

FCC/ISED

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Rugged Smart Phone

ISSUED TO
Shenzhen UniStrong Science & Technology Co., Ltd.

B,4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen,
China



Tested by:

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Date: Nov. 27, 2018

Approved by:

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Date: Nov. 28, 2018



Report No.: BL-EC18B0146-601
EUT Name: Rugged Smart Phone
Model Name: UT12
Brand Name: UniStrong
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen (Issue 5, April 2018)
RSS-247 (Issue 2, February 2017)
FCC ID: 2AOPD-UT10
ISED Number: 11546A-UT10
Test conclusion: Pass
Test Date: Nov. 08, 2018 ~ Nov. 15, 2018
Date of Issue: Nov. 28, 2018

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Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Nov. 20, 2018</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Nov. 28, 2018</u>	<u>Update test standard version and related information</u>

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v5.4.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address	B,4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China

2.2 Manufacturer Information

Manufacturer	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address	B,4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Rugged Smart Phone
Model Name Under Test	UT12
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	SJYEnergy
	Model No.	BA7800
	Serial No.	N/A
	Capacity	8000 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.35 V
Ancillary Equipment 2	Adapter	
	Brand Name	N/A
	Model No.	ASUC71W
	Serial No.	N/A
	Rated Input	100-240 V~, 0.7 A, 50/60 Hz
	Rated Output	5 V= 3 A
Ancillary Equipment 3	USB Cable	
	Model No.	N/A
	Length (Approx.)	1.1 m

2.6 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EGPRS 850/900/1800/1900 MHz; 3G Network WCDMA/HSDPA/HSUPA Band 1/2/5/8; CDMA Band Class 0; EVDO Rel. 0/Rev. A Band Class 0; 4G Network LTE FDD Band 1/2/3/4/5/7/8/17/20/28; LTE TDD Band 38/40/41; Bluetooth 4.0 (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n(HT20) and 802.11ac GPS, GLONASS, NFC, BDS, 5.8G SRD
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The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	FHSS
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Transfer Rate	DH5: 1 Mbps 2DH5: 2 Mbps 3DH5: 3 Mbps
Frequency Range	The frequency range used is 2400 MHz to 2483.5 MHz.
Number of channel	79 (at intervals of 1 MHz)
Tested Channel	0 (2402 MHz), 39 (2441 MHz), 78 (2480 MHz)
Antenna Type	PIFA Antenna
Antenna Gain	0.27 dBi (In test items related to antenna gain, the final results reflect this figure.)
Antenna Impedance	50 Ω
Antenna System(MIMO Smart Antenna)	N/A

All channel was listed on the following table:

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

2.7 Additional Instructions

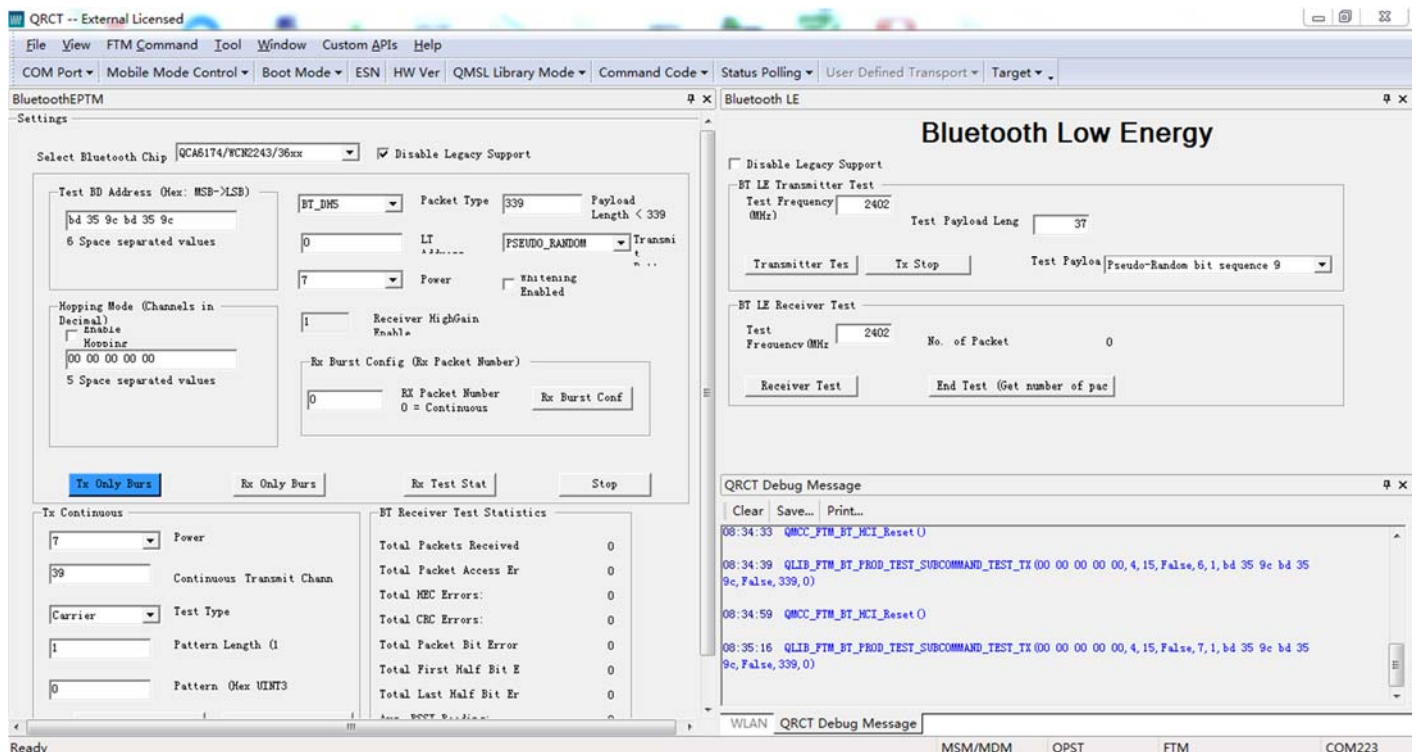
EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
------	--

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	QRCT		
Support Units (Software installation media)	Description	Manufacturer	Model
	Laptop	Lenovo	X220
Mode	Channel	Frequency (MHz)	Soft Set
DH5	CH0	2402	Power parameter Settings is 7
	CH39	2441	
	CH78	2480	
2DH5	CH0	2402	
	CH39	2441	
	CH78	2480	
3DH5	CH0	2402	
	CH39	2441	
	CH78	2480	

Run Software:



The screenshot displays the QRCT software interface, which is used for testing Bluetooth Low Energy (BLE) devices. The interface is divided into several sections:

- Bluetooth LE Settings:** This section includes fields for selecting the Bluetooth chip (e.g., QCA6174/WCN243/36xx), disabling legacy support, and configuring test parameters such as Test BD Address, Packet Type, Payload Length, and Test Frequency (2402 MHz).
- Bluetooth Low Energy Test:** This section contains controls for Transmitter and Receiver tests, including Test Payload Length, Test Payload (Pseudo-Random bit sequence 9), and Test Frequency (2402 MHz).
- QRCT Debug Message:** This section displays real-time test results and debug messages, such as "QRCCT_FTM_BT_MCI_Reset()", "QLIB_FTM_BT_PROD_TEST_SUBCOMMAND_TEST_TX", and "QRCCT_FTM_BT_MCI_Reset()".
- BT Receiver Test Statistics:** This section provides a summary of test results, including Total Packets Received, Total Packet Access Error, Total HEC Errors, Total CRC Errors, Total Packet Bit Error, Total First Half Bit Error, and Total Last Half Bit Error.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-17 Edition)	Miscellaneous Wireless Communications Services
2	FCC PUBLIC NOTICE DA 00-705 (Mar. 30, 2000)	Filling and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
3	RSS-Gen (Issue 5, April 2018)	General Requirements for Compliance of Radio Apparatus
4	RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSS) and Licence-Exemp Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	ISED Part No.	Channel	Test Result	Verdict	Remark
1	Antenna Requirement	15.203	RSS-247, 5.4 (6)	N/A	--	Pass	Note ¹
2	Number of Hopping Frequencies	15.247(a)	RSS-247, 5.1 (4)	Hopping Mode	ANNEX A.1	Pass	Note ²
3	Peak Output Power and E.I.R.P	15.247(b)	RSS-247, 5.4 (2)	Low/Middle/High	ANNEX A.2	Pass	--
4	Occupied Bandwidth	15.247(a)	RSS-247, 5.1 (1)	Low/Middle/High	ANNEX A.3	Pass	Note ²
5	Carrier Frequency Separation	15.247(a)	RSS-247, 5.1 (2)	Hopping Mode	ANNEX A.4	Pass	Note ²
6	Time of Occupancy (Dwell time)	15.247(a)	RSS-247, 5.1 (4)	Hopping Mode	ANNEX A.5	Pass	Note ²
7	Conducted Spurious Emission & Authorized-band band-edge	15.247(d)	RSS-247, 5.5	Low/Middle/High	ANNEX A.6	Pass	Note ²
8	Conducted Emission	15.207	RSS-GEN, 8.8	Low/Middle/High	ANNEX A.7	Pass	Note ²
9	Radiated Spurious Emission	15.209 15.247(d)	RSS-247, 5.5	Hopping Mode, Low/Middle/High	ANNEX A.8	Pass	Note ²
10	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	RSS-247, 5.5	Hopping Mode, Low/Middle/High	ANNEX A.9	Pass	Note ²
11	Receiver Spurious Emissions	--	RSS-Gen, 7.1.2	--	--	N/A	Note ³

Note¹: Please refer to section 5.1

Note²: $\pi/4$ -DQPSK is the EDR 2M rate mode, 8-DPSK is the EDR 3M rate mode. The consistency of test results in $\pi/4$ -DQPSK and 8-DPSK is very high. So we chose 8-DPSK as a typical representative to appear on the report. Another we will show all the modes on the RF output power test item.

Note³: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.

Note⁴: The only difference between the EUT (test samples in this report) and test sample in report BL-EC17C0360-601, which was issued by Shenzhen BALUN Technology Co., Ltd. on Mar. 20, 2018, is product information. Just changed the information as below:

1. Difference WIFI and 4G antenna;
2. Difference size of shell and appearance;
3. Difference camera;
4. Difference LCD screen;

And others hardware circuit and software were all the same. So just Radiated Spurious Emission and Band Edge (Restricted-band band-edge) were retested in this report, Other test items please refer to the BL-EC17C0360-601, which was issued by Shenzhen BALUN Technology Co., Ltd. on Mar. 20, 2018.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% to 55%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	3.8 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2018.06.15	2019.06.14
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2018.06.15	2019.06.14
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2018.11.07	2019.11.06
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2018.06.13	2019.06.12
LISN	SCHWARZBECK	NSLK 8127	8127-687	2018.06.13	2019.06.12
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2018.06.15	2019.06.14
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2018.06.15	2019.06.14
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	2018.10.10	2019.01.09
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	2018.10.10	2019.01.09
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2018.06.14	2019.06.13
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2018.06.26	2019.06.25
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.11.09	2019.11.08
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2017.07.22	2019.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2018.06.21	2019.06.20
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2017.01.06	2019.01.05
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2017.08.08	2019.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2018.06.15	2019.06.14
Power Amplifier	OPHIR RF	5225F	1037	2018.02.16	2019.02.15
Power Amplifier	OPHIR RF	5273F	1016	2018.02.16	2019.02.15
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Feld Strength Meter	Narda	EP601	511WX51129	2018.05.21	2019.05.20
Mouth Simulator	B&K	4227	2423931	2018.11.15	2019.11.14
Sound Calibrator	B&K	4231	2430337	2018.11.15	2019.11.14
Sound Level Meter	B&K	NL-20	00844023	2018.11.15	2019.11.14
Ear Simulator	B&K	4185	2409449	2018.11.15	2019.11.14
Ear Simulator	B&K	4195	2418189	2018.11.15	2019.11.14
Audio analyzer	B&K	UPL 16	100129	2018.11.15	2019.11.14
Software	BALUN	BL410	-	-	-
Cable	ROHDE&SCHWARZ	JUNFLON	APR0914004	2018.10.10	2019.01.09

4.3 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.4 dB
Power Spectral Density, conducted	±2.5 dB
Unwanted Emissions, conducted	±2.8 dB
All emissions, radiated	±5.4 dB
Temperature	±1°C
Humidity	±4%

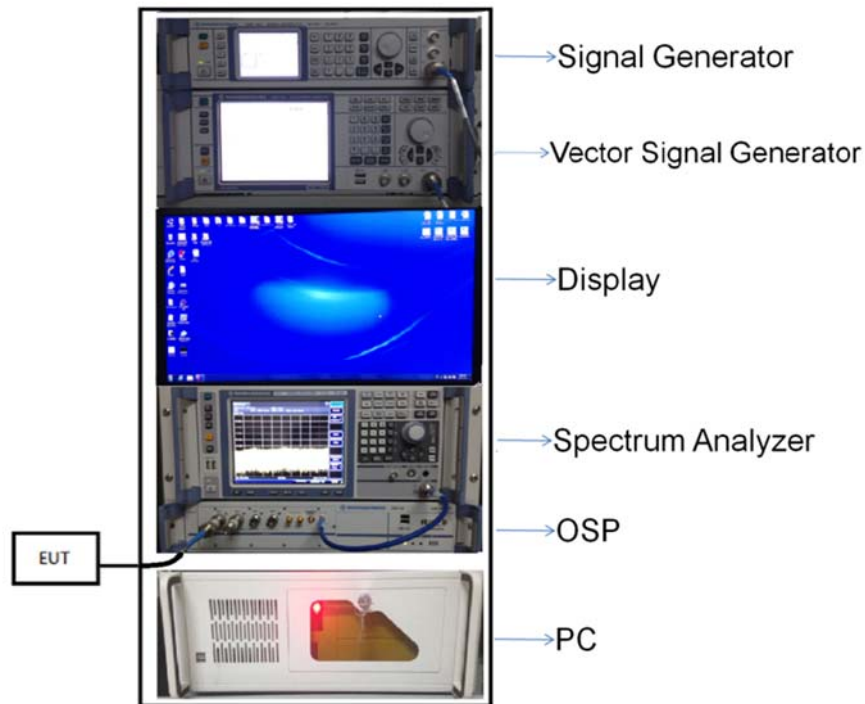
4.4 Description of Test Setup

4.4.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

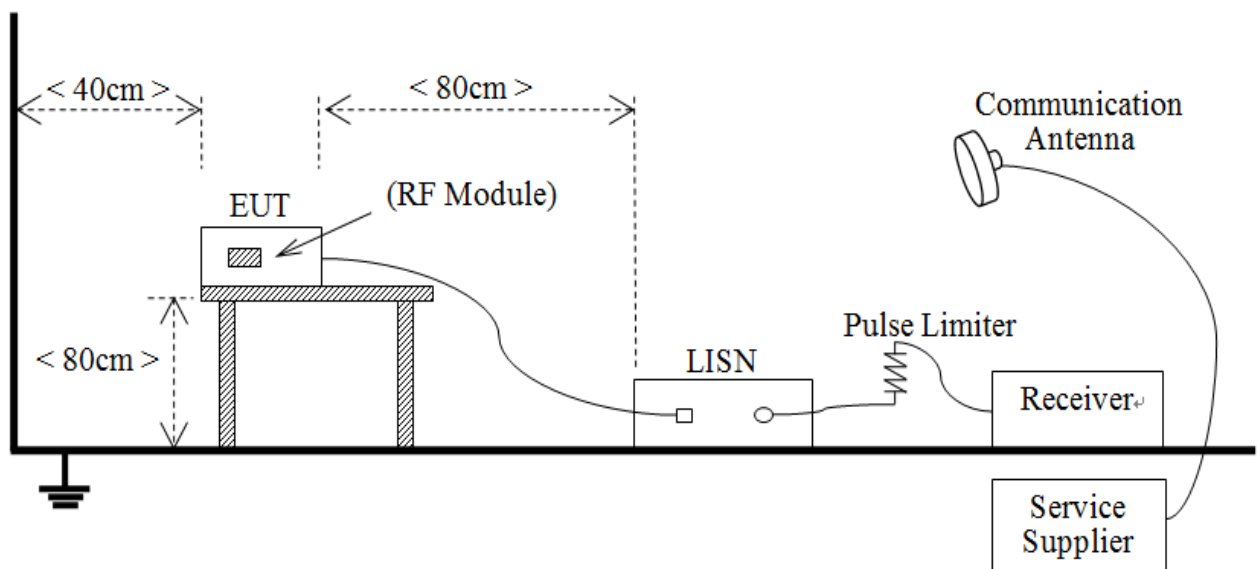
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



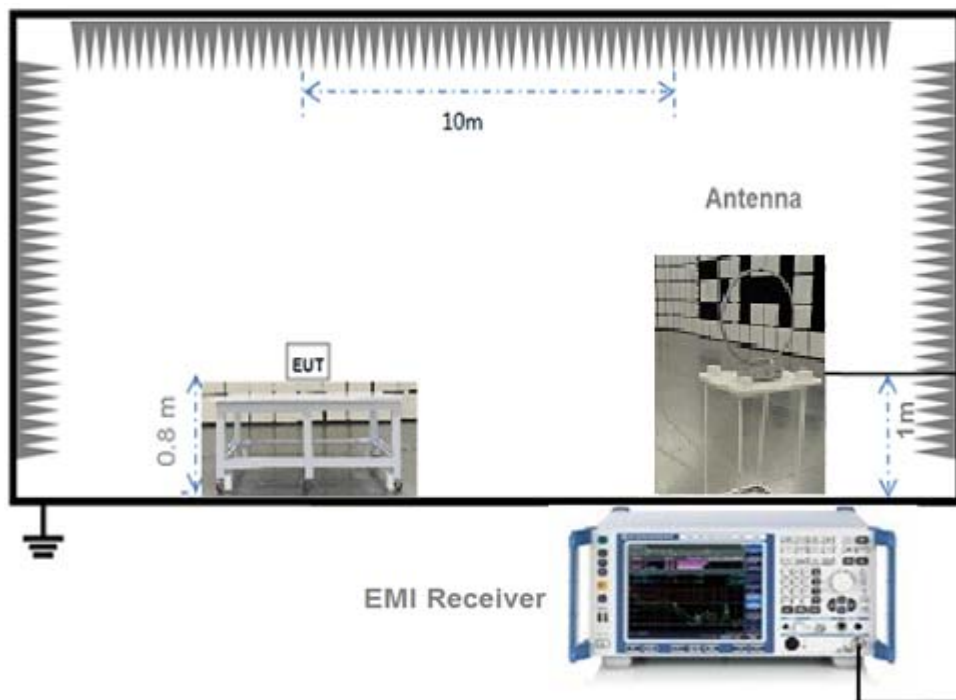
(Diagram 1)

4.4.2 For AC Power Supply Port Test



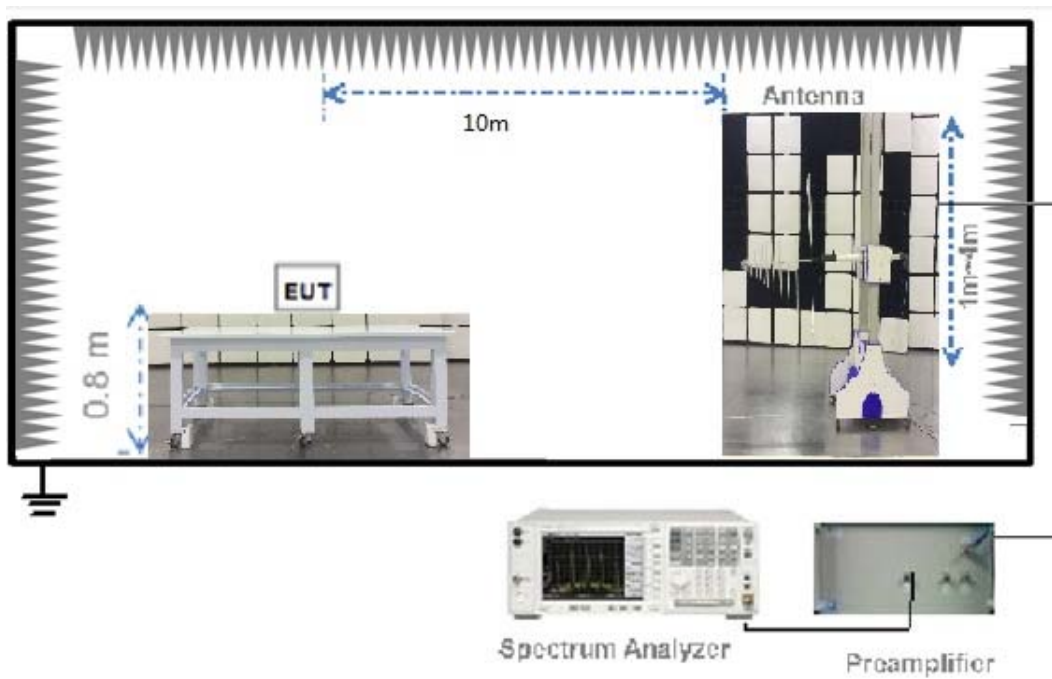
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



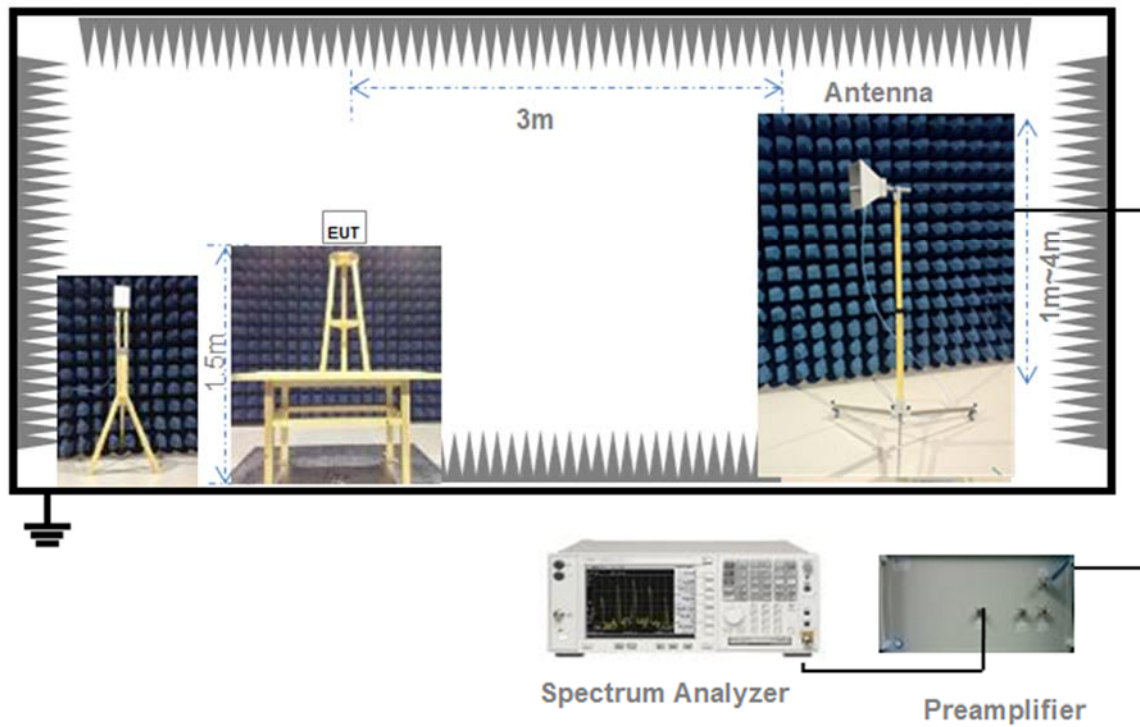
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.5 Measurement Results Explanation Example

4.5.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

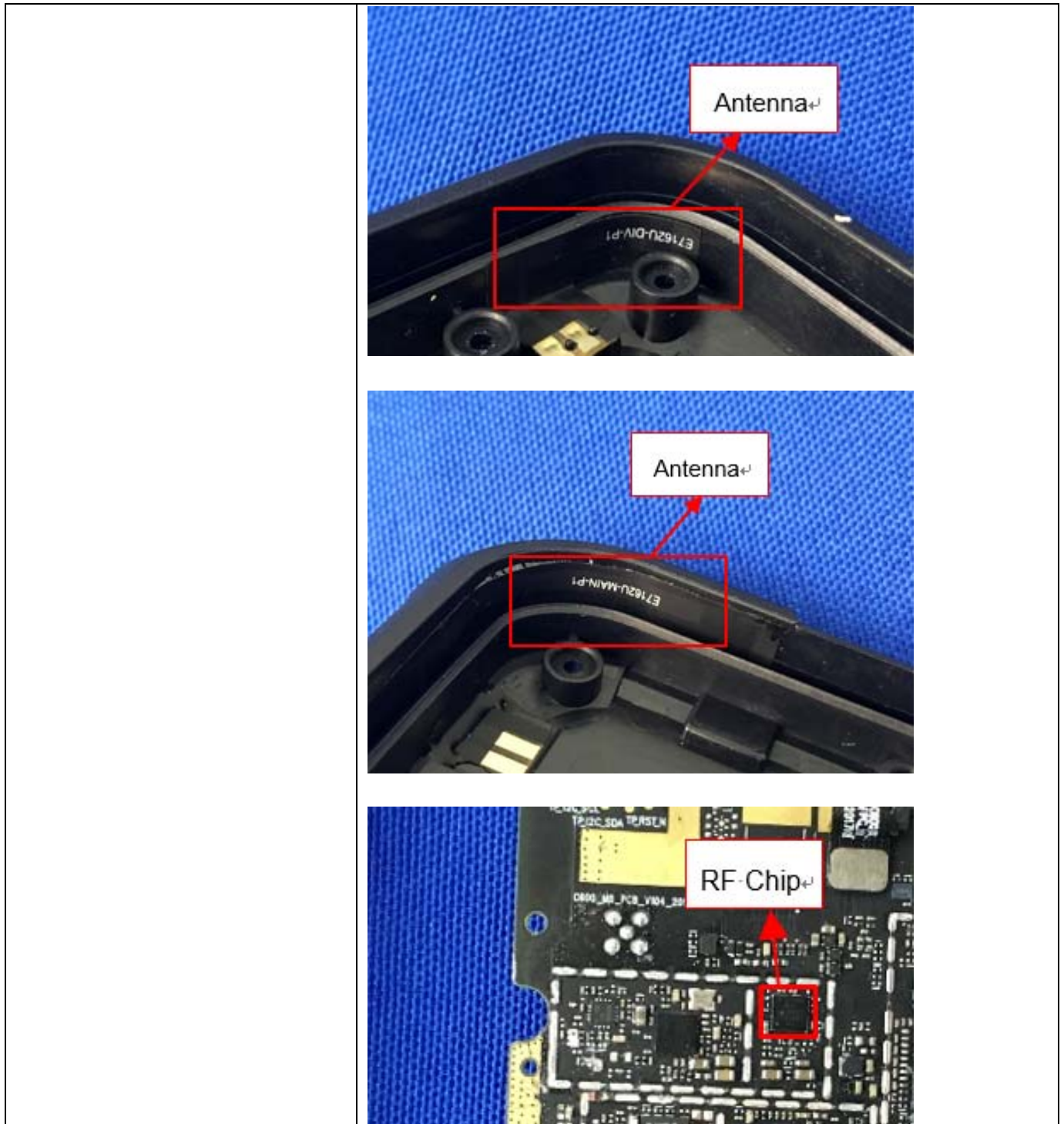
If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The 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 FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	The antenna is welded on the mainboard, can't be replaced by the consumer

Reference Documents	Item
Photo	



5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Number of Hopping Frequencies

5.2.1 Limit

FCC §15.247(a) (1) (iii); RSS-247, 5.1 (4)

Frequency hopping systems operating in the 2400 MHz to 2483.5 MHz bands shall use at least 15 hopping frequencies.

5.2.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

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 $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Peak Output Power and E.I.R.P

5.3.1 Test Limit

FCC § 15.247(b)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247, 5.4 (2)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels (see Section 5.4(5) for exceptions).

5.3.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a); RSS-247, 5.1 (1)

Measurement of the 20dB bandwidth of the modulated signal.

5.4.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW = in the range of 1% to 5% of the OBW

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate, Allow the trace to stabilize.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a); RSS-247, 5.1 (2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

5.5.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) $\geq$ 1% of the span

Video (or Average) Bandwidth (VBW) $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a); RSS-247, 5.1 (4)

Frequency hopping systems in the 2400 MHz - 2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

5.6.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

Span: Zero span, centered on a hopping channel

RBW shall be $\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel

Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel

Detector function: Peak

Trace: Max hold

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

The average time of occupancy on any channel within the Period can be calculated with formulas:

For GFSK and 8-DPSK:

For DH1 package type

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (1600 / 2) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

For DH3 package type

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (1600 / 4) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

For DH5 package type

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (1600 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

For AFH Mode:

For DH1 package type

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (800 / 2) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

For DH3 package type

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (800 / 4) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

For DH5 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (800 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

{Period} = 0.4 s * {Number of Hopping Frequency}

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

5.6.4 Test Result

Please refer to ANNEX A.5

5.7 Conducted Spurious Emission & Authorized-band band-edge

5.7.1 Limit

FCC §15.247(d); RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.7.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW = 300 kHz

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207; RSS-GEN, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.8.2 Test Setup

See section 4.4.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: $54\text{dB}\mu\text{V/m}@3\text{m}$ (AV) and $74\text{dB}\mu\text{V/m}@3\text{m}$ (PK).

5.9.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360° , and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1 \text{ GHz}$, 100 kHz for $f < 1 \text{ GHz}$

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, 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.

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d)

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.10.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.10.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, 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.

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

A.1 Number of Hopping Frequency

Note: Number of Hopping Frequency result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.1 Number of Hopping Frequency.

A.2 Peak Output Power and E.I.R.P

Note: Peak Output Power and E.I.R.P result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.2 Peak Output Power and E.I.R.P.

A.3 20 dB and 99% bandwidth

Note: 20 dB and 99% bandwidth result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.3 20 dB and 99% bandwidth.

A.4 Hopping Frequency Separation

Note: Hopping Frequency Separation result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.4 Hopping Frequency Separation.

A.5 Average Time of Occupancy

Note: Average Time of Occupancy result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.5 Average Time of Occupancy.

A.6 Conducted Spurious Emissions & Authorized-band band-edge

Note: Conducted Spurious Emissions & Authorized-band band-edge result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.6 Conducted Spurious Emissions & Authorized-band band-edge.

A.7 Conducted Emissions

Note: Conducted Emissions result reference from original test report: BL-EC17C0360-601 (issued by Shenzhen BALUN Technology Co., Ltd. On Mar. 20, 2018) A.7 Conducted Emissions.

A.8 Radiated Spurious Emission

Test Data and Plots

Note¹: The symbol of “--” in the table which means not application.

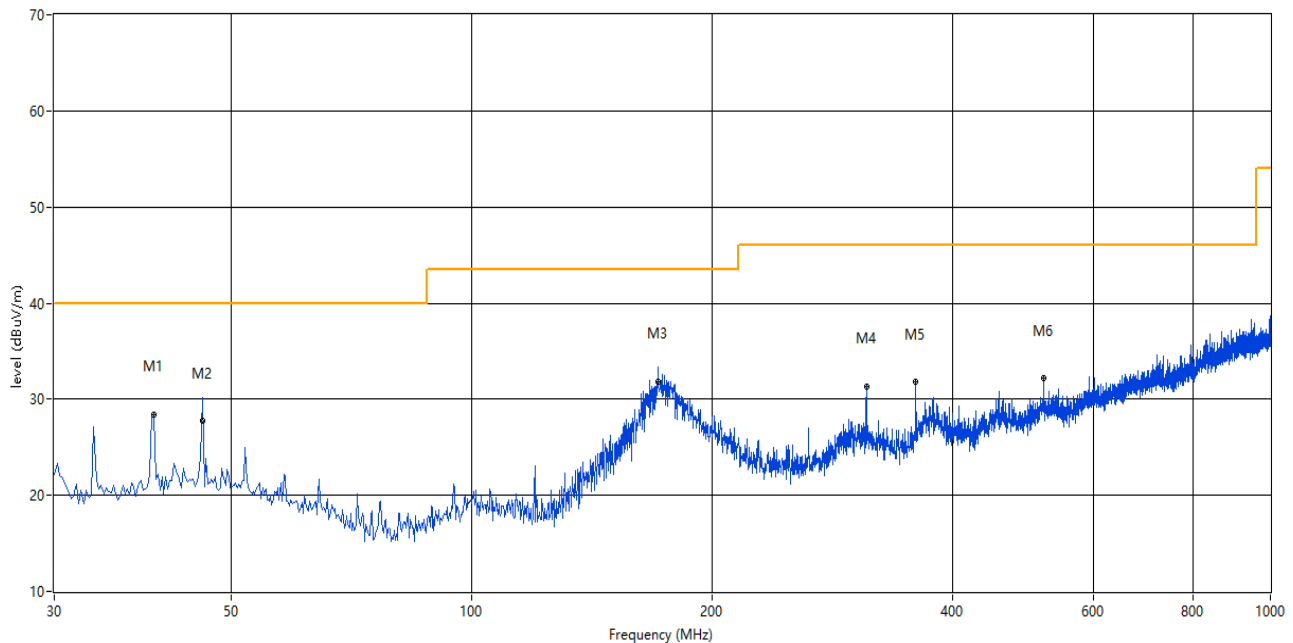
Note²: For the test data above 1 GHz, according the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note³: The EUT is working in the Normal link mode below 1 GHz.

Note⁴: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

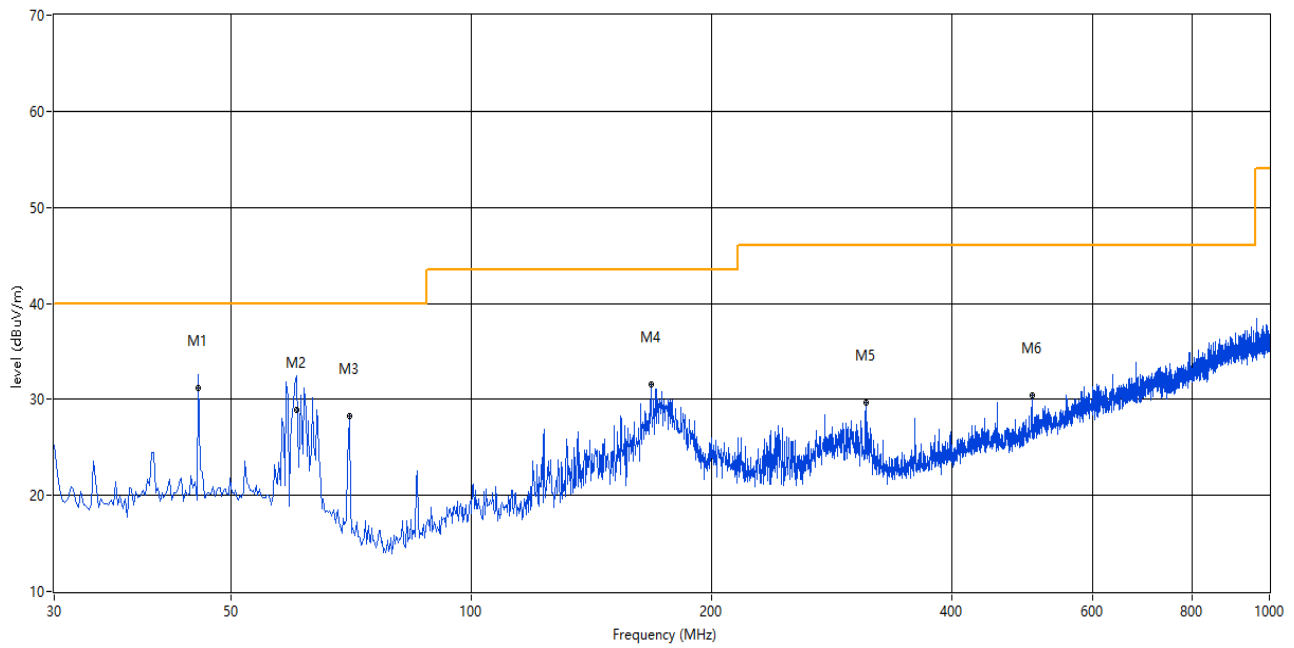
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

GFSK 30 MHz to 1 GHz, ANT V



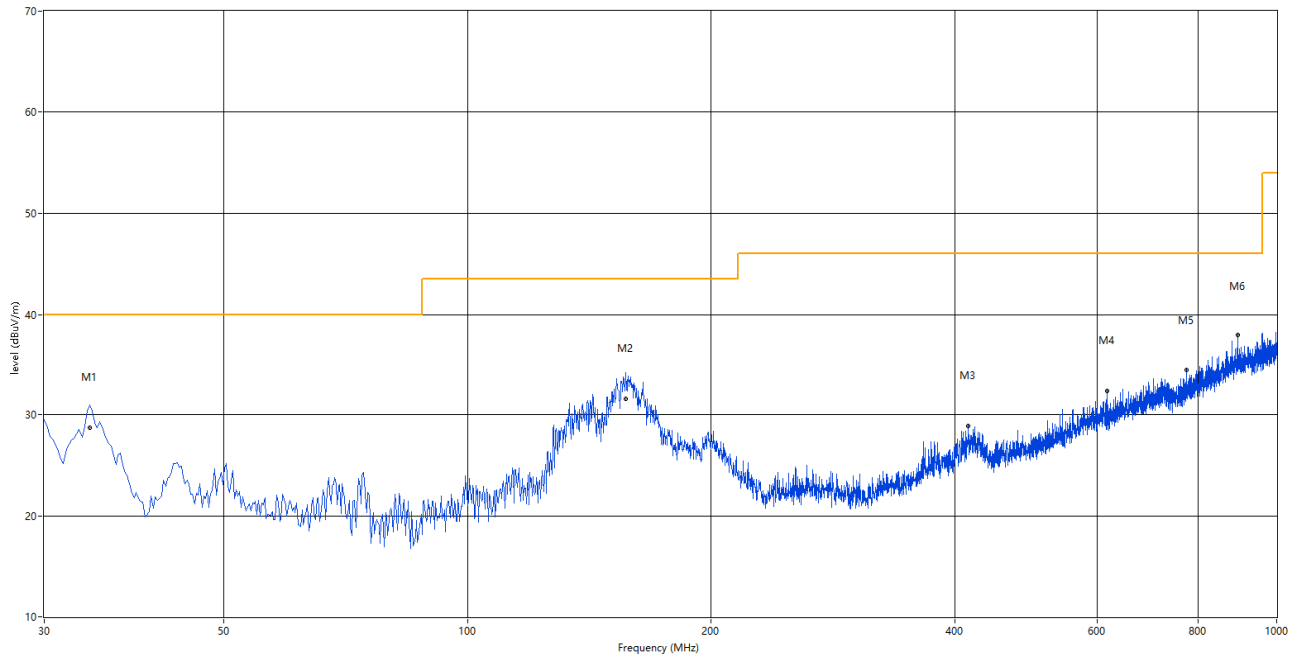
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
39.940	28.41	--	--	-27.34	--	40.0	--	11.59	147.70	150	Vertical	Pass
46.001	30.18	27.79	--	-26.48	--	40.0	--	12.21	174.70	150	Vertical	Pass
170.857	33.39	31.78	--	-31.09	--	43.5	--	11.72	34.60	150	Vertical	Pass
311.957	31.36	--	--	-26.44	--	46.0	--	14.64	305.90	150	Vertical	Pass
359.960	31.80	--	--	-25.15	--	46.0	--	14.20	75.30	150	Vertical	Pass
519.728	32.24	--	--	-21.15	--	46.0	--	13.76	118.10	150	Vertical	Pass

GFSK 30 MHz to 1 GHz, ANT H



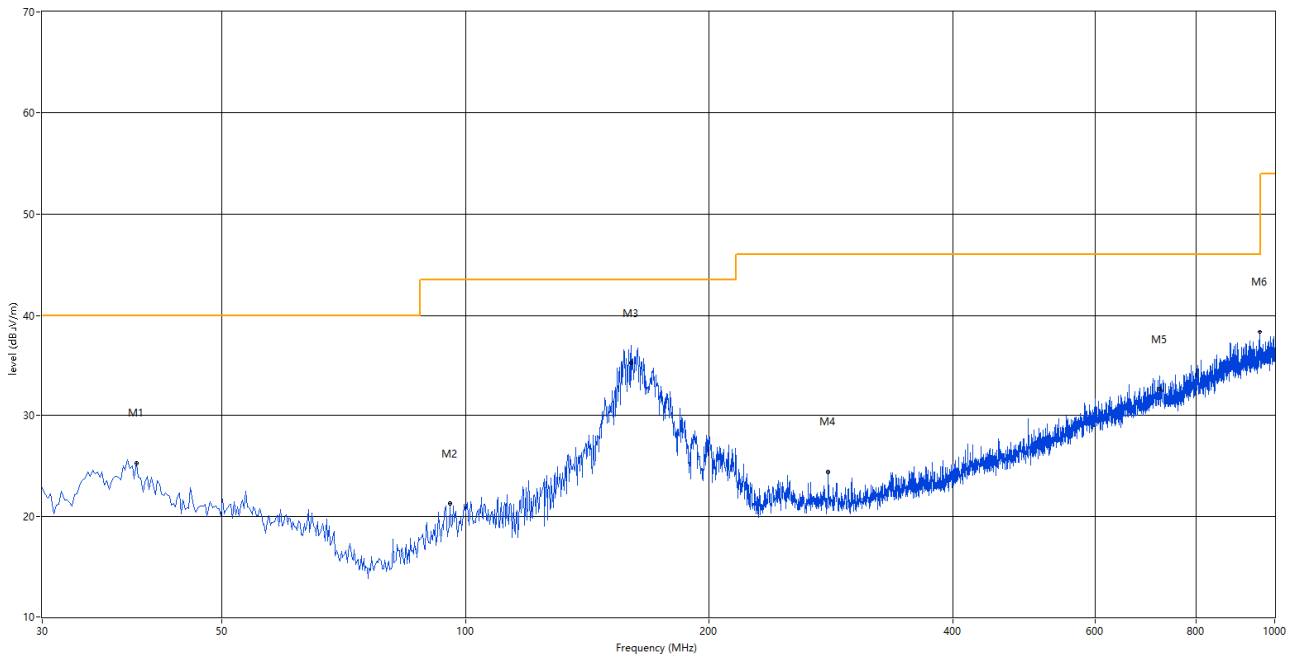
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
45.516	32.57	31.18	--	-26.49	--	40.0	--	8.82	279.00	150	Horizontal	Pass
60.305	32.40	28.86	--	-28.47	--	40.0	--	11.14	127.30	150	Horizontal	Pass
70.245	28.24	--	--	-31.06	--	40.0	--	11.76	21.80	150	Horizontal	Pass
167.948	31.63	--	--	-31.22	--	43.5	--	11.87	16.60	150	Horizontal	Pass
311.957	29.61	--	--	-26.44	--	46.0	--	16.39	333.40	150	Horizontal	Pass
503.727	30.38	--	--	-21.77	--	46.0	--	15.62	62.50	150	Horizontal	Pass

8-DPSK 30 MHz to 1 GHz, ANT V



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
34.121	30.96	28.71	--	-28.53	--	40.0	--	11.29	95.40	150	Vertical	Pass
157.038	34.19	31.57	--	-31.67	--	43.5	--	11.93	68.50	150	Vertical	Pass
415.479	28.85	--	--	-23.59	--	46.0	--	17.15	308.90	150	Vertical	Pass
616.703	32.33	--	--	-18.69	--	46.0	--	13.67	317.10	150	Vertical	Pass
774.046	34.38	--	--	-16.05	--	46.0	--	11.62	298.00	150	Vertical	Pass
894.296	37.85	--	--	-13.55	--	46.0	--	8.15	192.50	150	Vertical	Pass

8-DPSK 30 MHz to 1 GHz, ANT H



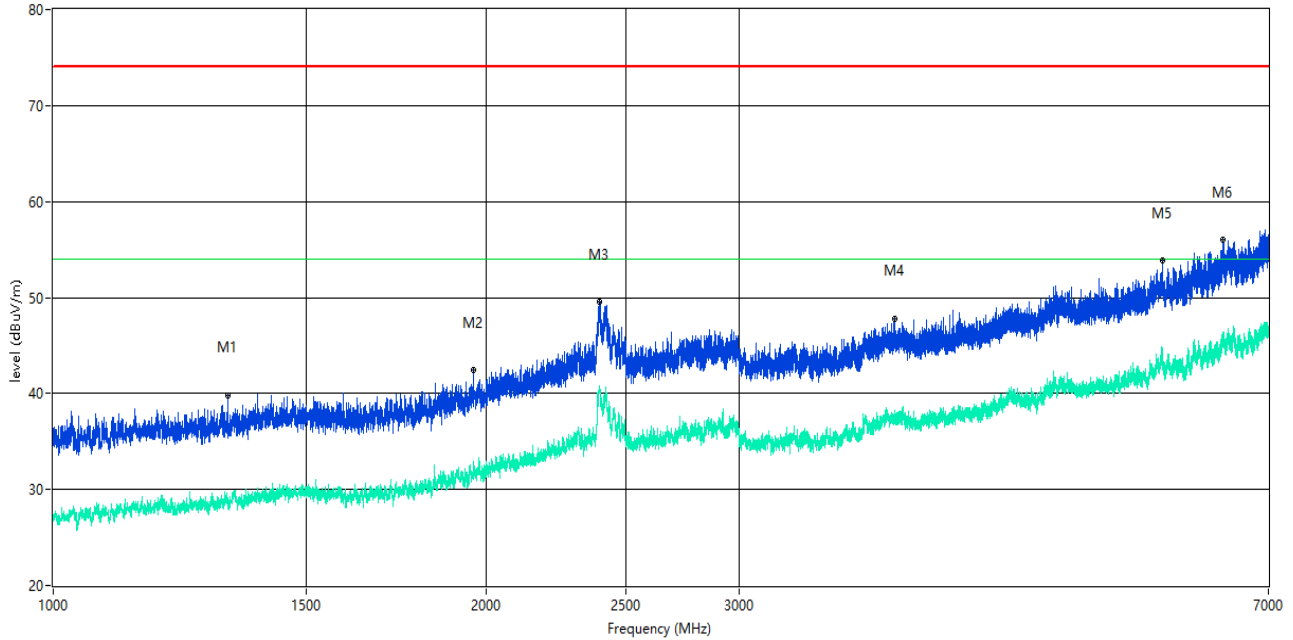
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
39.213	25.27	--	--	-27.41	--	40.0	--	14.73	121.80	150	Horizontal	Pass
95.701	21.25	--	--	-29.34	--	43.5	--	22.25	43.00	150	Horizontal	Pass
160.190	36.89	35.20	--	-31.52	--	43.5	--	8.30	24.20	150	Horizontal	Pass
280.925	24.39	--	--	-26.76	--	46.0	--	21.61	29.60	150	Horizontal	Pass
720.952	33.87	32.64	--	-17.03	--	46.0	--	13.36	194.90	150	Horizontal	Pass
958.785	38.30	--	--	-12.87	--	46.0	--	7.70	40.20	150	Horizontal	Pass

Test Data and Plots (1 GHz ~ 10th Harmonic)

Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

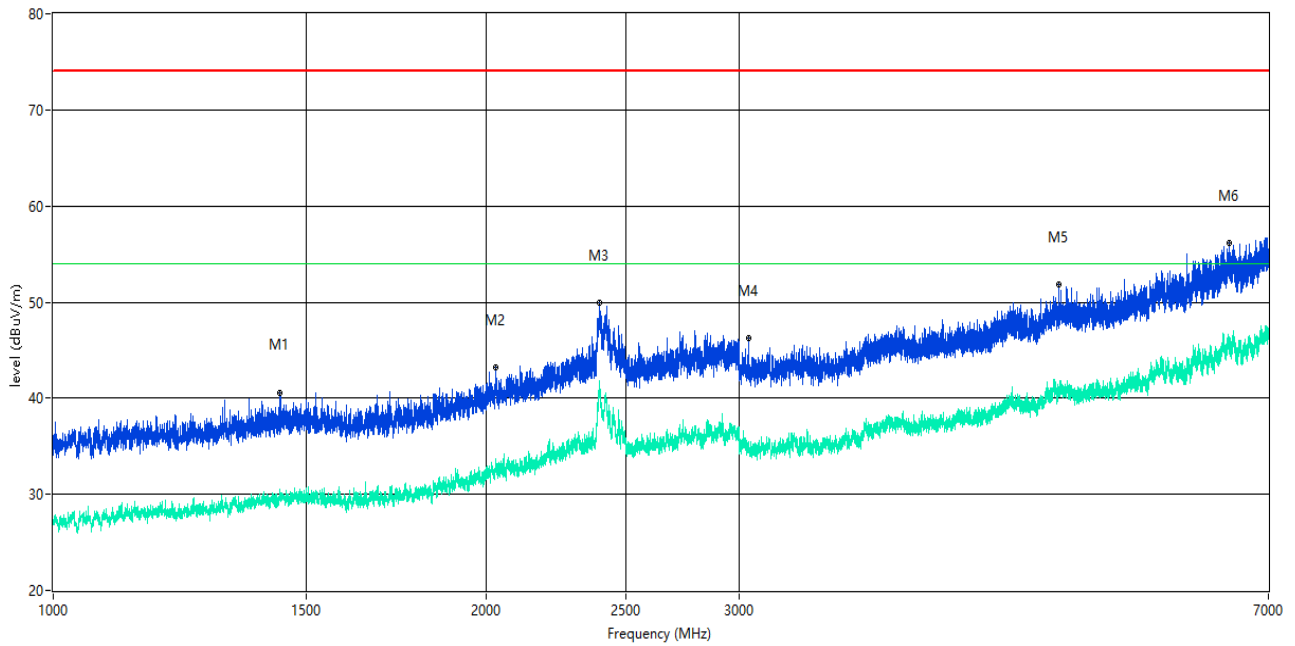
Note 2: The spurious from 18GHz-25GHz is noise only, do not show on the report.

GFSK LOW CHANNEL 1 GHz to 7 GHz, ANT V



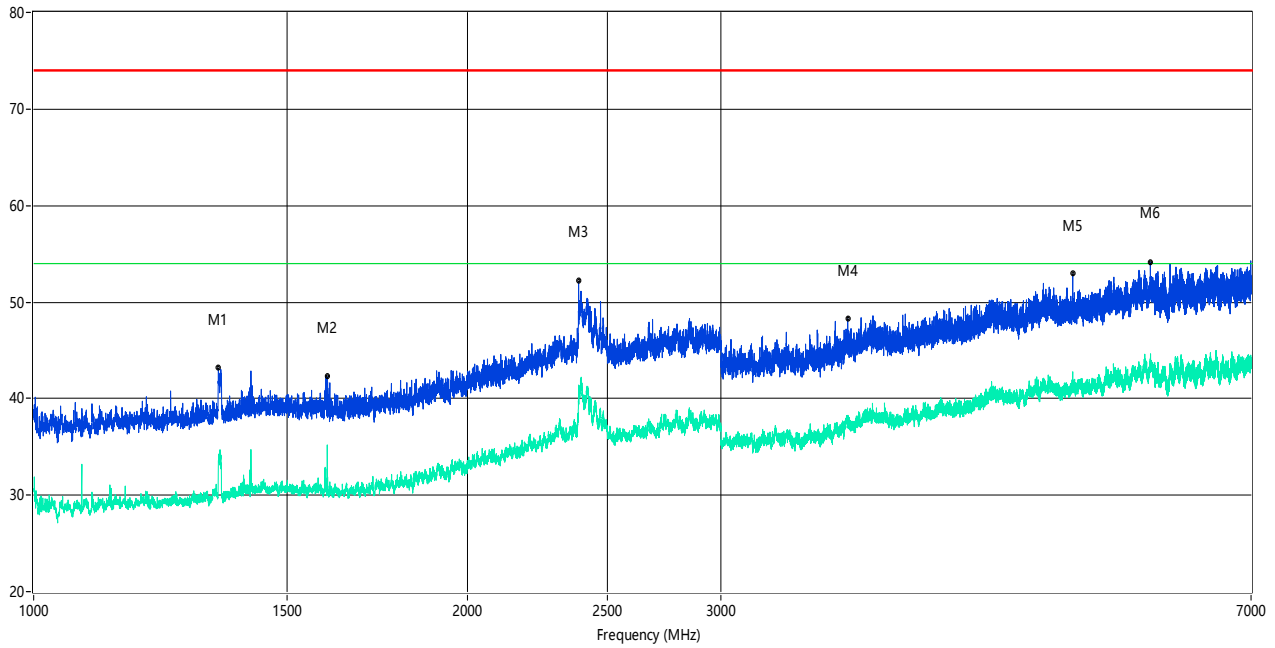
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1323.210	39.78	--	28.7	-12.71	74.0	--	54.0	25.30	256.00	150	Vertical	Pass
1960.630	42.44	--	32.9	-9.18	74.0	--	54.0	21.10	313.00	150	Vertical	Pass
2397.575	49.53	--	40.6	-0.02	74.0	--	54.0	13.40	139.00	150	Vertical	Pass
3848.519	47.75	--	37.9	-3.01	74.0	--	54.0	16.10	130.00	150	Vertical	Pass
5904.387	53.83	--	44.8	4.43	74.0	--	54.0	9.20	209.00	150	Vertical	Pass
6509.561	56.09	--	45.6	8.14	74.0	--	54.0	8.40	214.00	150	Vertical	Pass

GFSK LOW CHANNEL 1 GHz to 7 GHz, ANT H



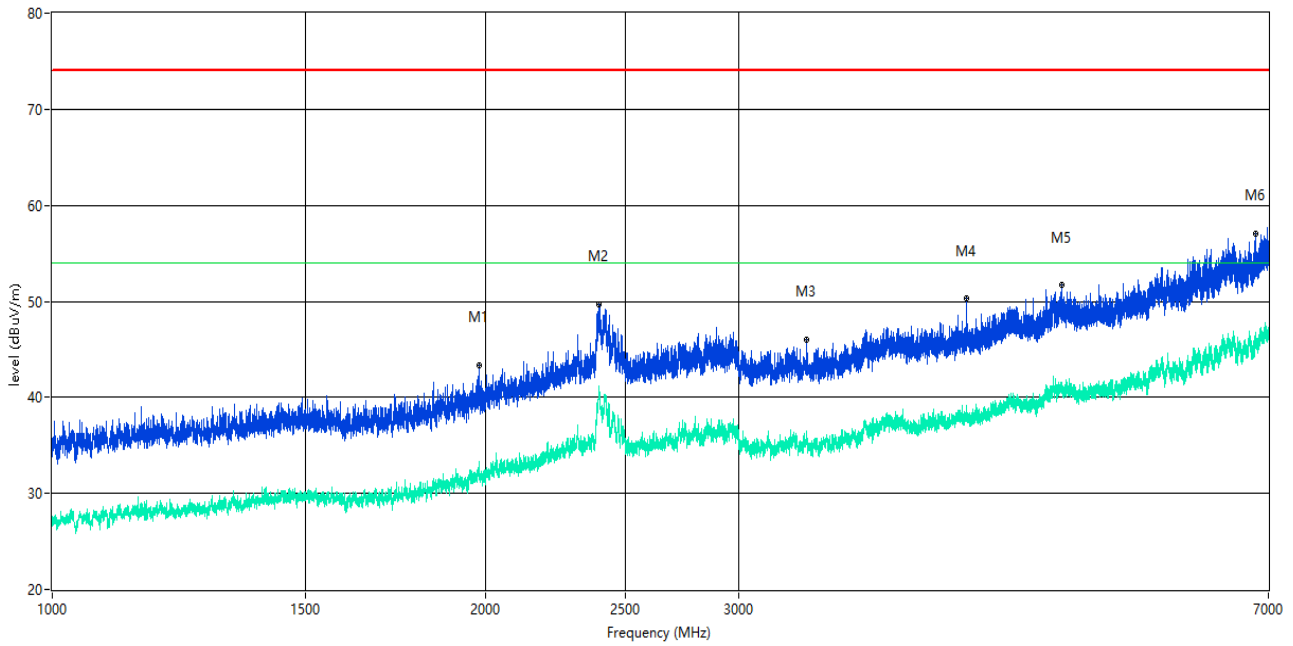
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1437.945	40.51	--	29.8	-11.78	74.0	--	54.0	24.20	120.00	150	Horizontal	Pass
2029.871	43.27	--	32.6	-8.13	74.0	--	54.0	21.40	340.00	150	Horizontal	Pass
2398.075	49.90	--	41.8	-0.03	74.0	--	54.0	12.20	147.00	150	Horizontal	Pass
3046.494	46.24	--	35.5	-5.12	74.0	--	54.0	18.50	134.00	150	Horizontal	Pass
5005.624	51.83	--	40.9	0.87	74.0	--	54.0	13.10	201.00	150	Horizontal	Pass
6577.553	56.17	--	45.4	7.81	74.0	--	54.0	8.60	280.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 7 GHz, ANT V



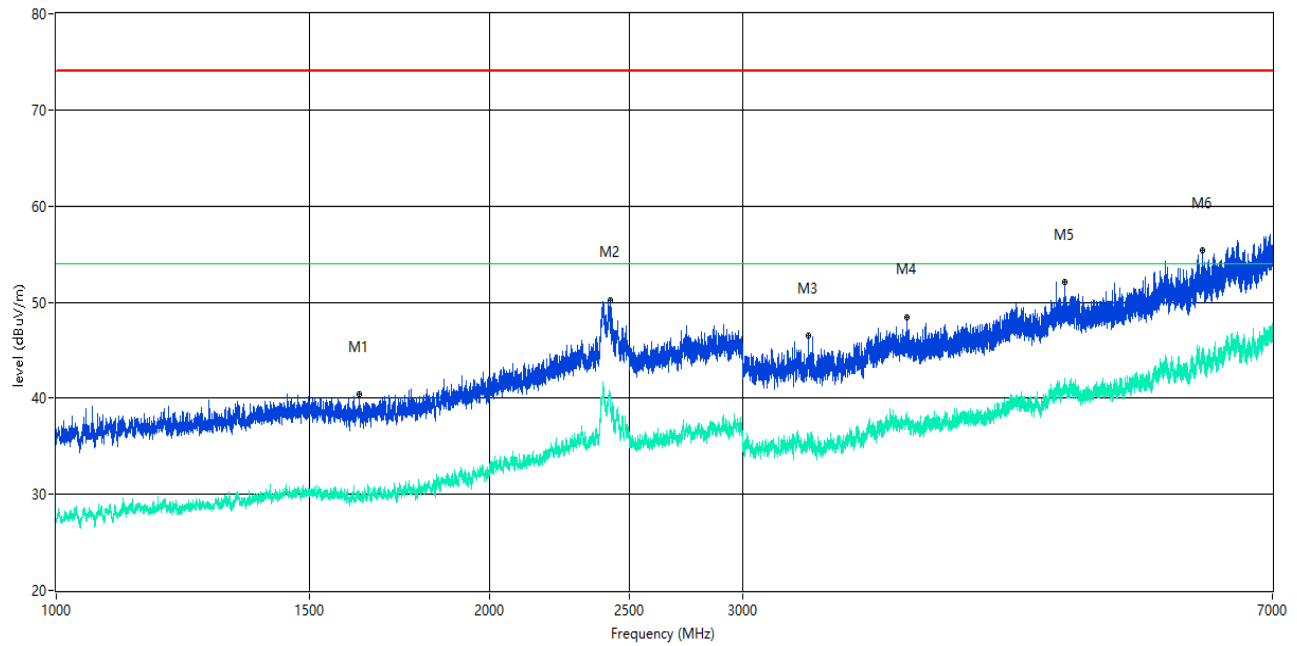
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1343.457	43.15	--	33.6	-12.53	74.0	--	54.0	20.40	328.00	150	Vertical	Pass
1598.925	42.28	--	35.2	-12.51	74.0	--	54.0	18.80	277.00	150	Vertical	Pass
2389.576	52.16	--	41.4	-1.63	74.0	--	54.0	12.60	113.00	150	Vertical	Pass
3673.416	48.28	--	37.6	-3.30	74.0	--	54.0	16.40	78.00	150	Vertical	Pass
5263.217	52.92	--	42.8	1.57	74.0	--	54.0	11.20	340.00	150	Vertical	Pass
5959.130	54.09	--	44.2	4.07	74.0	--	54.0	9.80	52.00	150	Vertical	Pass

GFSK MIDDLE CHANNEL 1 GHz to 7 GHz, ANT H



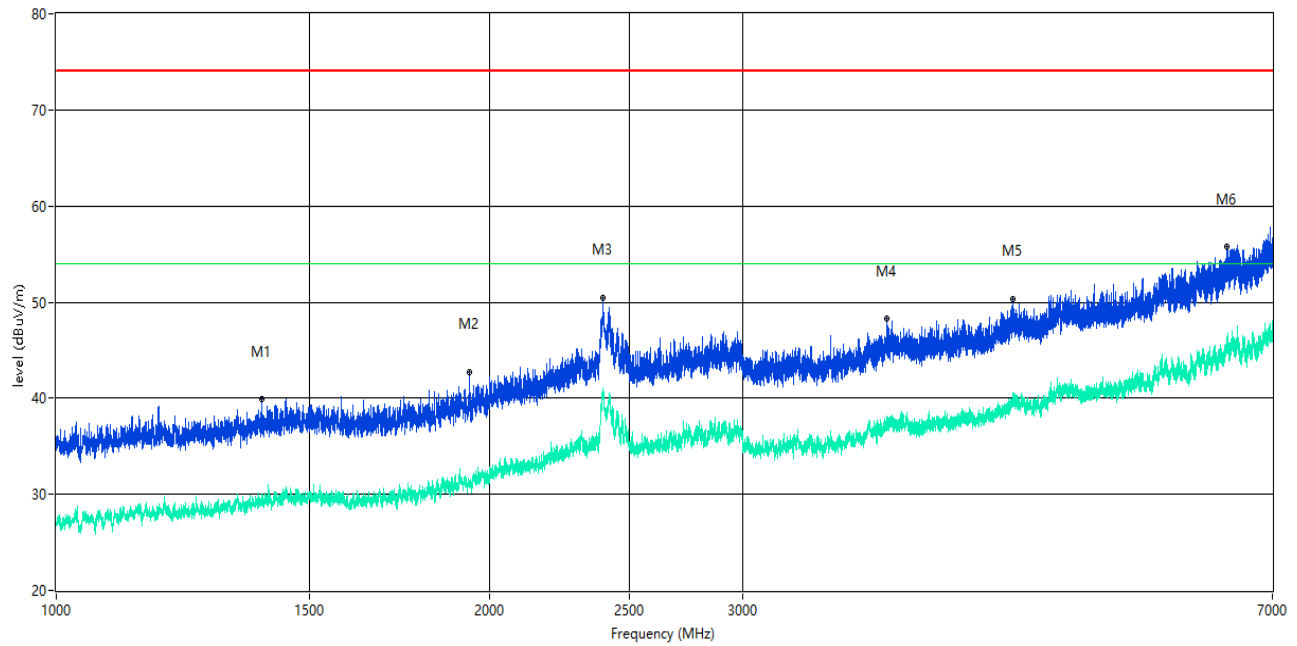
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1978.378	43.37	--	33.3	-8.52	74.0	--	54.0	20.70	136.00	150	Horizontal	Pass
2398.075	49.63	--	40.9	-0.03	74.0	--	54.0	13.10	300.00	150	Horizontal	Pass
3343.457	46.00	--	36.0	-4.86	74.0	--	54.0	18.00	122.00	150	Horizontal	Pass
4316.460	50.30	--	39.1	-2.05	74.0	--	54.0	14.90	3.00	150	Horizontal	Pass
5027.747	51.69	--	40.7	0.84	74.0	--	54.0	13.30	263.00	150	Horizontal	Pass
6859.268	56.98	--	45.8	7.85	74.0	--	54.0	8.20	206.00	150	Horizontal	Pass

GFSK HIGH CHANNEL 1 GHz to 7 GHz, ANT V



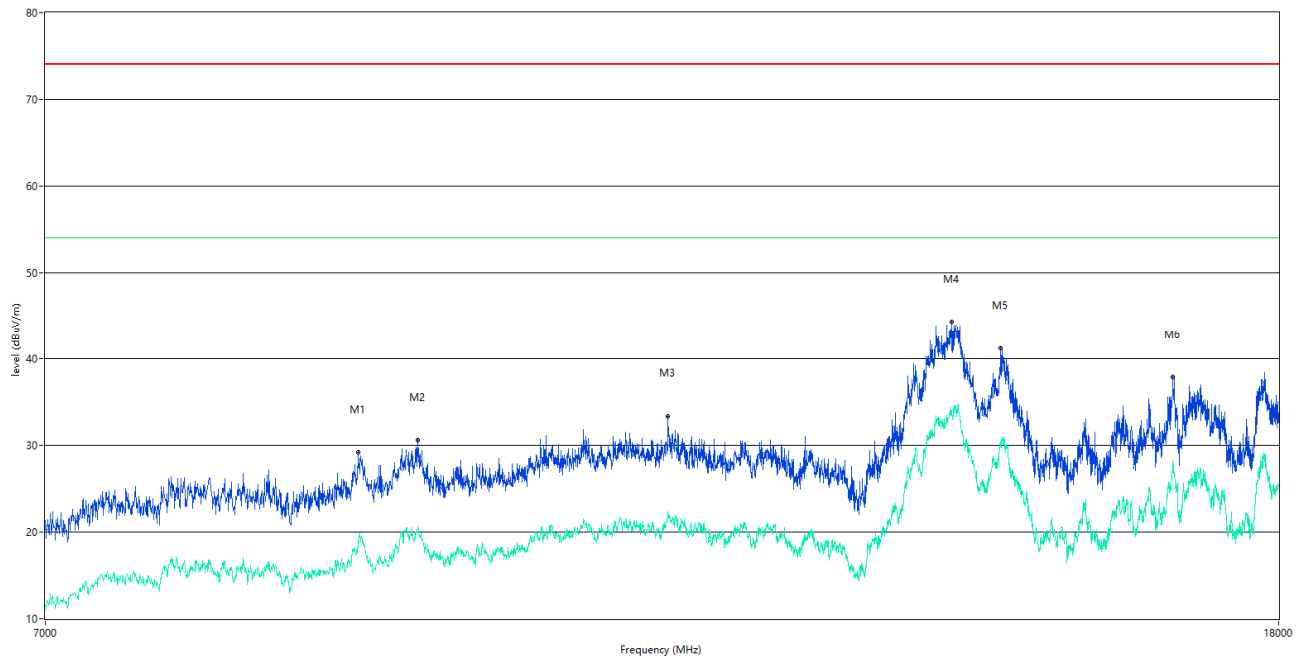
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1625.172	40.39	--	30.3	-12.02	74.0	--	54.0	23.70	5.00	150	Vertical	Pass
2425.072	50.14	--	40.6	-0.96	74.0	--	54.0	13.40	163.00	150	Vertical	Pass
3331.459	46.55	--	35.5	-4.63	74.0	--	54.0	18.50	96.00	150	Vertical	Pass
3900.262	48.45	--	37.9	-2.35	74.0	--	54.0	16.10	118.00	150	Vertical	Pass
5017.998	52.10	--	41.4	0.97	74.0	--	54.0	12.60	49.00	150	Vertical	Pass
6261.092	55.36	--	44.3	5.91	74.0	--	54.0	9.70	90.00	150	Vertical	Pass

GFSK HIGH CHANNEL 1 GHz to 7 GHz, ANT H



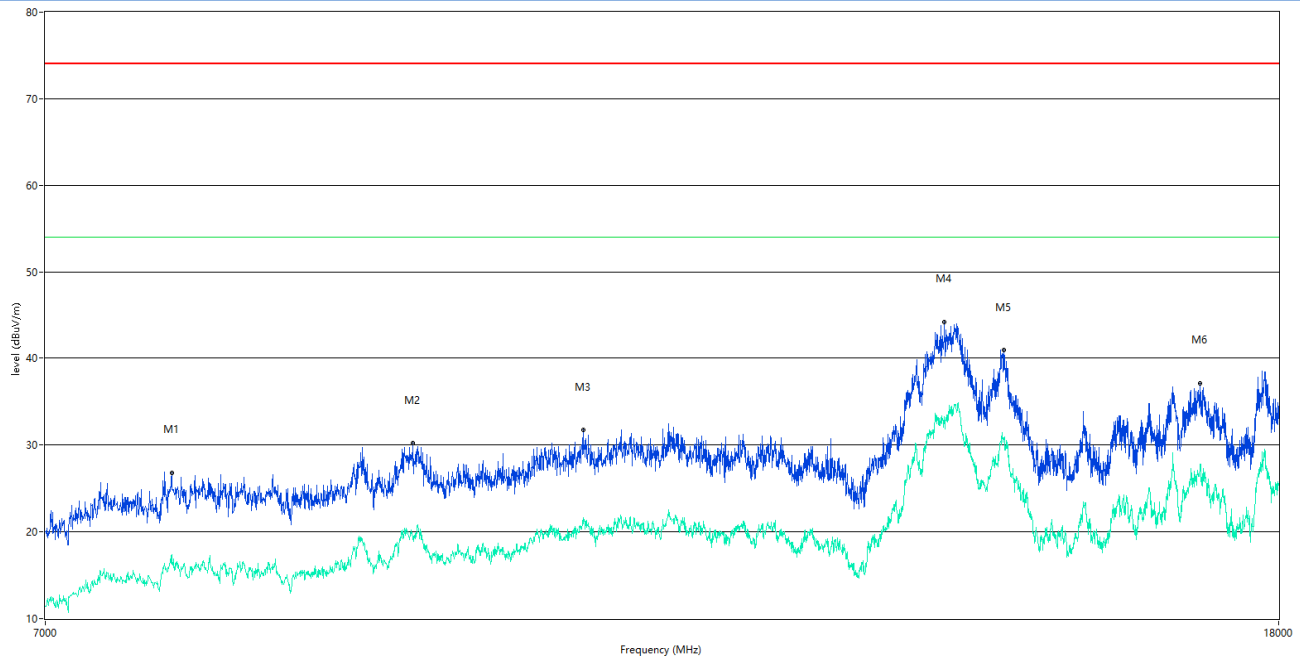
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1388.451	39.85	--	29.5	-11.93	74.0	--	54.0	24.50	116.00	150	Horizontal	Pass
1936.383	42.71	--	31.3	-9.48	74.0	--	54.0	22.70	28.00	150	Horizontal	Pass
2397.575	50.43	--	40.7	-0.02	74.0	--	54.0	13.30	303.00	150	Horizontal	Pass
3776.903	48.27	--	37.5	-2.56	74.0	--	54.0	16.50	280.00	150	Horizontal	Pass
4622.797	50.27	--	39.3	0.24	74.0	--	54.0	14.70	251.00	150	Horizontal	Pass
6507.437	55.81	--	46.4	8.04	74.0	--	54.0	7.60	271.00	150	Horizontal	Pass

GFSK LOW CHANNEL 7 GHz to 18 GHz, ANT V



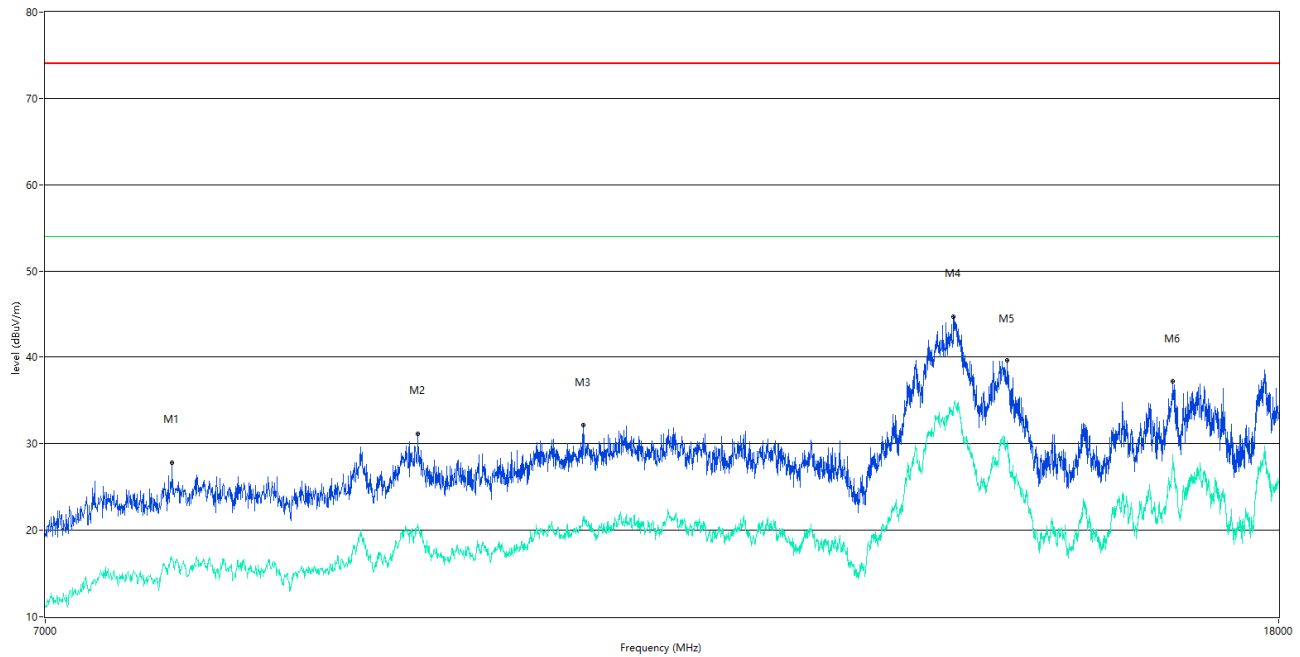
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8894.276	29.21	--	18.7	-32.19	74.0	--	54.0	35.30	17.00	150	Vertical	Pass
9312.172	30.56	--	20.6	-31.06	74.0	--	54.0	33.40	66.00	150	Vertical	Pass
11277.931	33.38	--	22.3	-24.69	74.0	--	54.0	31.70	96.00	150	Vertical	Pass
14016.246	44.36	--	34.0	-6.92	74.0	--	54.0	20.00	189.00	150	Vertical	Pass
14546.863	41.23	--	30.0	-11.40	74.0	--	54.0	24.00	67.00	150	Vertical	Pass
16595.101	37.88	--	27.5	-10.68	74.0	--	54.0	26.50	305.00	150	Vertical	Pass

GFSK LOW CHANNEL 7 GHz to 18 GHz, ANT H



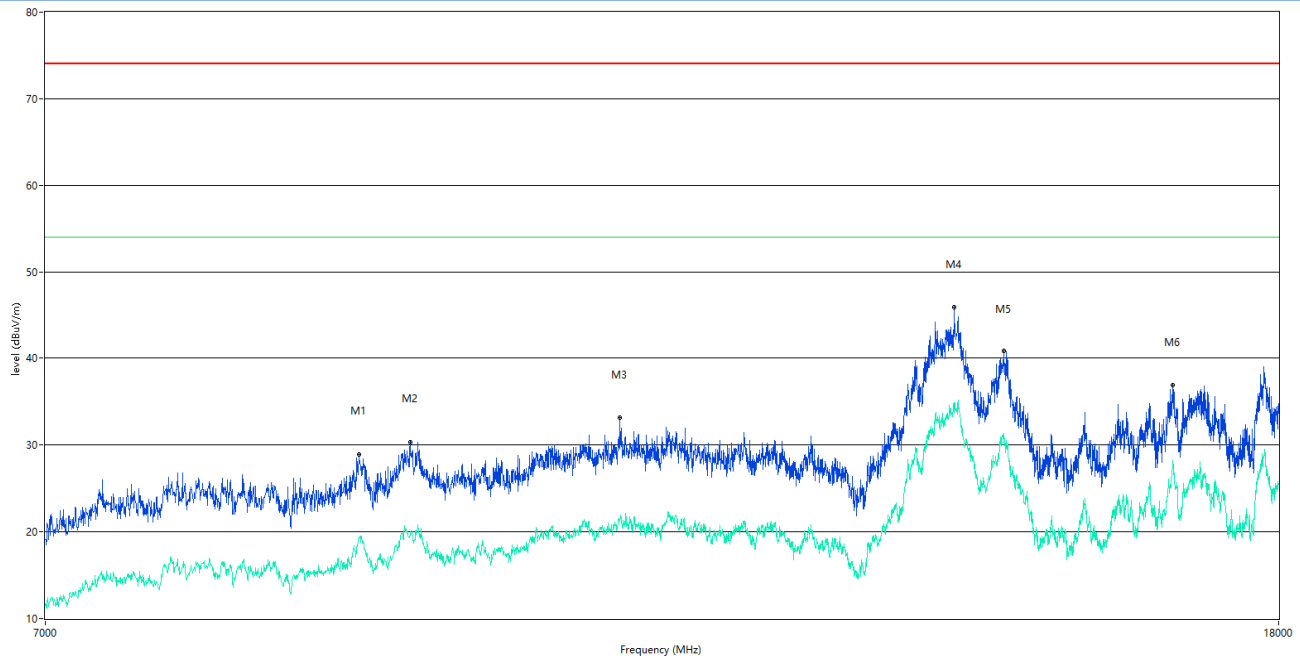
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7712.072	26.77	--	17.4	-35.81	74.0	--	54.0	36.60	18.00	150	Horizontal	Pass
9276.431	30.20	--	19.0	-31.36	74.0	--	54.0	35.00	244.00	150	Horizontal	Pass
10565.859	31.68	--	21.6	-26.47	74.0	--	54.0	32.40	334.00	150	Horizontal	Pass
13936.516	44.21	--	33.0	-8.06	74.0	--	54.0	21.00	5.00	150	Horizontal	Pass
14588.103	40.87	--	30.7	-10.79	74.0	--	54.0	23.30	233.00	150	Horizontal	Pass
16952.512	37.03	--	27.6	-10.39	74.0	--	54.0	26.40	220.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 7 GHz to 18 GHz, ANT V



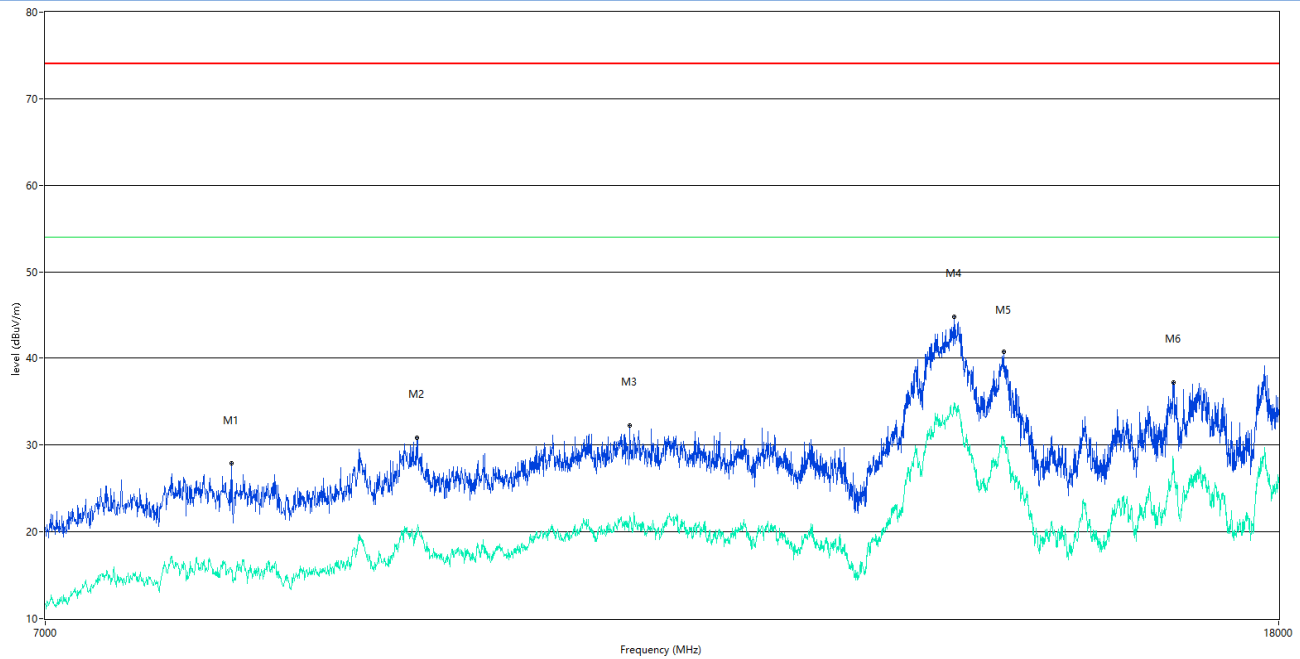
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7714.821	27.83	--	16.6	-35.77	74.0	--	54.0	37.40	229.00	150	Vertical	Pass
9312.172	31.14	--	20.3	-31.06	74.0	--	54.0	33.70	220.00	150	Vertical	Pass
10565.859	32.14	--	21.5	-26.47	74.0	--	54.0	32.50	198.00	150	Vertical	Pass
14032.742	44.72	--	34.2	-6.76	74.0	--	54.0	19.80	68.00	150	Vertical	Pass
14621.095	39.56	--	30.3	-11.26	74.0	--	54.0	23.70	339.00	150	Vertical	Pass
16597.851	37.13	--	28.7	-10.41	74.0	--	54.0	25.30	215.00	150	Vertical	Pass

GFSK MIDDLE CHANNEL 7 GHz to 18 GHz, ANT H



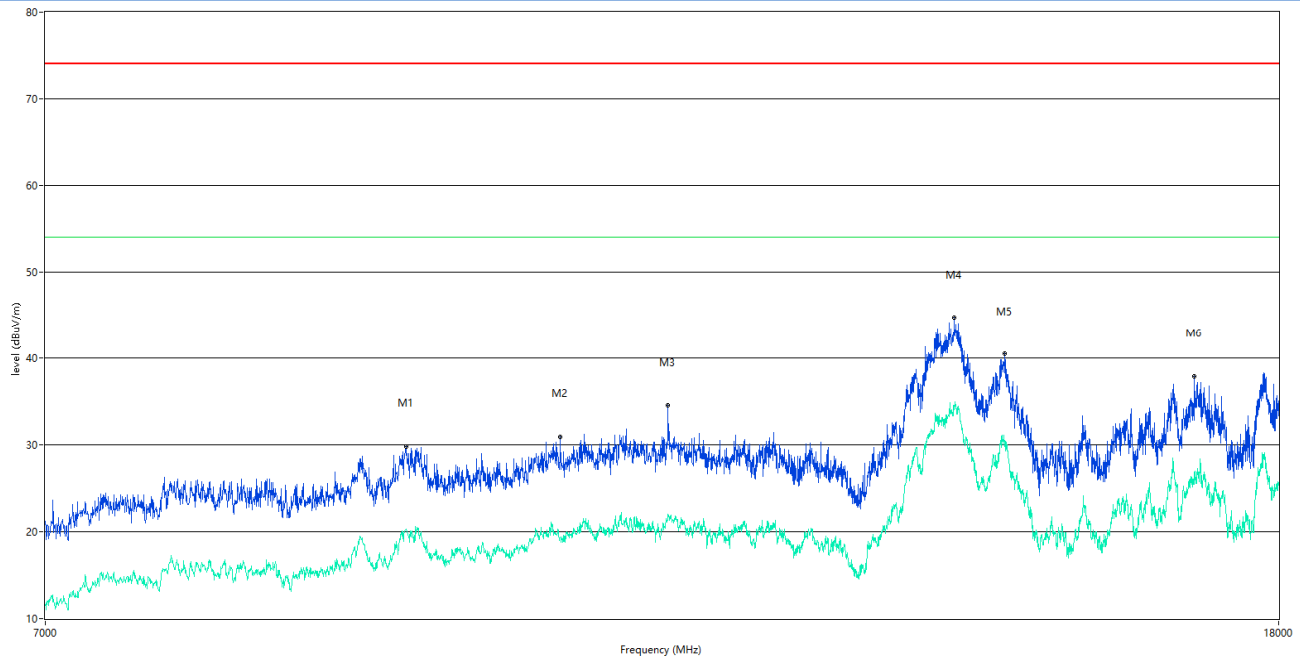
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8899.775	28.86	--	19.4	-32.30	74.0	--	54.0	34.60	27.00	150	Horizontal	Pass
9257.186	30.29	--	19.8	-31.50	74.0	--	54.0	34.20	218.00	150	Horizontal	Pass
10871.032	33.15	--	21.3	-25.59	74.0	--	54.0	32.70	262.00	150	Horizontal	Pass
14040.990	45.99	--	34.7	-6.76	74.0	--	54.0	19.30	347.00	150	Horizontal	Pass
14588.103	40.77	--	31.0	-10.79	74.0	--	54.0	23.00	178.00	150	Horizontal	Pass
16592.352	36.84	--	27.3	-10.81	74.0	--	54.0	26.70	218.00	150	Horizontal	Pass

GFSK HIGH CHANNEL 7 GHz to 18 GHz, ANT V



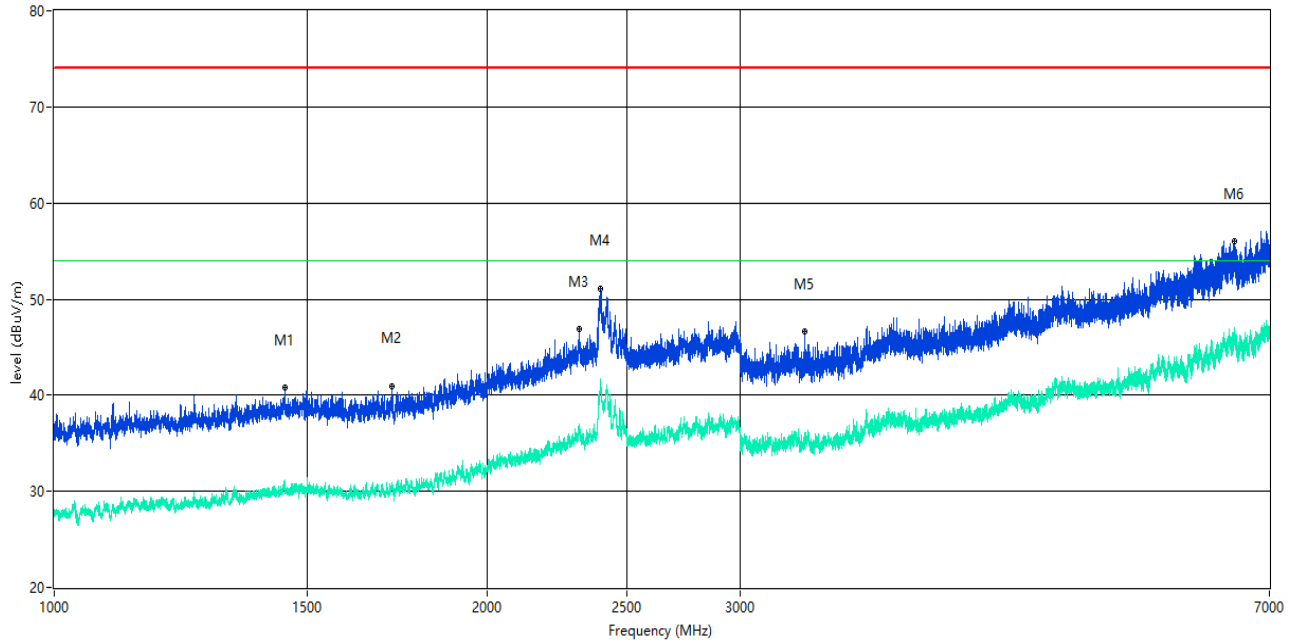
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8074.981	27.87	--	15.6	-35.76	74.0	--	54.0	38.40	112.00	150	Vertical	Pass
9306.673	30.76	--	20.4	-31.10	74.0	--	54.0	33.60	268.00	150	Vertical	Pass
10953.512	32.26	--	21.8	-24.66	74.0	--	54.0	32.20	166.00	150	Vertical	Pass
14038.240	44.85	--	34.7	-6.75	74.0	--	54.0	19.30	22.00	150	Vertical	Pass
14585.354	40.68	--	30.9	-10.86	74.0	--	54.0	23.10	109.00	150	Vertical	Pass
16603.349	37.21	--	28.4	-10.25	74.0	--	54.0	25.60	258.00	150	Vertical	Pass

GFSK HIGH CHANNEL 7 GHz to 18 GHz, ANT H



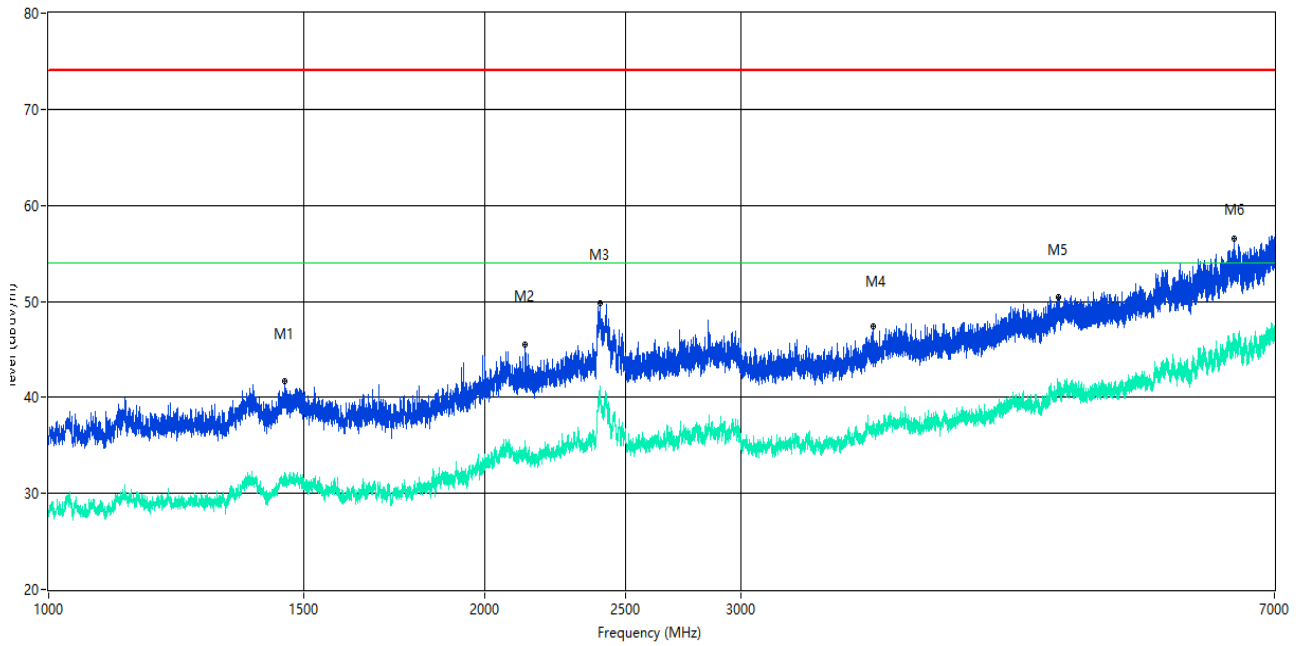
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9229.693	29.84	--	20.3	-32.07	74.0	--	54.0	33.70	79.00	150	Horizontal	Pass
10384.404	30.91	--	19.3	-27.82	74.0	--	54.0	34.70	197.00	150	Horizontal	Pass
11277.931	34.52	--	22.0	-24.69	74.0	--	54.0	32.00	343.00	150	Horizontal	Pass
14040.990	44.71	--	34.6	-6.76	74.0	--	54.0	19.40	263.00	150	Horizontal	Pass
14593.602	40.47	--	29.8	-10.75	74.0	--	54.0	24.20	75.00	150	Horizontal	Pass
16878.280	37.84	--	26.8	-12.54	74.0	--	54.0	27.20	315.00	150	Horizontal	Pass

8-DFS LOW CHANNEL 1 GHz to 7 GHz, ANT V



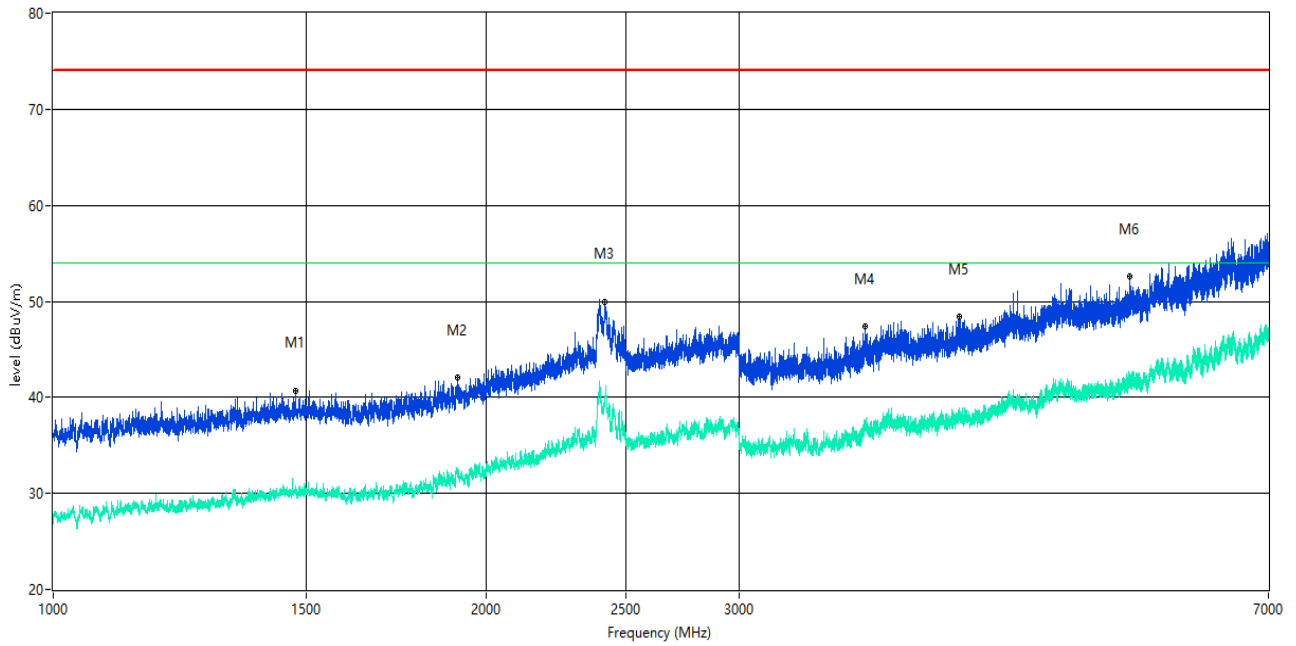
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1447.194	40.79	--	30.7	-11.66	74.0	--	54.0	23.30	12.00	150	Vertical	Pass
1718.410	40.96	--	30.6	-11.01	74.0	--	54.0	23.40	2.00	150	Vertical	Pass
2317.585	46.88	--	36.4	-4.20	74.0	--	54.0	17.60	132.00	150	Vertical	Pass
2398.575	51.07	--	41.2	-0.05	74.0	--	54.0	12.80	199.00	150	Vertical	Pass
3328.459	46.63	--	35.5	-4.63	74.0	--	54.0	18.50	263.00	150	Vertical	Pass
6620.297	56.08	--	46.1	7.90	74.0	--	54.0	7.90	198.00	150	Vertical	Pass

8-DFSK LOW CHANNEL 1 GHz to 7 GHz, ANT H



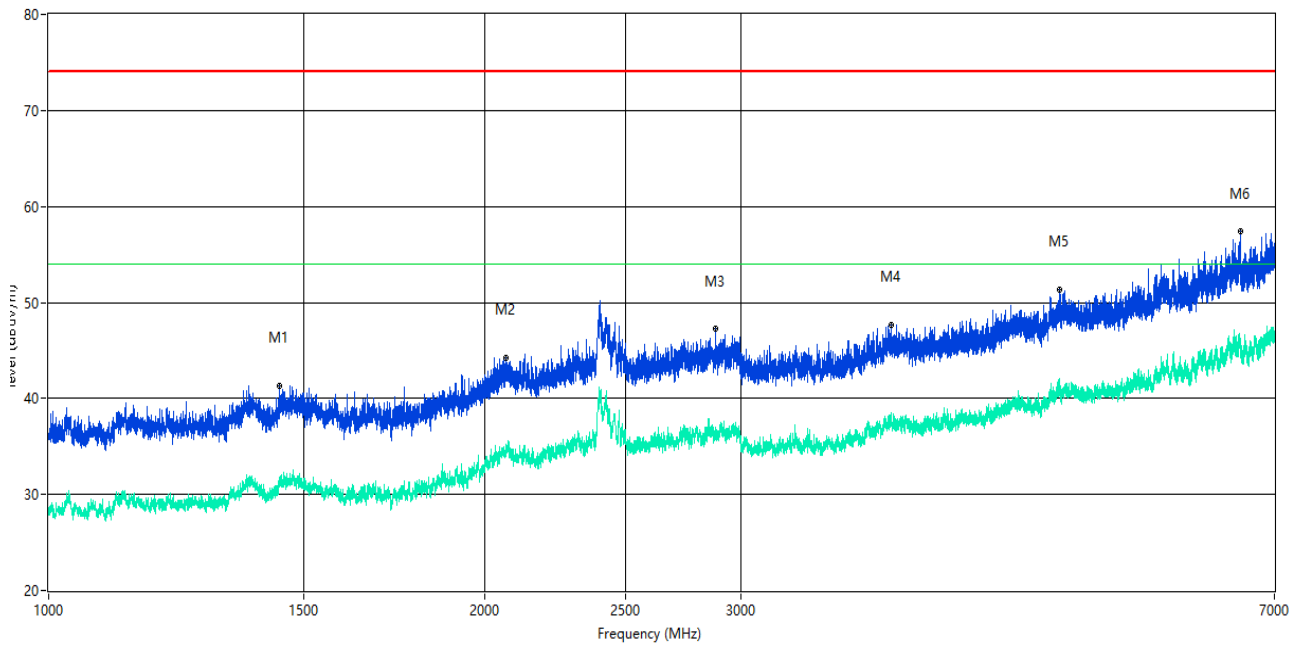
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1455.693	41.73	--	32.1	-11.81	74.0	--	54.0	21.90	178.00	150	Horizontal	Pass
2131.859	45.51	--	35.2	-7.51	74.0	--	54.0	18.80	151.00	150	Horizontal	Pass
2398.325	49.77	--	41.1	-0.04	74.0	--	54.0	12.90	64.00	150	Horizontal	Pass
3702.287	47.34	--	37.3	-3.40	74.0	--	54.0	16.70	229.00	150	Horizontal	Pass
4968.504	50.43	--	41.2	1.08	74.0	--	54.0	12.80	175.00	150	Horizontal	Pass
6563.680	56.49	--	46.6	8.44	74.0	--	54.0	7.40	4.00	150	Horizontal	Pass

8-DFSK MIDDLE CHANNEL 1 GHz to 7 GHz, ANT V



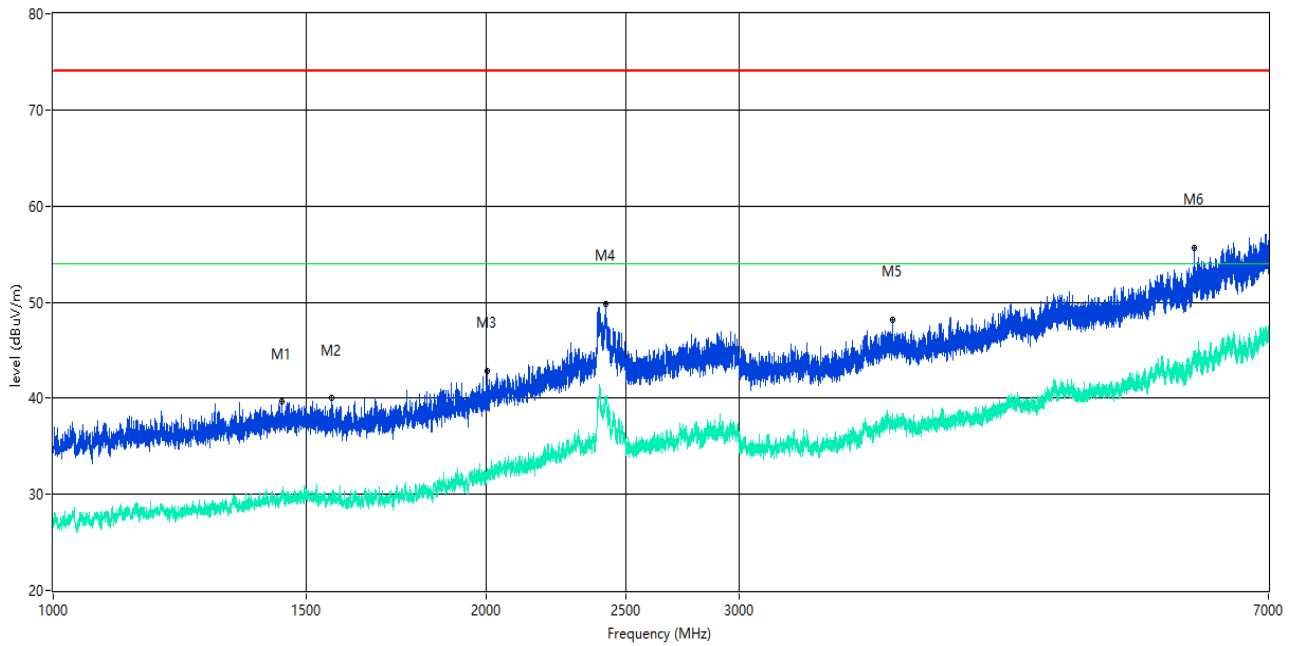
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1474.441	40.67	--	30.7	-11.37	74.0	--	54.0	23.30	167.00	150	Vertical	Pass
1909.636	42.12	--	32.0	-8.93	74.0	--	54.0	22.00	206.00	150	Vertical	Pass
2419.573	49.99	--	40.1	-0.76	74.0	--	54.0	13.90	78.00	150	Vertical	Pass
3667.042	47.40	--	37.6	-3.18	74.0	--	54.0	16.40	40.00	150	Vertical	Pass
4269.966	48.47	--	38.4	-1.73	74.0	--	54.0	15.60	346.00	150	Vertical	Pass
5601.800	52.66	--	42.5	2.38	74.0	--	54.0	11.50	324.00	150	Vertical	Pass

8-DFSK MIDDLE CHANNEL 1 GHz to 7 GHz, ANT H



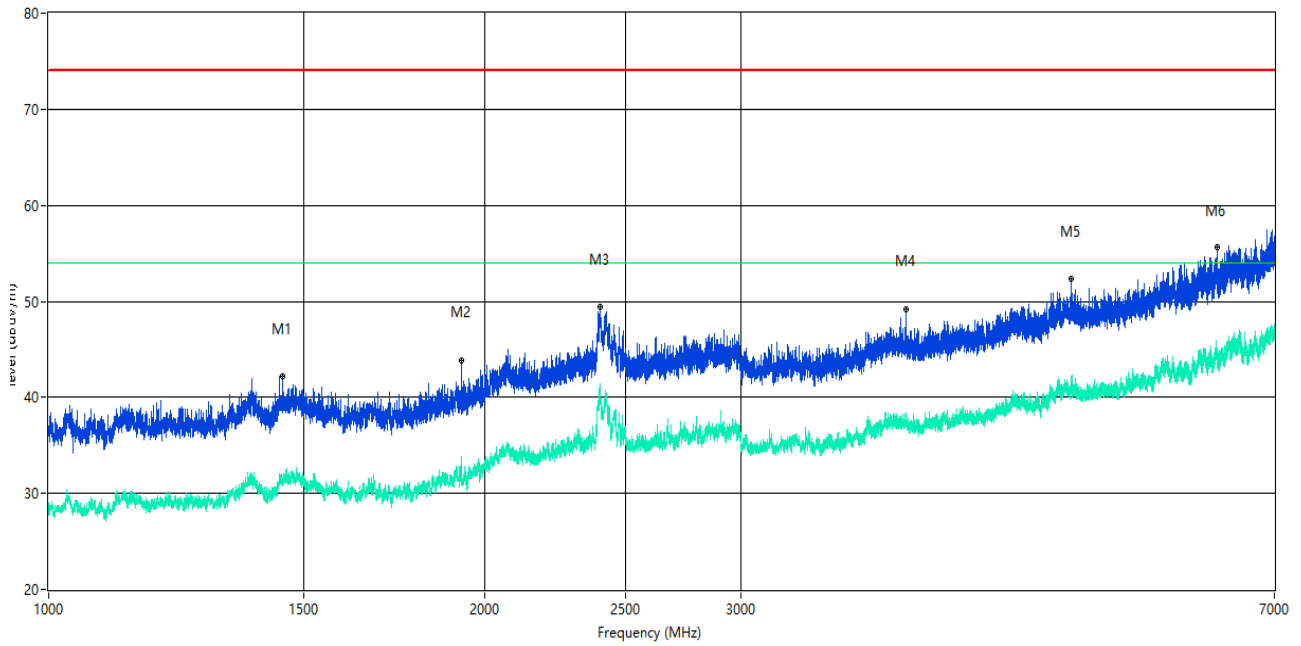
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1443.445	41.33	--	31.7	-11.41	74.0	--	54.0	22.30	276.00	150	Horizontal	Pass
2067.617	44.17	--	35.2	-8.18	74.0	--	54.0	18.80	205.00	150	Horizontal	Pass
2884.514	47.25	--	36.6	-3.10	74.0	--	54.0	17.40	160.00	150	Horizontal	Pass
3807.649	47.70	--	37.9	-2.52	74.0	--	54.0	16.10	97.00	150	Horizontal	Pass
4977.503	51.32	--	40.9	1.31	74.0	--	54.0	13.10	312.00	150	Horizontal	Pass
6633.796	57.37	--	45.4	7.75	74.0	--	54.0	8.60	172.00	150	Horizontal	Pass

8-DFSK HIGH CHANNEL 1 GHz to 7 GHz, ANT V



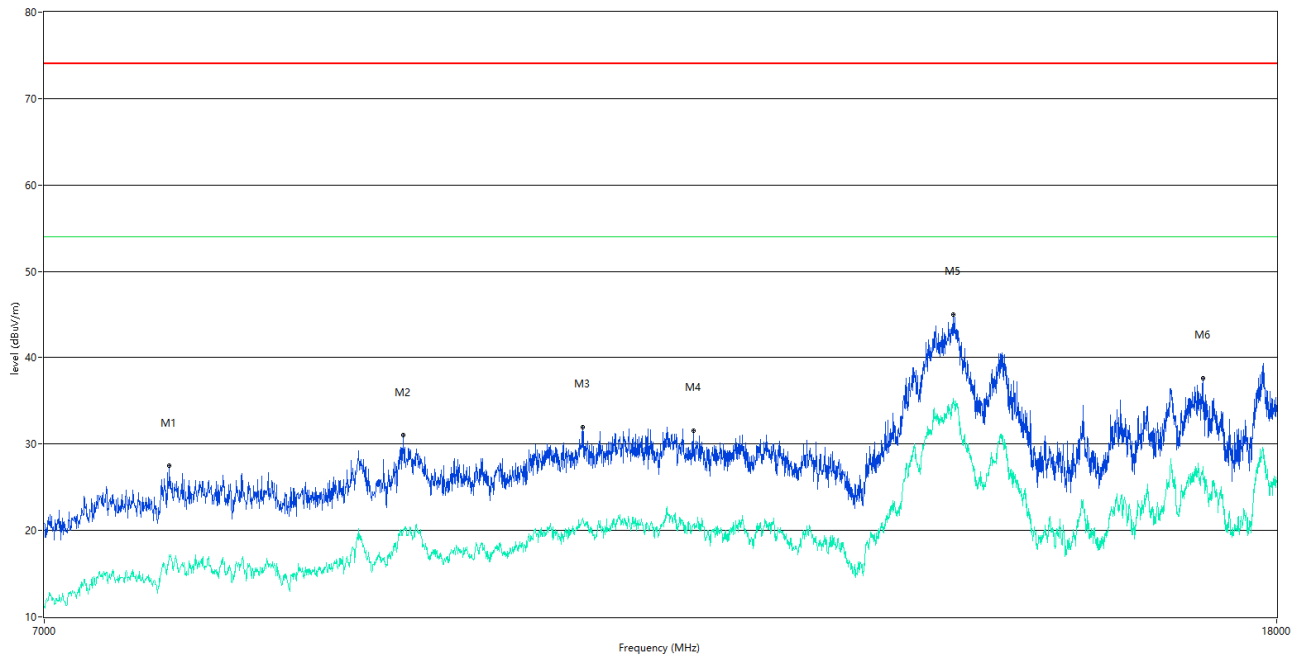
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1441.695	39.62	--	30.0	-11.54	74.0	--	54.0	24.00	220.00	150	Vertical	Pass
1560.430	40.02	--	29.5	-11.81	74.0	--	54.0	24.50	82.00	150	Vertical	Pass
2004.874	42.79	--	32.2	-8.33	74.0	--	54.0	21.80	346.00	150	Vertical	Pass
2424.322	49.83	--	40.1	-0.92	74.0	--	54.0	13.90	152.00	150	Vertical	Pass
3833.146	48.21	--	38.3	-2.88	74.0	--	54.0	15.70	46.00	150	Vertical	Pass
6212.098	55.65	--	43.9	5.37	74.0	--	54.0	10.10	6.00	150	Vertical	Pass

8-DFSK HIGH CHANNEL 1 GHz to 7 GHz, ANT H



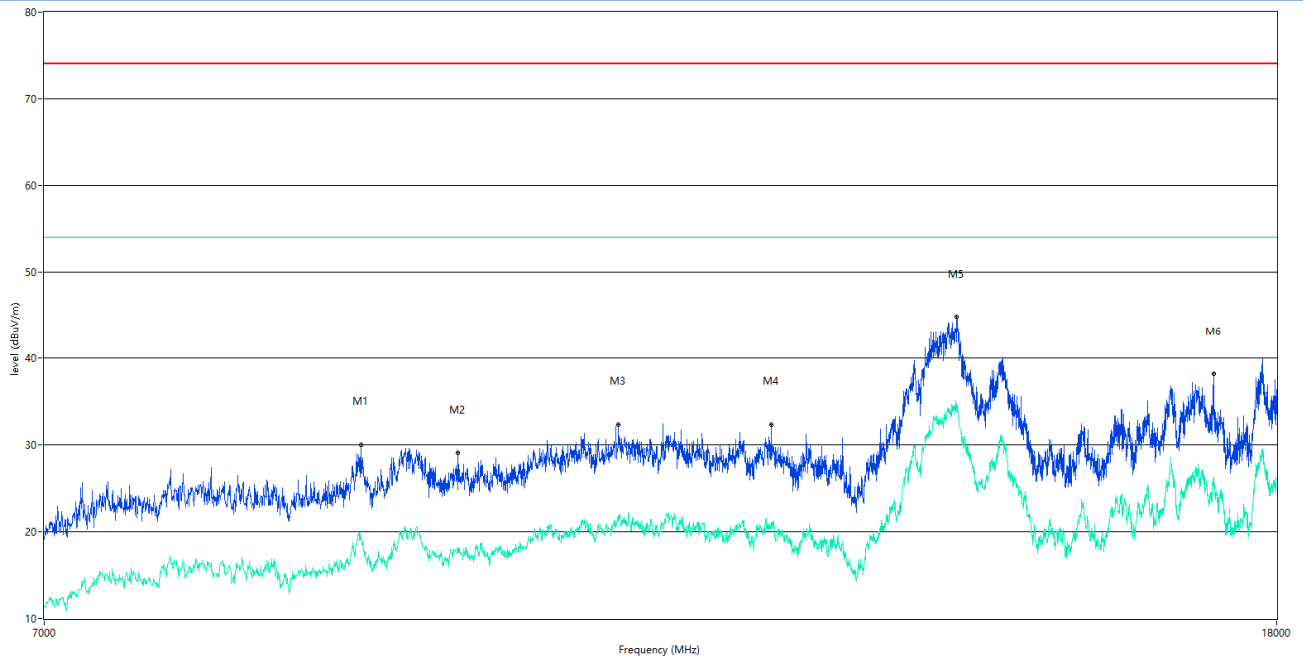
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1450.194	42.15	--	31.5	-11.75	74.0	--	54.0	22.50	157.00	150	Horizontal	Pass
1926.884	43.82	--	33.2	-9.88	74.0	--	54.0	20.80	27.00	150	Horizontal	Pass
2399.575	49.43	--	41.0	-0.07	74.0	--	54.0	13.00	31.00	150	Horizontal	Pass
3899.888	49.22	--	38.1	-2.36	74.0	--	54.0	15.90	257.00	150	Horizontal	Pass
5071.616	52.36	--	41.2	1.62	74.0	--	54.0	12.80	39.00	150	Horizontal	Pass
6389.576	55.58	--	44.3	6.02	74.0	--	54.0	9.70	172.00	150	Horizontal	Pass

8-DFSK LOW CHANNEL 7 GHz to 18 GHz, ANT V



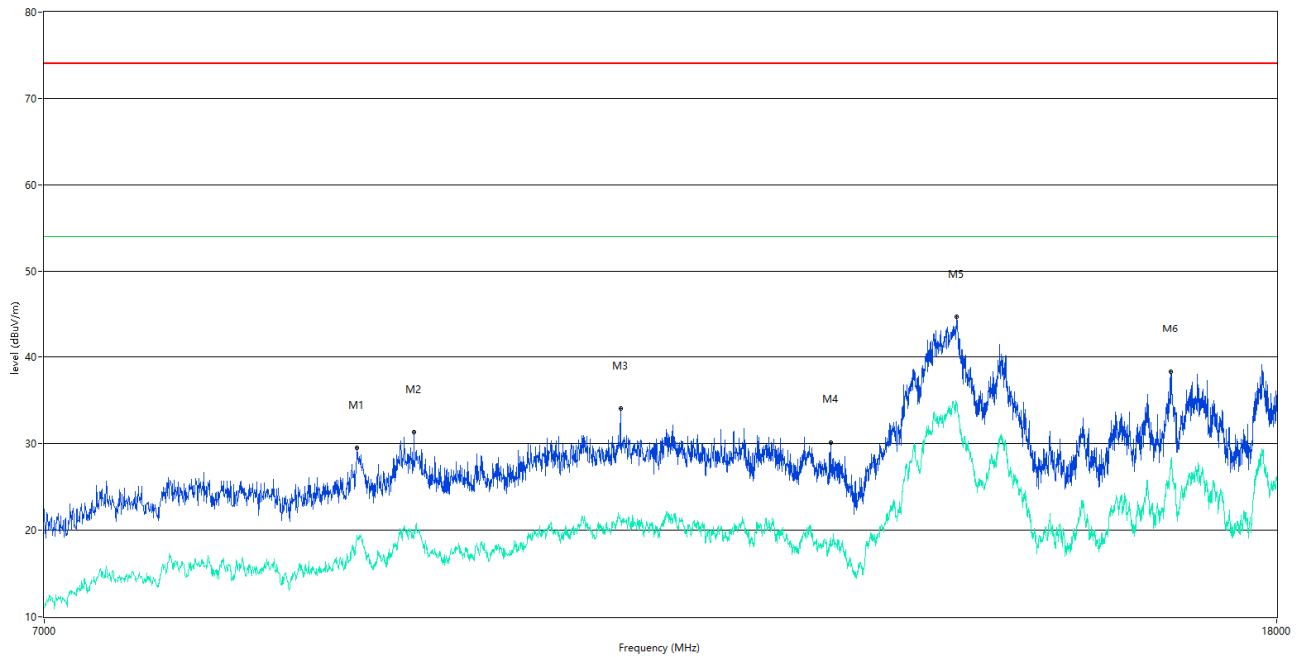
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7703.824	27.48	--	17.1	-35.80	74.0	--	54.0	36.90	86.00	150	Vertical	Pass
9215.946	31.03	--	20.1	-31.70	74.0	--	54.0	33.90	184.00	150	Vertical	Pass
10576.856	31.95	--	21.4	-26.35	74.0	--	54.0	32.60	1.00	150	Vertical	Pass
11511.622	31.52	--	20.7	-23.34	74.0	--	54.0	33.30	144.00	150	Vertical	Pass
14046.488	45.05	--	34.8	-6.60	74.0	--	54.0	19.20	116.00	150	Vertical	Pass
17007.498	37.60	--	27.4	-10.52	74.0	--	54.0	26.60	287.00	150	Vertical	Pass

8-DFSK LOW CHANNEL 7 GHz to 18 GHz, ANT H



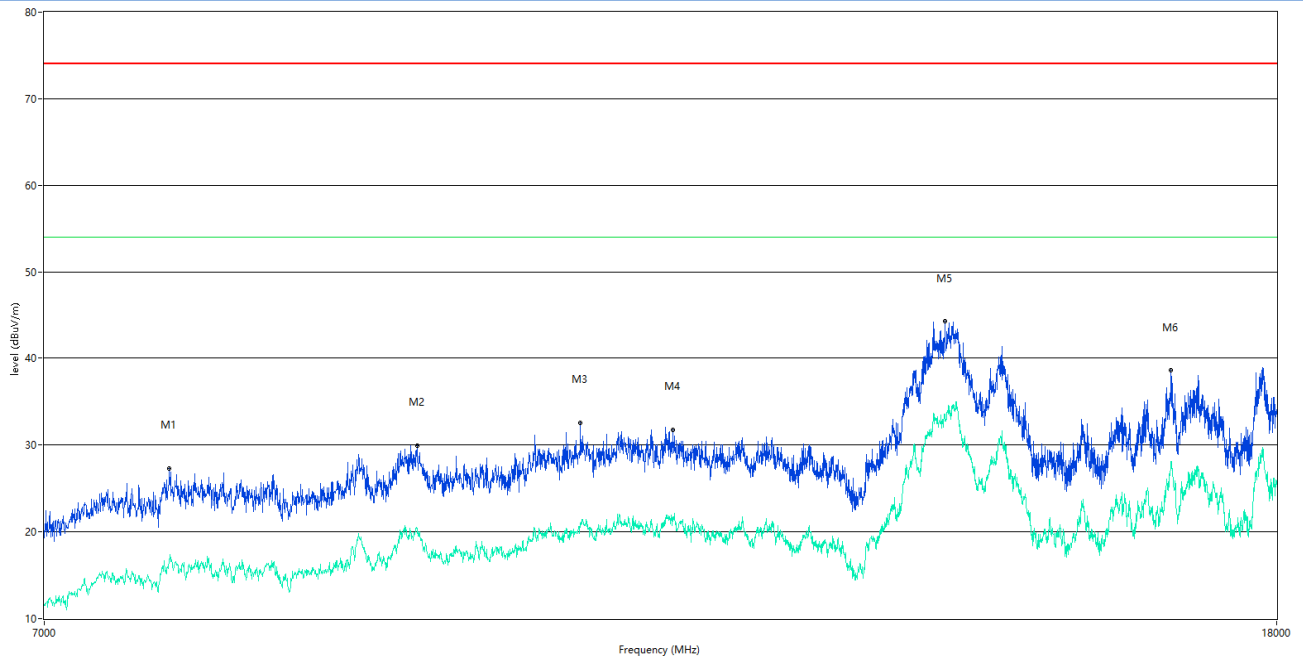
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8921.770	30.04	--	19.4	-32.33	74.0	--	54.0	34.60	279.00	150	Horizontal	Pass
9611.847	29.09	--	18.2	-33.78	74.0	--	54.0	35.80	320.00	150	Horizontal	Pass
10868.283	32.37	--	21.8	-25.72	74.0	--	54.0	32.20	169.00	150	Horizontal	Pass
12220.945	32.30	--	20.7	-24.56	74.0	--	54.0	33.30	184.00	150	Horizontal	Pass
14087.728	44.81	--	34.8	-6.71	74.0	--	54.0	19.20	233.00	150	Horizontal	Pass
17150.462	38.15	--	26.4	-11.48	74.0	--	54.0	27.60	173.00	150	Horizontal	Pass

8-DFSK MIDDLE CHANNEL 7 GHz to 18 GHz, ANT V



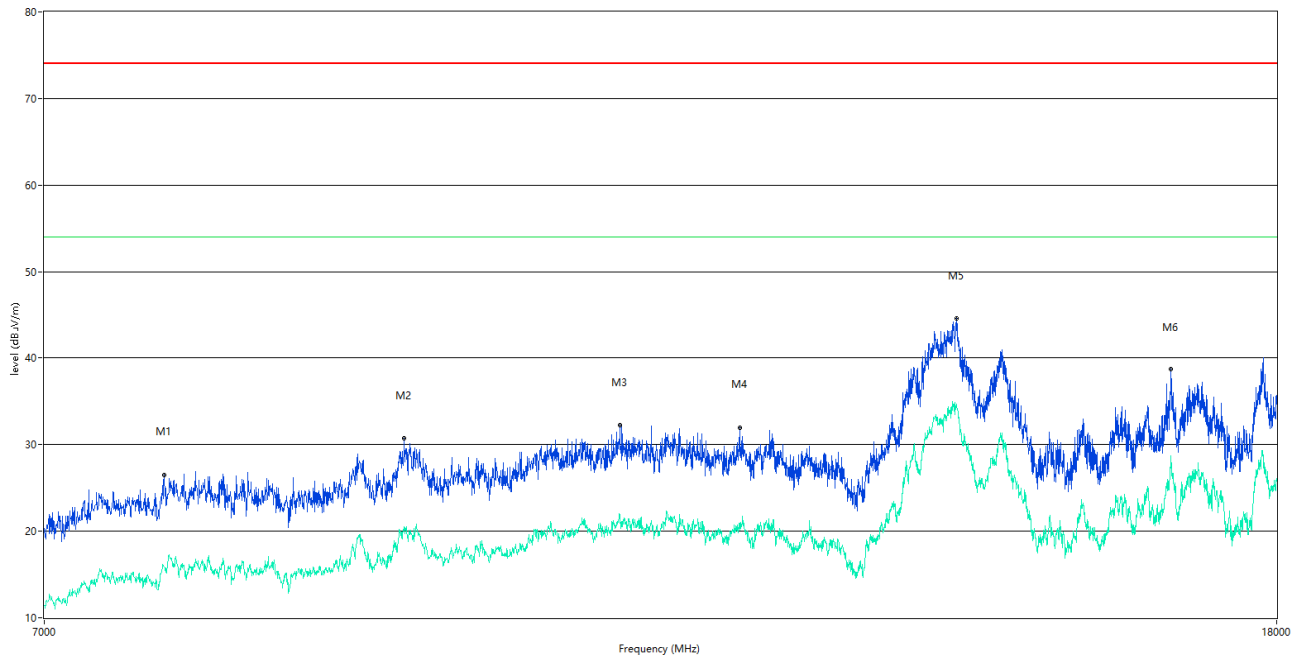
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8897.026	29.47	--	19.4	-32.04	74.0	--	54.0	34.60	7.00	150	Vertical	Pass
9292.927	31.27	--	20.1	-30.96	74.0	--	54.0	33.90	59.00	150	Vertical	Pass
10887.528	33.99	--	21.1	-25.55	74.0	--	54.0	32.90	230.00	150	Vertical	Pass
12787.303	30.11	--	18.9	-24.36	74.0	--	54.0	35.10	4.00	150	Vertical	Pass
14087.728	44.79	--	34.7	-6.71	74.0	--	54.0	19.30	273.00	150	Vertical	Pass
16597.851	38.33	--	28.1	-10.41	74.0	--	54.0	25.90	360.00	150	Vertical	Pass

8-DFSK MIDDLE CHANNEL 7 GHz to 18 GHz, ANT H



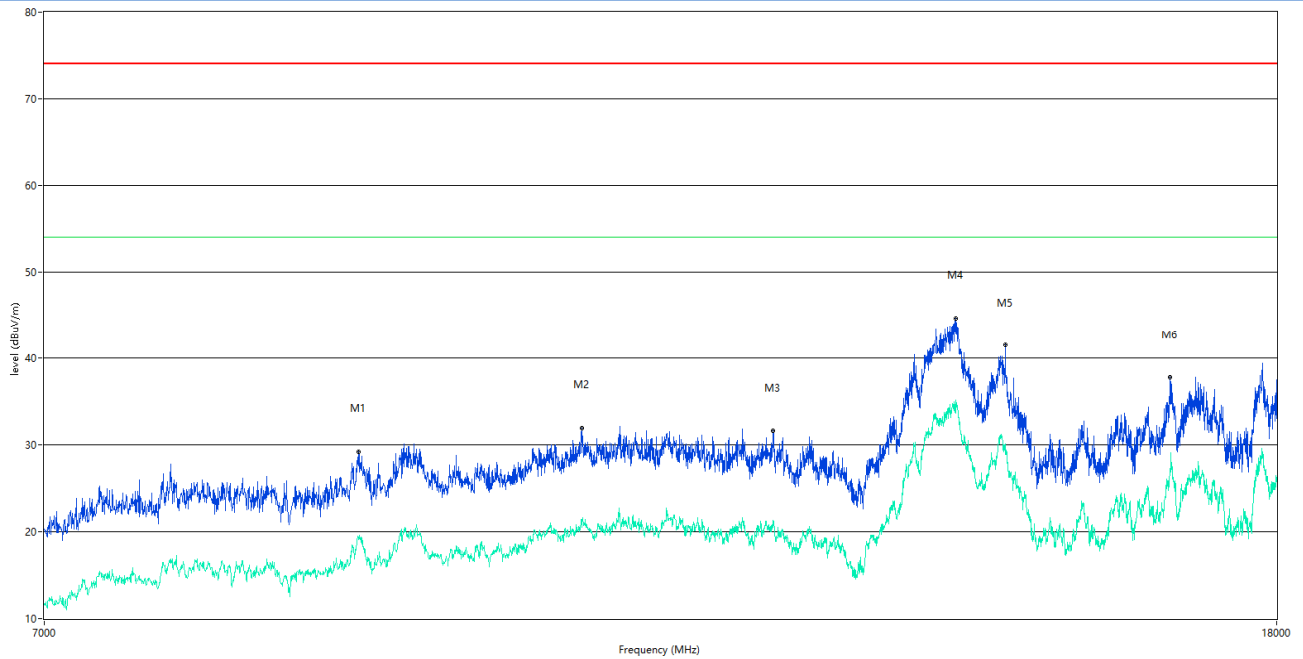
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7703.824	27.28	--	16.8	-35.80	74.0	--	54.0	37.20	122.00	150	Horizontal	Pass
9314.921	29.86	--	20.4	-31.34	74.0	--	54.0	33.60	51.00	150	Horizontal	Pass
10557.611	32.54	--	21.0	-26.97	74.0	--	54.0	33.00	205.00	150	Horizontal	Pass
11332.917	31.71	--	21.7	-24.50	74.0	--	54.0	32.30	297.00	150	Horizontal	Pass
13961.260	44.31	--	33.2	-7.71	74.0	--	54.0	20.80	310.00	150	Horizontal	Pass
16600.600	38.63	--	27.6	-10.26	74.0	--	54.0	26.40	179.00	150	Horizontal	Pass

8-DFSK HIGH CHANNEL 7 GHz to 18 GHz, ANT V



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7673.582	26.49	--	15.8	-36.37	74.0	--	54.0	38.20	154.00	150	Vertical	Pass
9224.194	30.73	--	20.1	-32.01	74.0	--	54.0	33.90	187.00	150	Vertical	Pass
10882.029	32.22	--	22.0	-25.06	74.0	--	54.0	32.00	207.00	150	Vertical	Pass
11926.768	31.93	--	20.9	-24.29	74.0	--	54.0	33.10	1.00	150	Vertical	Pass
14087.728	44.61	--	34.5	-6.71	74.0	--	54.0	19.50	139.00	150	Vertical	Pass
16600.600	38.65	--	28.5	-10.26	74.0	--	54.0	25.50	215.00	150	Vertical	Pass

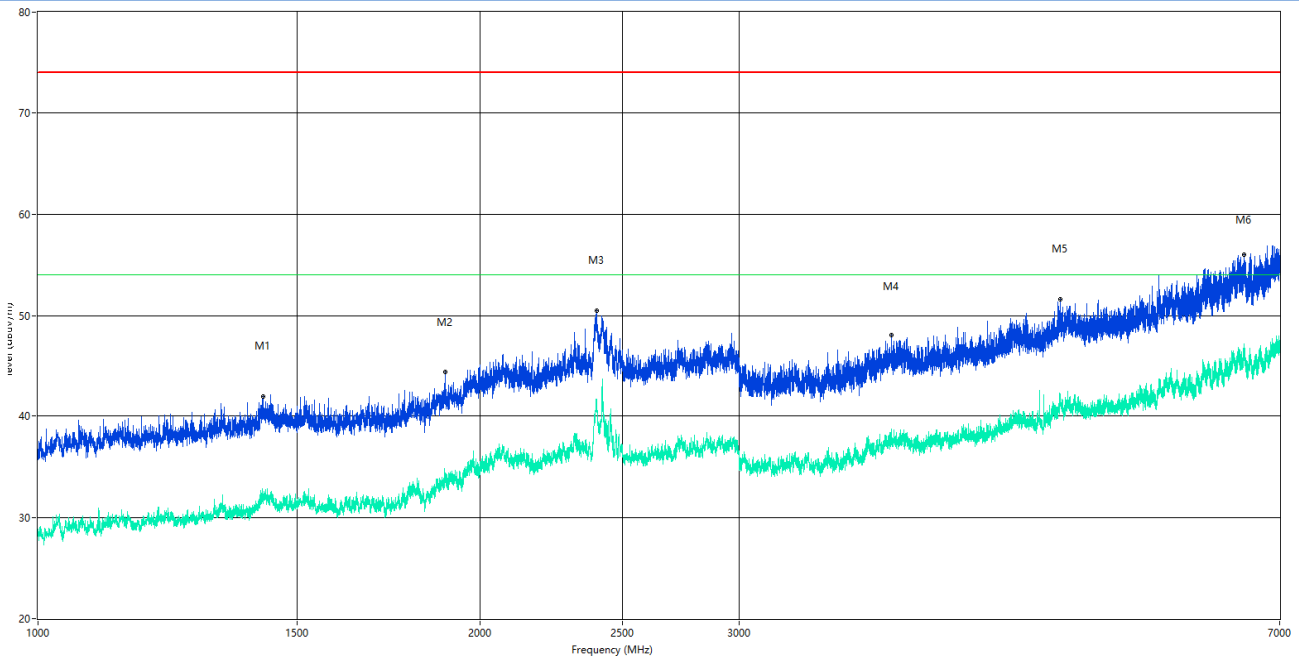
8-DFSK HIGH CHANNEL 7 GHz to 18 GHz, ANT H



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8908.023	29.21	--	19.2	-32.42	74.0	--	54.0	34.80	232.00	150	Horizontal	Pass
10571.357	31.90	--	21.4	-26.38	74.0	--	54.0	32.60	305.00	150	Horizontal	Pass
12237.441	31.61	--	21.3	-24.42	74.0	--	54.0	32.70	178.00	150	Horizontal	Pass
14079.480	44.60	--	35.2	-6.58	74.0	--	54.0	18.80	134.00	150	Horizontal	Pass
14621.095	41.48	--	30.1	-11.26	74.0	--	54.0	23.90	220.00	150	Horizontal	Pass
16584.104	37.75	--	27.0	-10.98	74.0	--	54.0	27.00	356.00	150	Horizontal	Pass

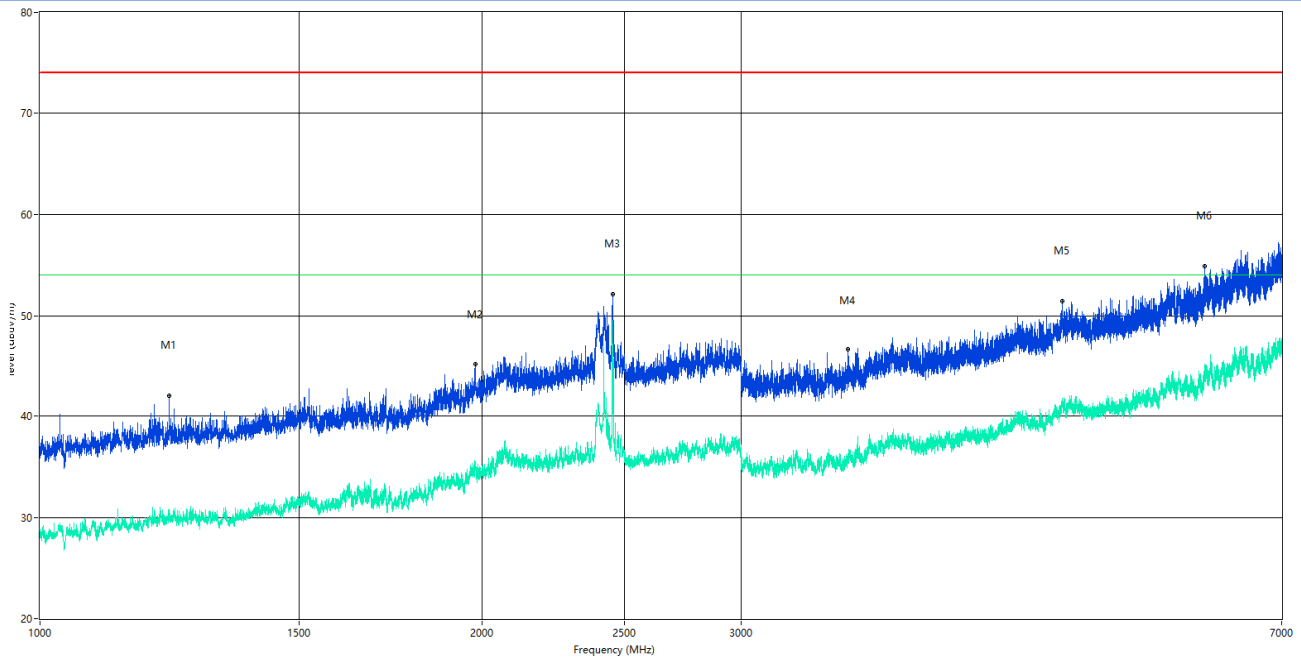
Hopping Mode:

GFSK 1 GHz to 7 GHz, ANT V



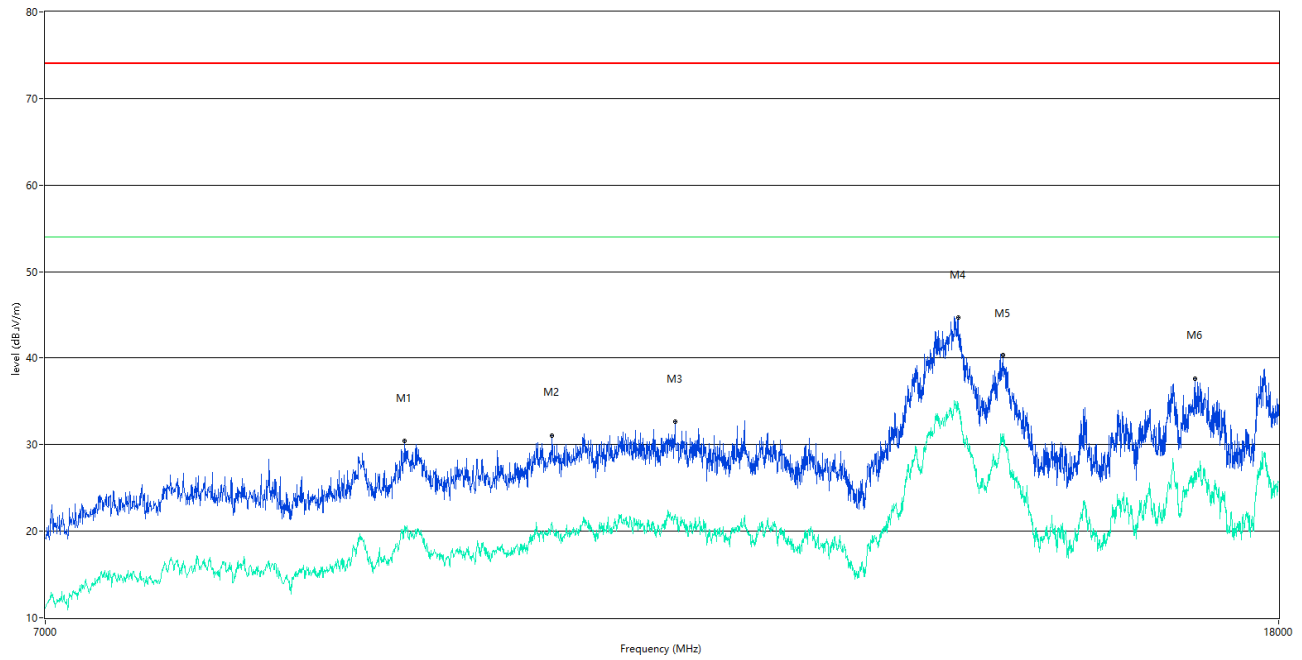
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1422.947	41.87	--	32.0	-11.87	74.0	--	54.0	22.00	28.00	150	Vertical	Pass
1893.638	44.30	--	33.8	-9.53	74.0	--	54.0	20.20	26.00	150	Vertical	Pass
2400.325	50.44	--	41.1	-0.09	74.0	--	54.0	12.90	279.00	150	Vertical	Pass
3808.024	47.98	--	37.9	-2.55	74.0	--	54.0	16.10	313.00	150	Vertical	Pass
4966.254	51.57	--	42.2	1.32	74.0	--	54.0	11.80	328.00	150	Vertical	Pass
6619.048	56.06	--	46.2	7.99	74.0	--	54.0	7.80	120.00	150	Vertical	Pass

GFSK 1 GHz to 7 GHz, ANT H



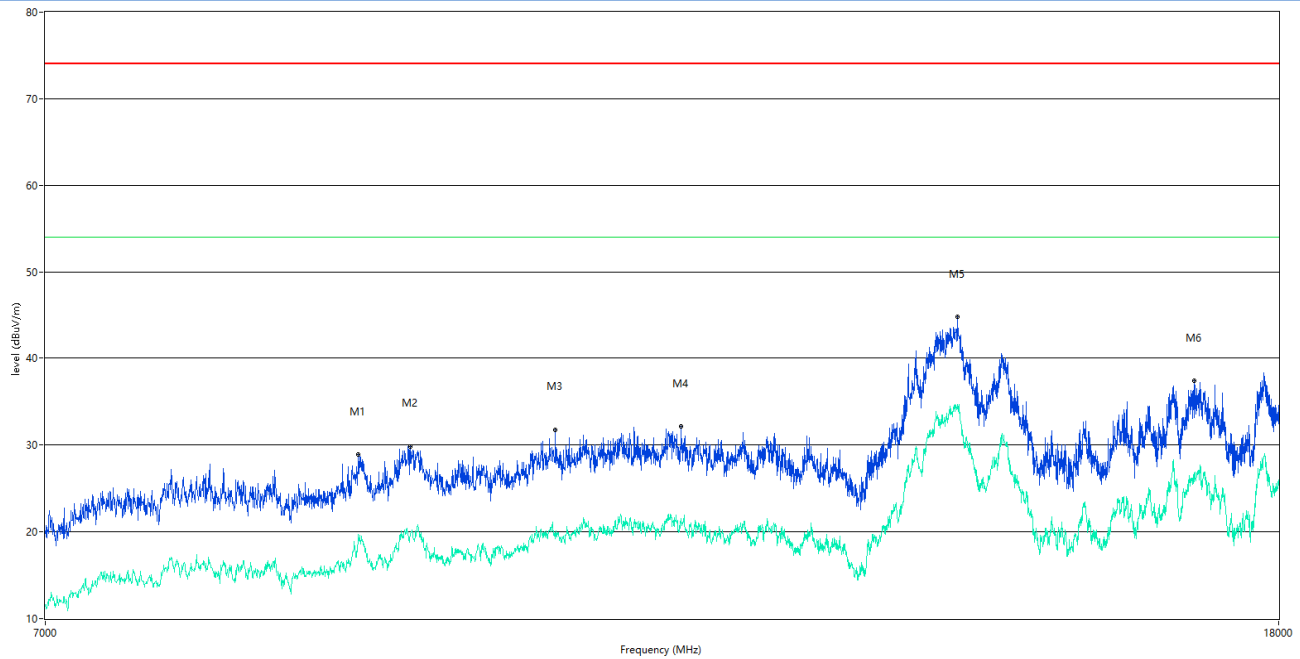
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1224.722	42.00	--	30.8	-12.32	74.0	--	54.0	23.20	107.00	150	Horizontal	Pass
1978.128	45.11	--	35.4	-8.49	74.0	--	54.0	18.60	199.00	150	Horizontal	Pass
2453.818	52.16	--	49.5	-2.11	74.0	--	54.0	4.50	112.00	150	Horizontal	N.A
3549.306	46.58	--	36.3	-4.46	74.0	--	54.0	17.70	274.00	150	Horizontal	Pass
4965.129	51.42	--	41.5	1.44	74.0	--	54.0	12.50	309.00	150	Horizontal	Pass
6206.849	54.93	--	44.6	5.59	74.0	--	54.0	9.40	37.00	150	Horizontal	Pass

GFSK 7 GHz to 18 GHz, ANT V



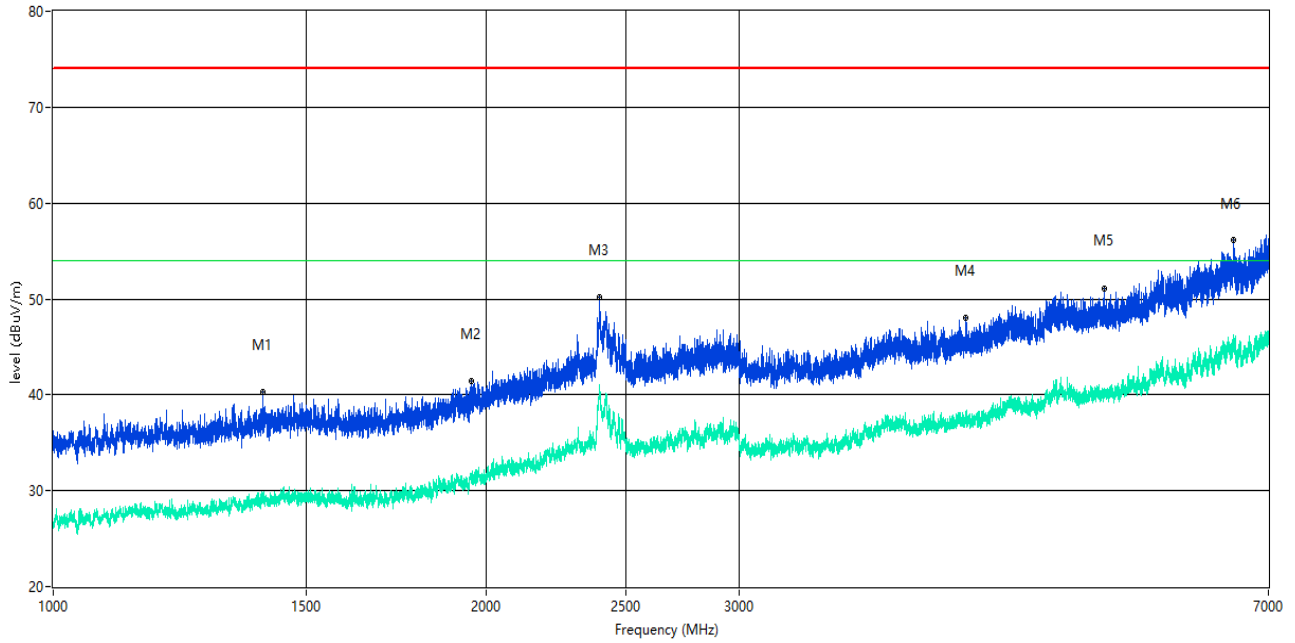
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
9218.695	30.45	--	20.2	-31.93	74.0	--	54.0	33.80	2.00	150	Vertical	Pass
10318.420	30.97	--	20.9	-27.67	74.0	--	54.0	33.10	101.00	150	Vertical	Pass
11338.415	32.63	--	21.8	-24.54	74.0	--	54.0	32.20	94.00	150	Vertical	Pass
14084.979	44.77	--	34.7	-6.61	74.0	--	54.0	19.30	117.00	150	Vertical	Pass
14571.607	40.28	--	30.7	-11.13	74.0	--	54.0	23.30	10.00	150	Vertical	Pass
16881.030	37.61	--	26.9	-12.59	74.0	--	54.0	27.10	91.00	150	Vertical	Pass

GFSK 7 GHz to 18 GHz, ANT H



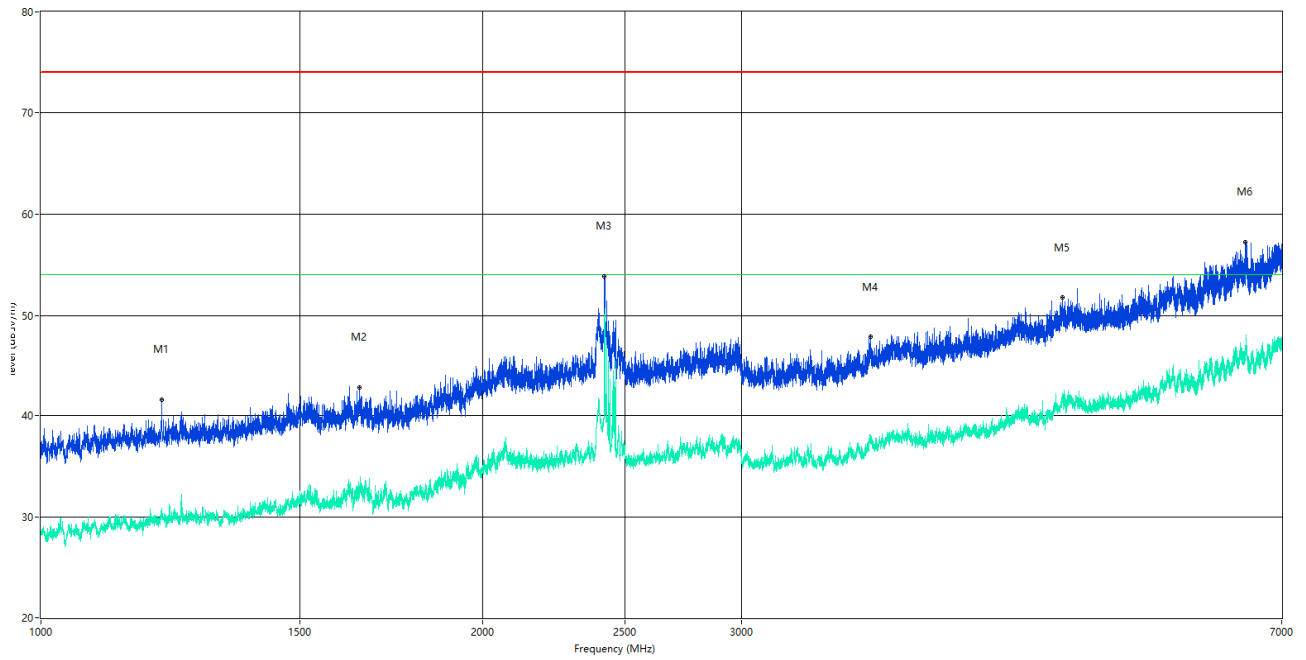
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8897.026	28.92	--	19.7	-32.04	74.0	--	54.0	34.30	311.00	150	Horizontal	Pass
9257.186	29.78	--	19.6	-31.50	74.0	--	54.0	34.40	132.00	150	Horizontal	Pass
10345.914	31.75	--	19.2	-28.20	74.0	--	54.0	34.80	33.00	150	Horizontal	Pass
11393.402	32.12	--	21.5	-24.66	74.0	--	54.0	32.50	187.00	150	Horizontal	Pass
14071.232	44.83	--	34.1	-6.65	74.0	--	54.0	19.90	354.00	150	Horizontal	Pass
16878.280	37.33	--	26.7	-12.54	74.0	--	54.0	27.30	290.00	150	Horizontal	Pass

8-DFSK 1 GHz to 7 GHz, ANT V



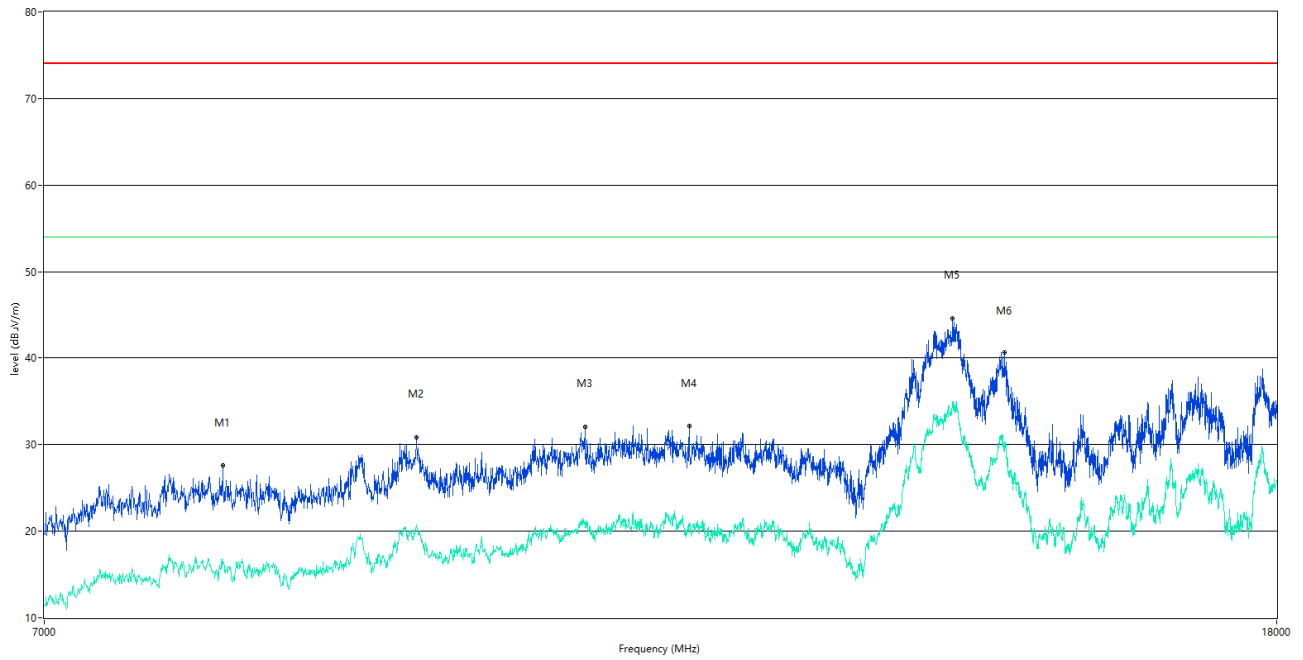
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1399.200	40.27	--	29.1	-11.80	74.0	--	54.0	24.90	152.00	150	Vertical	Pass
1954.881	41.43	--	31.3	-9.31	74.0	--	54.0	22.70	246.00	150	Vertical	Pass
2399.075	50.18	--	40.3	-0.06	74.0	--	54.0	13.70	334.00	150	Vertical	Pass
4312.336	48.01	--	37.7	-1.96	74.0	--	54.0	16.30	40.00	150	Vertical	Pass
5380.577	51.13	--	40.2	0.82	74.0	--	54.0	13.80	143.00	150	Vertical	Pass
6618.173	56.11	--	46.3	8.03	74.0	--	54.0	7.70	336.00	150	Vertical	Pass

8-DFSK 1 GHz to 7 GHz, ANT H



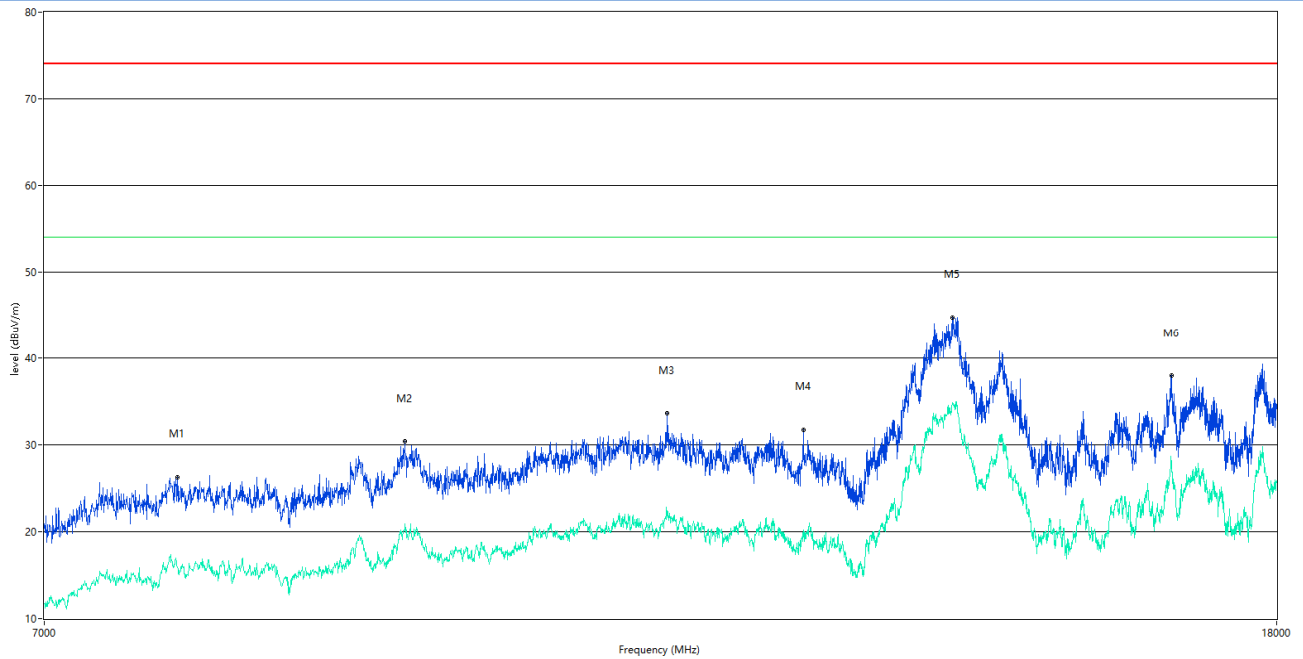
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1208.974	41.54	--	30.7	-11.94	74.0	--	54.0	23.30	158.00	150	Horizontal	Pass
1648.419	42.78	--	33.1	-11.14	74.0	--	54.0	20.90	211.00	150	Horizontal	Pass
2420.572	53.89	--	49.5	-0.79	74.0	--	54.0	4.50	102.00	150	Horizontal	Pass
3673.416	47.78	--	38.1	-3.30	74.0	--	54.0	15.90	191.00	150	Horizontal	Pass
4964.004	51.82	--	41.5	1.38	74.0	--	54.0	12.50	126.00	150	Horizontal	Pass
6613.673	57.25	--	46.1	7.74	74.0	--	54.0	7.90	196.00	150	Horizontal	Pass

8-DFSK 7 GHz to 18 GHz, ANT V



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
8025.494	27.54	--	16.8	-36.94	74.0	--	54.0	37.20	0.00	150	Vertical	Pass
9312.172	30.81	--	20.8	-31.06	74.0	--	54.0	33.20	189.00	150	Vertical	Pass
10593.352	32.06	--	21.1	-26.27	74.0	--	54.0	32.90	143.00	150	Vertical	Pass
11475.881	32.09	--	20.5	-23.82	74.0	--	54.0	33.50	161.00	150	Vertical	Pass
14038.240	44.66	--	34.9	-6.75	74.0	--	54.0	19.10	122.00	150	Vertical	Pass
14612.847	40.64	--	29.9	-11.14	74.0	--	54.0	24.10	222.00	150	Vertical	Pass

8-DFSK 7 GHz to 18 GHz, ANT H



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7750.562	26.31	--	16.0	-36.13	74.0	--	54.0	38.00	11.00	150	Horizontal	Pass
9226.943	30.38	--	20.2	-32.00	74.0	--	54.0	33.80	158.00	150	Horizontal	Pass
11283.429	33.65	--	22.4	-24.88	74.0	--	54.0	31.60	58.00	150	Horizontal	Pass
12523.369	31.75	--	20.2	-24.68	74.0	--	54.0	33.80	340.00	150	Horizontal	Pass
14043.739	44.73	--	34.8	-6.67	74.0	--	54.0	19.20	261.00	150	Horizontal	Pass
16606.098	37.95	--	26.9	-10.28	74.0	--	54.0	27.10	257.00	150	Horizontal	Pass

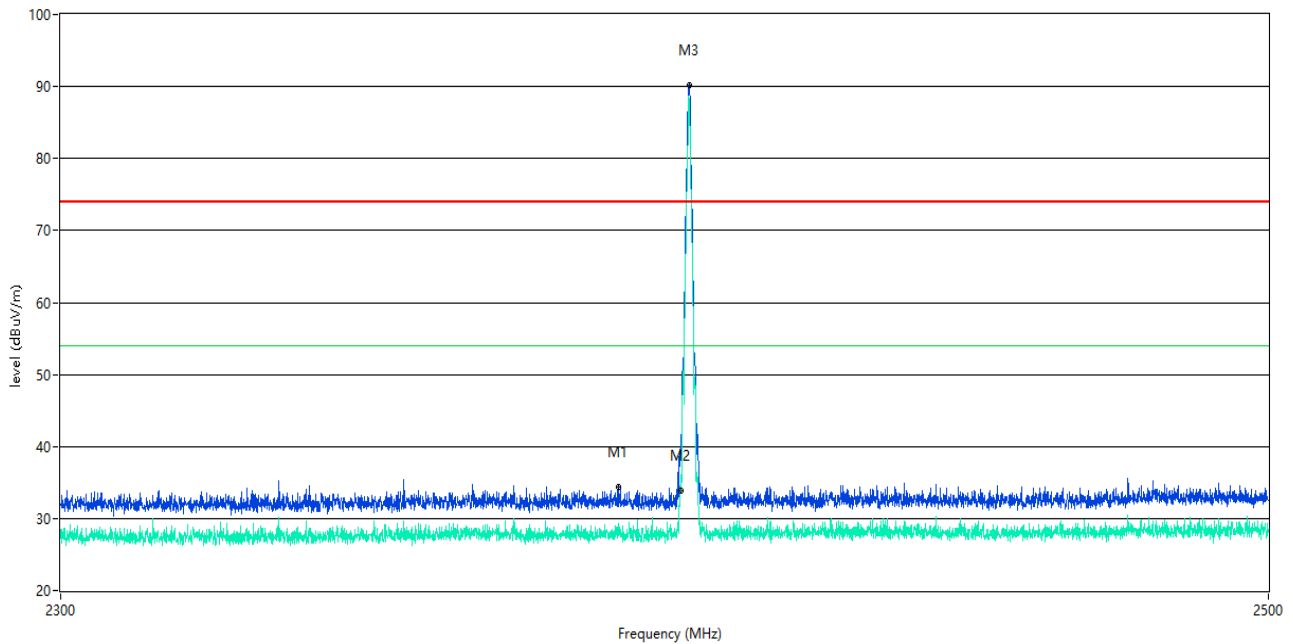
A.9 Band Edge (Restricted-band band-edge)

Note¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Note²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

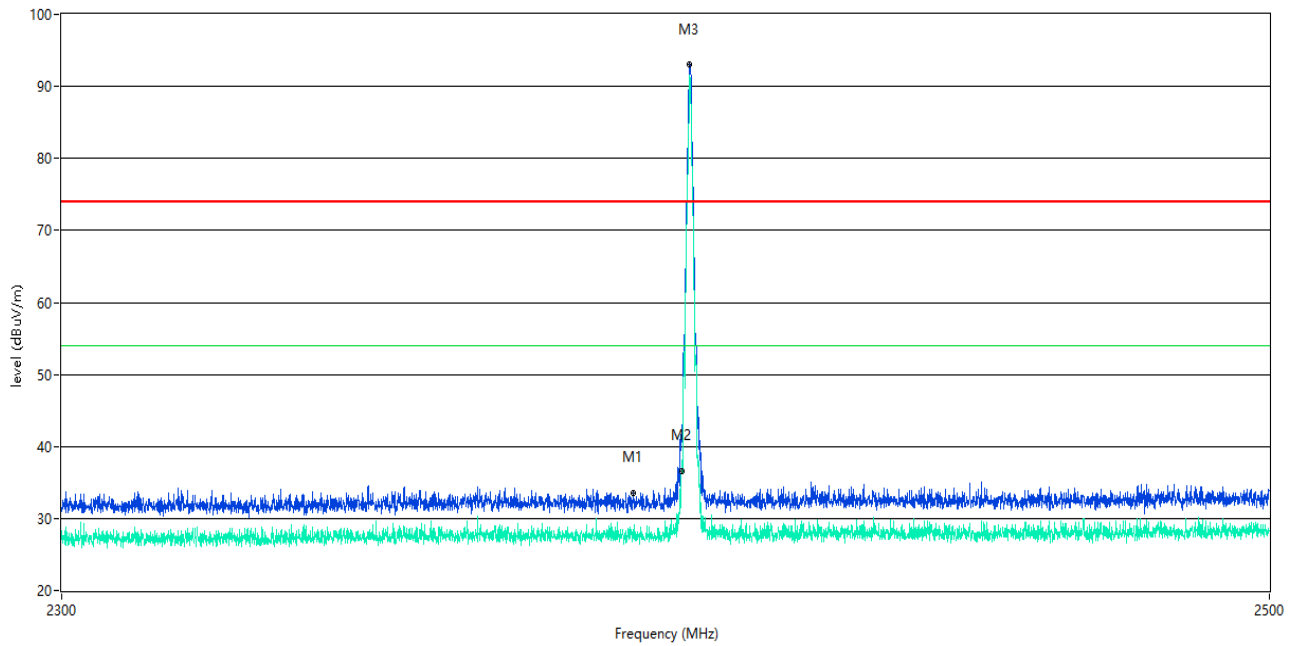
Test Plots

GFSK LOW CHANNEL, ANT V



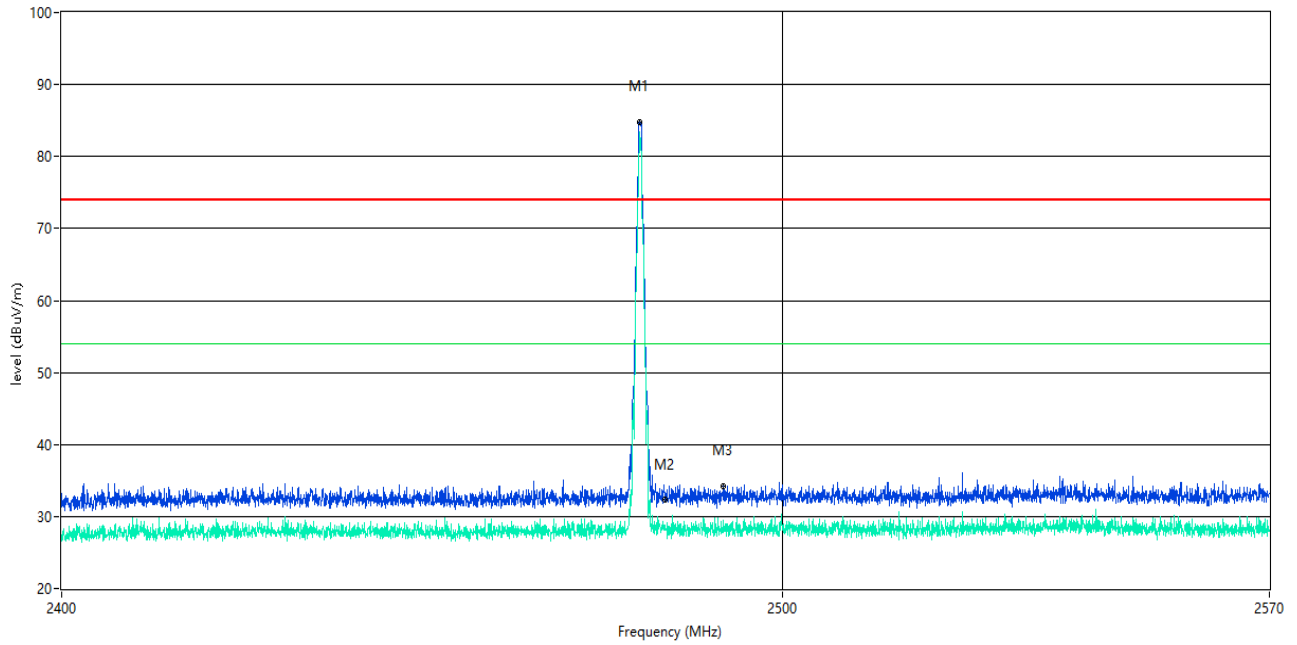
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2390.227	34.35	--	29.3	2.02	74.0	--	54.0	24.70	67.20	150	Vertical	Pass
2400.000	34.02	--	28.5	1.85	74.0	--	54.0	25.50	152.90	150	Vertical	Pass
2401.975	90.18	--	88.3	1.91	74.0	--	54.0	-34.30	108.90	150	Vertical	N.A

GFSK LOW CHANNEL, ANT H



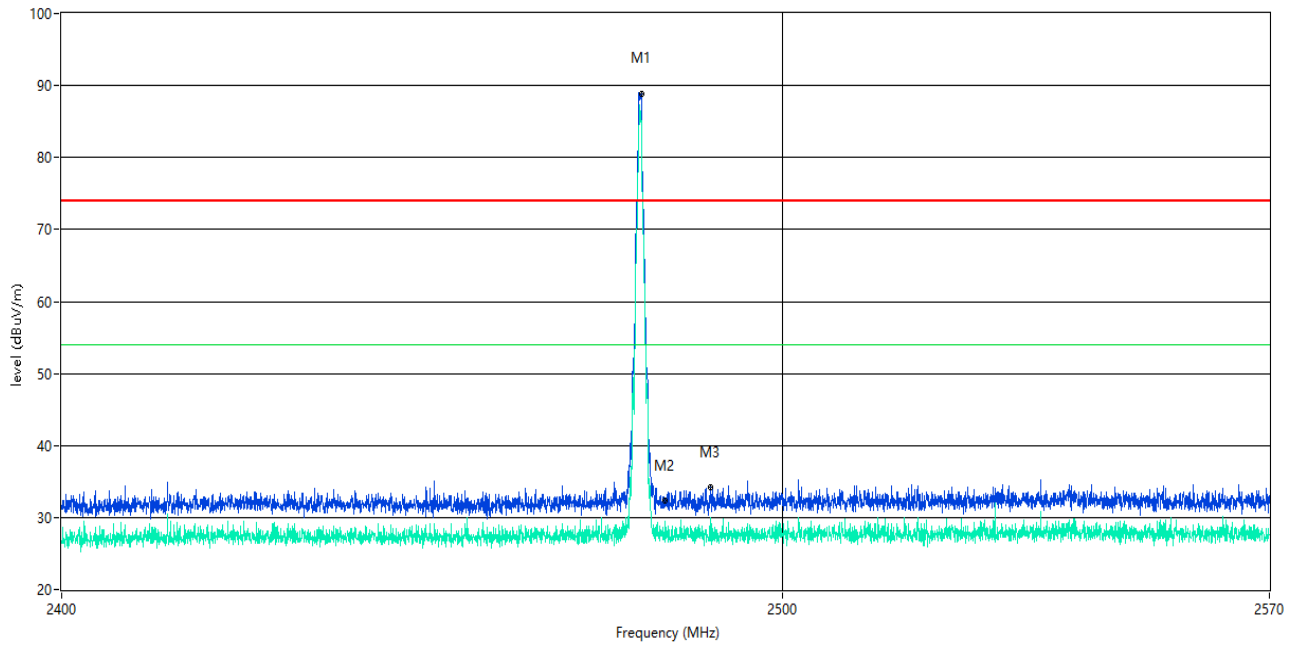
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2392.527	33.54	--	27.6	1.96	74.0	--	54.0	26.40	54.10	150	Horizontal	Pass
2400.000	36.48	--	29.9	1.85	74.0	--	54.0	24.10	123.75	150	Horizontal	Pass
2401.825	93.00	--	90.2	1.91	74.0	--	54.0	-36.20	42.20	150	Horizontal	N.A

GFSK HIGH CHANNEL, ANT V



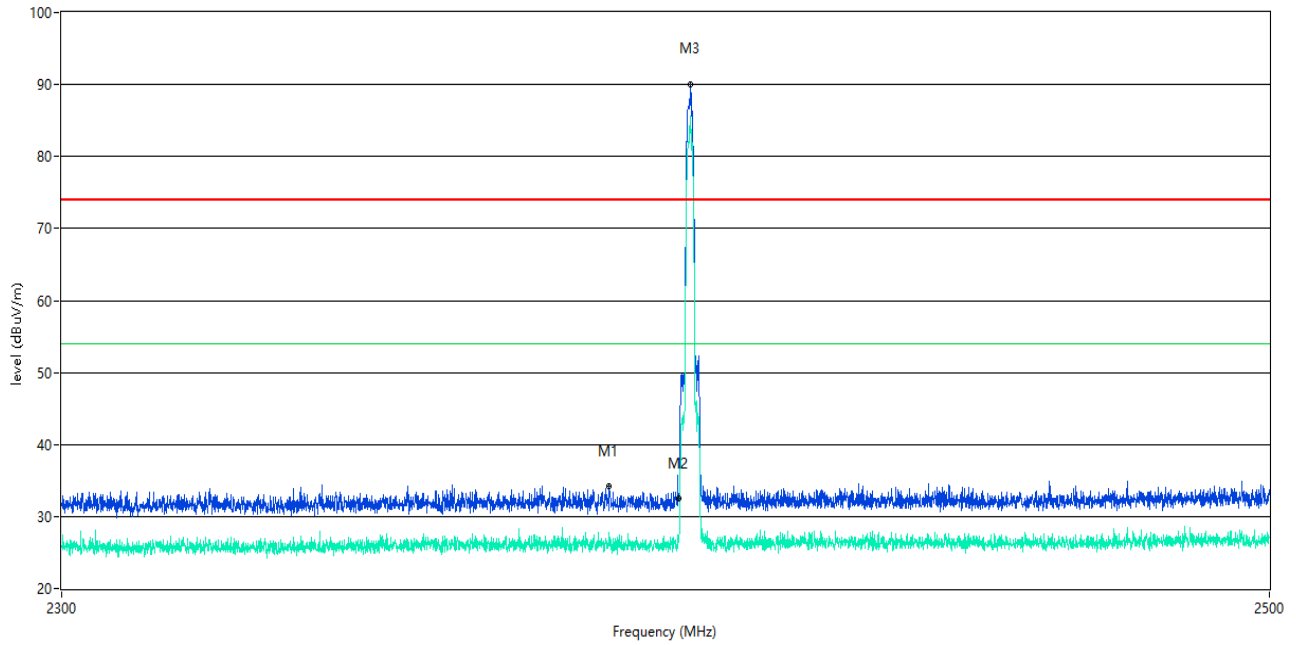
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2479.838	84.70	--	81.6	2.69	74.0	--	54.0	-27.60	86.50	150	Vertical	N.A
2483.500	32.30	--	28.6	2.71	74.0	--	54.0	25.40	174.97	150	Vertical	Pass
2491.692	34.23	--	29.5	2.71	74.0	--	54.0	24.50	155.00	150	Vertical	Pass

GFSK HIGH CHANNEL, ANT H



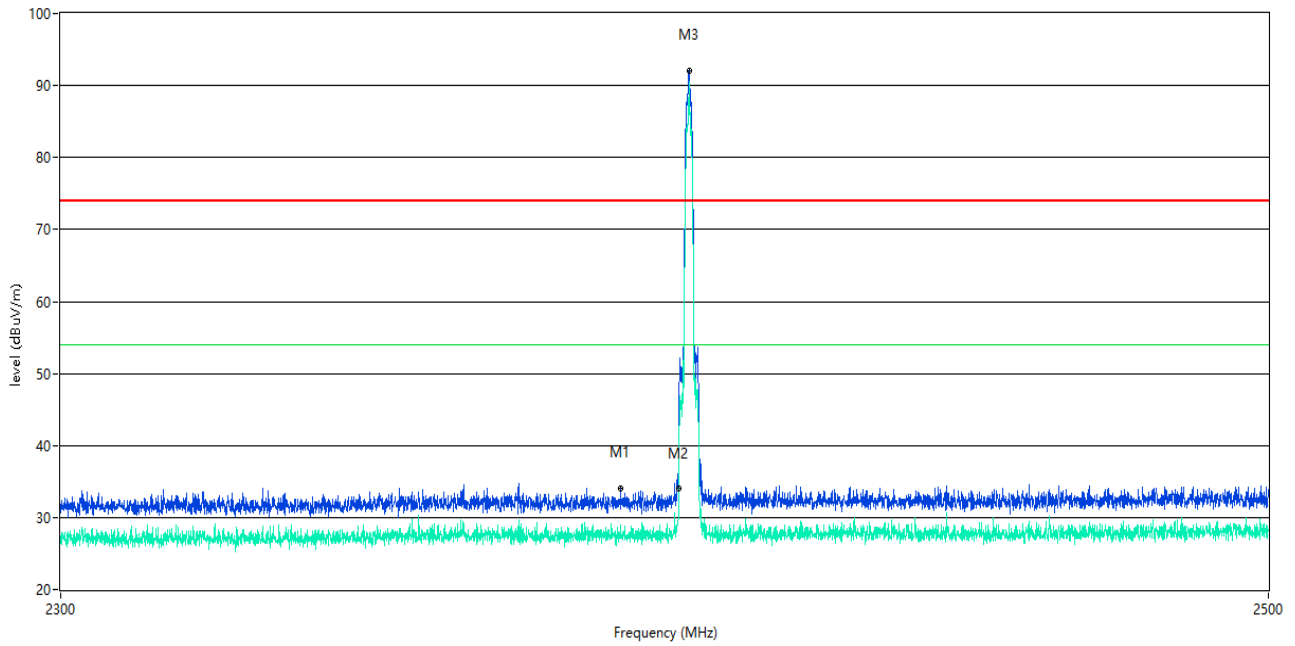
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2480.135	88.91	--	84.6	2.70	74.0	--	54.0	-30.60	329.70	150	Horizontal	N.A
2483.500	32.27	--	28.3	2.71	74.0	--	54.0	25.70	342.90	150	Horizontal	Pass
2489.823	34.14	--	30.0	2.71	74.0	--	54.0	24.00	288.10	150	Horizontal	Pass

8-DPSK LOW CHANNEL, ANT V



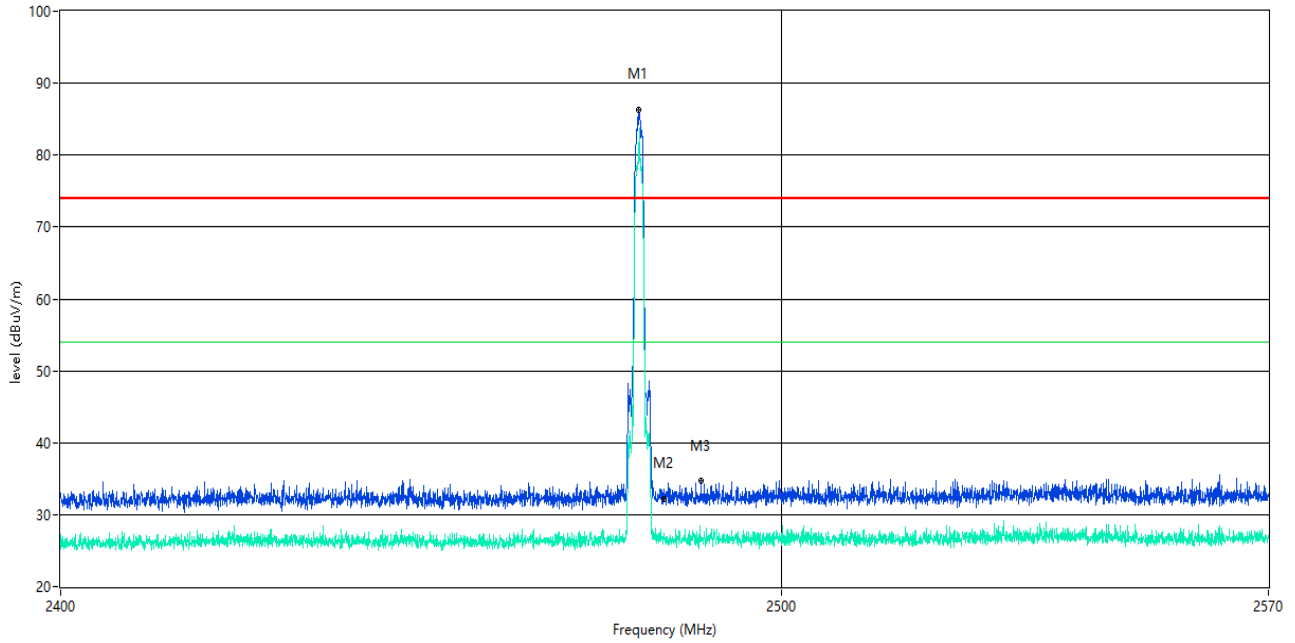
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2388.628	34.19	--	27.8	2.06	74.0	--	54.0	26.20	125.00	150	Vertical	Pass
2400.000	32.45	--	26.4	1.85	74.0	--	54.0	27.60	43.45	150	Vertical	Pass
2402.124	90.07	--	85.1	1.91	74.0	--	54.0	-31.10	86.40	150	Vertical	N.A

8-DPSK LOW CHANNEL, ANT H



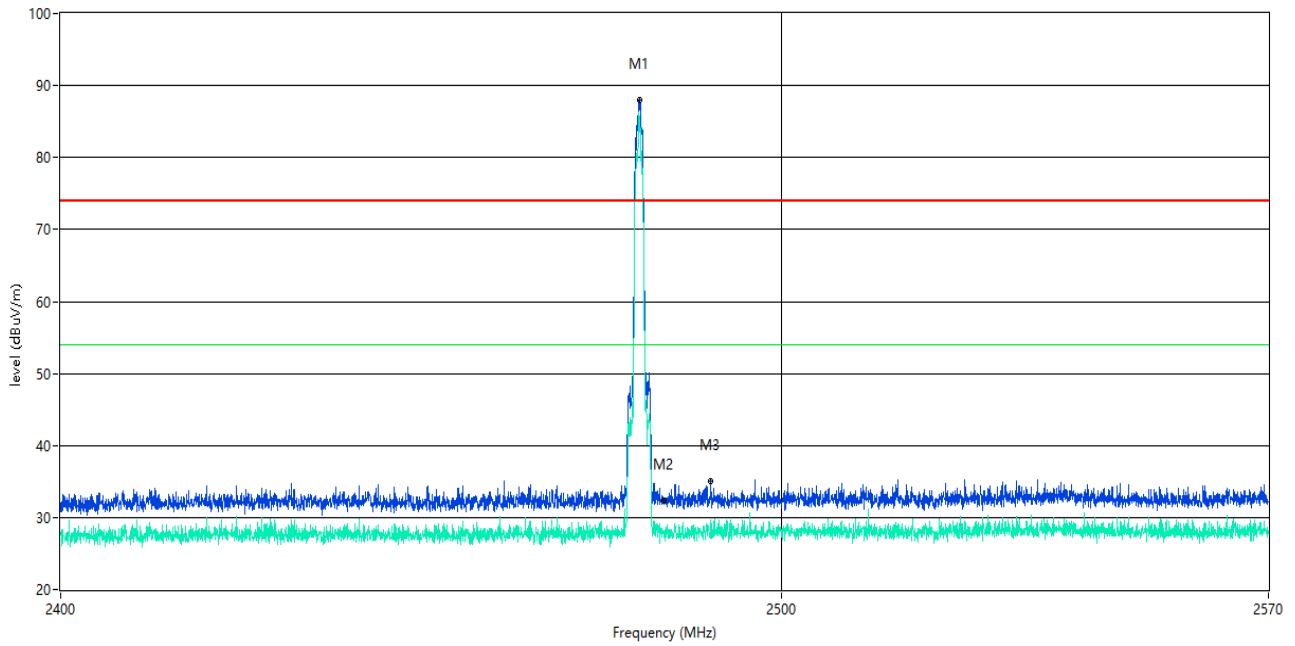
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2390.677	34.02	--	28.9	2.01	74.0	--	54.0	25.10	82.70	150	Horizontal	Pass
2400.000	34.68	--	29.0	1.85	74.0	--	54.0	25.00	88.95	150	Horizontal	Pass
2402.124	92.11	--	89.1	1.91	74.0	--	54.0	-35.10	41.70	150	Horizontal	N.A

8-DPSK HIGH CHANNEL, ANT V



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2479.965	86.34	--	80.0	2.70	74.0	--	54.0	-26.00	3.00	150	Vertical	N.A
2483.500	32.09	--	27.1	2.71	74.0	--	54.0	26.90	115.66	150	Vertical	Pass
2488.675	34.68	--	26.9	2.71	74.0	--	54.0	27.10	3.00	150	Vertical	Pass

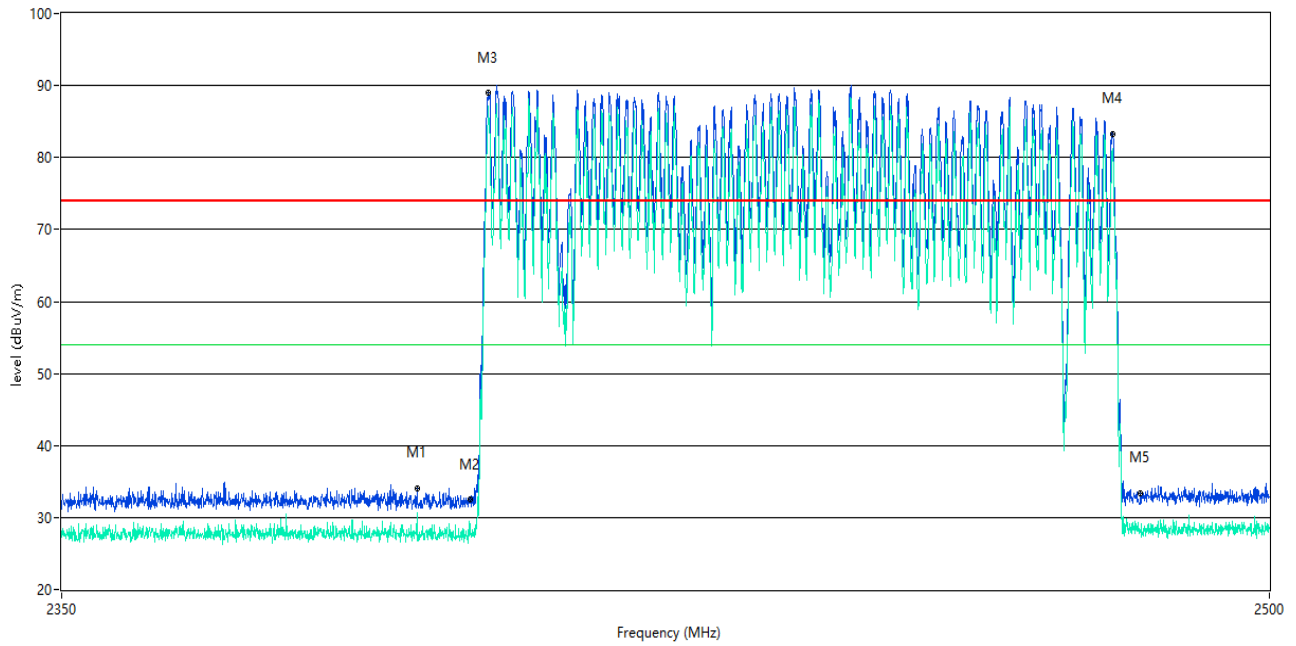
8-DPSK HIGH CHANNEL, ANT H



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2480.092	87.93	--	83.6	2.70	74.0	--	54.0	-29.60	33.30	150	Horizontal	N.A
2483.500	32.34	--	28.0	2.71	74.0	--	54.0	26.00	55.88	150	Horizontal	Pass
2490.035	35.12	--	29.7	2.71	74.0	--	54.0	24.30	98.50	150	Horizontal	Pass

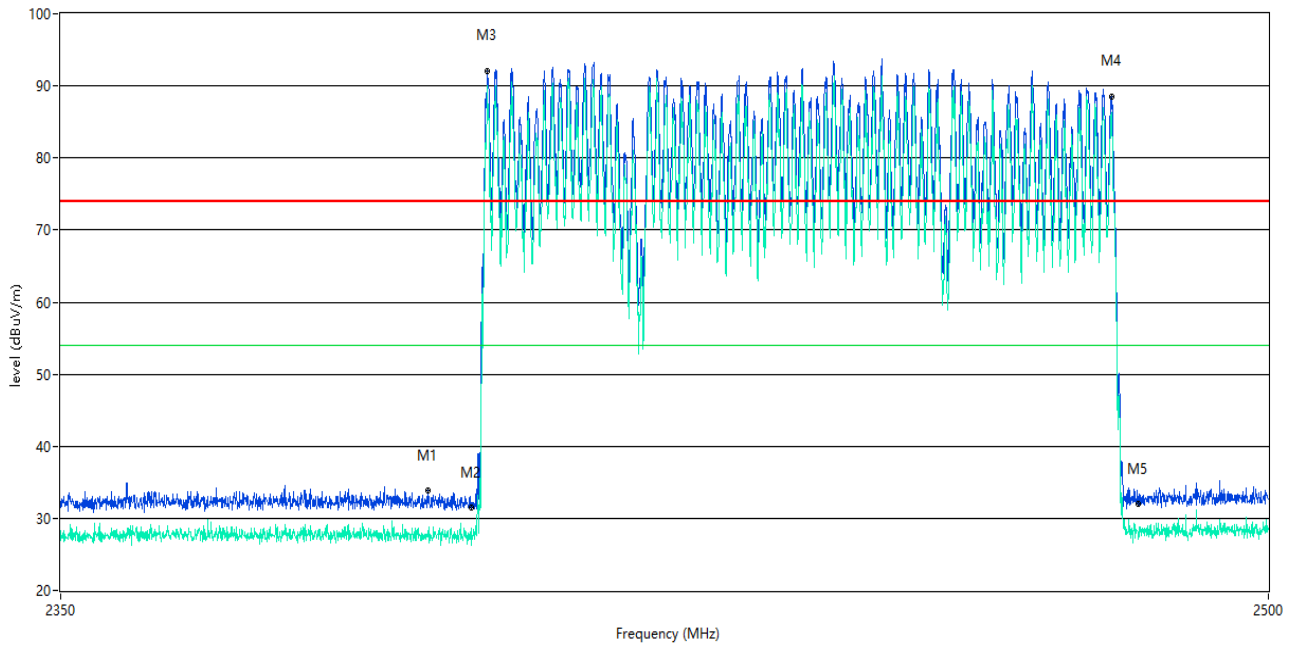
Hopping Mode:

GFSK LOW CHANNEL, ANT V



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2393.177	33.99	--	30.6	1.95	74.0	--	54.0	23.40	1.20	150	Vertical	Pass
2400.000	32.45	--	28.0	1.85	74.0	--	54.0	26.00	146.95	150	Vertical	Pass
2401.975	88.98	--	87.0	1.91	74.0	--	54.0	-33.00	78.80	150	Vertical	N.A
2480.005	83.25	--	80.9	2.70	74.0	--	54.0	-26.90	96.60	150	Vertical	N.A
2483.500	33.20	--	28.1	2.71	74.0	--	54.0	25.90	139.42	150	Vertical	Pass

GFSK LOW CHANNEL, ANT H



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2394.576	33.81	--	28.4	1.91	74.0	--	54.0	25.60	166.30	150	Horizontal	Pass
2400.000	31.48	--	26.8	1.85	74.0	--	54.0	27.20	99.80	150	Horizontal	Pass
2401.925	92.12	--	88.5	1.91	74.0	--	54.0	-34.50	116.10	150	Horizontal	N.A
2479.955	88.52	--	86.3	2.70	74.0	--	54.0	-32.30	29.90	150	Horizontal	N.A
2483.500	31.97	--	27.6	2.71	74.0	--	54.0	26.40	323.10	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-EC18B0146-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-EC18B0146-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-EC18B0146-AI.PDF”.

--END OF REPORT--