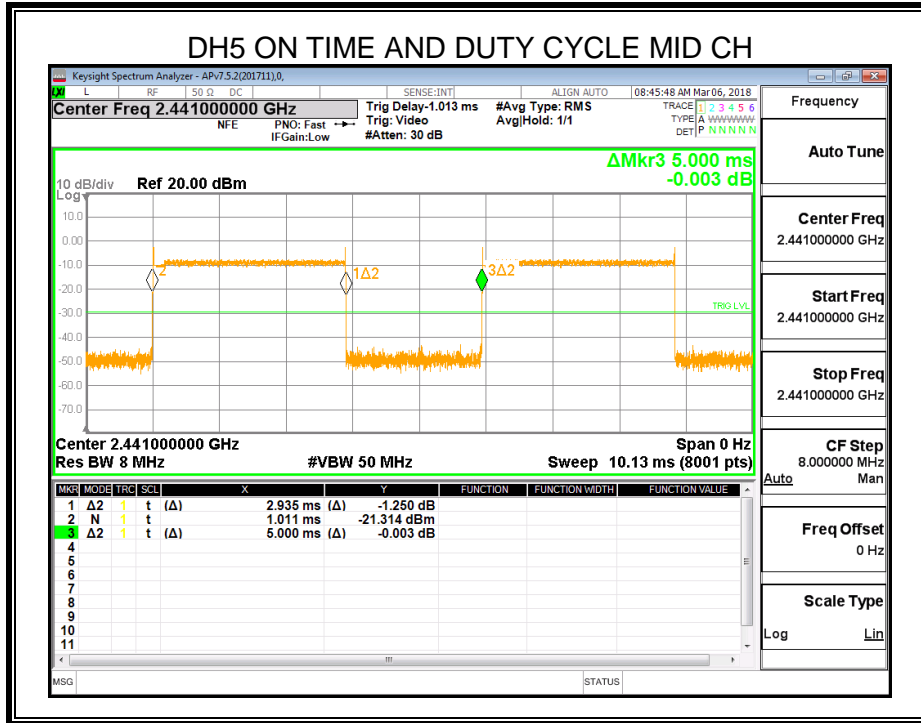
TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
GFSK	2.935	5.00	0.587	59	2.31	1
8DPSK	2.925	5.00	0.585	59	2.33	1

Note: Duty Cycle Correction Factor= $10\log(1/x)$.
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 RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a)	20dB Bandwidth	500KHz	2400-2483.5
RSS-Gen Clause 6.6	99% Bandwidth	N/A	2400-2483.5

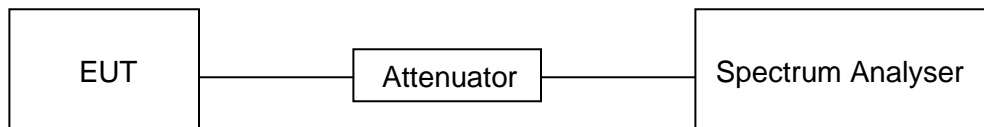
TEST PROCEDURE

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

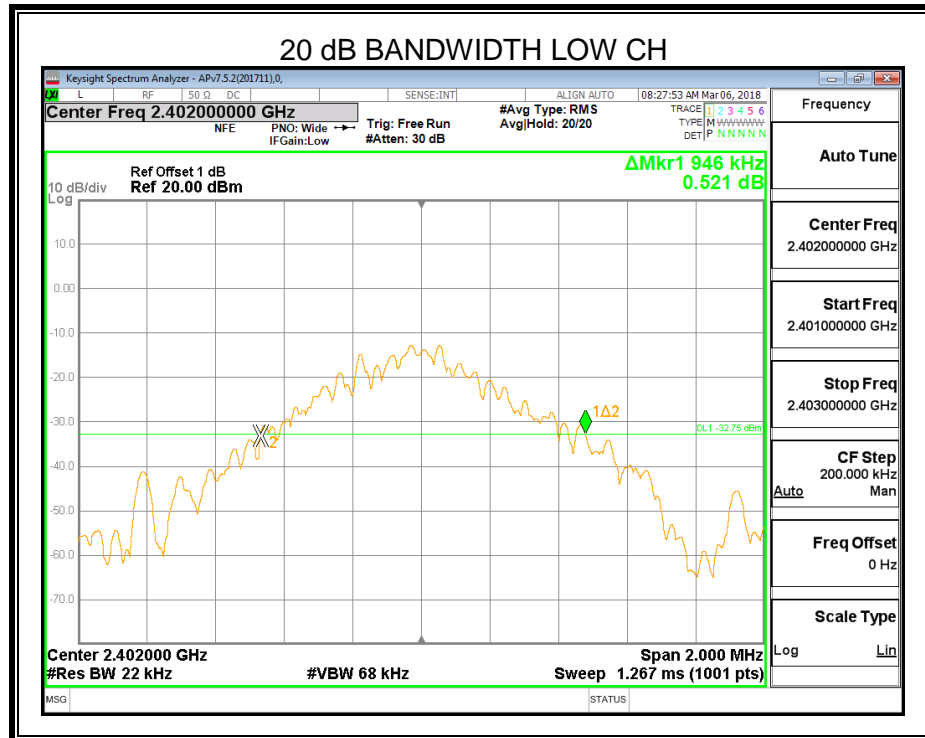
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

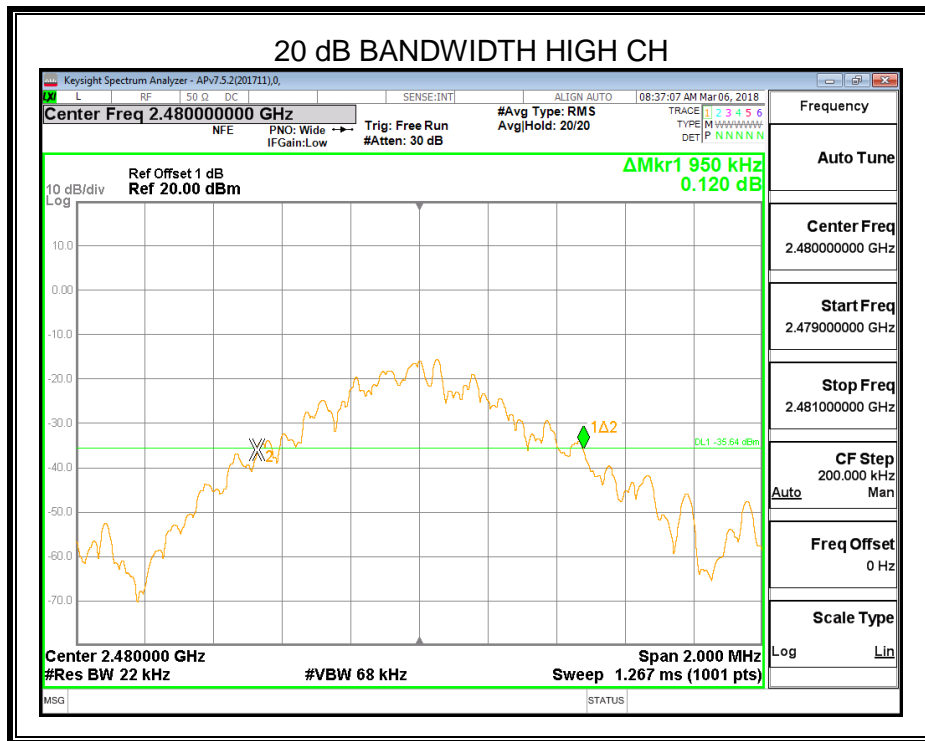
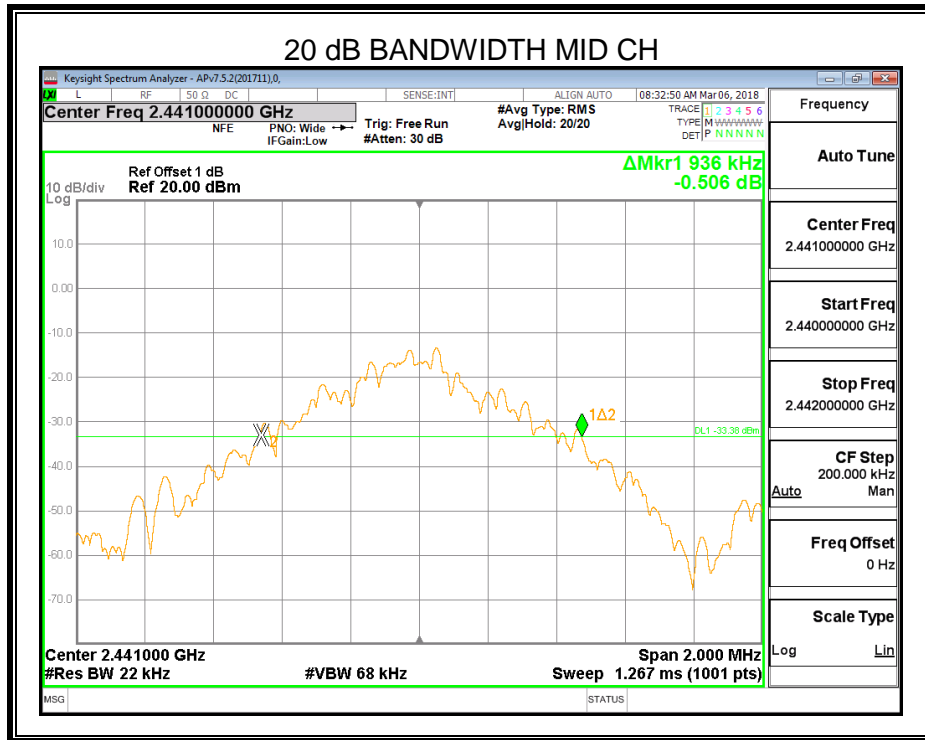
RESULTS

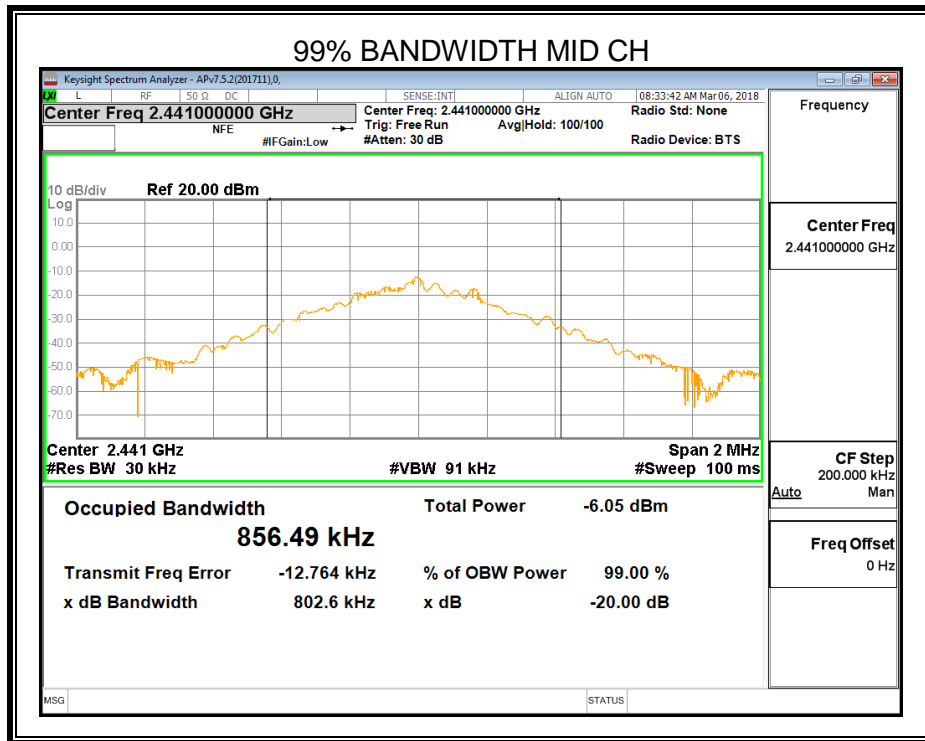
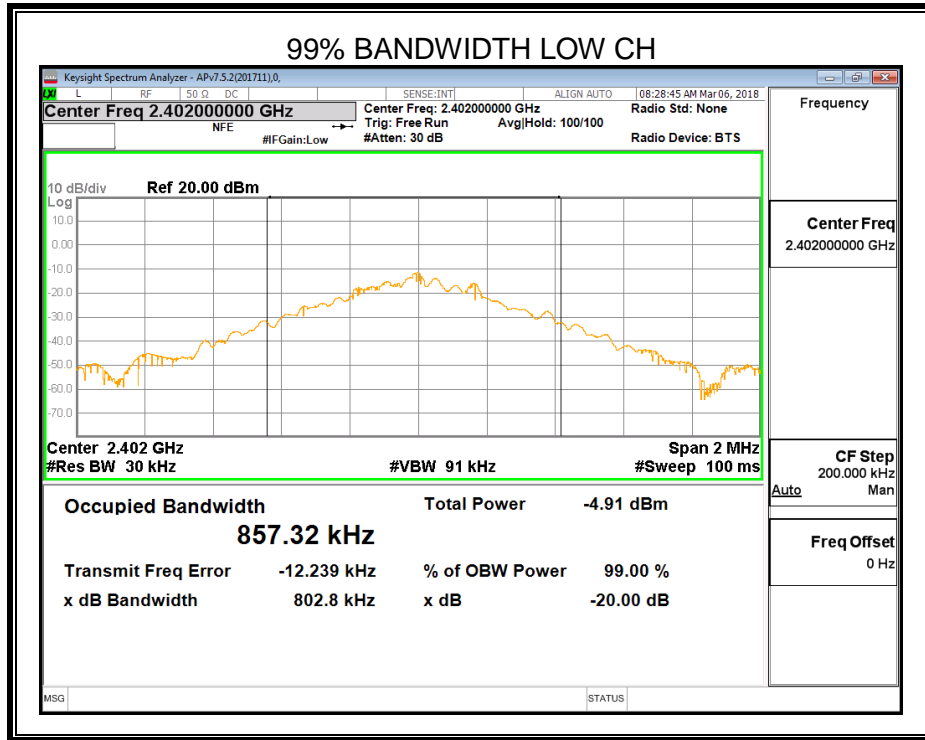
6.2.1. GFSK MODE

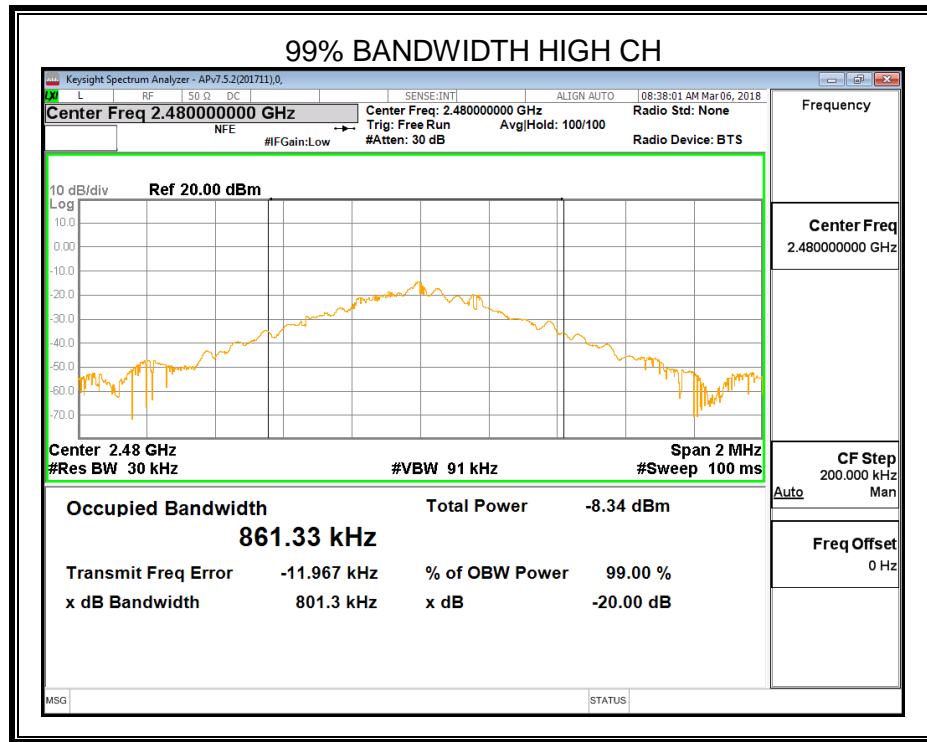
Channel	Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
Low	2402	0.946	0.857	PASS
Middle	2441	0.936	0.856	PASS
High	2480	0.950	0.861	PASS

Test Graph



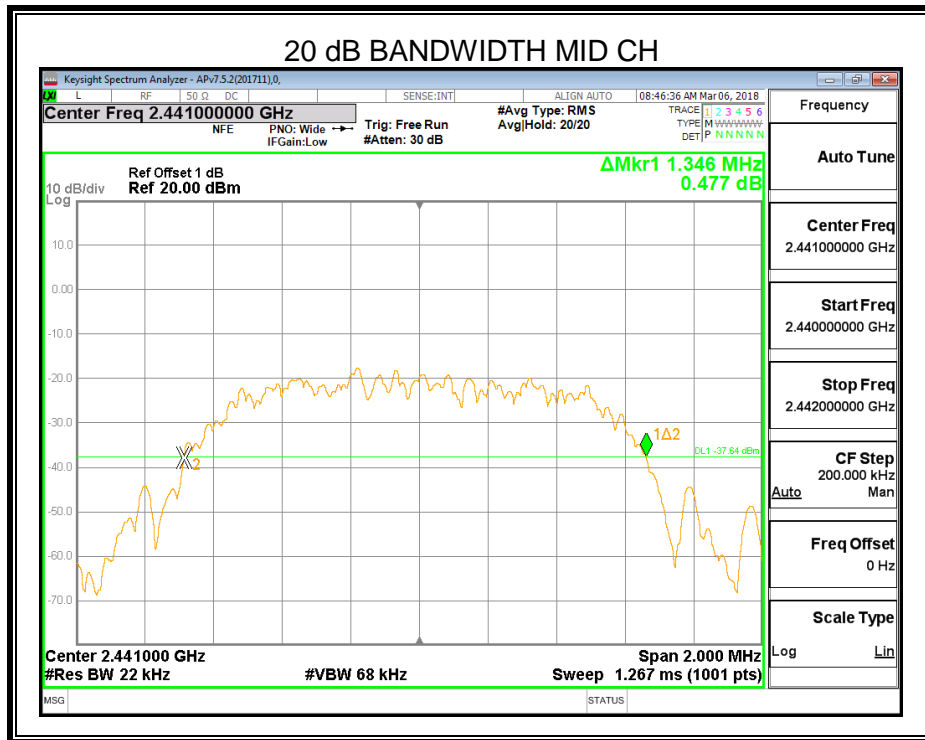
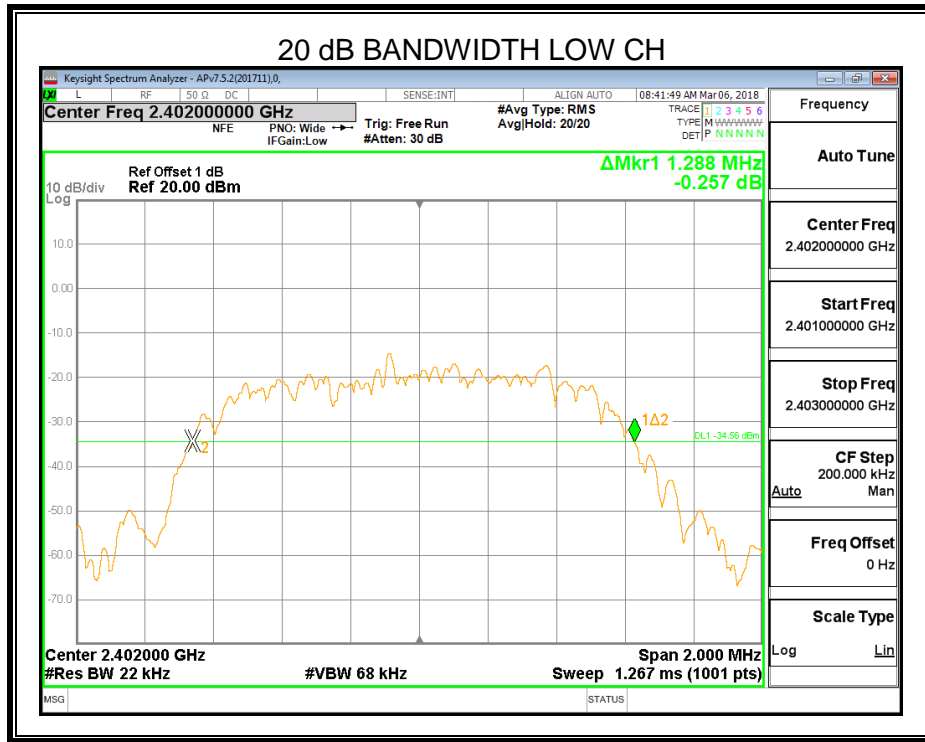


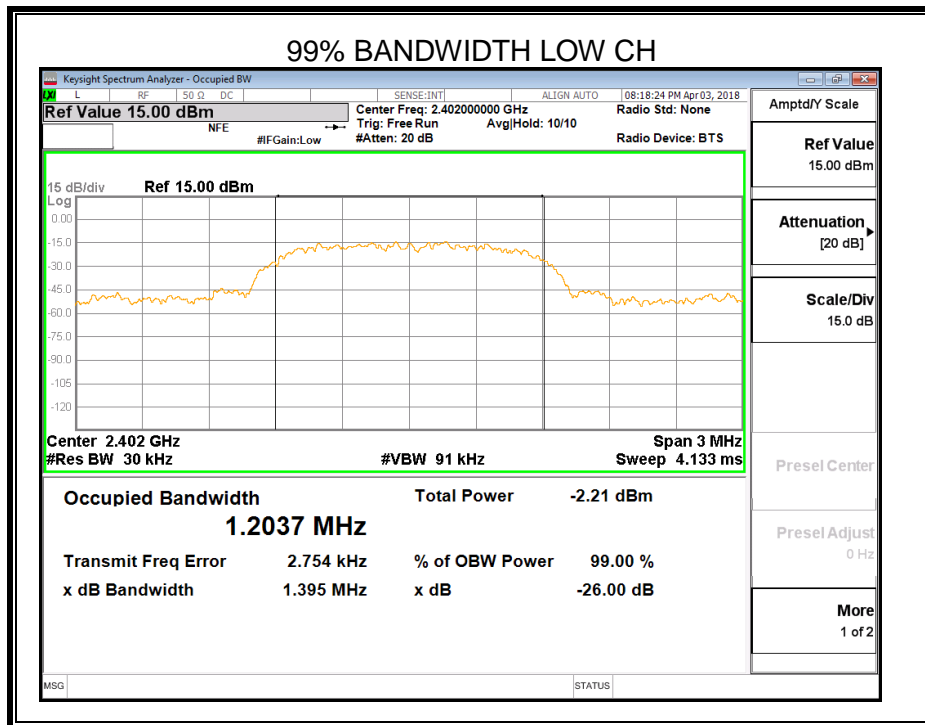
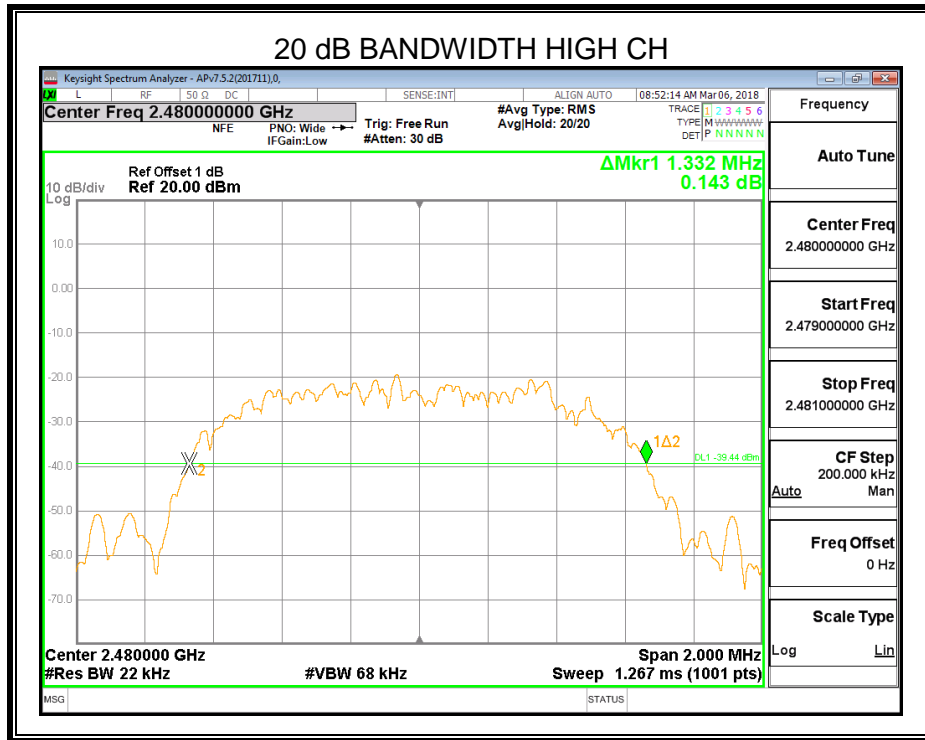


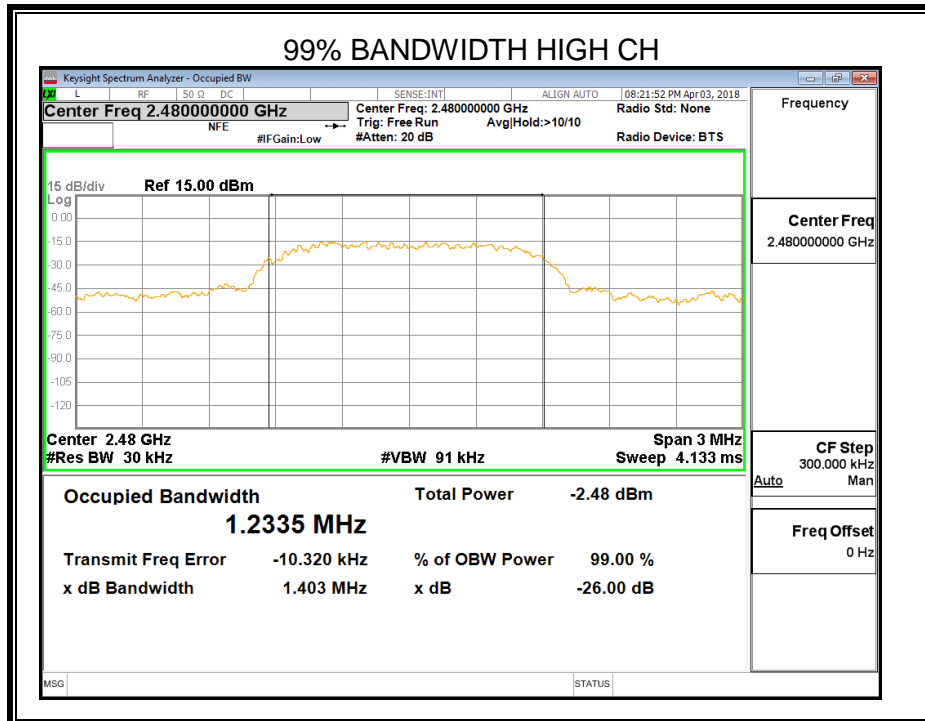
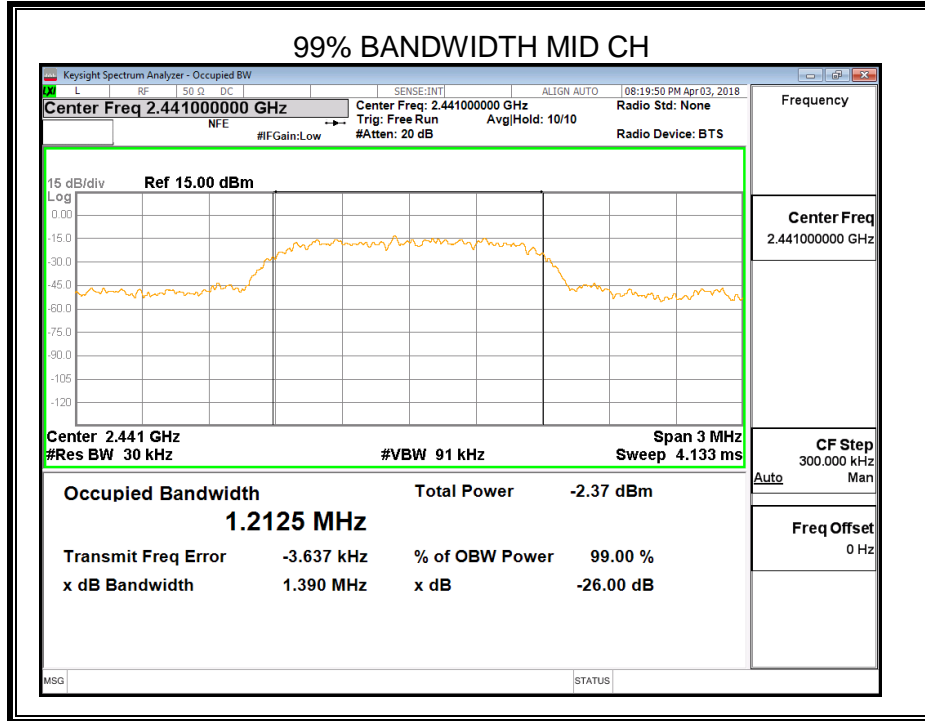


6.2.2. 8DPSK MODE

Channel	Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
Low	2402	1.228	1.2037	Pass
Middle	2441	1.346	1.2125	Pass
High	2480	1.332	1.2335	Pass









6.3. PEAK CONDUCTED OUTPUT POWER

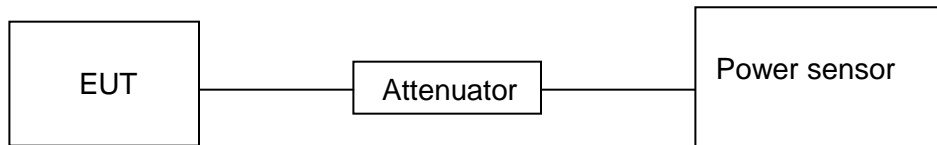
LIMITS

FCC Part15 (15.247) , Subpart C RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (b) (1) RSS-247 Clause 5.4 (b)	Peak Conducted Output Power	1 watt or 30dBm for GFSK 125mW or 21dBm for 8DPSK	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	DC 3.7V

RESULTS



6.3.1. GFSK MODE

Channel	Frequency	Maximum Conducted Output Power(PK)	EIRP	Result
	(MHz)	(dBm)	(dBm)	
Low	2402	-0.801	-0.801	Pass
Middle	2441	-1.588	-1.588	Pass
High	2480	-3.135	-3.135	Pass

Note: EIRP= Maximum Conducted Output Power + Antenna Gain

6.3.2. 8DPSK MODE

Channel	Frequency	Maximum Conducted Output Power(PK)	EIRP	Result
	(MHz)	(dBm)	(dBm)	
Low	2402	-0.813	-0.813	Pass
Middle	2441	-1.606	-1.606	Pass
High	2480	-3.159	-3.159	Pass

Note: EIRP= Maximum Conducted Output Power + Antenna Gain



6.4. CARRIER HOPPING CHANNEL SEPARATION

LIMITS

FCC Part15 (15.247) , Subpart C RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1) RSS-247 Clause 5.1 (b)	Carrier Hopping Channel Separation	25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.	2400-2483.5

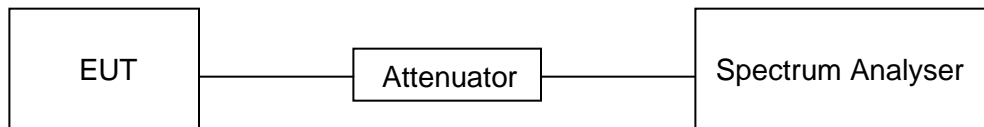
TEST PROCEDURE

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	≥ 1% of the span
VBW	≥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

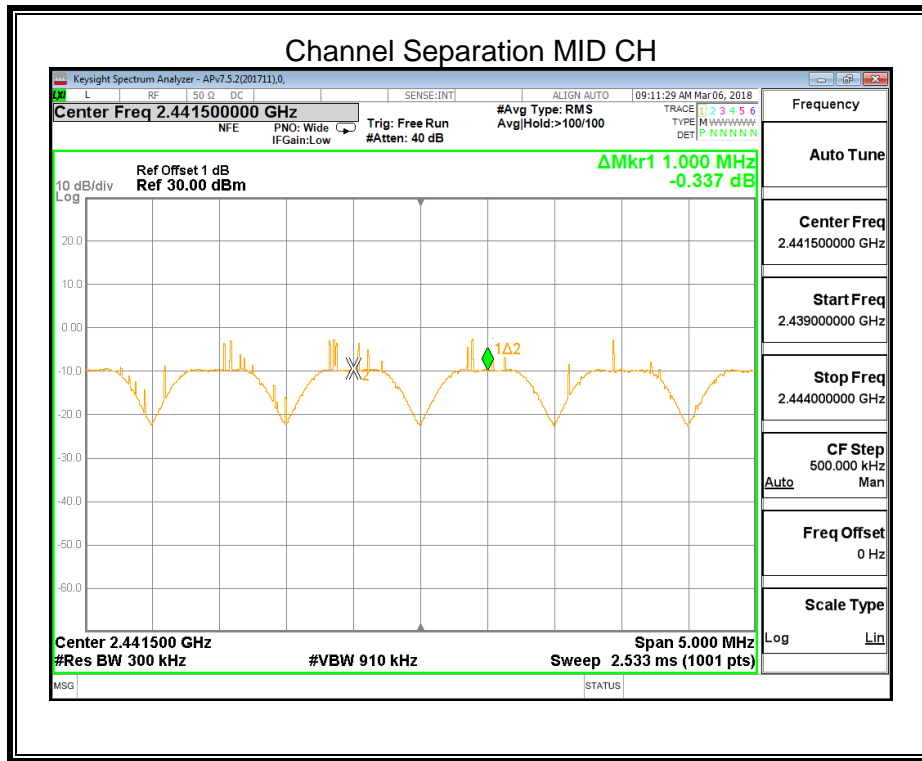
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V



RESULTS

6.4.1. GFSK MODE

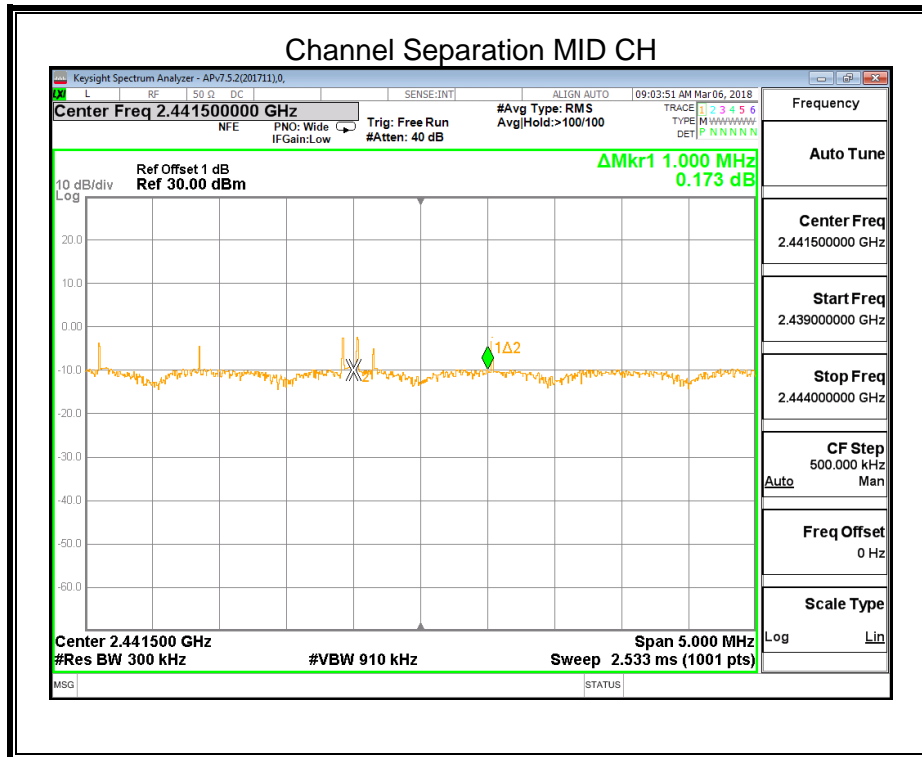
Channel	Carrier Hopping Channel Separation (MHz)	Limit (MHz)	Result
Middle	1.0	≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel	PASS



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

6.4.2. 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 RSS-247 ISSUE 2		
Section	Test Item	Limit
15.247 (a) (1) III RSS-247 Clause 5.1 (d)	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	1% of the span
VBW	≥RBW
Span	The frequency band of operation
Trace	Max hold
Sweep time	Auto couple

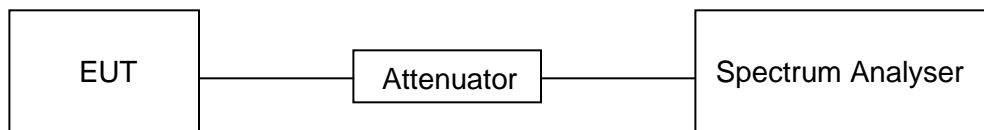
Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.

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

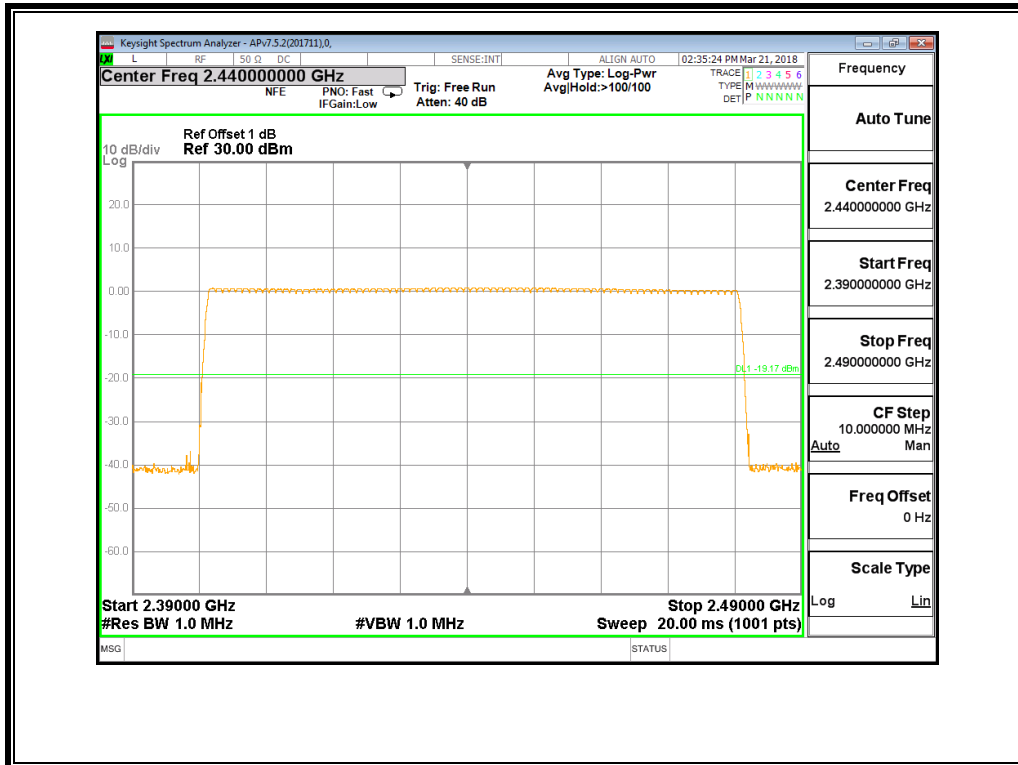
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V



RESULTS

GFSK MODE

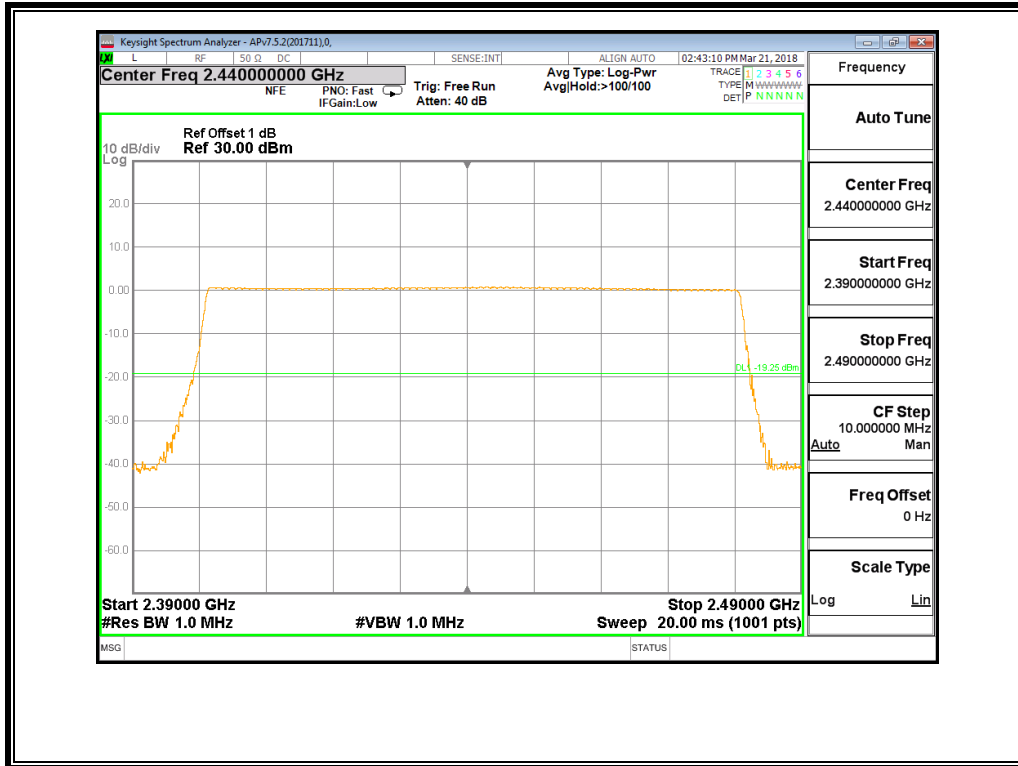
Hopping numbers	Limit	Results
79	>15	Pass





6.5.1. 8DPSK MODE

Hopping numbers	Limit	Results
79	>15	Pass





6.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

FCC Part15 (15.247) , Subpart C RSS-247 ISSUE 2		
Section	Test Item	Limit
15.247 (a) (1) III RSS-247 Clause 5.1 (d)	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 Period Time = (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):

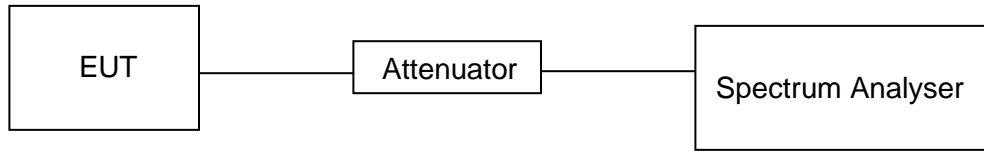
DH1 Time Slot: Reading * (1600/2)*8/(channel number)

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	DC 3.7V

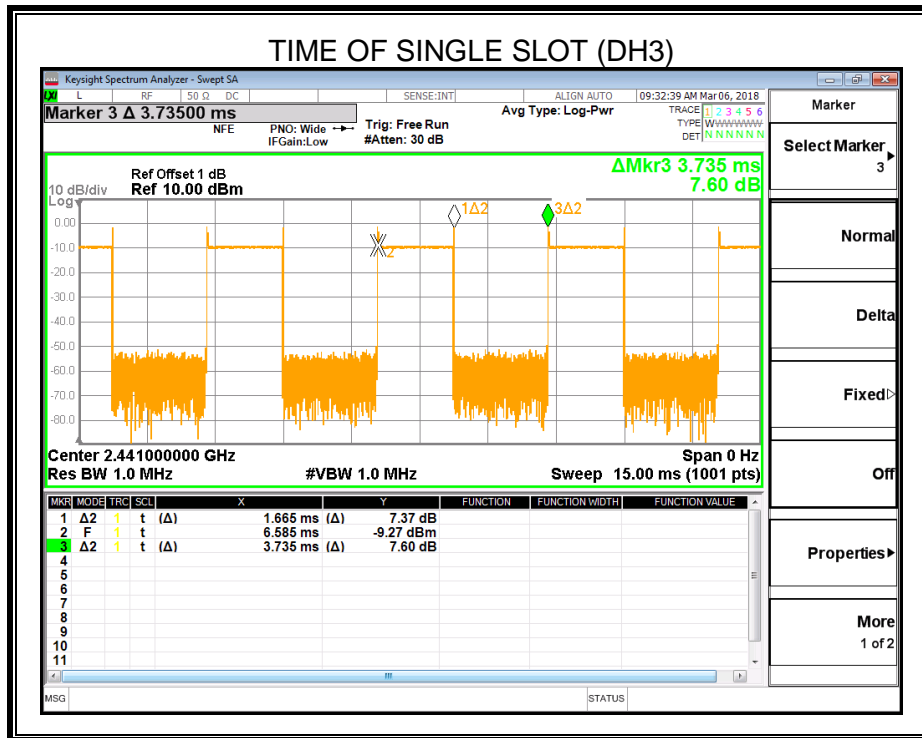
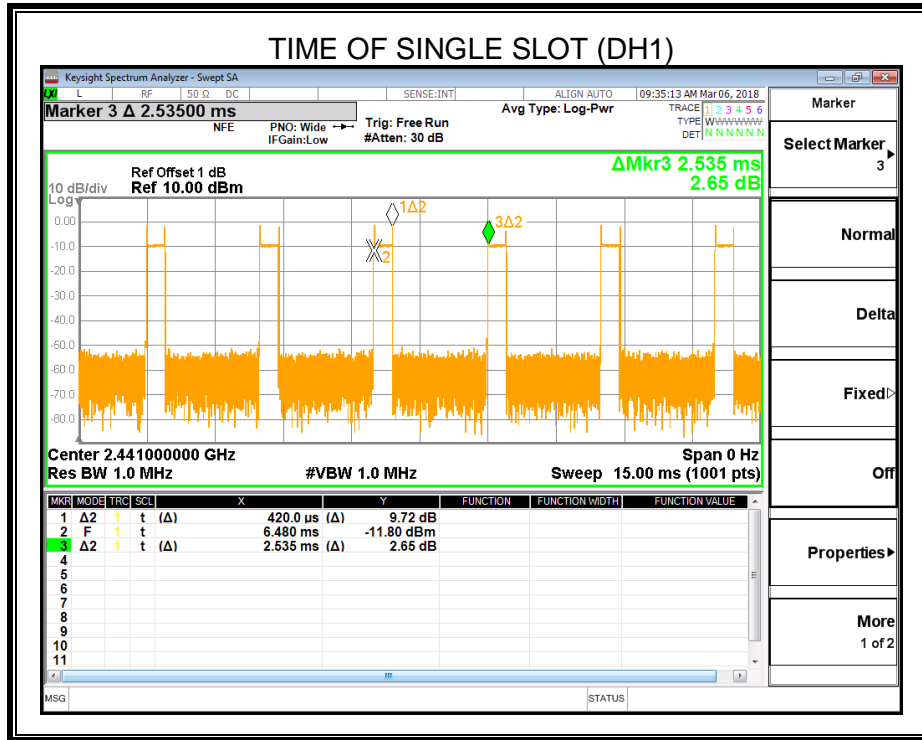
RESULTS

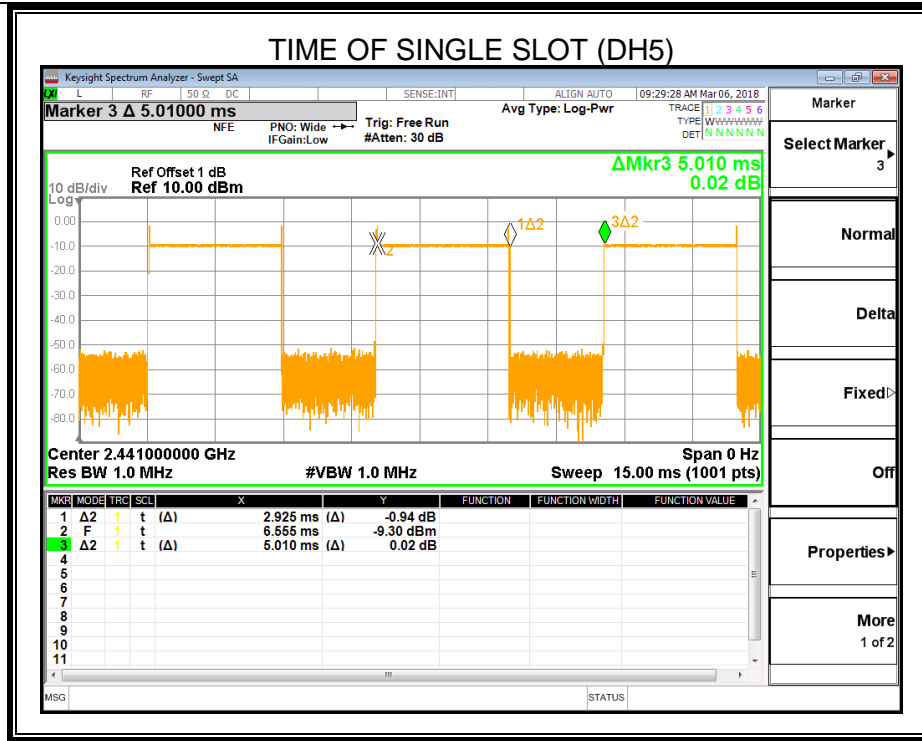
6.6.1. GFSK MODE

Normal Mode				
Packet	Channel	Burst Width [ms/hop/ch]	Dwell Time [s]	Results
DH1	MCH	0.420	0.134	PASS
DH3	MCH	1.665	0.266	PASS
DH5	MCH	2.925	0.312	PASS
AFH Mode				
DH1	MCH	0.420	0.134	PASS
DH3	MCH	1.665	0.266	PASS
DH5	MCH	2.925	0.312	PASS



Test Graph



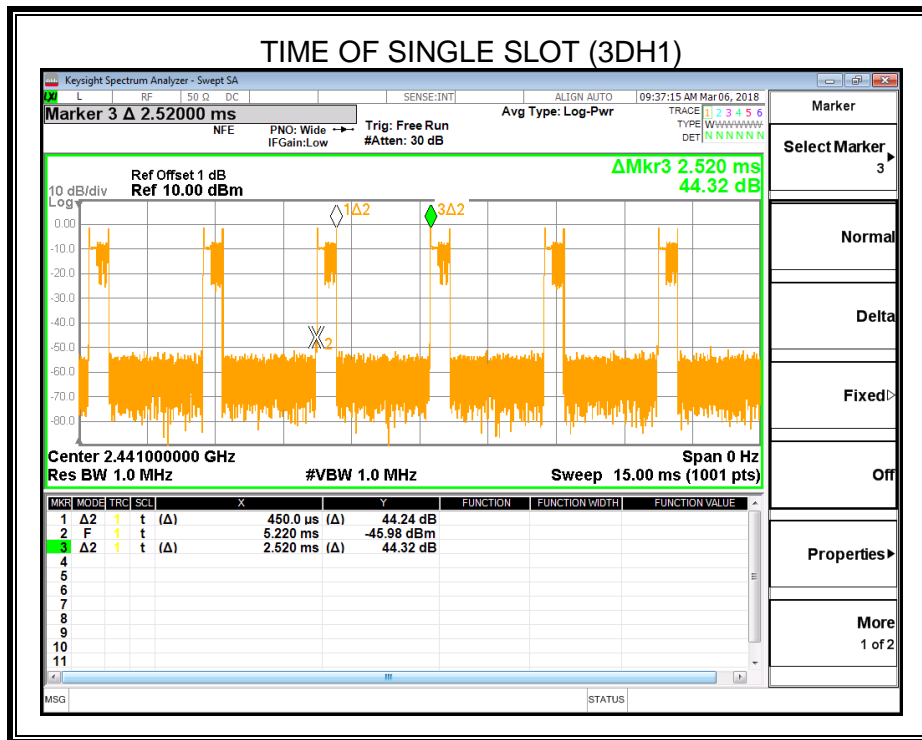


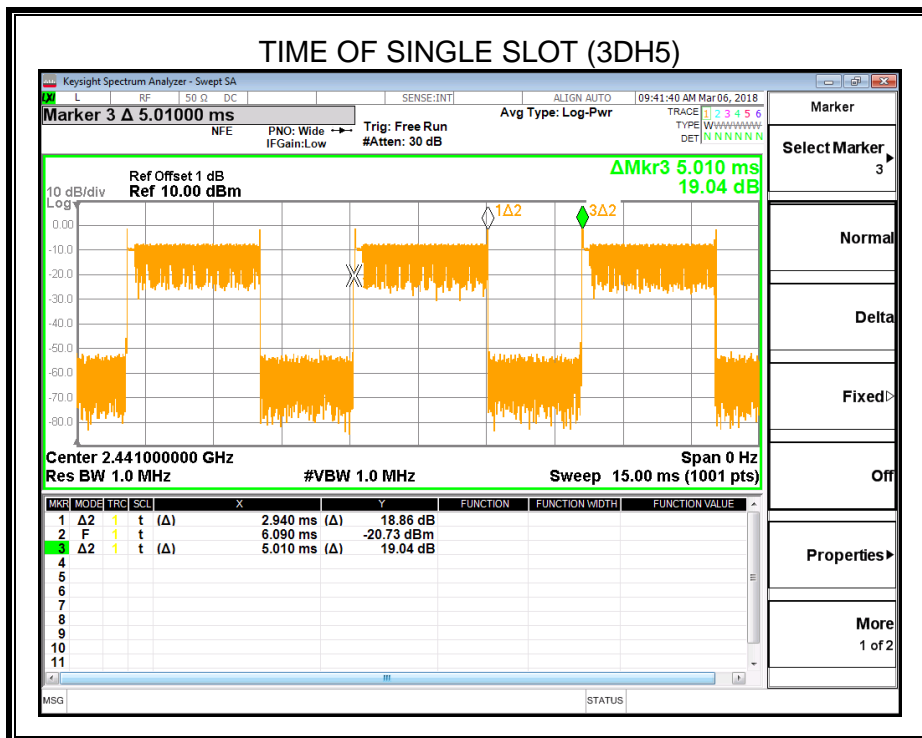
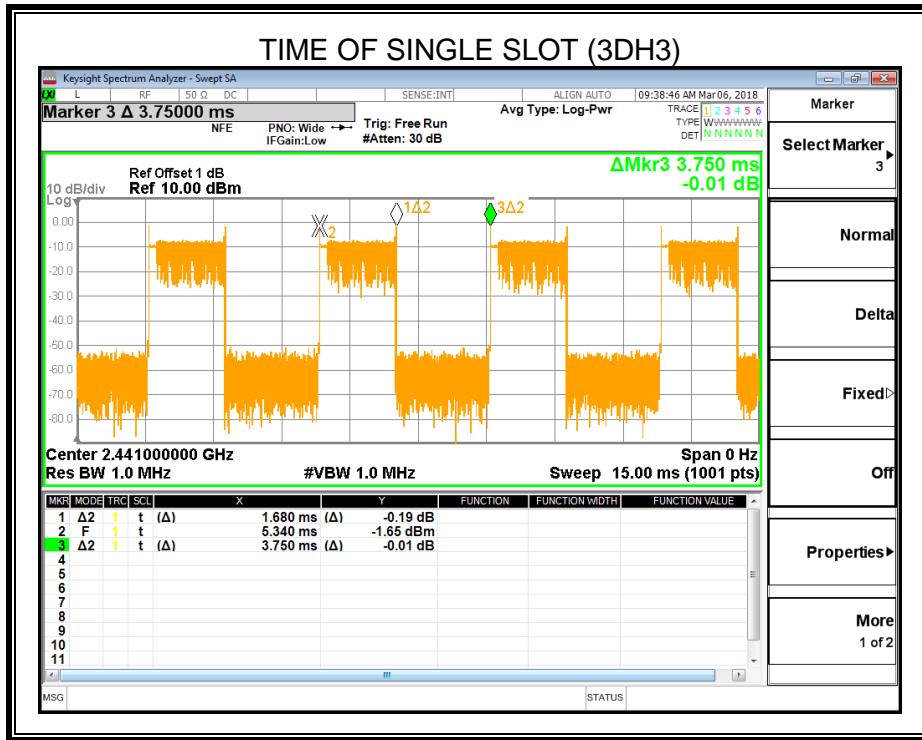


6.6.2. 8DPSK MODE

Normal Mode				
Packet	Channel	Burst Width [ms/hop/ch]	Dwell Time [s]	Results
3DH1	MCH	0.450	0.144	PASS
3DH3	MCH	1.680	0.269	PASS
3DH5	MCH	2.940	0.314	PASS
AFH Mode				
3DH1	MCH	0.450	0.144	PASS
3DH3	MCH	1.680	0.269	PASS
3DH5	MCH	2.940	0.314	PASS

Test Graph







6.7. CONDUCTED SPURIOUS EMISSION

LIMITS

FCC Part15 (15.247) , Subpart C RSS-247 ISSUE 2		
Section	Test Item	Limit
FCC §15.247 (d) RSS-247 5.5	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 use the following settings:

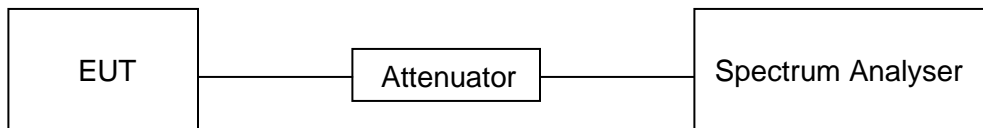
Detector	Peak
RBW	RBW \geq 1% of the span
VBW	\geq RBW
Span	wide enough to fully capture the emission being measured
Trace	Max hold
Sweep time	Auto couple.

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

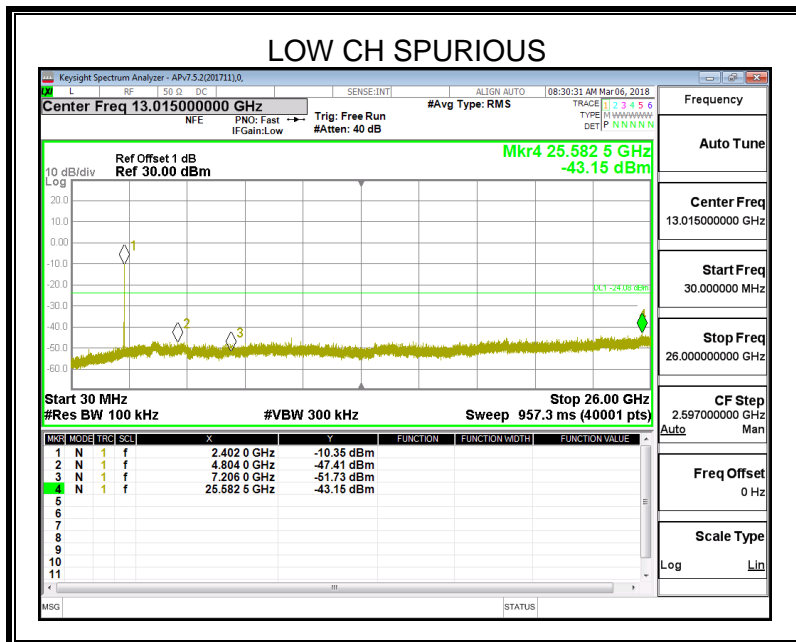
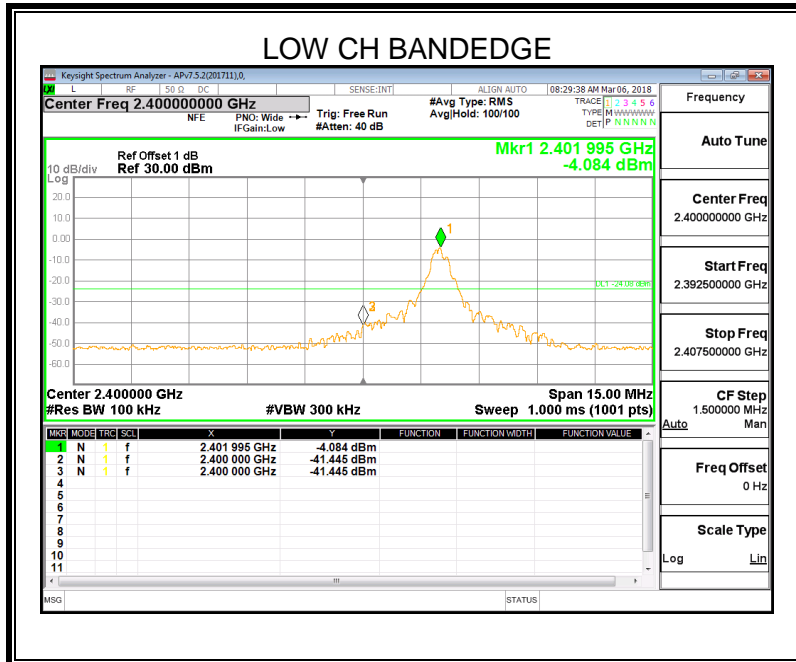
Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V



RESULTS

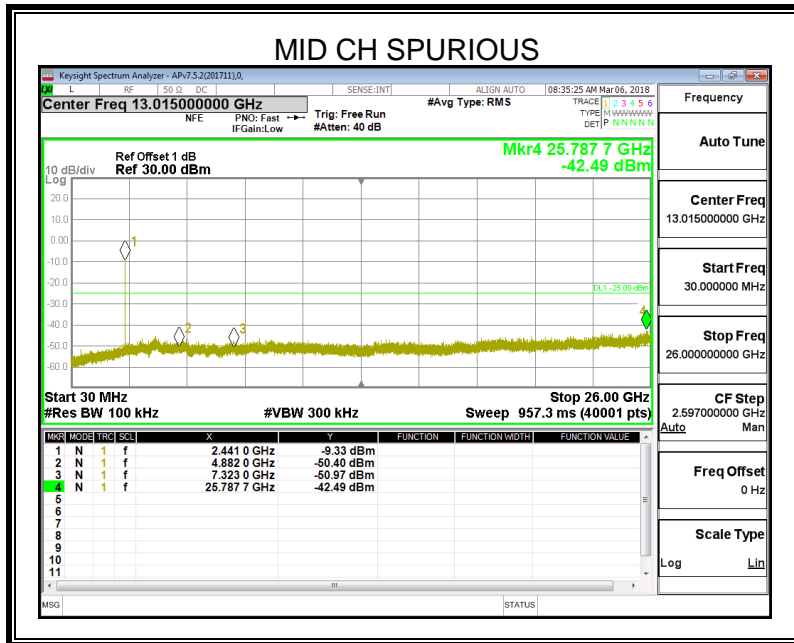
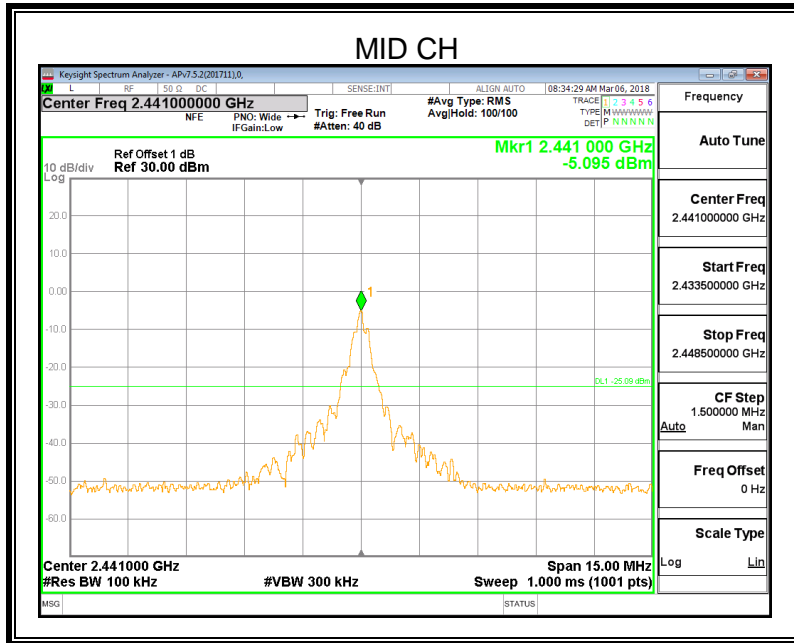
6.7.1. GFSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL



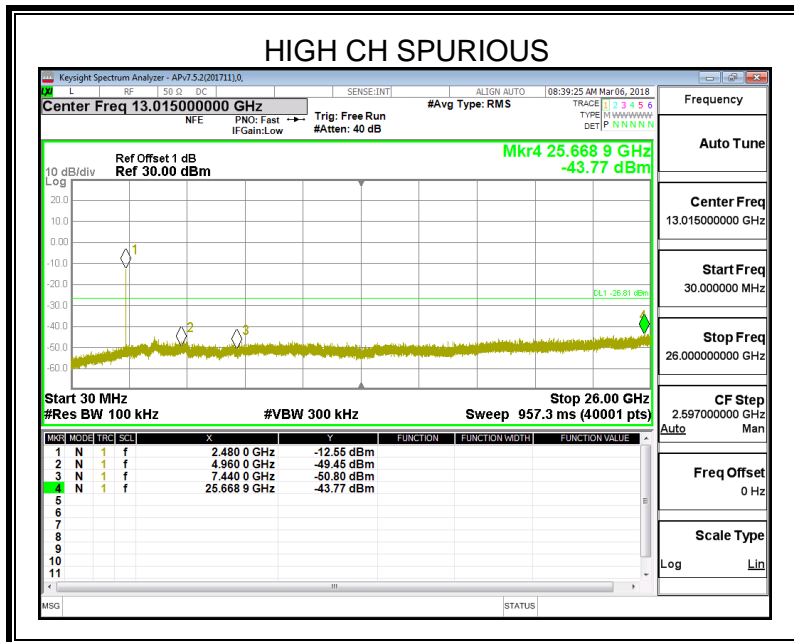
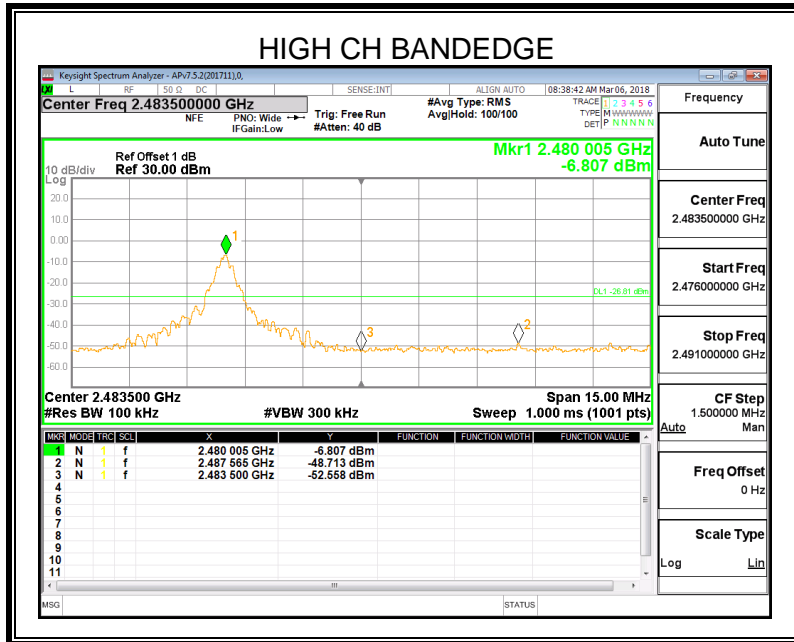


SPURIOUS EMISSIONS, MID CHANNEL



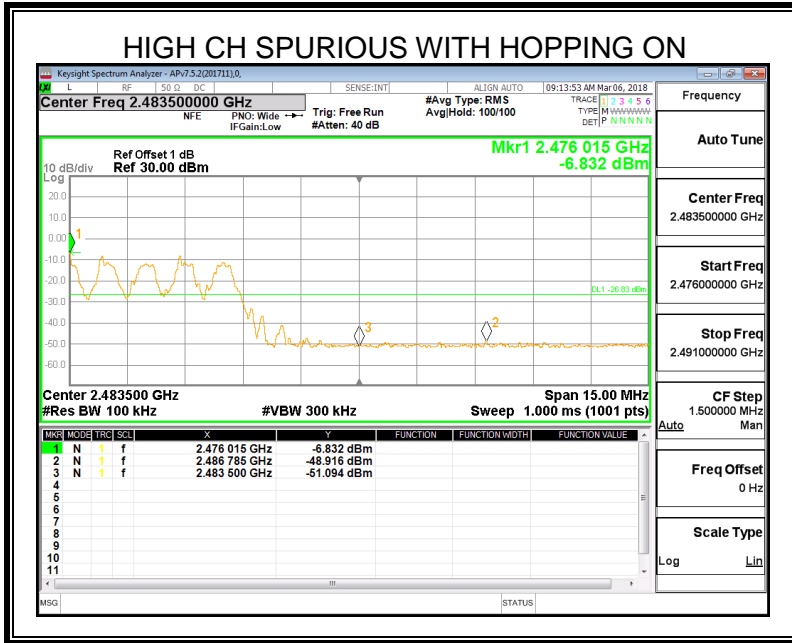
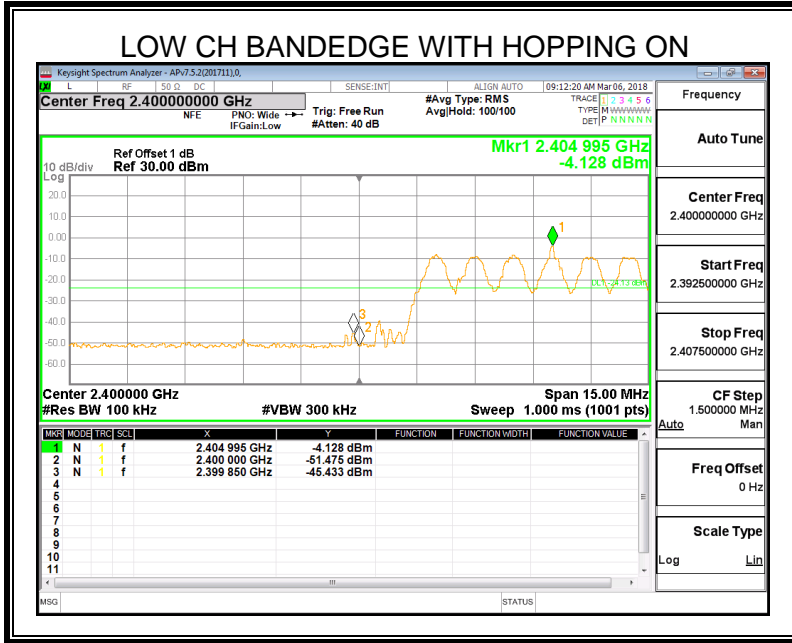


SPURIOUS EMISSIONS, HIGH CHANNEL





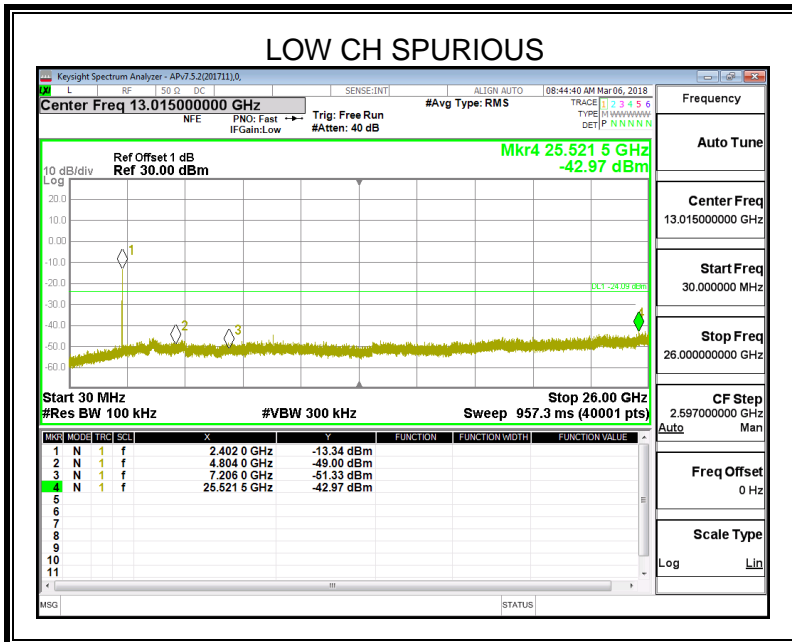
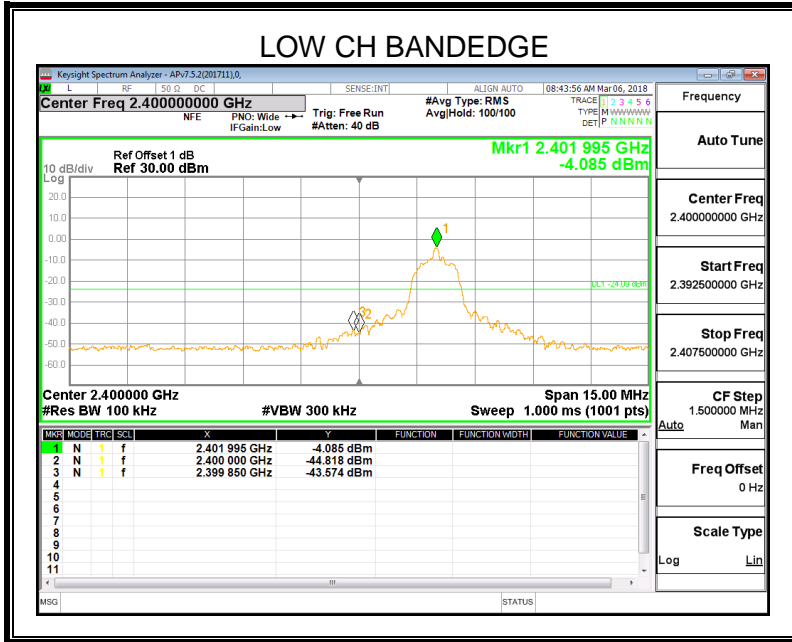
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





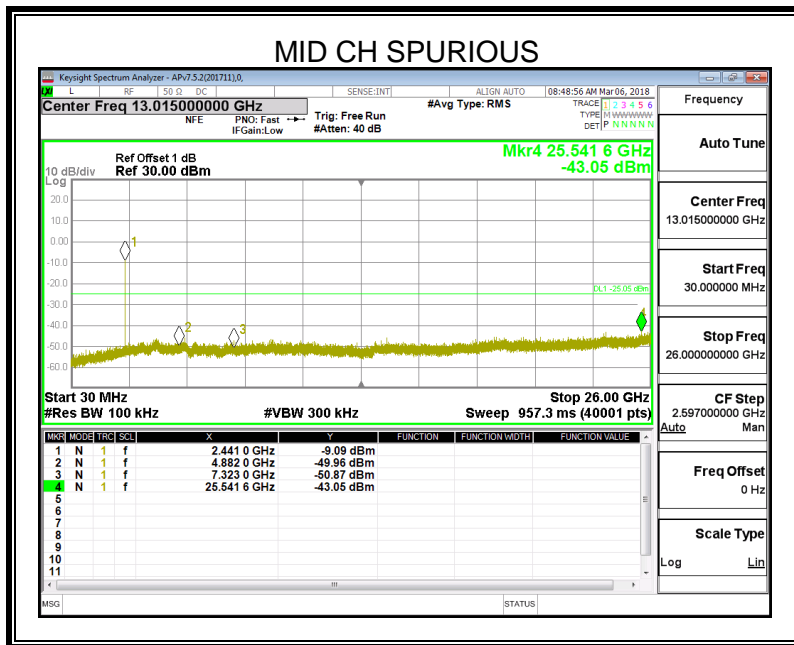
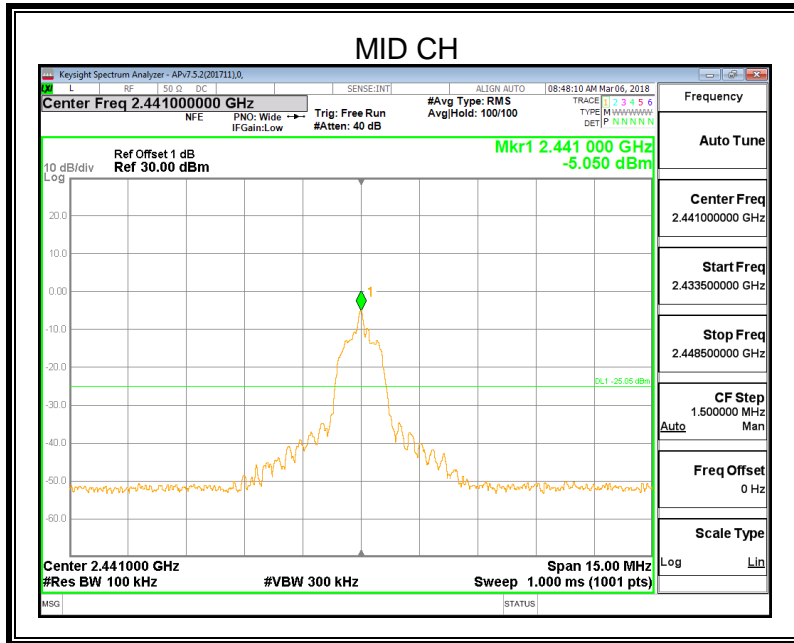
6.7.2. 8DPSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL



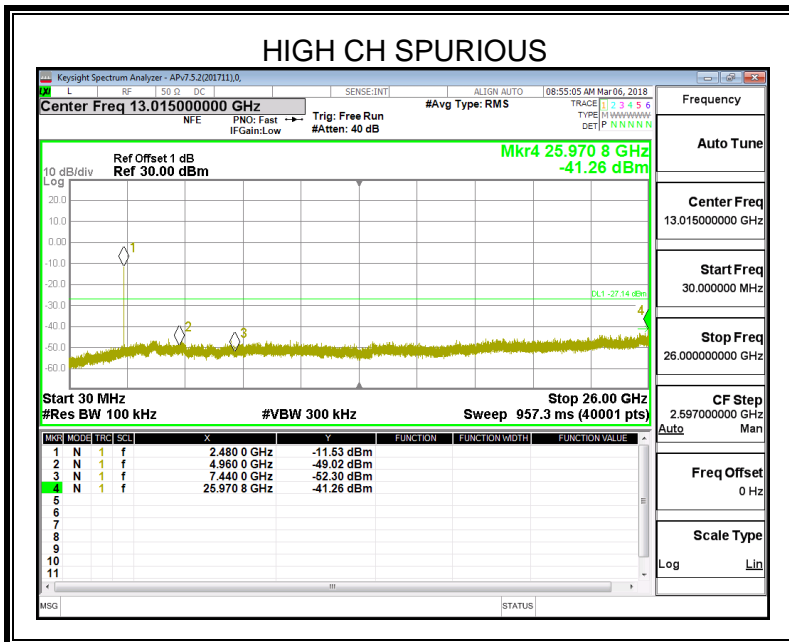
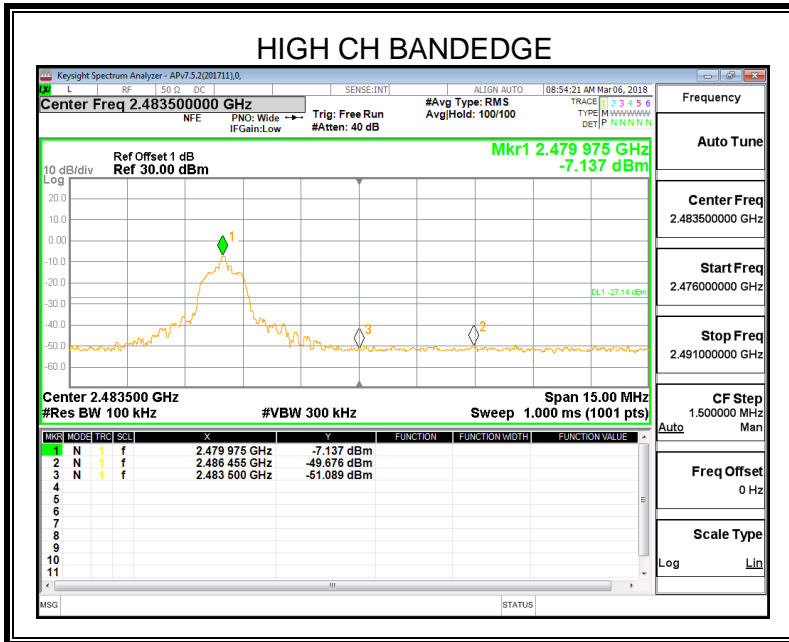


SPURIOUS EMISSIONS, MID CHANNEL



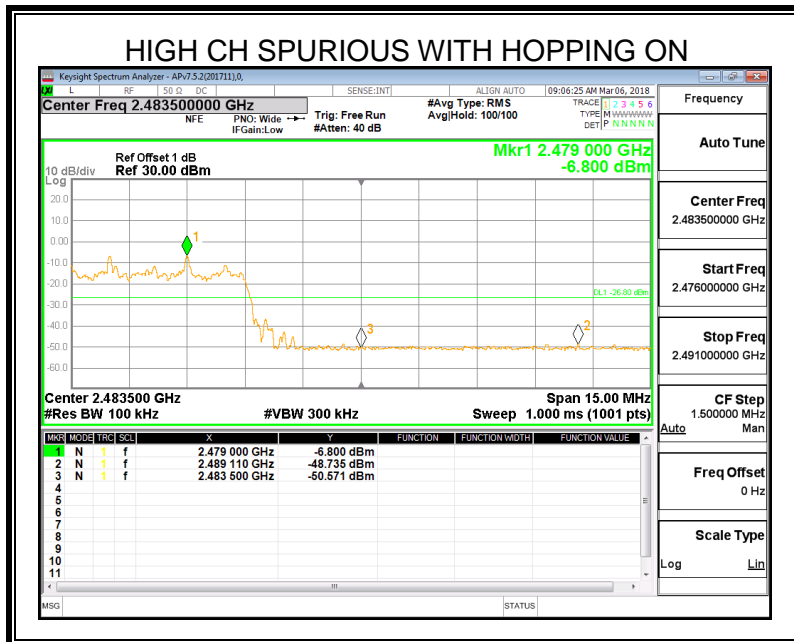
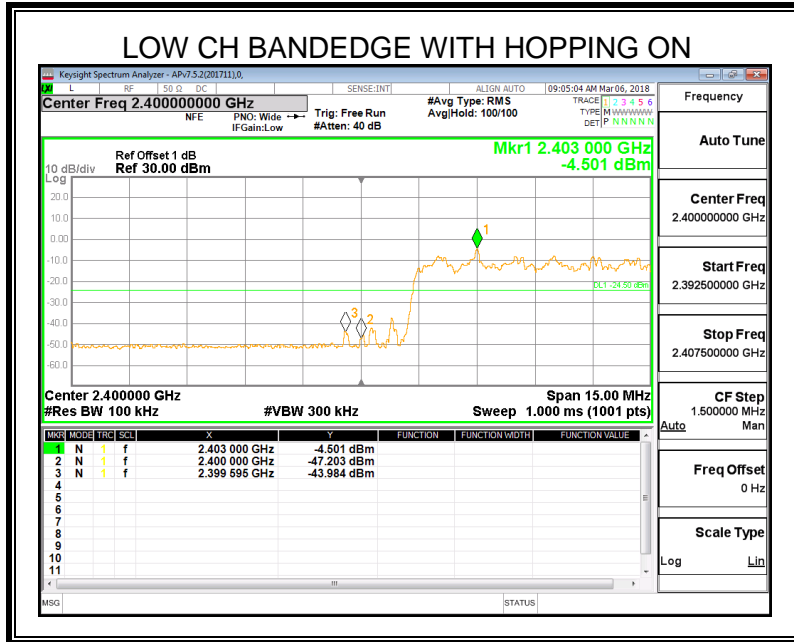


SPURIOUS EMISSIONS, HIGH CHANNEL





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

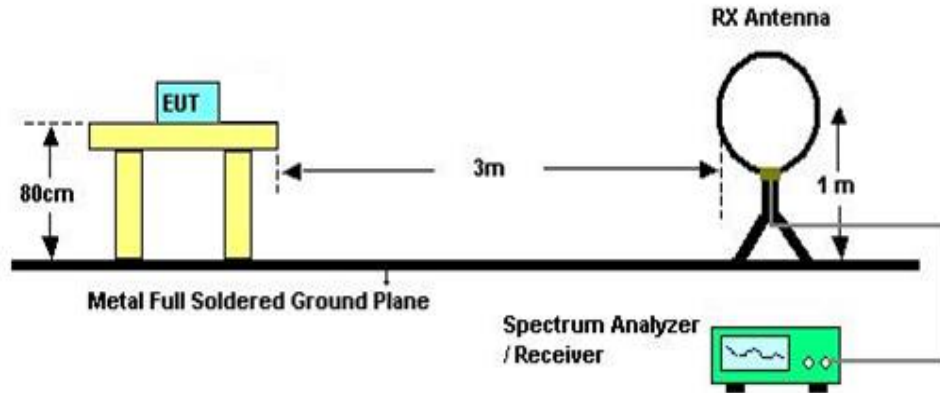
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	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

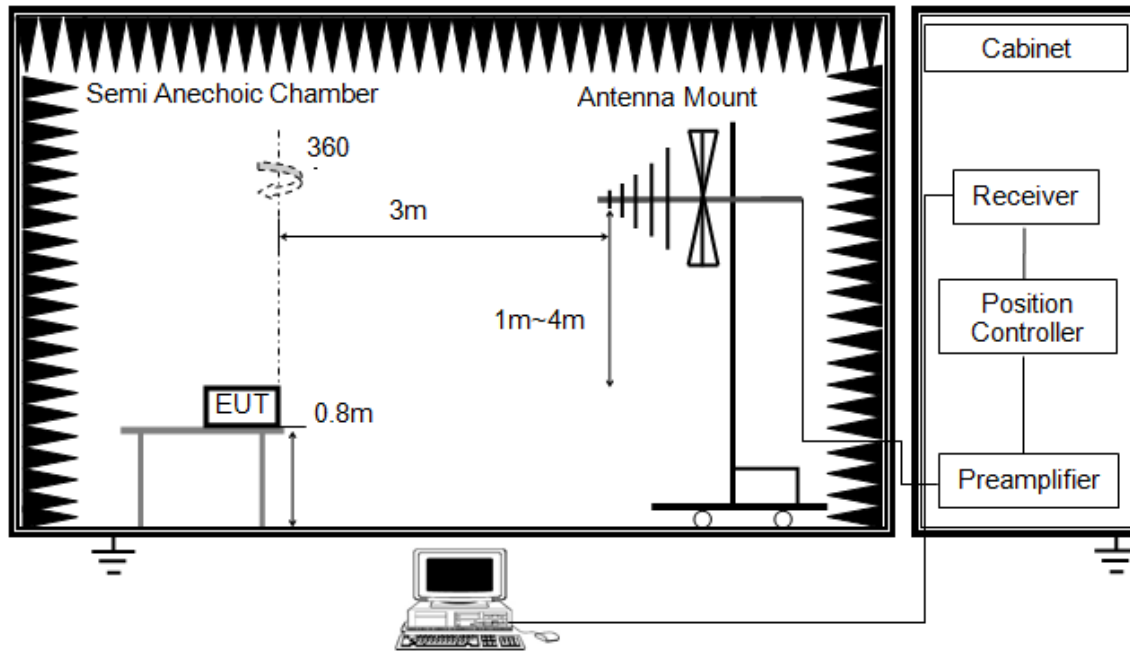


The setting of the spectrum analyser

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
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. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Below 1G and above 30MHz

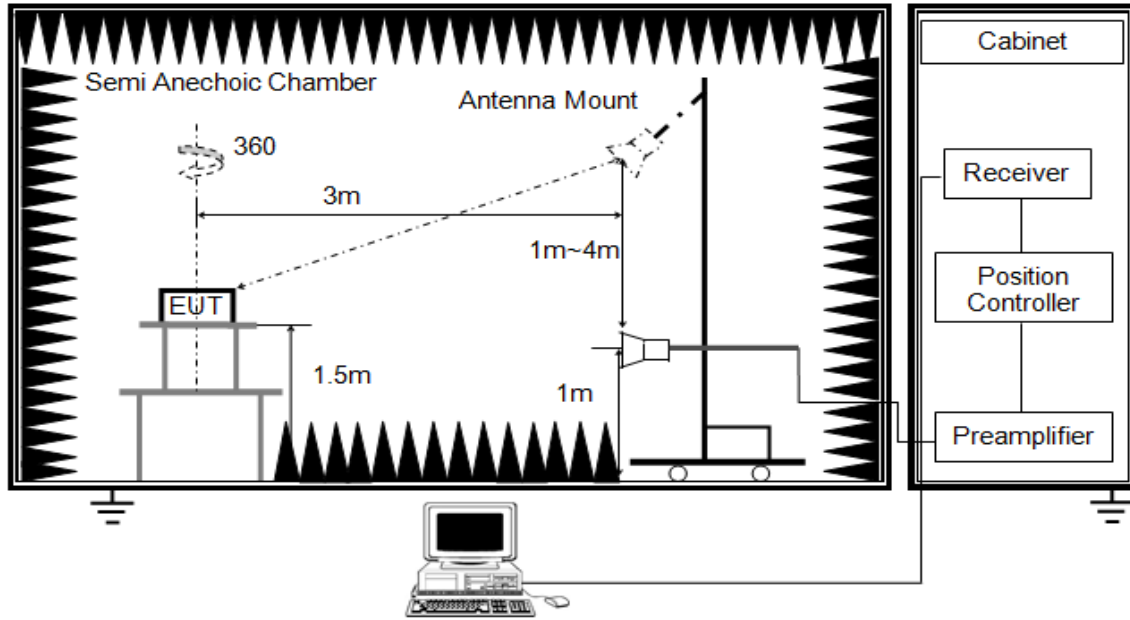


The setting of the spectrum analyser

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.

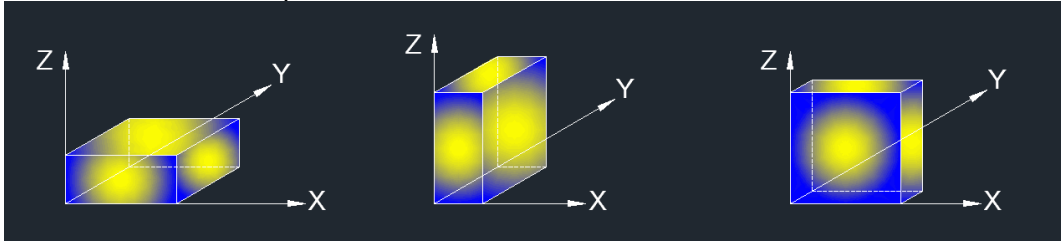
Above 1G



RBW	1M
VBW	PEAK: 3M AVG: see note 6
Sweep	Auto
Detector	Peak
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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector. For the Duty Cycle please refer to clause 6.1.ON TIME AND DUTY CYCLE.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

TEST ENVIRONMENT

Temperature	22.3°C	Relative Humidity	63%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

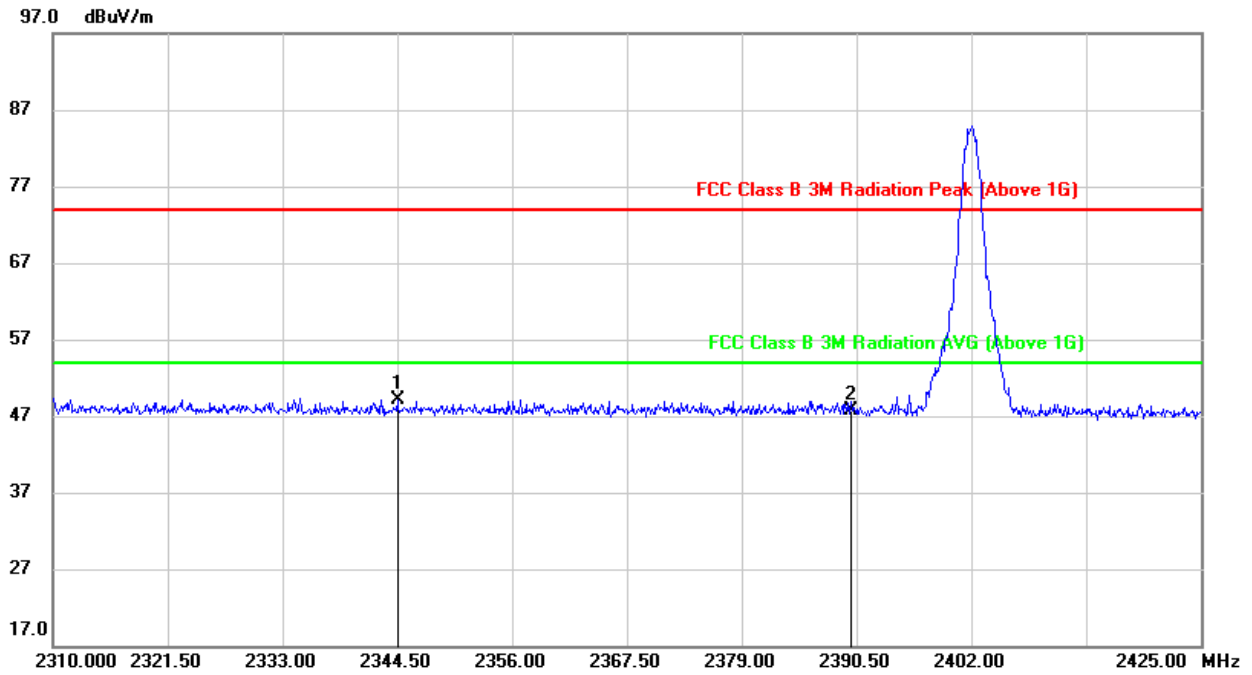
RESULTS



RESTRICTED BANDEGE

7.1.1. GFSK MODE

RESTRICTED BANDEGE (LOW CHANNEL, HORIZONTAL)

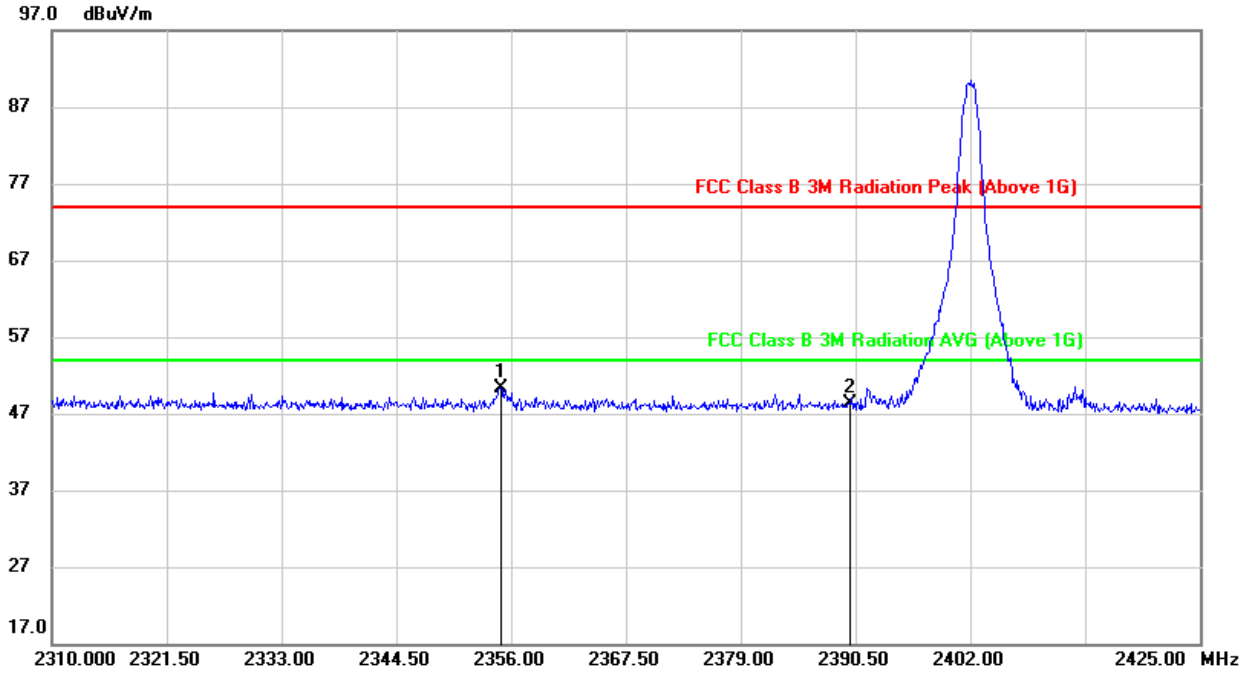


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2344.500	15.70	33.47	49.17	74.00	-24.83	peak
2	2390.000	14.61	33.14	47.75	74.00	-26.25	peak

- 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.



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

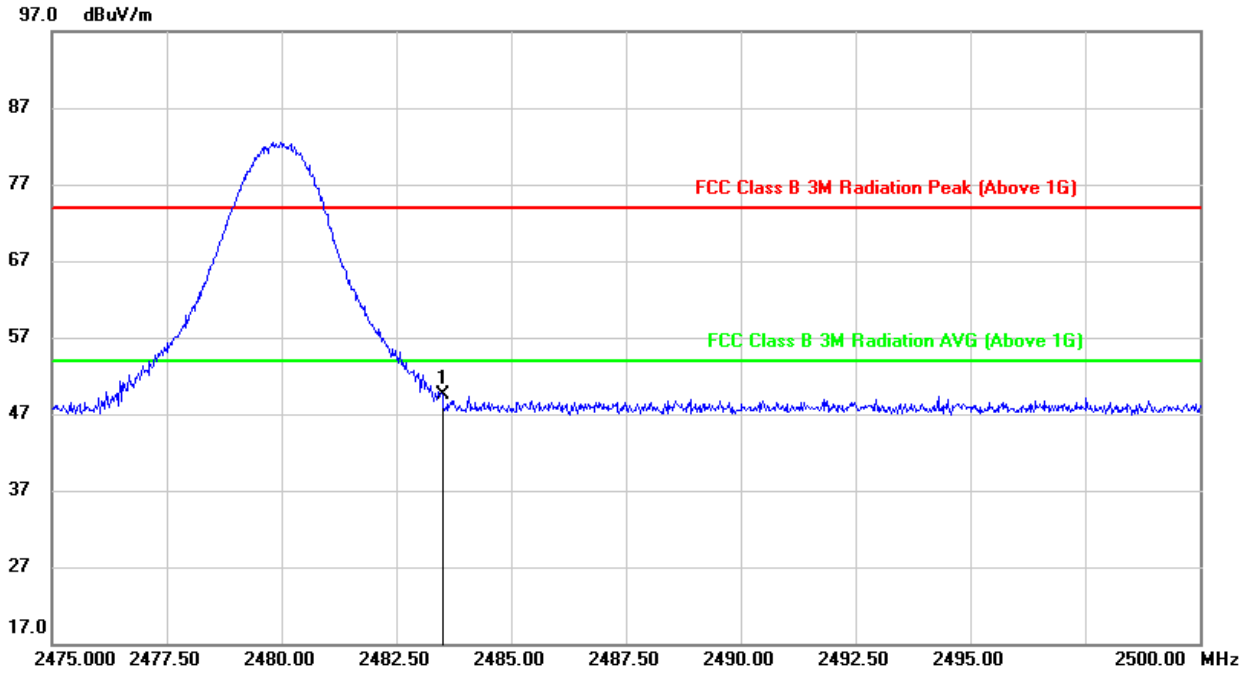


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2354.965	16.89	33.49	50.38	74.00	-23.62	peak
2	2390.000	15.11	33.24	48.35	74.00	-25.65	peak

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.



RESTRICTED BANDEGE (HIGH CHANNEL, HORIZONTAL)

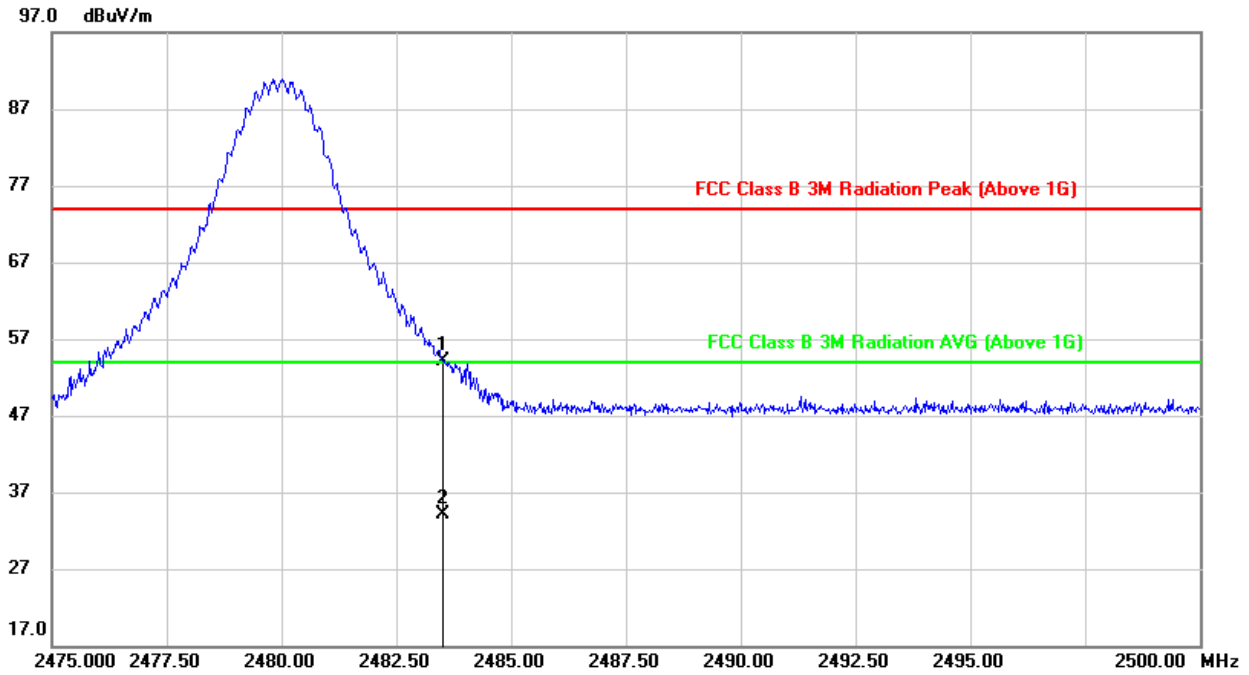


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	16.72	32.78	49.50	74.00	-24.50	peak

- 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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



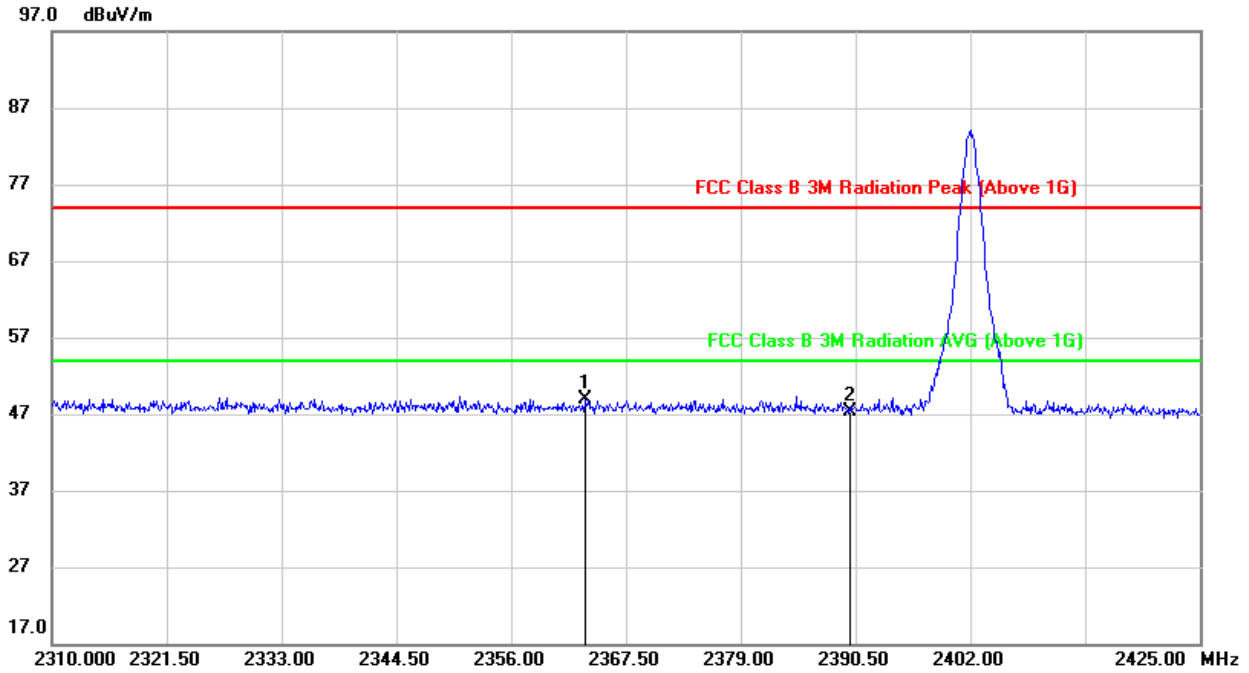
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	21.29	32.88	54.17	74.00	-19.83	peak
2	2483.500	1.25	32.88	34.13	54.00	-19.87	AVG

- 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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



7.1.2. 8DPSK MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

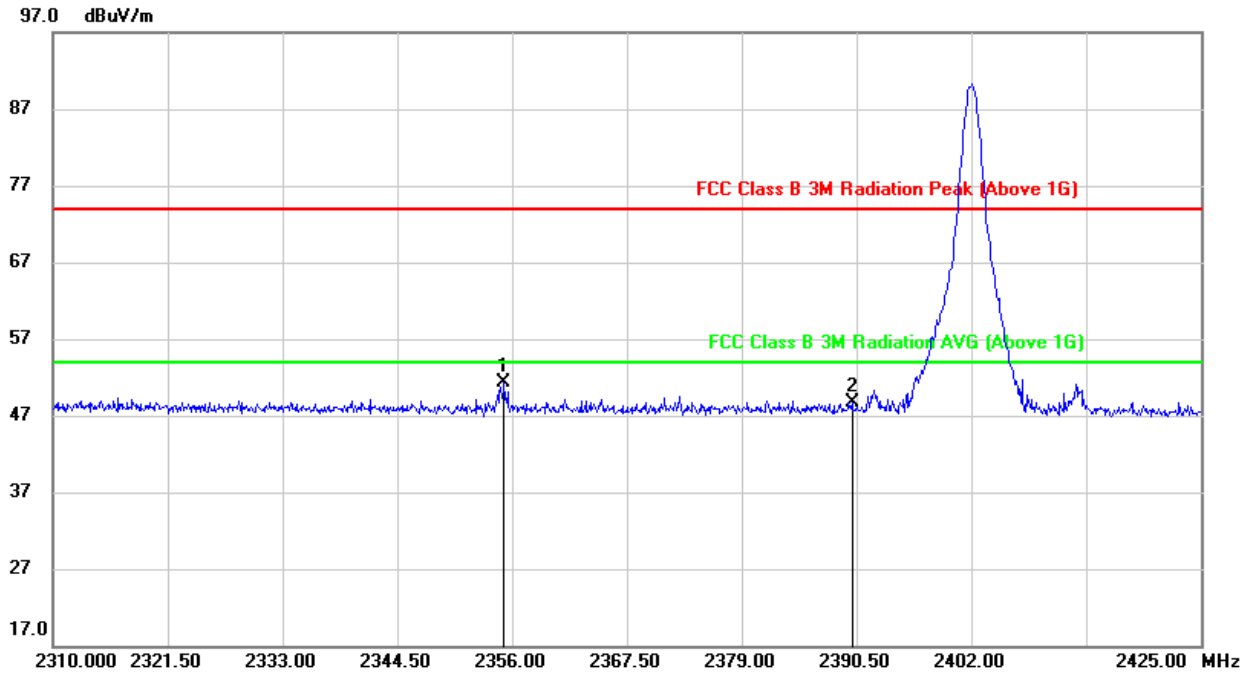


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2363.475	15.63	33.33	48.96	74.00	-25.04	peak
2	2390.000	14.14	33.14	47.28	74.00	-26.72	peak

- 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.



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

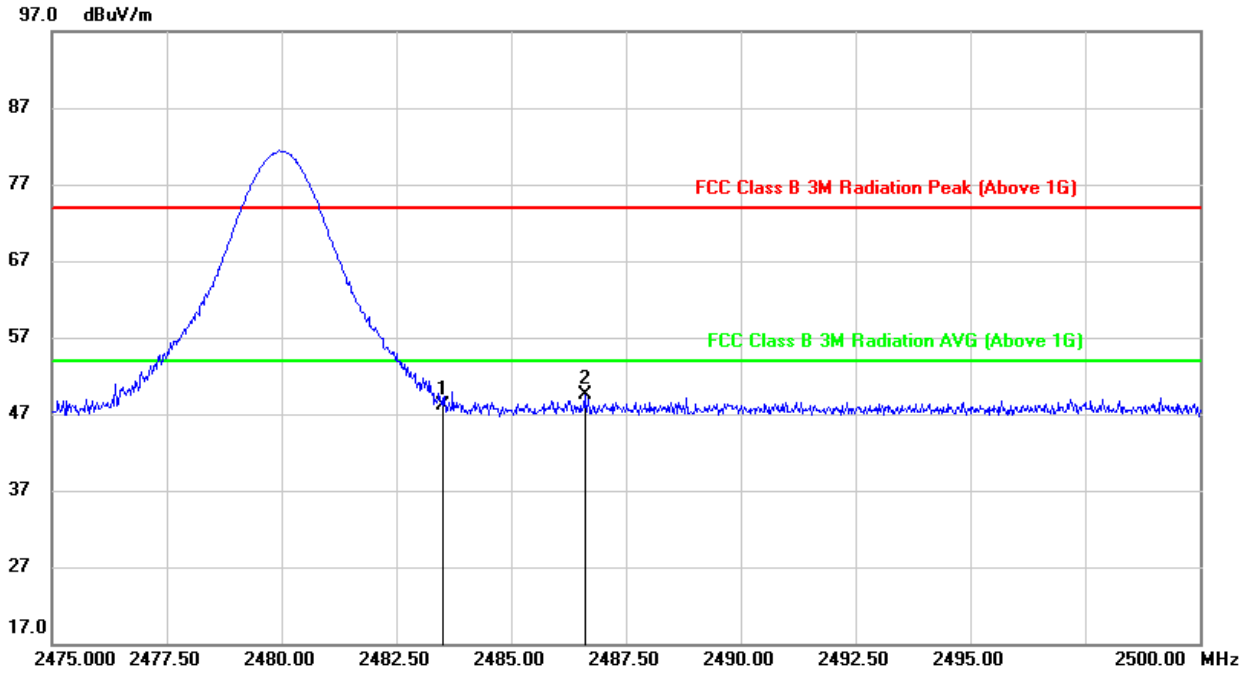


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2355.195	17.72	33.49	51.21	74.00	-22.79	peak
2	2390.000	15.42	33.24	48.66	74.00	-25.34	peak

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.



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

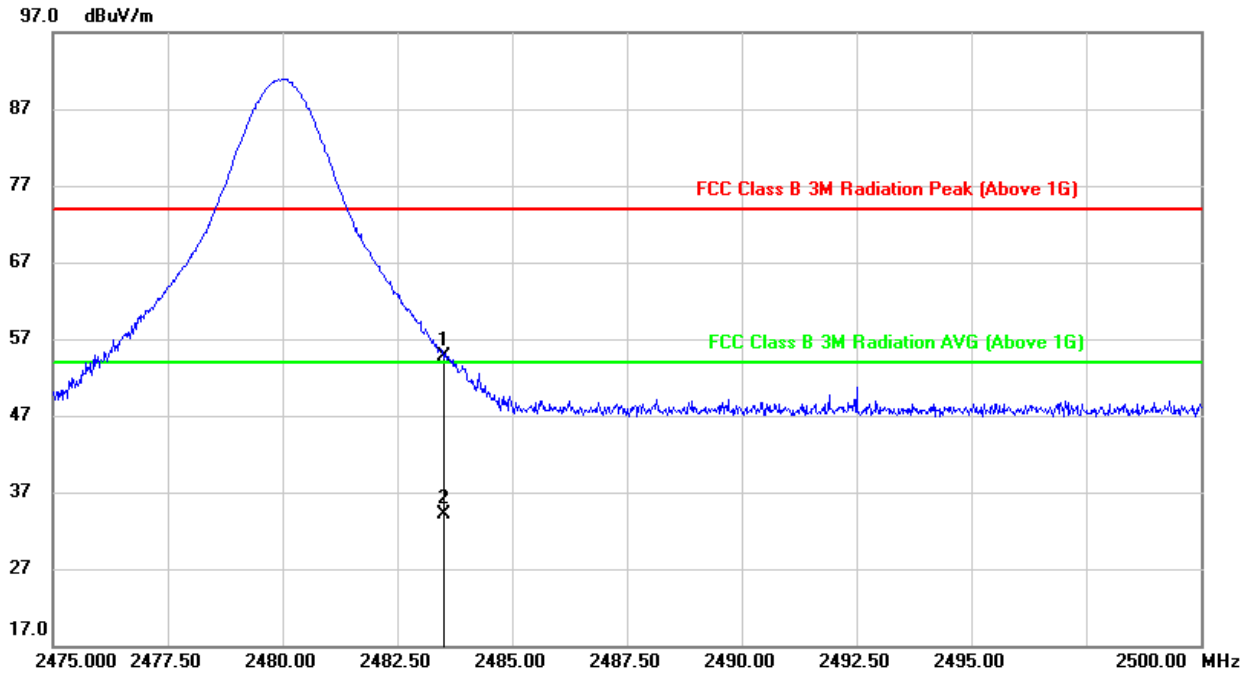


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	15.29	32.78	48.07	74.00	-25.93	peak
2	2486.600	16.64	32.79	49.43	74.00	-24.57	peak

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.



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	21.80	32.88	54.68	74.00	-19.32	peak
2	2483.500	1.30	32.88	34.18	54.00	-19.82	AVG

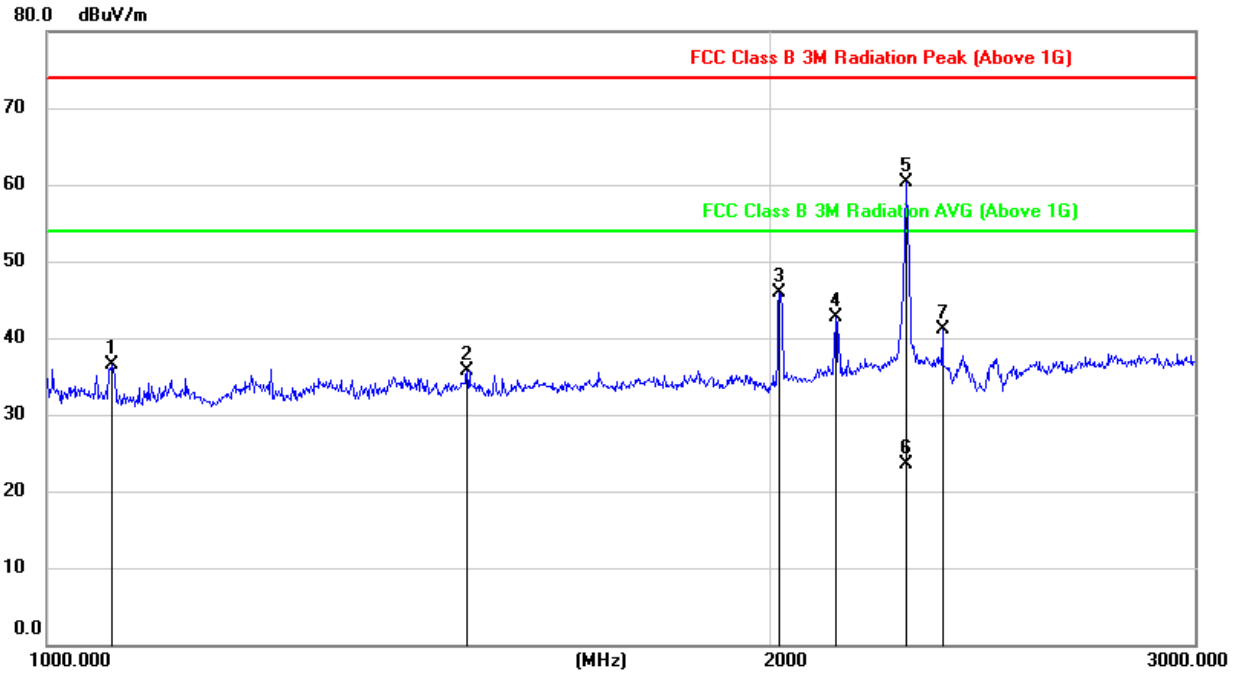
- Note:
1. Measurement = Reading Level + Correct Factor.
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. Peak: Peak detector.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



7.2. SPURIOUS EMISSIONS (1~18GHz)

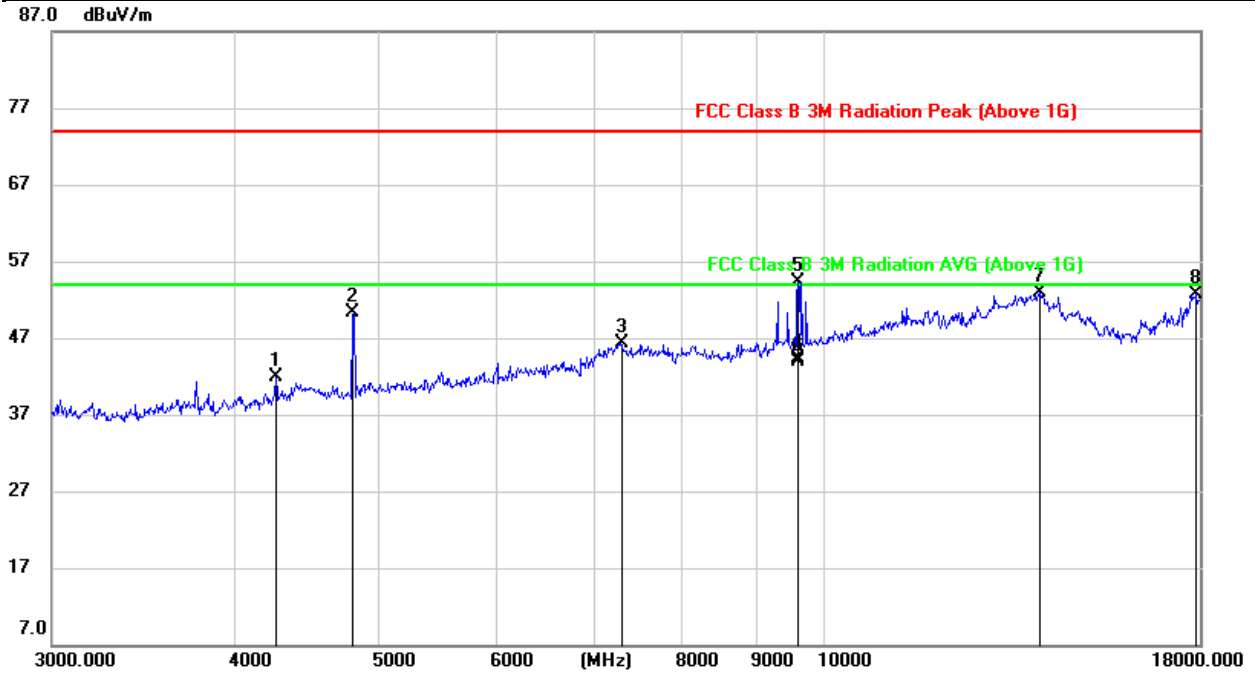
7.2.1. GFSK MODE

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	1064.623	50.12	-13.62	36.50	74.00	-37.50	peak
2	1494.949	47.90	-12.19	35.71	74.00	-38.29	peak
3	2015.595	56.47	-10.50	45.97	74.00	-28.03	peak
4	2127.073	51.92	-9.23	42.69	74.00	-31.31	peak
5	2277.004	67.70	-7.48	60.22	74.00	-13.78	peak
6	2277.004	30.93	-7.48	23.45	54.00	-30.55	AVG
7	2358.477	48.94	-7.81	41.13	74.00	-32.87	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

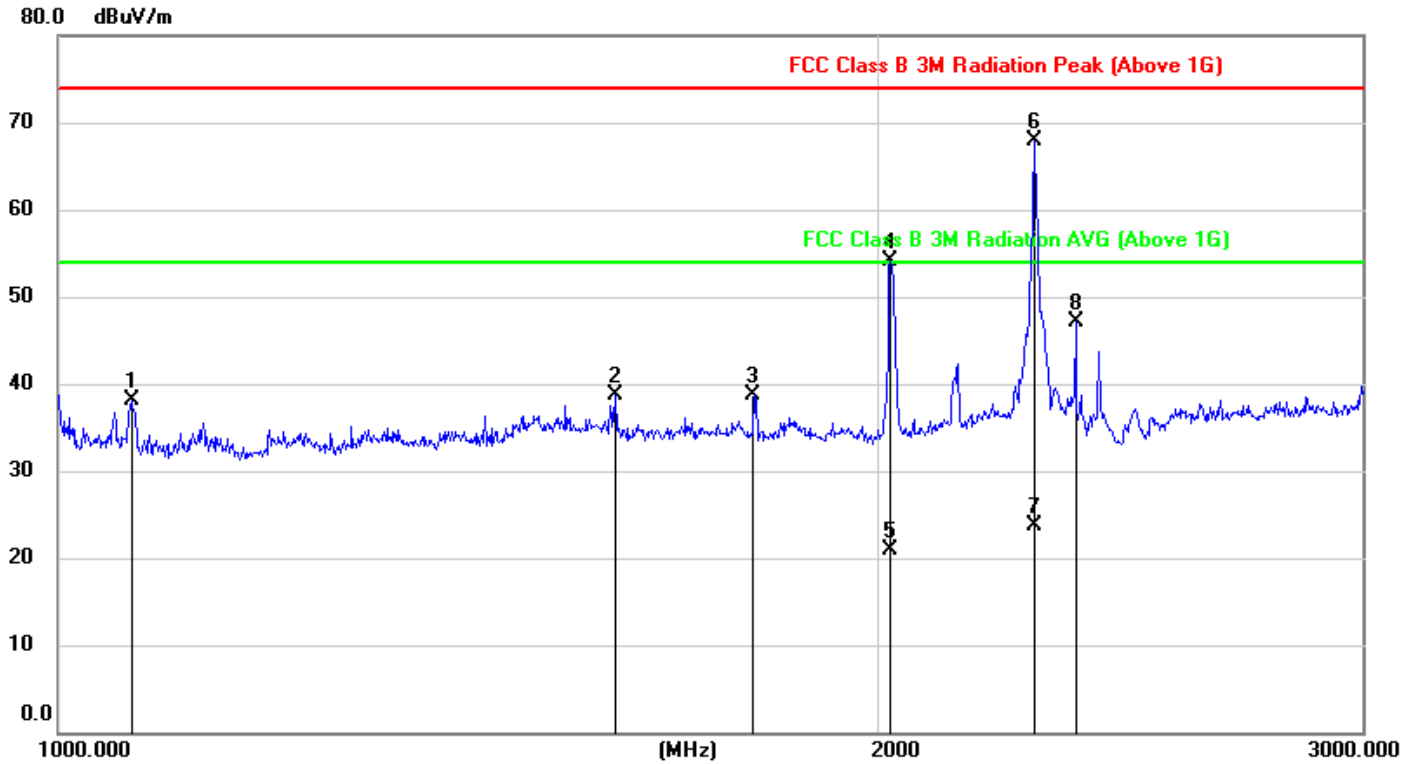


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	43.93	-1.95	41.98	74.00	-32.02	peak
2	4805.903	50.76	-0.49	50.27	74.00	-23.73	peak
3	7295.991	38.46	7.86	46.32	74.00	-27.68	peak
4	9607.968	33.23	11.17	44.40	54.00	-9.60	AVG
5	9607.988	43.18	11.17	54.35	74.00	-19.65	peak
6	9607.988	32.66	11.17	43.83	54.00	-10.17	AVG
7	14031.674	32.25	20.63	52.88	74.00	-21.12	peak
8	17935.612	26.01	26.79	52.80	74.00	-21.20	peak

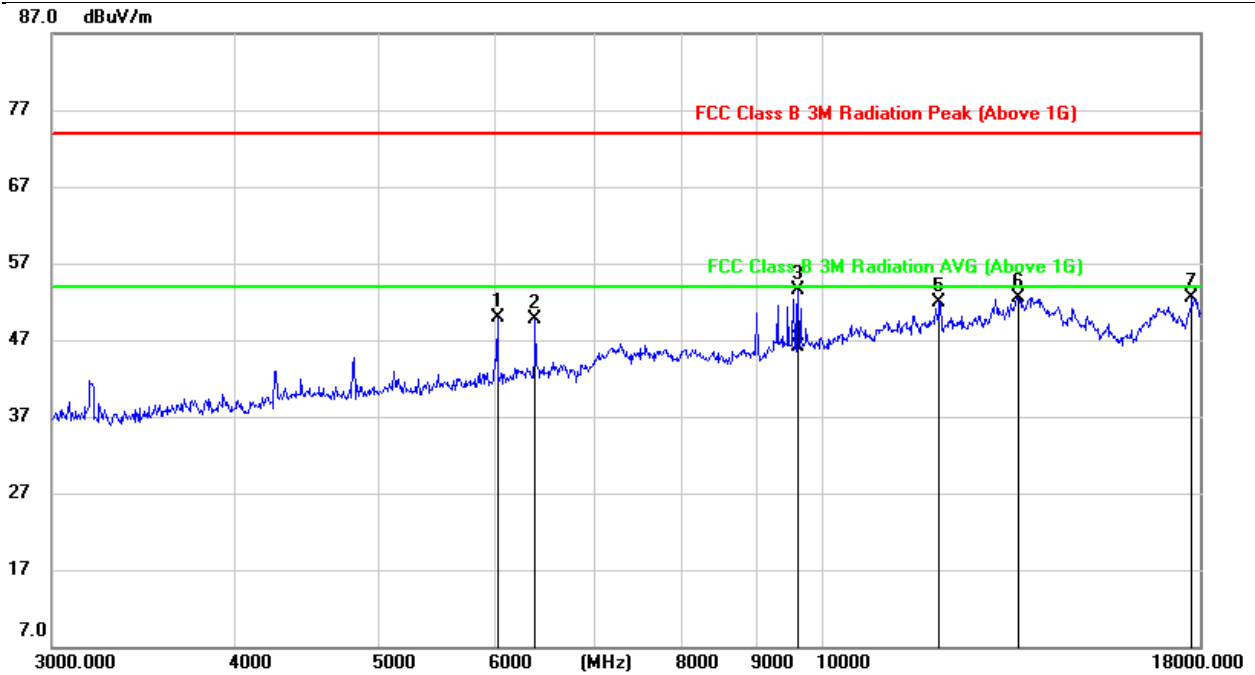
- Note: 1. Measurement = Reading Level + Correct Factor.
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. Peak: Peak detector.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



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	1064.623	52.02	-13.92	38.10	74.00	-35.90	peak
2	1598.567	50.85	-12.06	38.79	74.00	-35.21	peak
3	1797.971	49.86	-11.13	38.73	74.00	-35.27	peak
4	2015.595	64.71	-10.53	54.18	74.00	-19.82	peak
5	2015.595	31.43	-10.53	20.90	54.00	-33.10	AVG
6	2275.323	75.28	-7.39	67.89	74.00	-6.11	peak
7	2275.323	31.03	-7.39	23.64	54.00	-30.36	AVG
8	2358.477	54.79	-7.71	47.08	74.00	-26.92	peak

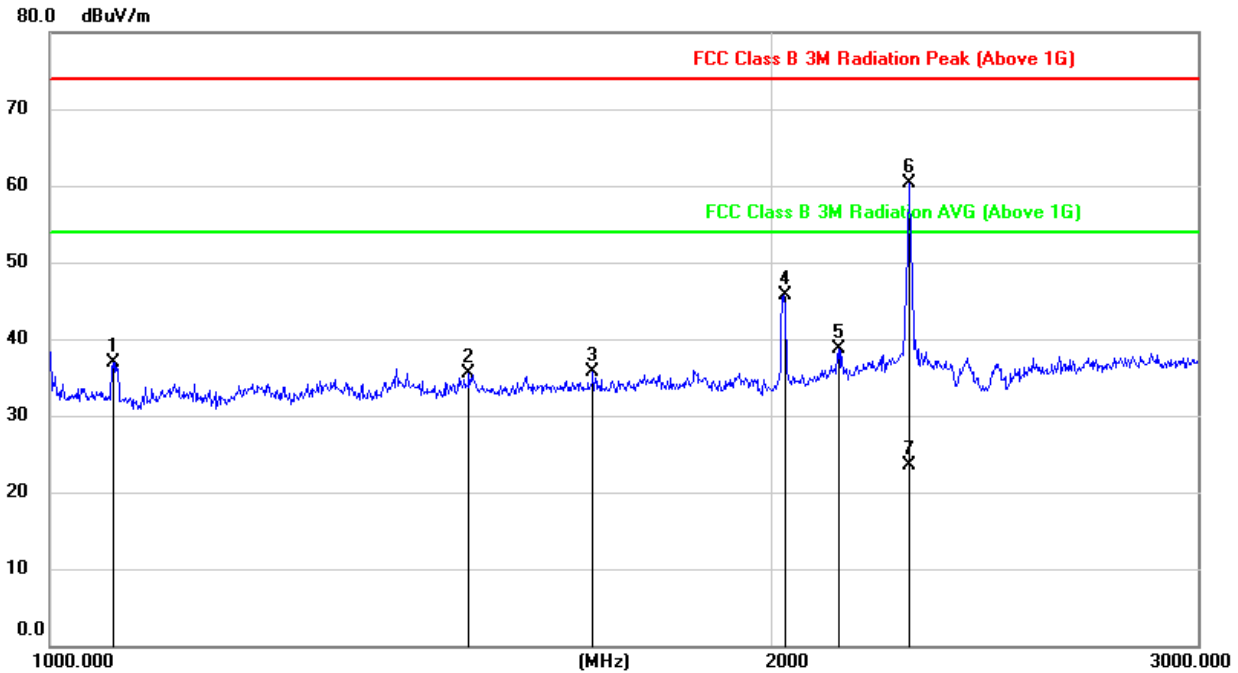


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6012.346	46.63	3.34	49.97	74.00	-24.03	peak
2	6378.564	45.02	4.71	49.73	74.00	-24.27	peak
3	9608.029	42.06	11.35	53.41	74.00	-20.59	peak
4	9608.029	34.80	11.35	46.15	54.00	-7.85	AVG
5	12006.331	35.39	16.48	51.87	74.00	-22.13	peak
6	13586.349	32.08	20.51	52.59	74.00	-21.41	peak
7	17775.648	25.95	26.59	52.54	74.00	-21.46	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

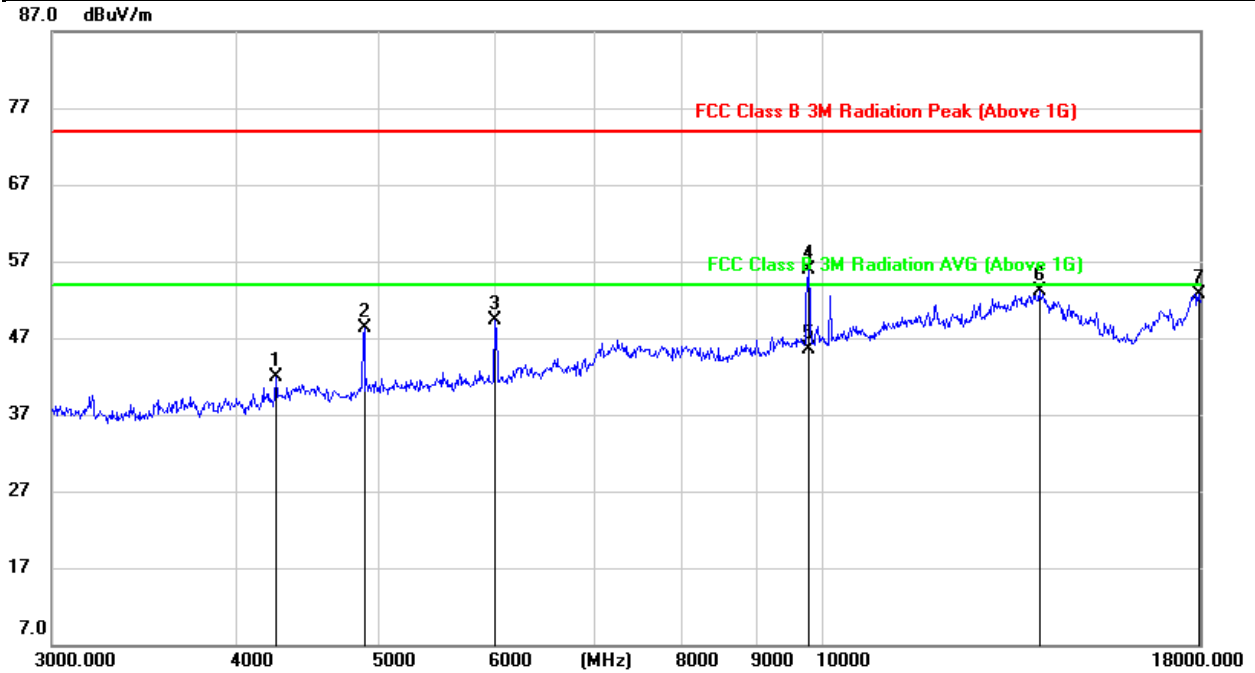


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	50.49	-13.62	36.87	74.00	-37.13	peak
2	1493.308	47.61	-12.19	35.42	74.00	-38.58	peak
3	1681.428	47.26	-11.61	35.65	74.00	-38.35	peak
4	2020.029	56.21	-10.46	45.75	74.00	-28.25	peak
5	2127.073	47.91	-9.23	38.68	74.00	-35.32	peak
6	2277.004	67.83	-7.48	60.35	74.00	-13.65	peak
7	2277.004	30.90	-7.48	23.42	54.00	-30.58	AVG

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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

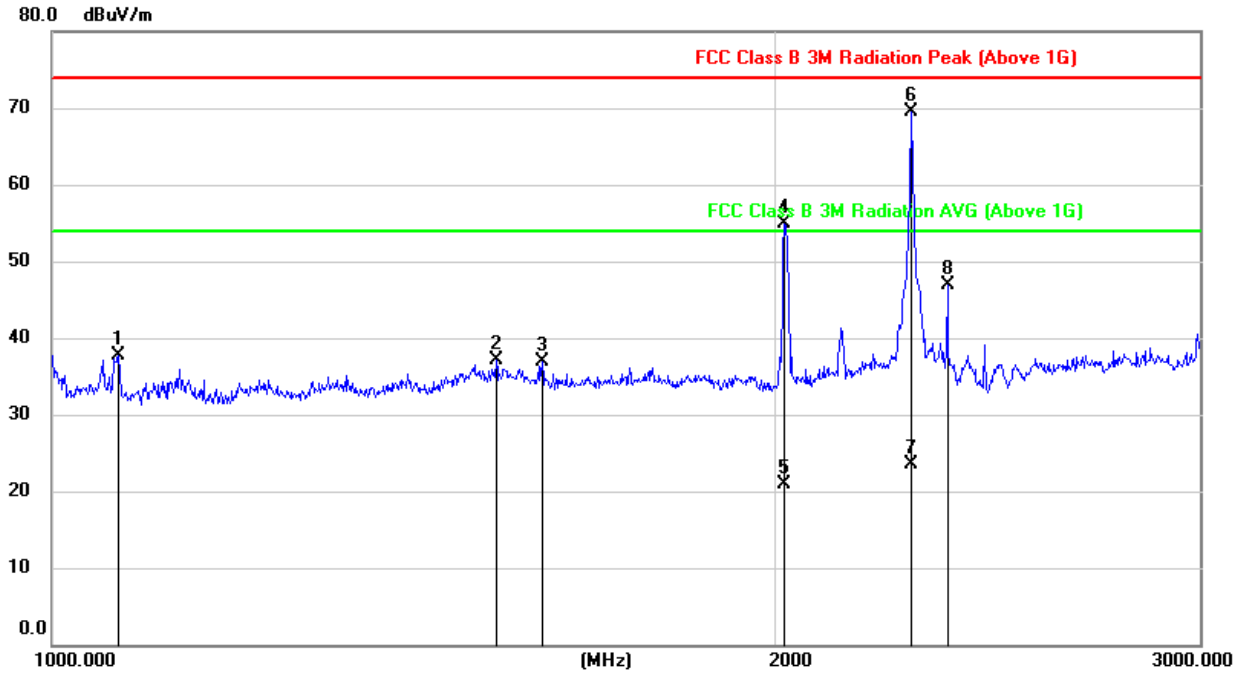


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	43.95	-1.95	42.00	74.00	-32.00	peak
2	4884.031	47.86	0.50	48.36	74.00	-25.64	peak
3	5990.839	46.14	3.20	49.34	74.00	-24.66	peak
4	9763.985	44.27	11.61	55.88	74.00	-18.12	peak
5	9763.985	33.82	11.61	45.43	54.00	-8.57	AVG
6	14006.555	32.49	20.61	53.10	74.00	-20.90	peak
7	17967.777	25.73	27.04	52.77	74.00	-21.23	peak

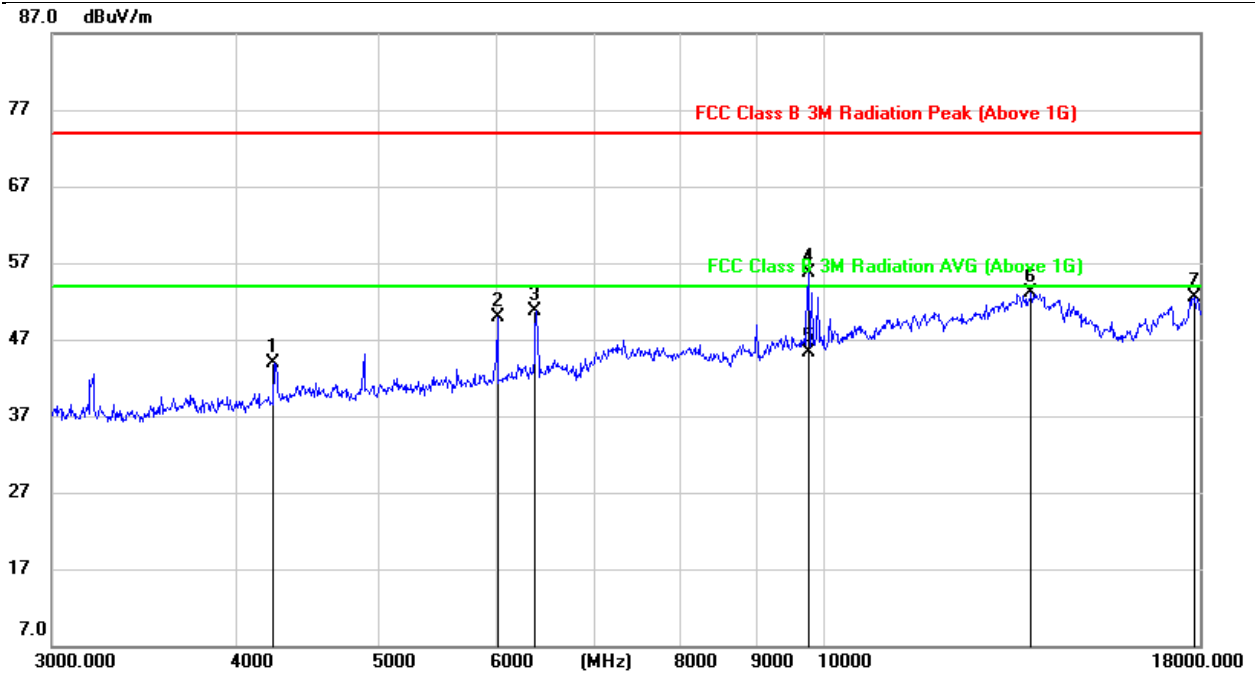
- Note: 1. Measurement = Reading Level + Correct Factor.
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. Peak: Peak detector.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



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	1065.793	51.53	-13.92	37.61	74.00	-36.39	peak
2	1529.840	49.44	-12.27	37.17	74.00	-36.83	peak
3	1598.567	48.92	-12.06	36.86	74.00	-37.14	peak
4	2015.595	65.51	-10.53	54.98	74.00	-19.02	peak
5	2015.595	31.40	-10.53	20.87	54.00	-33.13	AVG
6	2277.004	76.81	-7.38	69.43	74.00	-4.57	peak
7	2277.004	30.98	-7.38	23.60	54.00	-30.40	AVG
8	2358.477	54.70	-7.71	46.99	74.00	-27.01	peak

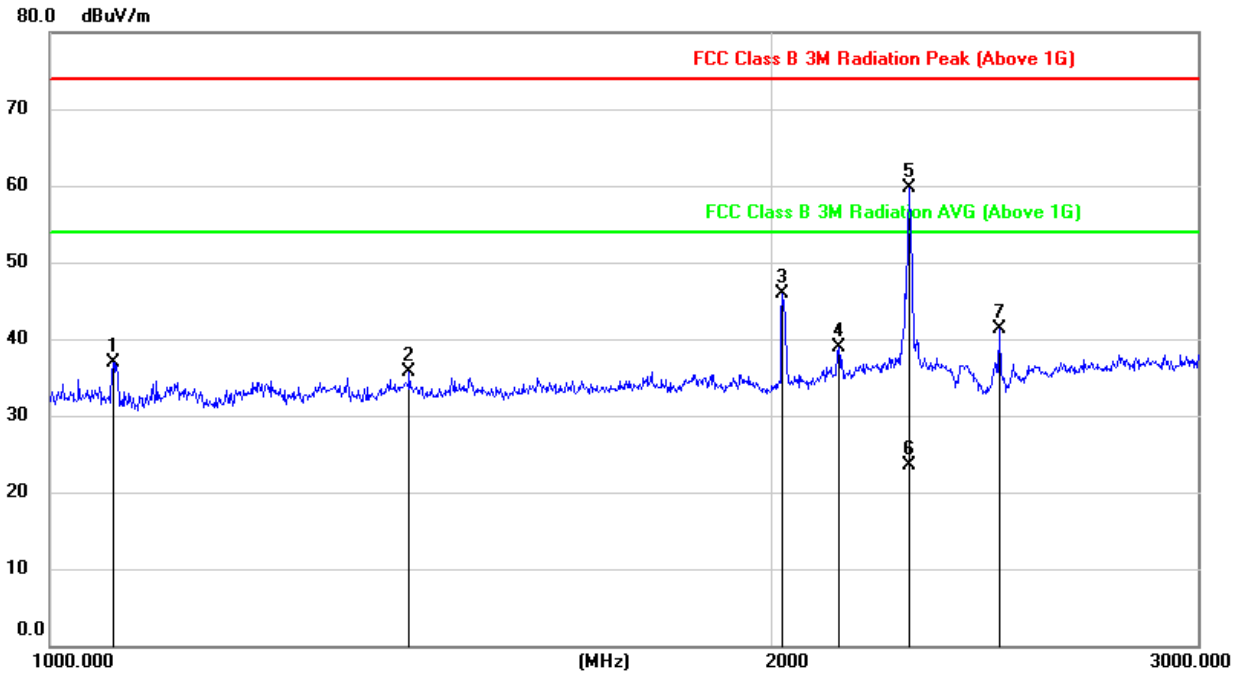


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4247.003	45.89	-1.90	43.99	74.00	-30.01	peak
2	6012.346	46.57	3.34	49.91	74.00	-24.09	peak
3	6390.003	45.95	4.73	50.68	74.00	-23.32	peak
4	9763.984	44.06	11.74	55.80	74.00	-18.20	peak
5	9763.984	33.55	11.74	45.29	54.00	-8.71	AVG
6	13831.977	32.13	21.03	53.16	74.00	-20.84	peak
7	17839.462	26.16	26.26	52.42	74.00	-21.58	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

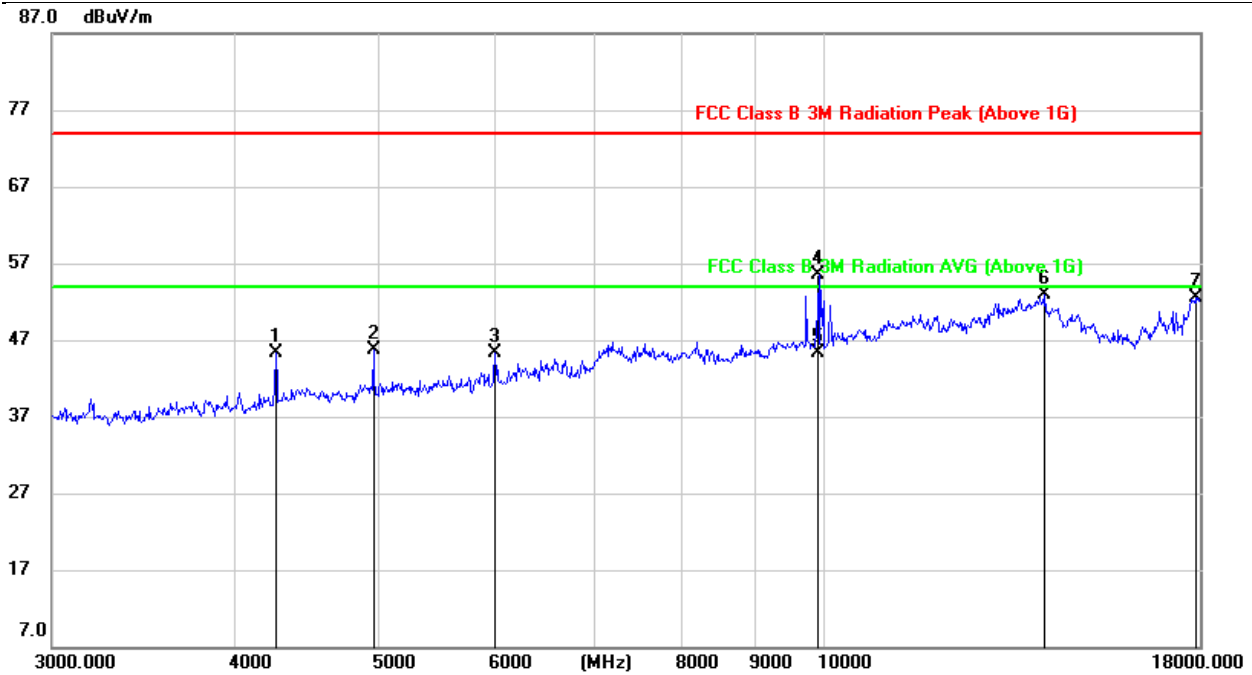


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	50.61	-13.62	36.99	74.00	-37.01	peak
2	1410.389	47.88	-12.10	35.78	74.00	-38.22	peak
3	2015.595	56.46	-10.50	45.96	74.00	-28.04	peak
4	2127.073	48.23	-9.23	39.00	74.00	-35.00	peak
5	2277.004	67.28	-7.48	59.80	74.00	-14.20	peak
6	2277.004	30.91	-7.48	23.43	54.00	-30.57	AVG
7	2480.729	49.71	-8.38	41.33	74.00	-32.67	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

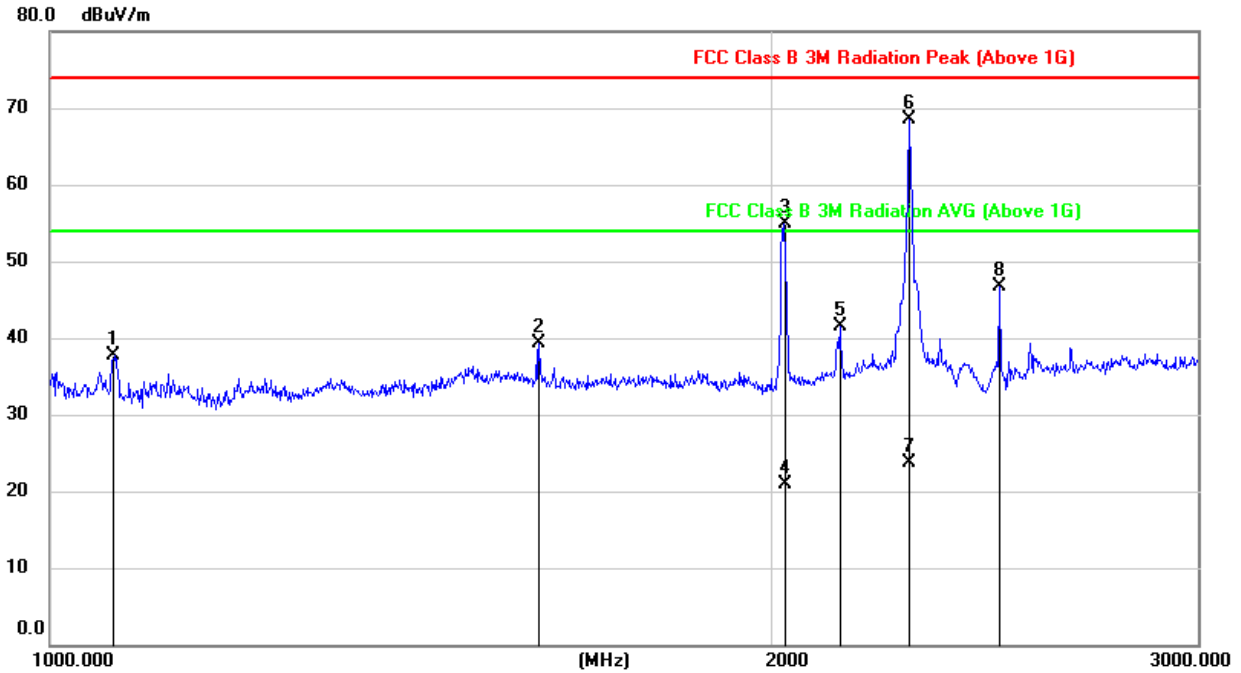


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	47.20	-1.95	45.25	74.00	-28.75	peak
2	4954.543	45.06	0.57	45.63	74.00	-28.37	peak
3	5990.839	42.19	3.20	45.39	74.00	-28.61	peak
4	9919.979	43.68	11.83	55.51	74.00	-18.49	peak
5	9919.979	33.49	11.83	45.32	54.00	-8.68	AVG
6	14132.601	32.34	20.50	52.84	74.00	-21.16	peak
7	17935.612	25.78	26.79	52.57	74.00	-21.43	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

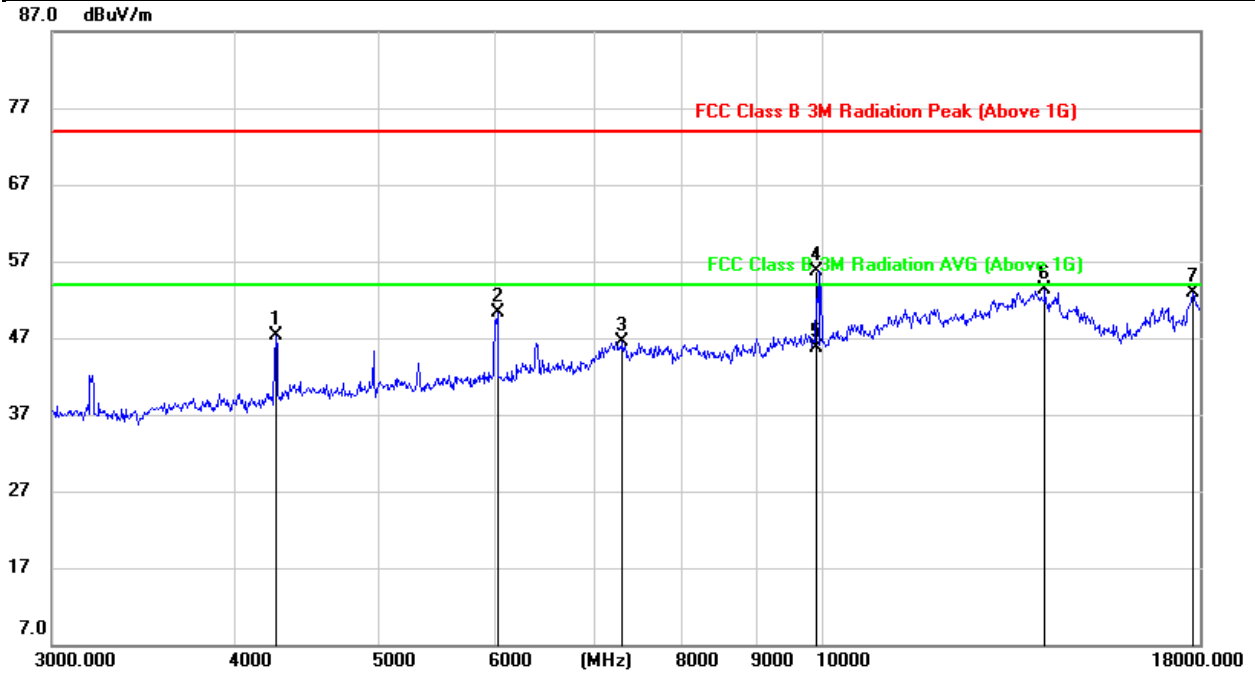


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	51.54	-13.92	37.62	74.00	-36.38	peak
2	1596.812	51.31	-12.08	39.23	74.00	-34.77	peak
3	2020.029	65.39	-10.50	54.89	74.00	-19.11	peak
4	2020.029	31.40	-10.50	20.90	54.00	-33.10	AVG
5	2129.411	50.71	-9.30	41.41	74.00	-32.59	peak
6	2277.004	75.79	-7.38	68.41	74.00	-5.59	peak
7	2277.004	31.06	-7.38	23.68	54.00	-30.32	AVG
8	2480.729	55.03	-8.28	46.75	74.00	-27.25	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



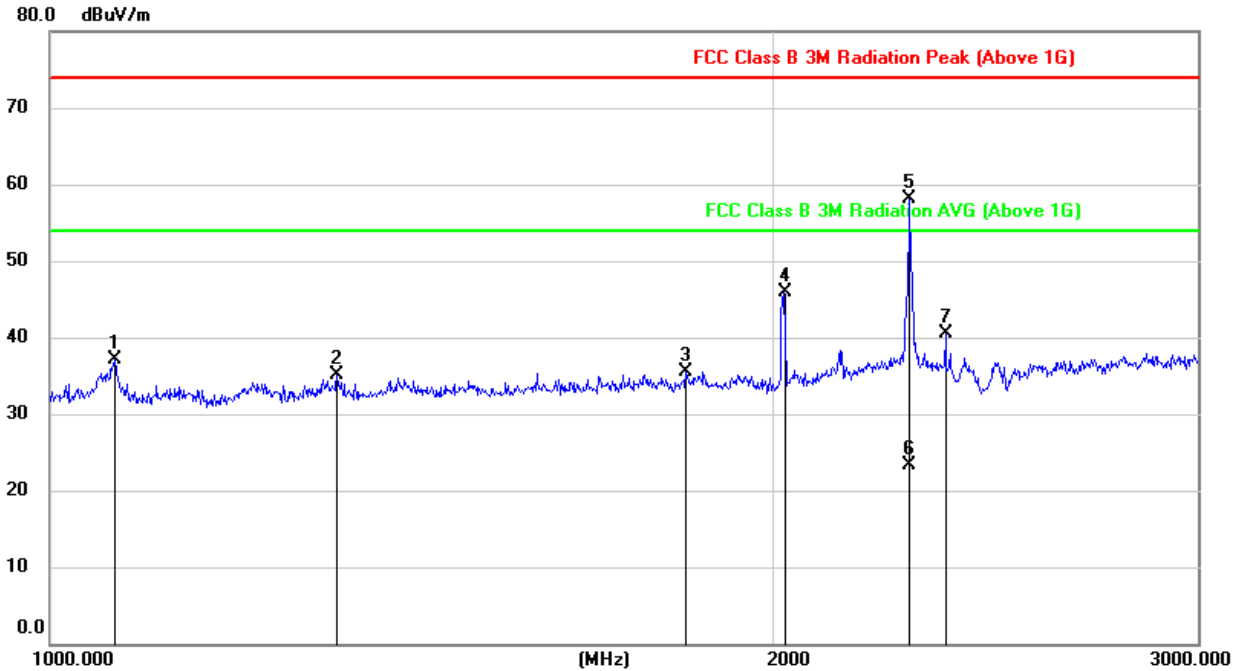
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4254.620	49.24	-1.85	47.39	74.00	-26.61	peak
2	6012.346	46.87	3.34	50.21	74.00	-23.79	peak
3	7309.075	38.75	7.77	46.52	74.00	-27.48	peak
4	9919.872	43.60	12.09	55.69	74.00	-18.31	peak
5	9919.872	33.65	12.09	45.74	54.00	-8.26	AVG
6	14132.601	32.83	20.50	53.33	74.00	-20.67	peak
7	17807.526	26.14	26.76	52.90	74.00	-21.10	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



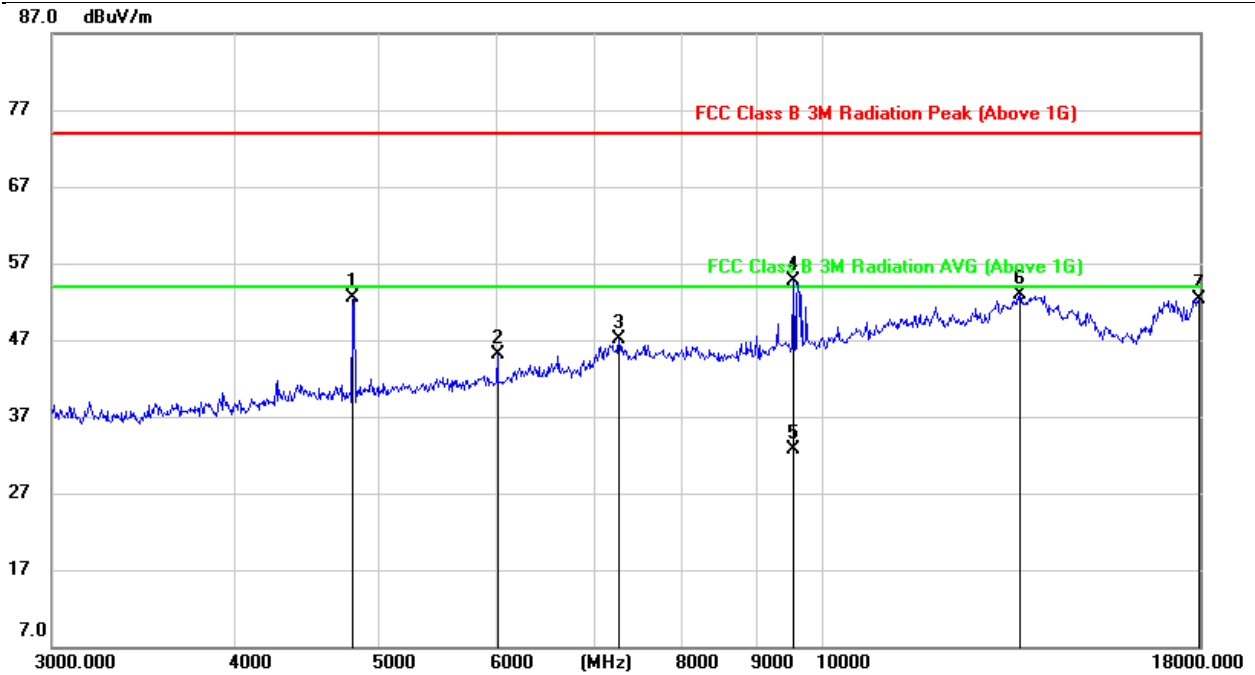
7.2.2. 8DPSK MODE

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	1064.623	50.71	-13.62	37.09	74.00	-36.91	peak
2	1316.074	47.40	-12.38	35.02	74.00	-38.98	peak
3	1837.914	46.40	-10.94	35.46	74.00	-38.54	peak
4	2020.029	56.31	-10.46	45.85	74.00	-28.15	peak
5	2277.004	65.50	-7.48	58.02	74.00	-15.98	peak
6	2277.004	30.76	-7.48	23.28	54.00	-30.72	AVG
7	2358.477	48.29	-7.81	40.48	74.00	-33.52	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

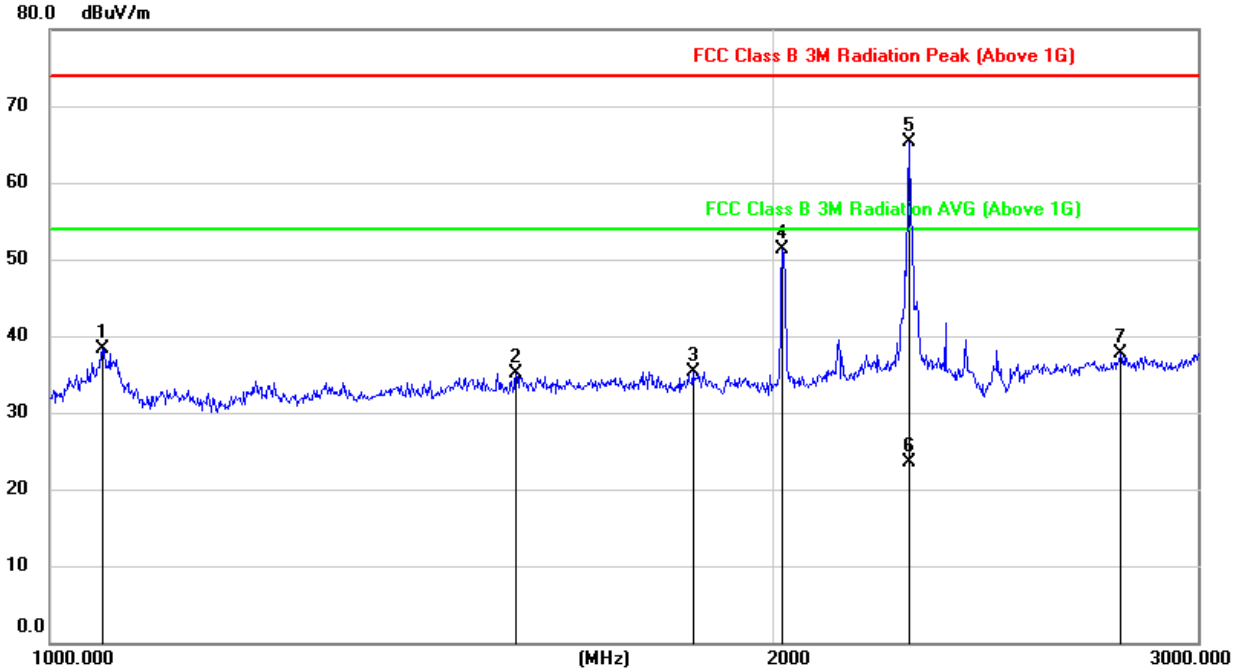


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4805.903	52.93	-0.49	52.44	74.00	-21.56	peak
2	6012.346	41.85	3.24	45.09	74.00	-28.91	peak
3	7269.892	39.20	7.86	47.06	74.00	-26.94	peak
4	9545.682	43.51	11.18	54.69	74.00	-19.31	peak
5	9545.682	21.48	11.18	32.66	54.00	-21.34	AVG
6	13610.714	32.39	20.53	52.92	74.00	-21.08	peak
7	17967.777	25.34	27.04	52.38	74.00	-21.62	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

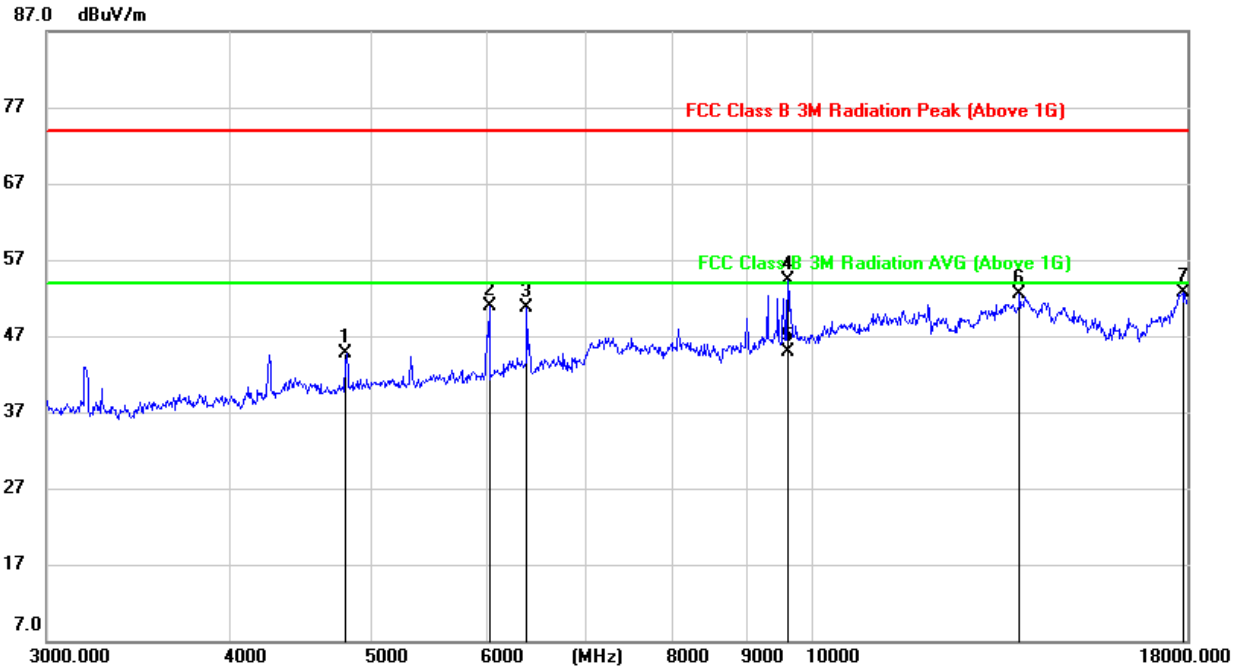


HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.835	52.20	-13.94	38.26	74.00	-35.74	peak
2	1562.109	47.40	-12.23	35.17	74.00	-38.83	peak
3	1850.069	46.18	-10.88	35.30	74.00	-38.70	peak
4	2015.595	61.82	-10.53	51.29	74.00	-22.71	peak
5	2277.004	72.60	-7.38	65.22	74.00	-8.78	peak
6	2277.004	30.98	-7.38	23.60	54.00	-30.40	AVG
7	2784.050	44.83	-7.08	37.75	74.00	-36.25	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

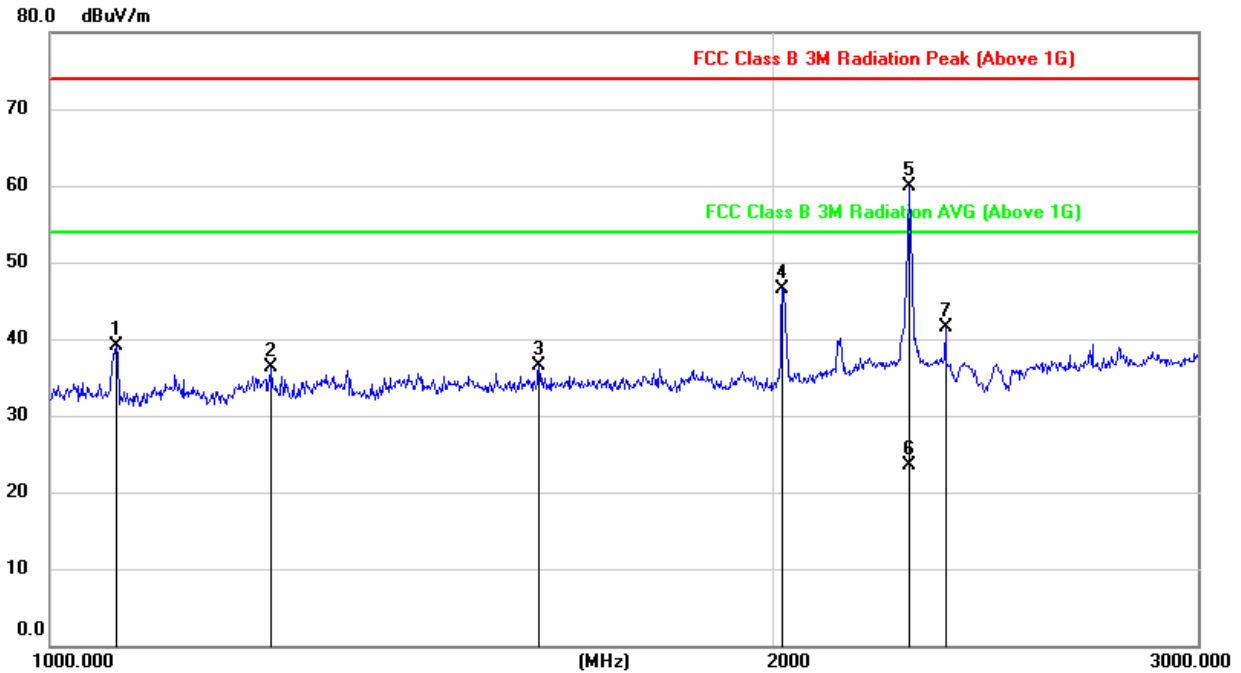


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4805.903	45.09	-0.40	44.69	74.00	-29.31	peak
2	6012.346	47.58	3.34	50.92	74.00	-23.08	peak
3	6378.564	46.01	4.71	50.72	74.00	-23.28	peak
4	9614.342	42.86	11.35	54.21	74.00	-19.79	peak
5	9614.342	33.57	11.35	44.92	54.00	-9.08	AVG
6	13831.977	31.44	21.03	52.47	74.00	-21.53	peak
7	17871.455	26.48	26.26	52.74	74.00	-21.26	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

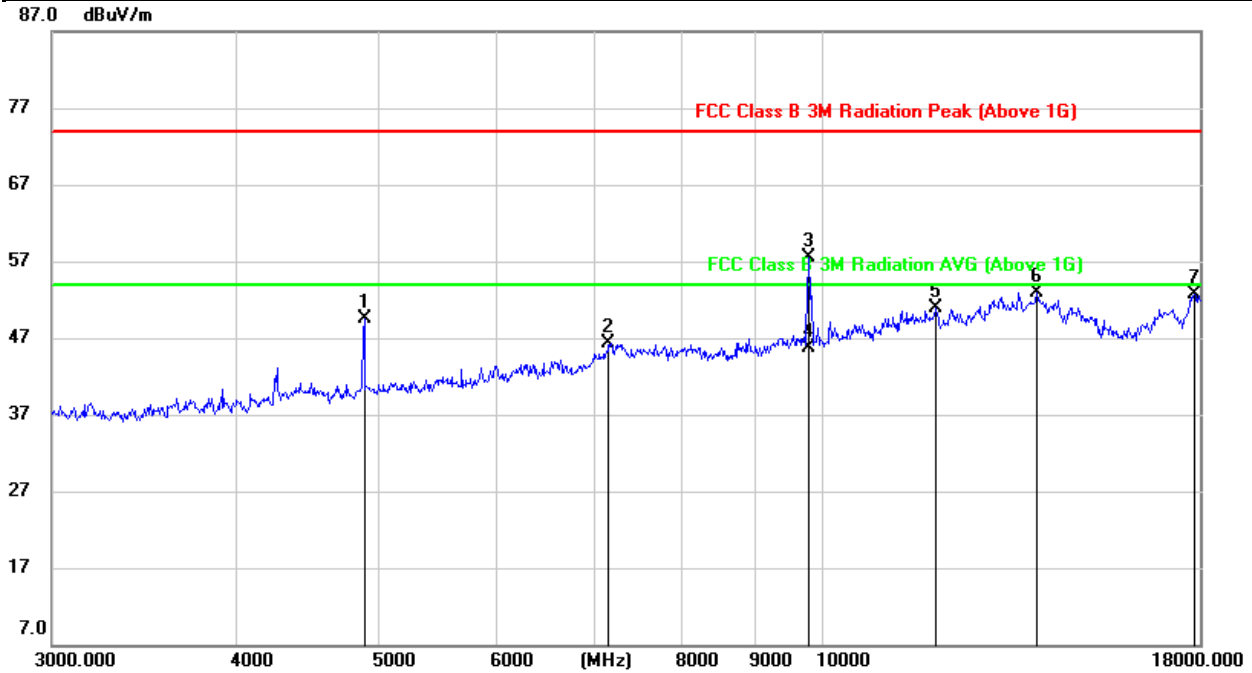


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1065.793	52.73	-13.62	39.11	74.00	-34.89	peak
2	1237.546	49.11	-12.89	36.22	74.00	-37.78	peak
3	1596.812	48.68	-12.08	36.60	74.00	-37.40	peak
4	2015.595	57.07	-10.50	46.57	74.00	-27.43	peak
5	2277.004	67.41	-7.48	59.93	74.00	-14.07	peak
6	2277.004	30.89	-7.48	23.41	54.00	-30.59	AVG
7	2358.477	49.32	-7.81	41.51	74.00	-32.49	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

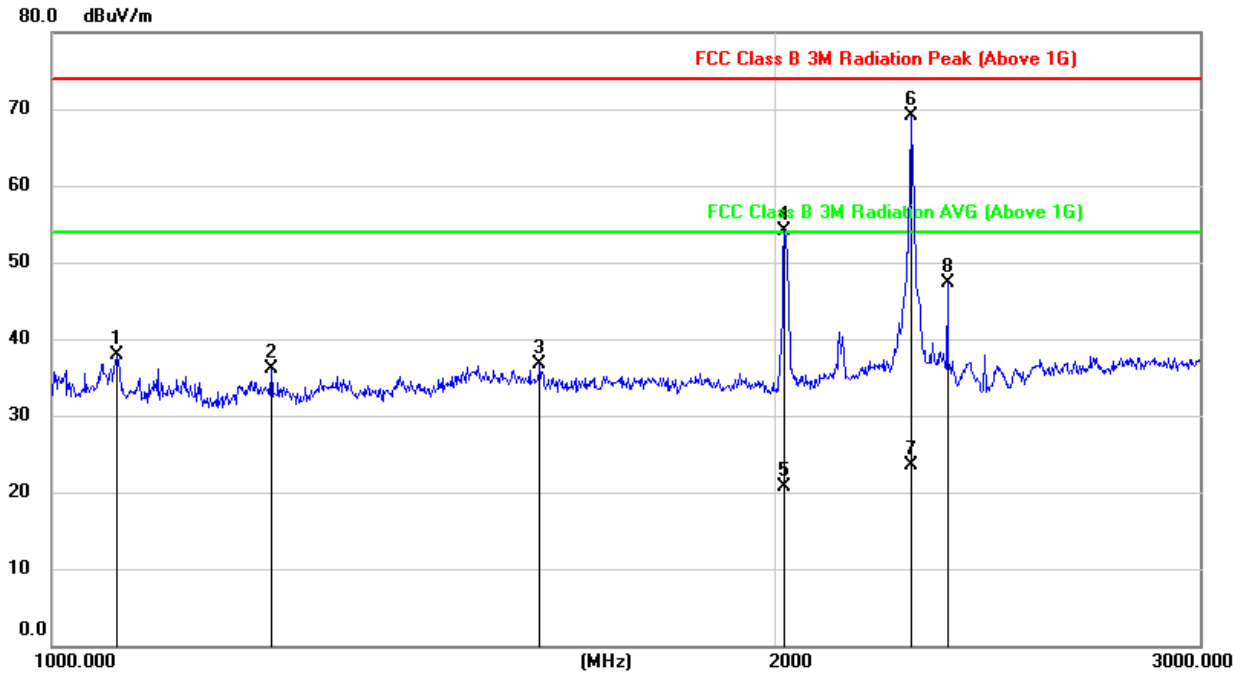


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4884.031	49.00	0.50	49.50	74.00	-24.50	peak
2	7179.280	38.53	7.72	46.25	74.00	-27.75	peak
3	9763.985	45.80	11.61	57.41	74.00	-16.59	peak
4	9763.985	34.11	11.61	45.72	54.00	-8.28	AVG
5	11941.967	34.37	16.48	50.85	74.00	-23.15	peak
6	13956.452	32.30	20.68	52.98	74.00	-21.02	peak
7	17839.462	26.12	26.49	52.61	74.00	-21.39	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.
 4. AVG: $VBW=1/T_{on}$ where: t_{on} is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

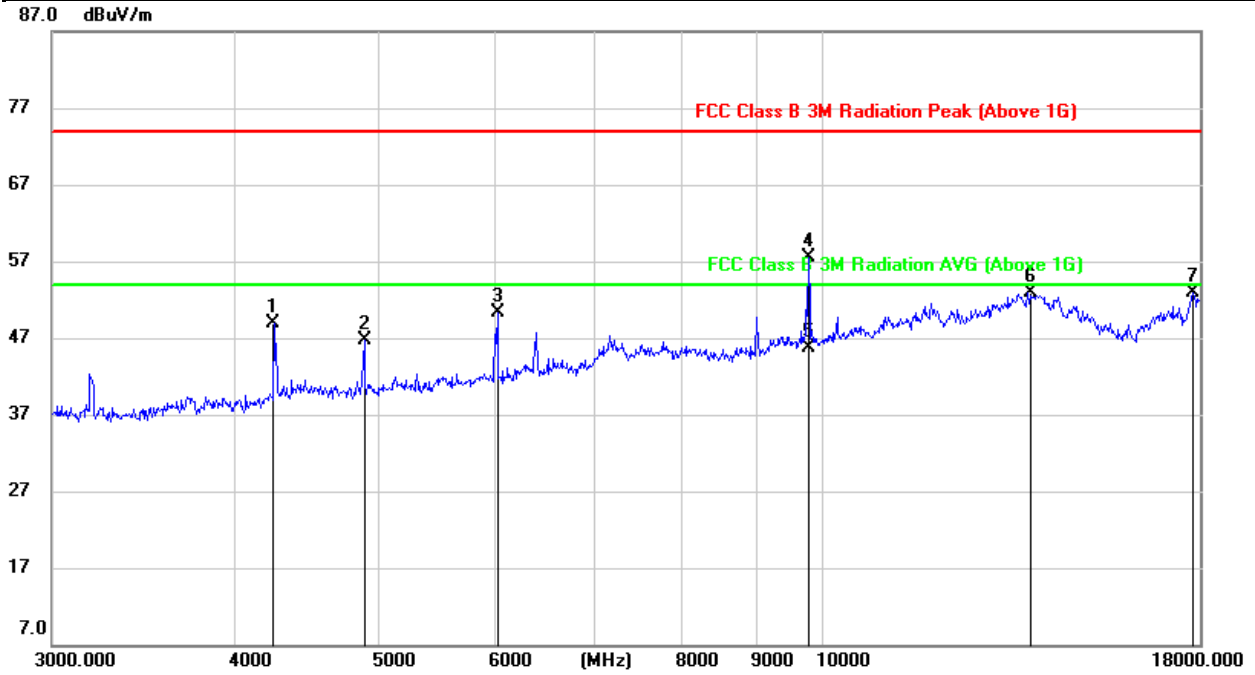


HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	51.91	-13.92	37.99	74.00	-36.01	peak
2	1233.475	48.92	-12.87	36.05	74.00	-37.95	peak
3	1595.058	48.75	-12.08	36.67	74.00	-37.33	peak
4	2015.595	64.73	-10.53	54.20	74.00	-19.80	peak
5	2015.595	31.17	-10.53	20.64	54.00	-33.36	AVG
6	2277.004	76.54	-7.38	69.16	74.00	-4.84	peak
7	2277.004	30.91	-7.38	23.53	54.00	-30.47	AVG
8	2358.477	54.99	-7.71	47.28	74.00	-26.72	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

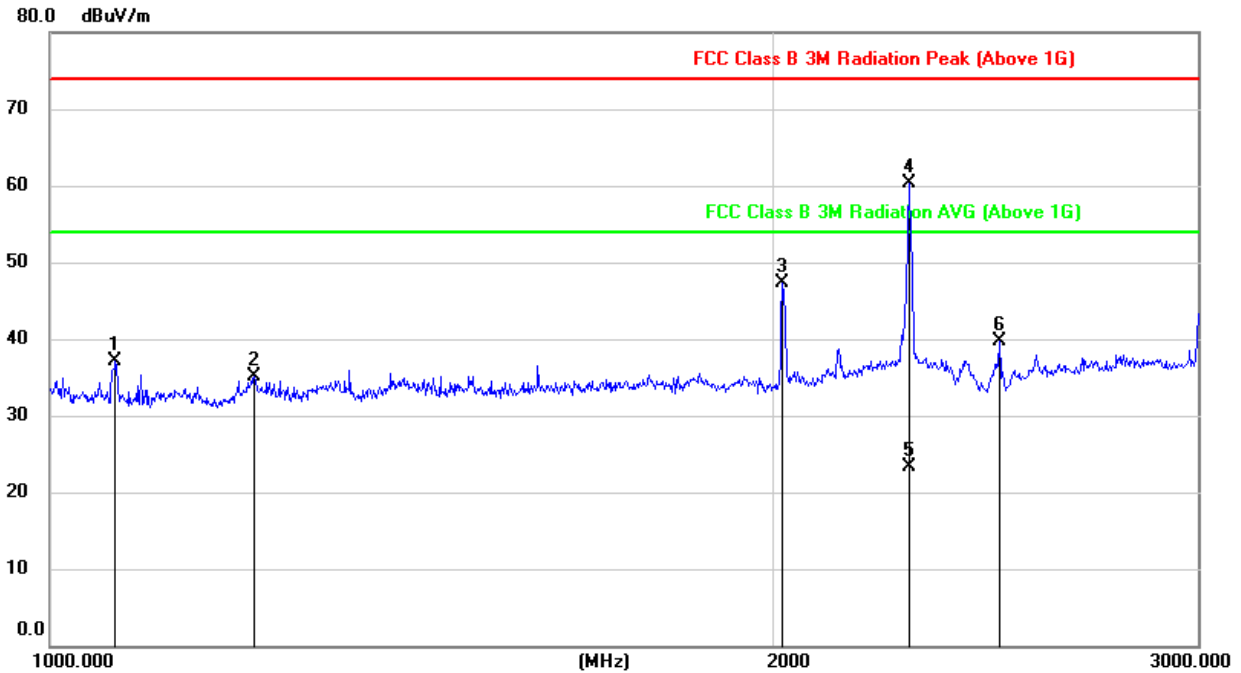


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4247.003	50.77	-1.90	48.87	74.00	-25.13	peak
2	4884.031	46.36	0.43	46.79	74.00	-27.21	peak
3	6012.346	46.96	3.34	50.30	74.00	-23.70	peak
4	9763.985	45.76	11.74	57.50	74.00	-16.50	peak
5	9763.985	33.95	11.74	45.69	54.00	-8.31	AVG
6	13782.499	31.91	21.01	52.92	74.00	-21.08	peak
7	17807.526	26.08	26.76	52.84	74.00	-21.16	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

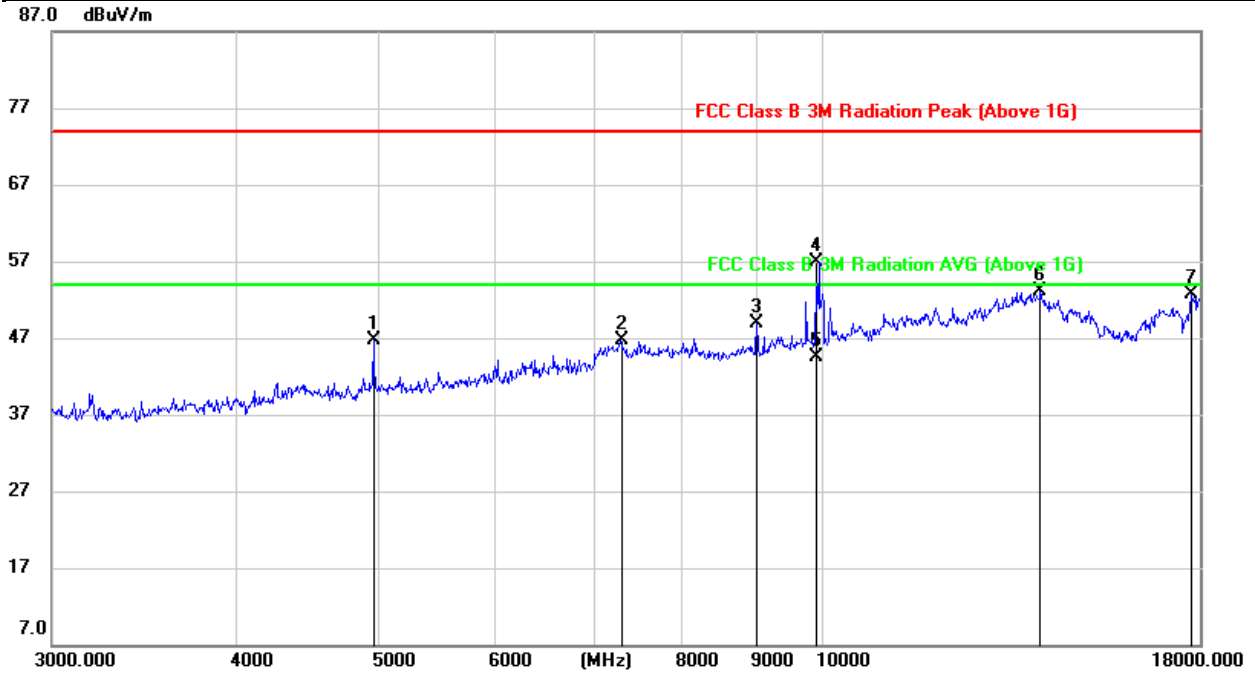


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	50.77	-13.62	37.15	74.00	-36.85	peak
2	1215.983	48.19	-13.00	35.19	74.00	-38.81	peak
3	2015.595	57.76	-10.50	47.26	74.00	-26.74	peak
4	2275.723	67.77	-7.50	60.27	74.00	-13.73	peak
5	2275.723	30.79	-7.49	23.30	54.00	-30.70	AVG
6	2480.729	48.18	-8.38	39.80	74.00	-34.20	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

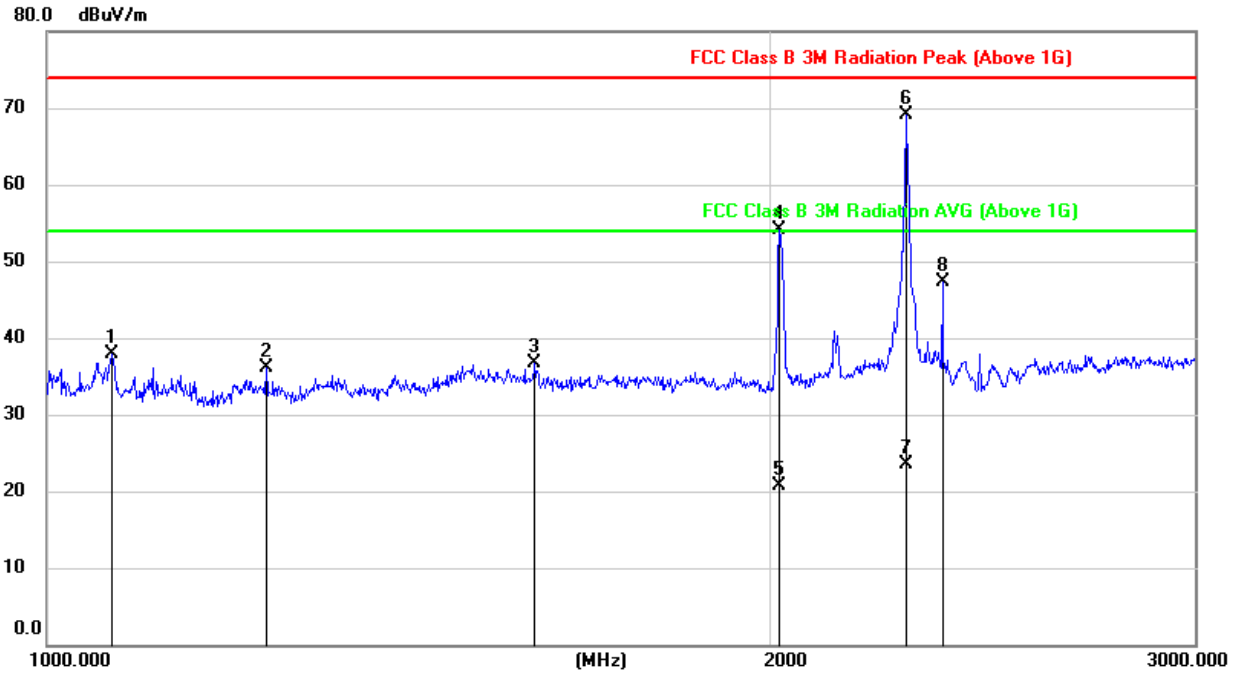


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4954.543	46.18	0.57	46.75	74.00	-27.25	peak
2	7295.991	38.80	7.86	46.66	74.00	-27.34	peak
3	9013.763	39.27	9.60	48.87	74.00	-25.13	peak
4	9920.009	45.01	11.83	56.84	74.00	-17.16	peak
5	9920.009	32.74	11.83	44.57	54.00	-9.43	AVG
6	14031.674	32.46	20.63	53.09	74.00	-20.91	peak
7	17775.648	26.45	26.19	52.64	74.00	-21.36	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.
 4. AVG: $VBW=1/T_{on}$ where: t_{on} is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

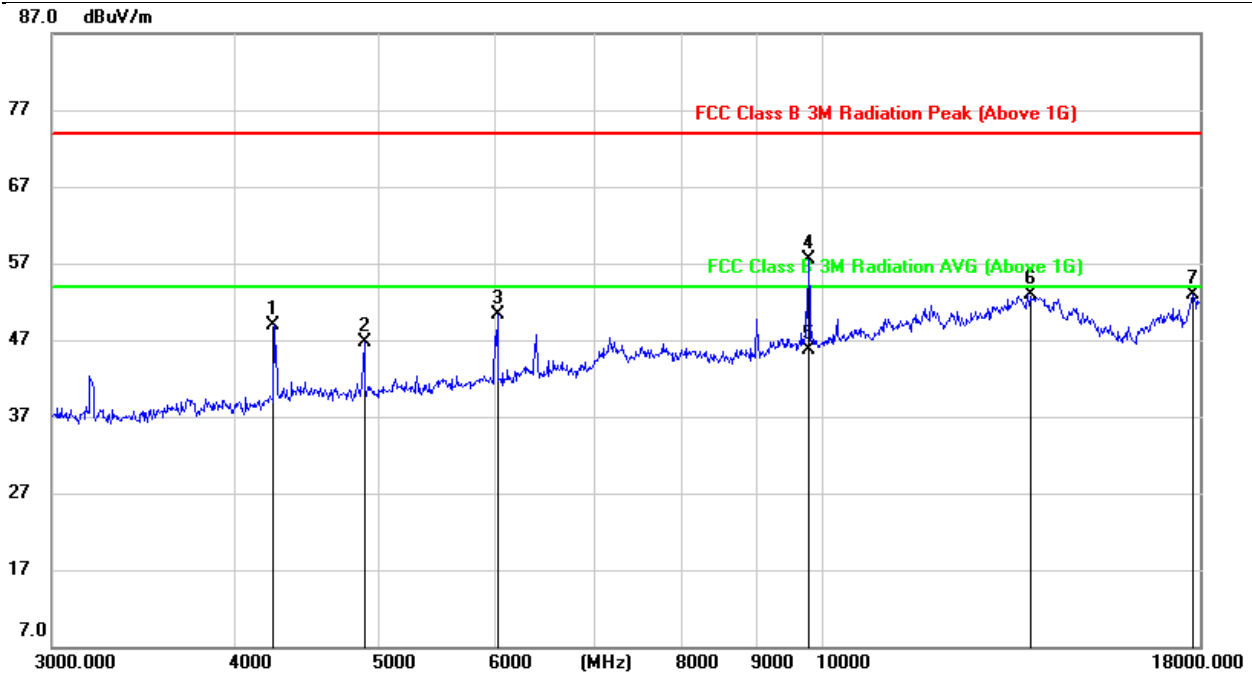


HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.623	51.91	-13.92	37.99	74.00	-36.01	peak
2	1233.475	48.92	-12.87	36.05	74.00	-37.95	peak
3	1595.058	48.75	-12.08	36.67	74.00	-37.33	peak
4	2015.595	64.73	-10.53	54.20	74.00	-19.80	peak
5	2015.595	31.17	-10.53	20.64	54.00	-33.36	AVG
6	2277.004	76.54	-7.38	69.16	74.00	-4.84	peak
7	2277.004	30.91	-7.38	23.53	54.00	-30.47	AVG
8	2358.477	54.99	-7.71	47.28	74.00	-26.72	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.
 4. AVG: VBW=1/Ton where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4247.003	50.77	-1.90	48.87	74.00	-25.13	peak
2	4884.031	46.36	0.43	46.79	74.00	-27.21	peak
3	6012.346	46.96	3.34	50.30	74.00	-23.70	peak
4	9763.985	45.76	11.74	57.50	74.00	-16.50	peak
5	9763.985	33.95	11.74	45.69	54.00	-8.31	AVG
6	13782.499	31.91	21.01	52.92	74.00	-21.08	peak
7	17807.526	26.08	26.76	52.84	74.00	-21.16	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.
 4. AVG: $VBW=1/Ton$ where: ton is transmit duration.
 5. For transmit duration, please refer to clause 6.1.

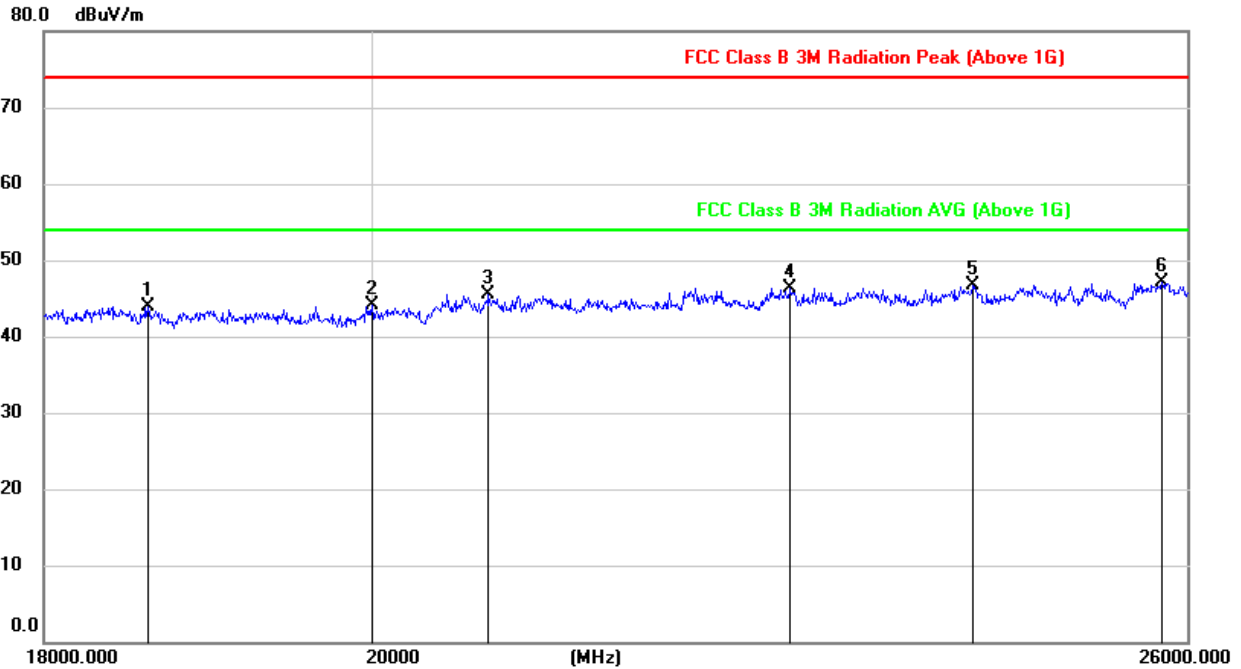
Note: All the modes had been tested, but only the worst data recorded in the report.



7.3. SPURIOUS EMISSIONS 18G ~ 26GHz

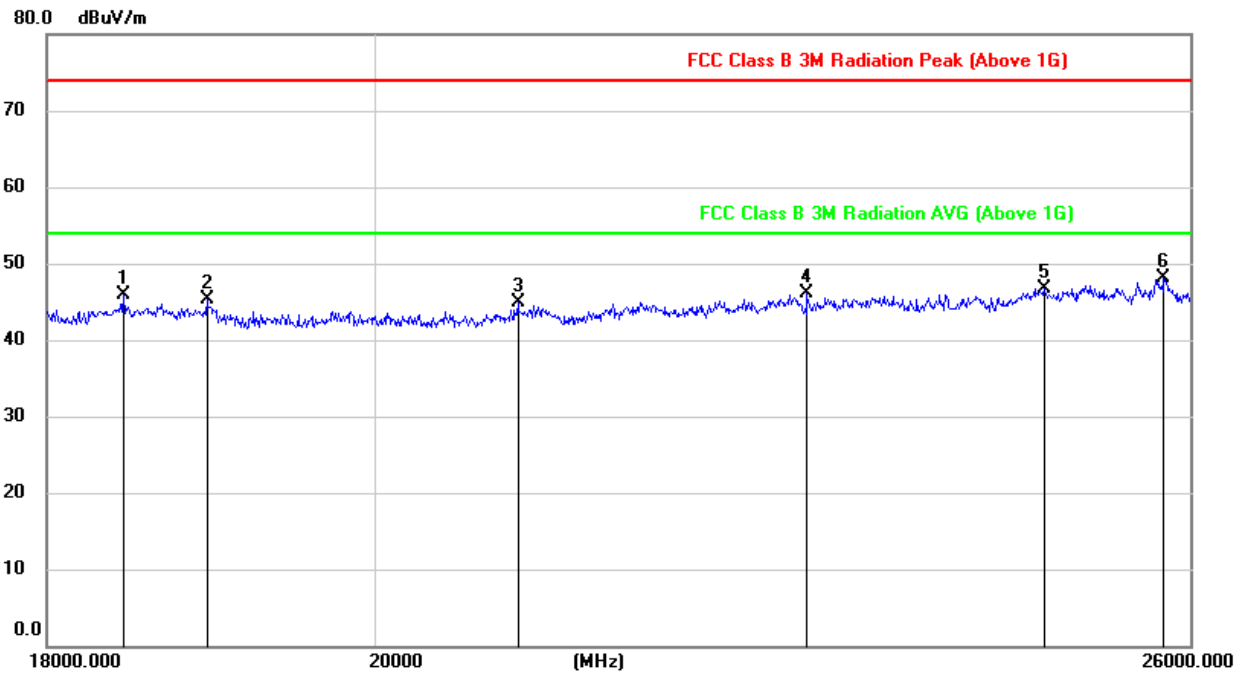
7.3.1. GFSK MODE

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	18612.524	49.24	-5.34	43.90	74.00	-30.10	peak
2	20003.530	49.58	-5.45	44.13	74.00	-29.87	peak
3	20768.070	50.57	-5.10	45.47	74.00	-28.53	peak
4	22885.329	49.92	-3.55	46.37	74.00	-27.63	peak
5	24263.284	49.61	-2.81	46.80	74.00	-27.20	peak
6	25790.510	47.71	-0.68	47.03	74.00	-26.97	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	18448.984	51.27	-5.32	45.95	74.00	-28.05	peak
2	18950.934	50.49	-5.26	45.23	74.00	-28.77	peak
3	20944.464	49.74	-4.93	44.81	74.00	-29.19	peak
4	22986.538	49.62	-3.45	46.17	74.00	-27.83	peak
5	24804.566	49.05	-2.27	46.78	74.00	-27.22	peak
6	25781.028	48.85	-0.66	48.19	74.00	-25.81	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.

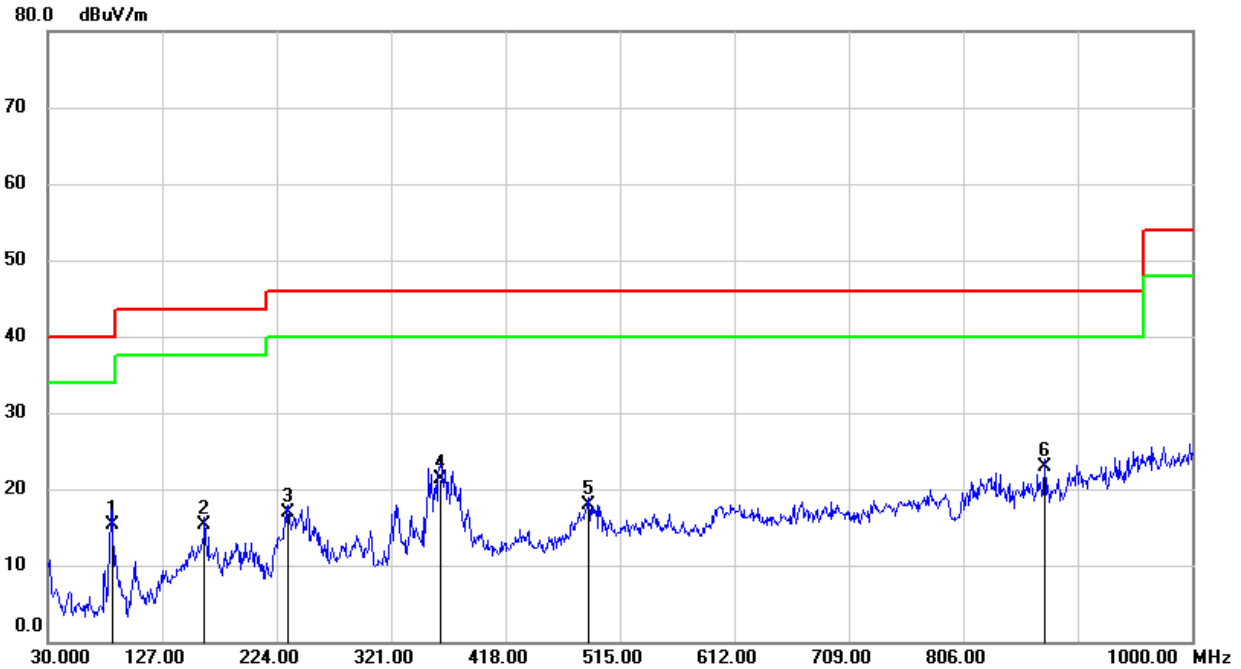
Note: All the modes had been tested, but only the worst data recorded in the report.



7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

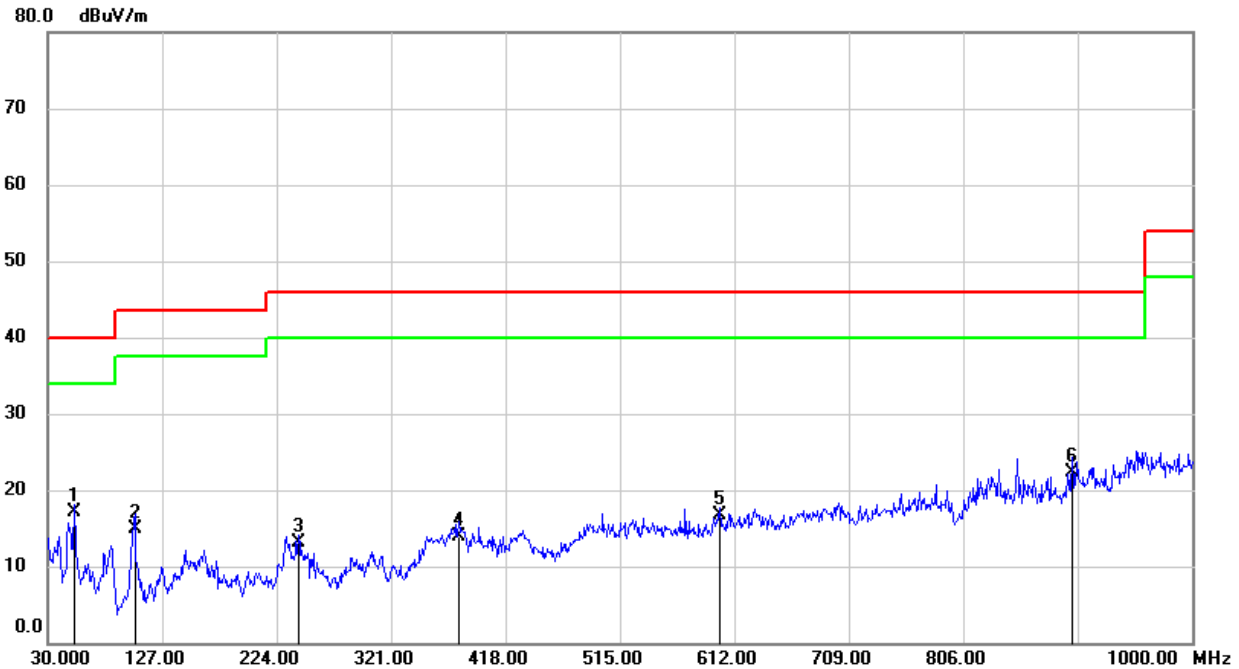
7.4.1. GFSK MODE

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	84.3200	36.89	-21.55	15.34	40.00	-24.66	QP
2	162.8900	32.43	-17.03	15.40	43.50	-28.10	QP
3	233.7000	33.81	-17.00	16.81	46.00	-29.19	QP
4	362.7100	35.21	-13.95	21.26	46.00	-24.74	QP
5	488.8100	29.11	-11.14	17.97	46.00	-28.03	QP
6	874.8700	29.05	-6.06	22.99	46.00	-23.01	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	52.3100	37.10	-19.92	17.18	40.00	-22.82	QP
2	103.7200	36.03	-21.21	14.82	43.50	-28.68	QP
3	242.4300	30.34	-17.30	13.04	46.00	-32.96	QP
4	378.2300	27.25	-13.31	13.94	46.00	-32.06	QP
5	599.3900	25.52	-8.79	16.73	46.00	-29.27	QP
6	898.1500	27.66	-5.30	22.36	46.00	-23.64	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

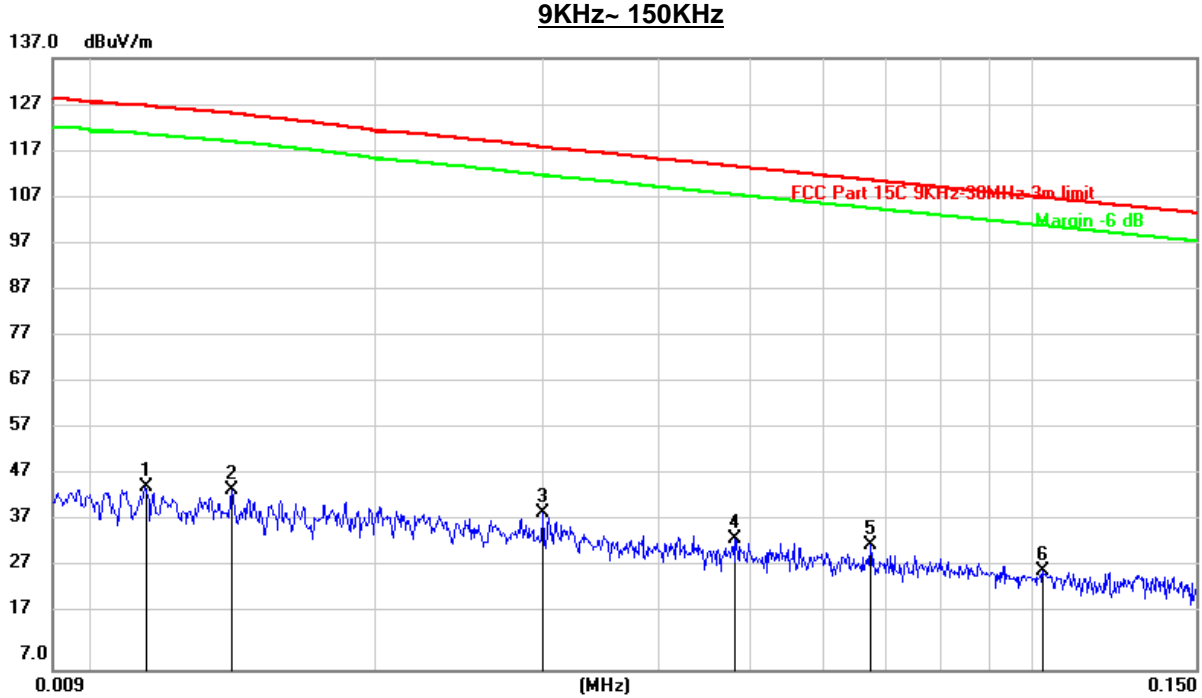
Note: All the modes had been tested, but only the worst data recorded in the report.



7.5. SPURIOUS EMISSIONS BELOW 30M

7.5.1. GFSK MODE

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

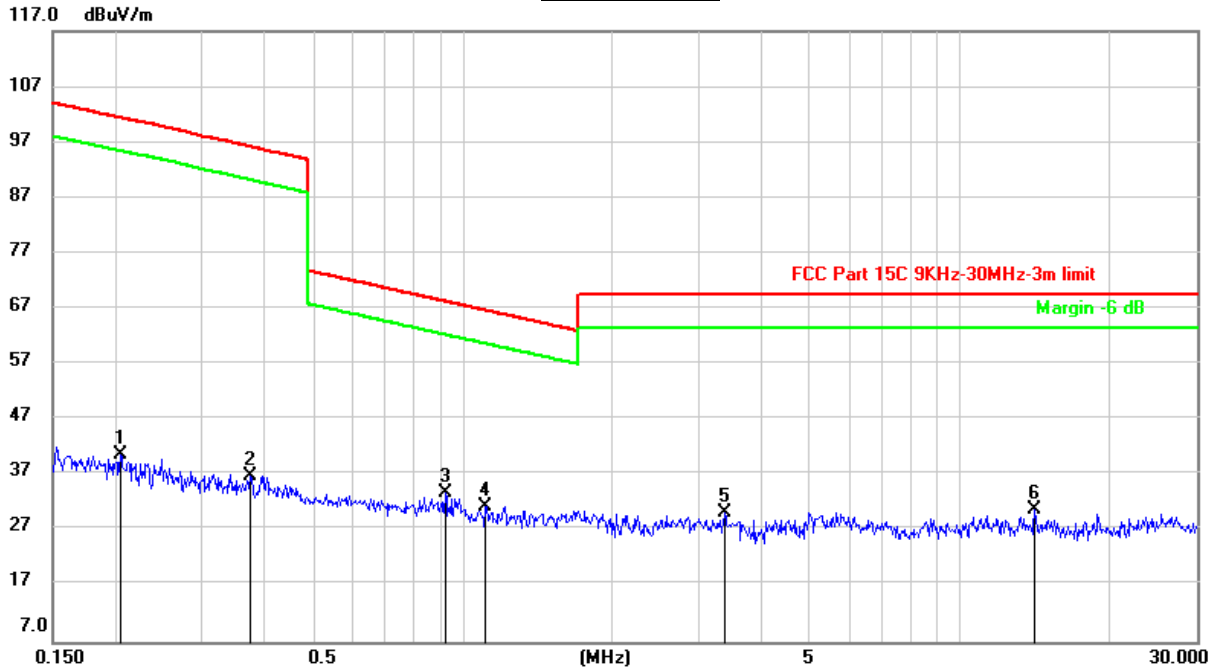


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0112	25.52	20.22	45.74	126.88	-81.14	peak
2	0.0140	24.97	20.25	45.22	125.19	-79.97	peak
3	0.0300	19.92	20.31	40.23	118.06	-77.83	peak
4	0.0483	14.40	20.31	34.71	113.95	-79.24	peak
5	0.0672	13.21	20.31	33.52	111.08	-77.56	peak
6	0.1029	7.72	20.23	27.95	107.36	-79.41	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.

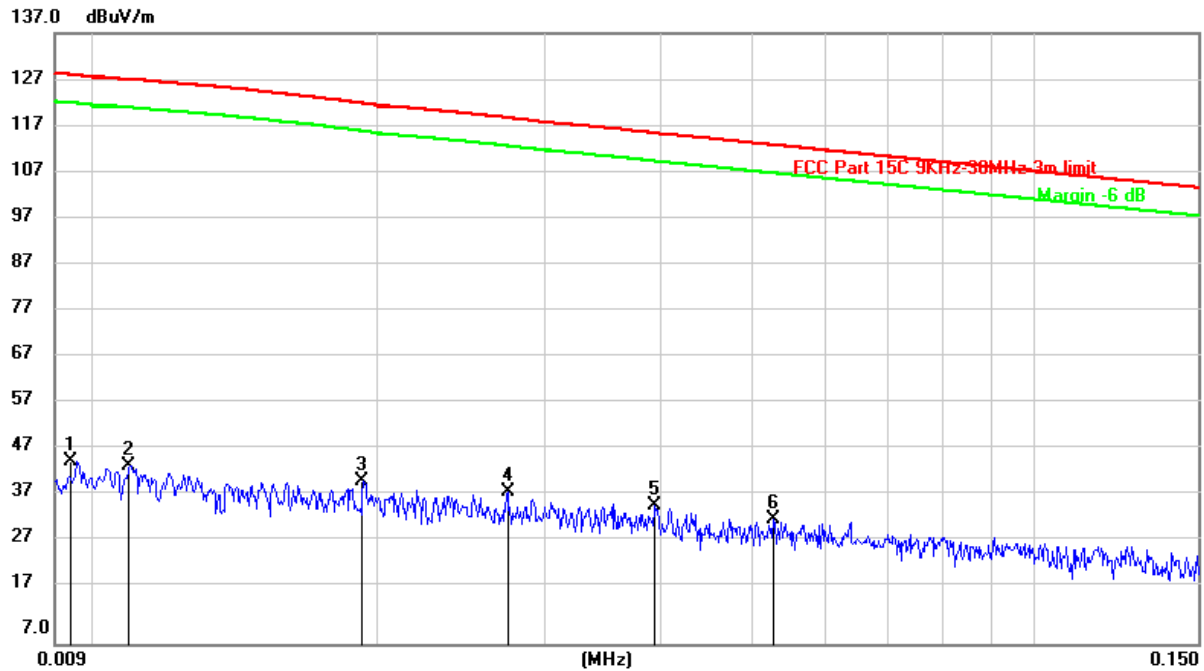


150KHz ~ 30M



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.2048	20.20	20.36	40.56	101.41	-60.85	peak
2	0.3729	16.61	20.28	36.89	96.24	-59.35	peak
3	0.9233	13.32	20.37	33.69	68.31	-34.62	peak
4	1.1111	10.89	20.41	31.30	66.70	-35.40	peak
5	3.3635	9.29	20.96	30.25	69.54	-39.29	peak
6	14.1376	9.91	20.95	30.86	69.54	-38.68	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	0.0094	25.53	20.26	45.79	128.10	-82.31	peak
2	0.0108	24.74	20.22	44.96	127.12	-82.16	peak
3	0.0191	21.27	20.30	41.57	122.12	-80.55	peak
4	0.0274	19.10	20.31	39.41	118.98	-79.57	peak
5	0.0393	16.01	20.31	36.32	115.73	-79.41	peak
6	0.0526	13.33	20.31	33.64	113.21	-79.57	peak

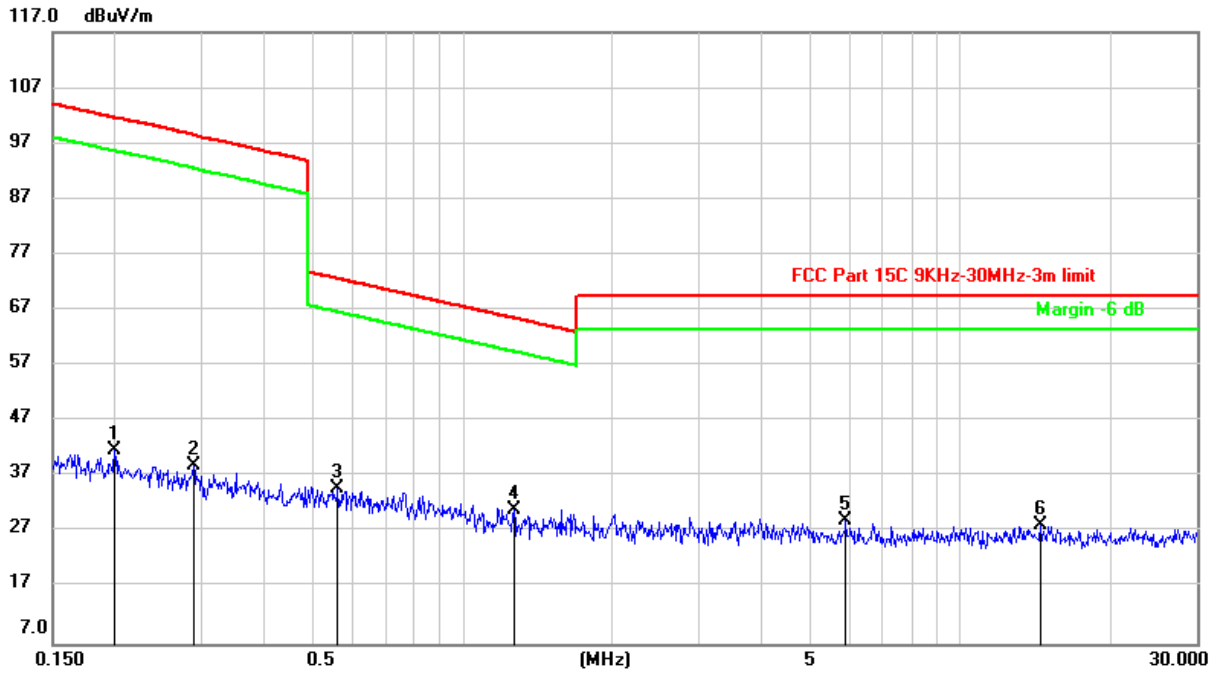
Note: 1. Measurement = Reading Level + Correct Factor.

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	21.35	20.37	41.72	101.60	-59.88	peak
2	0.2878	18.66	20.31	38.97	98.49	-59.52	peak
3	0.5611	14.66	20.26	34.92	72.66	-37.74	peak
4	1.2684	10.69	20.47	31.16	65.55	-34.39	peak
5	5.8978	8.18	20.87	29.05	69.54	-40.49	peak
6	14.5168	7.50	20.94	28.44	69.54	-41.10	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.

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

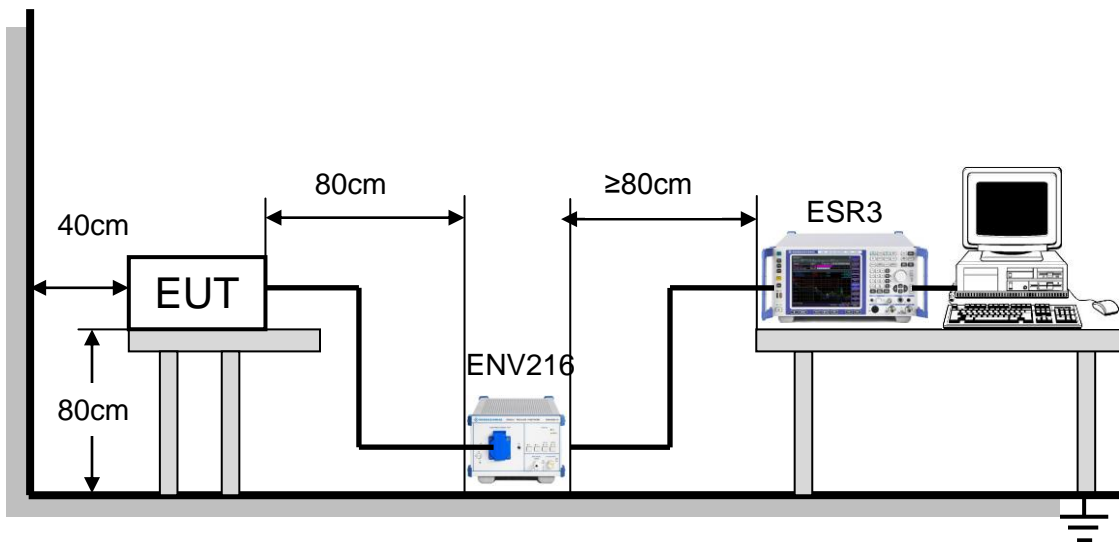
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8.

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	DC 3.7V

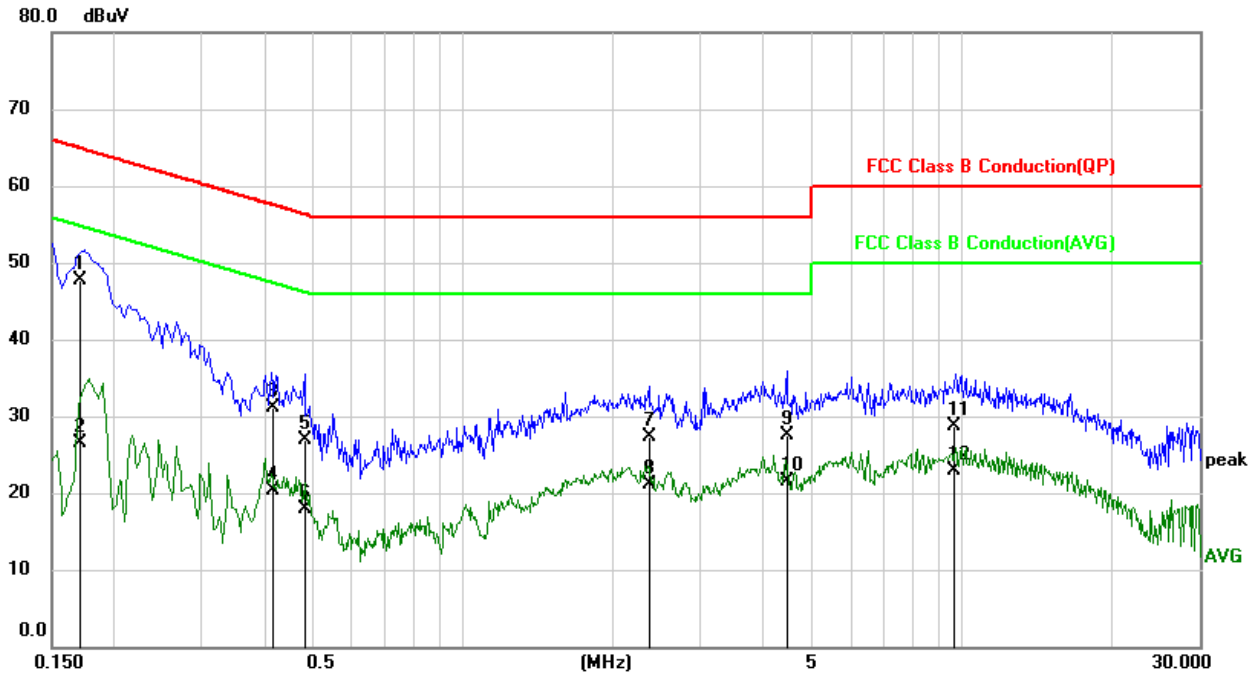
RESULTS



8.1.1. GFSK MODE

TEST RESULTS (MID CHANNEL, WORST-CASE CONFIGURATION)

LINE N RESULTS

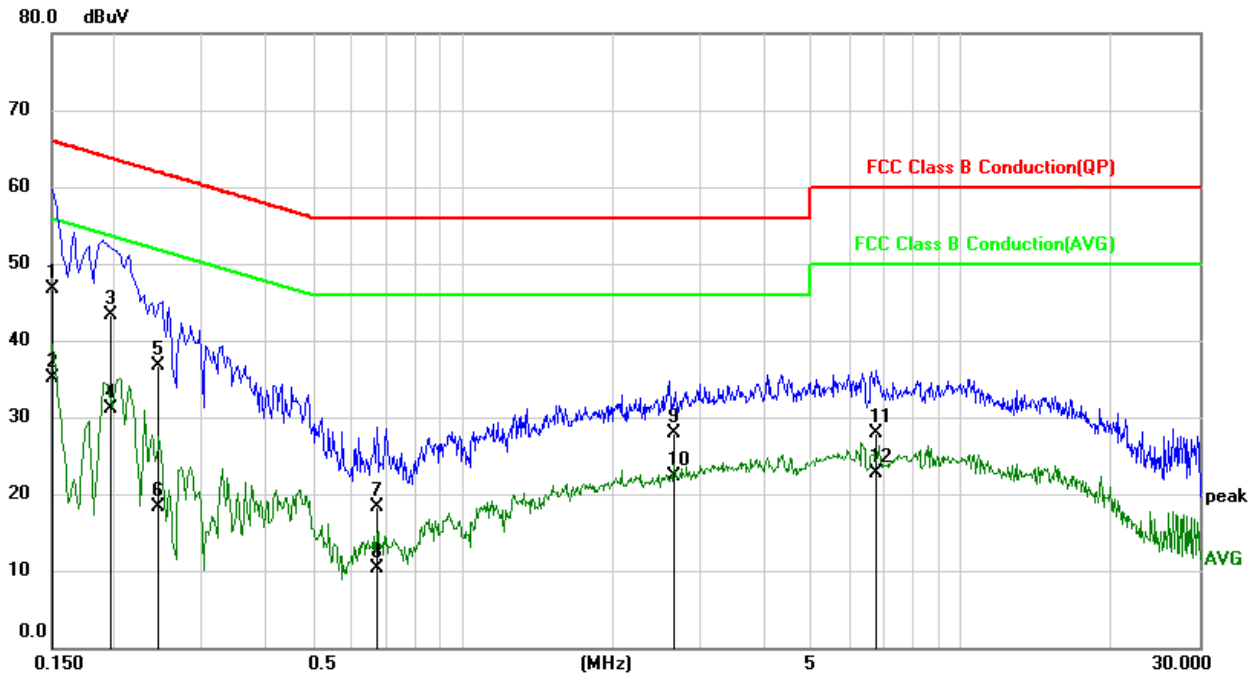


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1701	38.22	9.45	47.67	64.96	-17.29	QP
2	0.1701	17.12	9.45	26.57	54.96	-28.39	AVG
3	0.4162	21.74	9.42	31.16	57.52	-26.36	QP
4	0.4162	10.95	9.42	20.37	47.52	-27.15	AVG
5	0.4823	17.53	9.42	26.95	56.30	-29.35	QP
6	0.4823	8.56	9.42	17.98	46.30	-28.32	AVG
7	2.3683	17.81	9.45	27.26	56.00	-28.74	QP
8	2.3683	11.69	9.45	21.14	46.00	-24.86	AVG
9	4.4535	18.03	9.47	27.50	56.00	-28.50	QP
10	4.4535	12.00	9.47	21.47	46.00	-24.53	AVG
11	9.6633	19.23	9.57	28.80	60.00	-31.20	QP
12	9.6633	13.42	9.57	22.99	50.00	-27.01	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	0.1500	37.13	9.64	46.77	66.00	-19.23	QP
2	0.1500	25.39	9.64	35.03	56.00	-20.97	AVG
3	0.1966	33.71	9.63	43.34	63.75	-20.41	QP
4	0.1966	21.50	9.63	31.13	53.75	-22.62	AVG
5	0.2451	27.00	9.63	36.63	61.92	-25.29	QP
6	0.2451	8.58	9.63	18.21	51.92	-33.71	AVG
7	0.6743	8.68	9.64	18.32	56.00	-37.68	QP
8	0.6743	0.72	9.64	10.36	46.00	-35.64	AVG
9	2.6523	18.20	9.66	27.86	56.00	-28.14	QP
10	2.6523	12.73	9.66	22.39	46.00	-23.61	AVG
11	6.7273	18.17	9.70	27.87	60.00	-32.13	QP
12	6.7273	13.10	9.70	22.80	50.00	-27.20	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