

**CFR 47 FCC PART 15 SUBPART C
ISED RSS-247 Issue 3**

TEST REPORT

For

Milo

MODEL NUMBER: M01

FCC ID: 2A6M9-MV01

IC: 28476-MV01

REPORT NUMBER: 4790849656-4

ISSUE DATE: January 12, 2024

Prepared for

**Loose Cannon Systems, Inc.
PO Box 1447, Ross, CA. 94957 USA**

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	1/12/2023	Initial Issue	

Note: This report is based on 4790371944-10 which is issued by UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch on July 18, 2022. The EUT had already applied for the FCC ID & IC ID, the customer added the new Bit Rates and updated the channel list. The RF technical construction including circuit diagram, PCB Layout, components, component layout and performance does not change. All the Bit Rates have been tested in this report.

Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
Antenna Requirement	N/A	FCC Part 15.203/15.247 (c) RSS-GEN Clause 6.8	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
Conducted Output Power	ANSI C63.10-2013, Clause 11.9.1.3	FCC Part 15.247 (b)(3) RSS-247 Clause 5.4 (d)	Pass
6dB Bandwidth and 99% Occupied Bandwidth	ANSI C63.10-2013, Clause 11.8.1	FCC Part 15.247 (a)(2) RSS-247 Clause 5.2 (a) ISED RSS-Gen Clause 6.7	Pass
Power Spectral Density	ANSI C63.10-2013, Clause 11.10.2	FCC Part 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
Conducted Band edge and spurious emission	ANSI C63.10-2013, Clause 11.11	FCC Part 15.247(d) RSS-247 Clause 5.5	Pass
Radiated Band edge and Spurious Emission	ANSI C63.10-2013, Clause 11.12 & Clause 11.13	FCC Part 15.247 (d) FCC Part 15.205/15.209 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
Duty Cycle	ANSI C63.10-2013, Clause 11.6	None; for reporting purposes only.	Pass

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C><ISED RSS-247 Issue 3> when <Simple Acceptance> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Loose Cannon Systems, Inc.
Address: PO Box 1447, Ross, CA. 94957 USA

Manufacturer Information

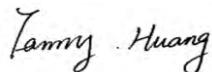
Company Name: Loose Cannon Systems, Inc.
Address: PO Box 1447, Ross, CA. 94957 USA

EUT Information

EUT Name: Milo
Model: M01
Brand: 
Sample Received Date: May 6, 2023
Sample Status: Normal
Sample ID: 6728894
Date of Tested: May 6, 2023~ January 12, 2024

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C ISED RSS-247 Issue 3	Pass

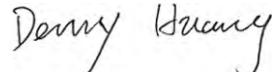
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2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C ISED RSS-247 Issue 3, KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, ANSI C63.10-2013 and ISED RSS-GEN Issue 5.

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>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>ISED (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 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p>VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202) 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.</p> <p>Facility Name: Chamber D, the VCCI registration No. is G-20192 and R-20202 Shielding Room B, the VCCI registration No. is C-20153 and T-20155</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, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of 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.

Note 3:

For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.

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
Conduction emission	3.62 dB
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB
Radiated Emission (Included Fundamental Emission) (1 GHz to 26 GHz)	5.78 dB (1 GHz ~ 18 GHz) 5.23 dB (18 GHz ~ 26 GHz)
Duty Cycle	±0.028%
DTS and 99% Occupied Bandwidth	±0.0196%
Maximum Conducted Output Power	±0.686 dB
Maximum Power Spectral Density Level	±0.743 dB
Conducted Band-edge Compliance	±1.328 dB
Conducted Unwanted Emissions In Non-restricted Frequency Bands	±0.746 dB (9 kHz ~ 1 GHz) ±1.328dB (1 GHz ~ 26 GHz)
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

EUT Name	Milo
Model	M01
Power Supply	DC 5 V

Note: The product has 3 power supply modes: battery (DC 3.7 V), USB (DC 5 V), AC adapter, we had pre-scan for all the 3 modes, and only the worst data for DC 5 V supply are recorded in the report.

Test Mode	Modulation	Bit Rate	Operation Frequency	Number of Channels
FCC.SubG.2GFSK.640kbps		640 kbps	902.9 MHz- 927.1 MHz	21
FCC.SubG.2GFSK.1000kbps		1000 kbps	903.24 MHz- 926.76 MHz	15
FCC.SubG.2GFSK.1600kbps		1600 kbps	903.905 MHz- 926.095 MHz	8
FCC.SubG.2GFSK.2000kbps		2000 kbps	904.38 MHz- 925.62 MHz	7

5.2. CHANNEL LIST

Channel List for FCC.SubG.2GFSK.640kbps

Channel	Frequency (MHz)								
11	902.9	16	908.95	21	915	26	921.05	31	927.1
12	904.11	17	910.16	22	916.21	27	922.26	/	/
13	905.32	18	911.37	23	917.42	28	923.47	/	/
14	906.53	19	912.58	24	918.63	29	924.68	/	/
15	907.74	20	913.79	25	919.84	30	925.89	/	/

Channel List for FCC.SubG.2GFSK.1000kbps

Channel	Frequency (MHz)								
11	903.24	14	908.28	17	913.32	20	918.36	23	923.4
12	904.92	15	909.96	18	915	21	920.04	24	925.08
13	906.6	16	911.64	19	916.68	22	921.72	25	926.76

Channel List for FCC.SubG.2GFSK.1600kbps

Channel	Frequency (MHz)								
11	903.905	13	910.245	15	916.585	17	922.925	/	/
12	907.075	14	913.415	16	919.755	18	926.095	/	/

Channel List for FCC.SubG.2GFSK.2000kbps

Channel	Frequency (MHz)								
11	904.38	13	911.46	15	918.54	17	925.62	/	/
12	907.92	14	915	16	922.08	/	/	/	/

5.3. MAXIMUM POWER

Test Mode	Modulation	Bit Rate	Operation Frequency	Maximum Conducted AVG Output Power (dBm)
FCC.SubG.2GFSK.640kbps	2GFSK	640 kbps	902.9 MHz- 927.1 MHz	26.14
FCC.SubG.2GFSK.1000kbps		1000 kbps	903.24 MHz- 926.76 MHz	26.15
FCC.SubG.2GFSK.1600kbps		1600 kbps	903.905 MHz- 926.095 MHz	26.16
FCC.SubG.2GFSK.2000kbps		2000 kbps	904.38 MHz- 925.62 MHz	26.17

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
FCC.SubG.2GFSK.640kbps	CH 11(Low Channel), CH 21(MID Channel), CH 31(High Channel)	902.9 MHz, 914.985 MHz, 927.1 MHz
FCC.SubG.2GFSK.1000kbps	CH 11(Low Channel), CH 18(MID Channel), CH 25(High Channel)	903.24 MHz, 915 MHz, 926.76 MHz
FCC.SubG.2GFSK.1600kbps	CH 11(Low Channel), CH 14(MID Channel), CH 18(High Channel)	903.905 MHz, 913.415 MHz, 926.095 MHz
FCC.SubG.2GFSK.2000kbps	CH 11(Low Channel), CH 14(MID Channel), CH 17(High Channel)	904.38 MHz, 915 MHz, 925.62 MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter					
Test Software		Yukon			
Test Mode	Transmit Antenna Number	Test Software Setting Value			
		Low	Middle	High	
FCC.SubG.2GFSK.640kbps	1	Default	Default	Default	
FCC.SubG.2GFSK.1000kbps	1	Default	Default	Default	
FCC.SubG.2GFSK.1600kbps	1	Default	Default	Default	
FCC.SubG.2GFSK.2000kbps	1	Default	Default	Default	

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency Band (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	902-928	Inverted F	-1.15

Test Mode	Transmit and Receive Mode	Description
FCC.SubG.2GFSK.640kbps	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
FCC.SubG.2GFSK.1000kbps	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
FCC.SubG.2GFSK.1600kbps	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
FCC.SubG.2GFSK.2000kbps	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

Note: The value of the antenna gain was declared by customer.

5.7. SUPPORT UNITS FOR SYSTEM TEST

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N	Remarks
1	PC	Dell	Vostro 3902	8KNDB2	/
2	USB TO UART	/	/	/	/
3	AC Adapter	/	HW-100225C00	/	Input: AC 100-240V, 50/60Hz,0.75A Output: DC 5 V,2A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	/	/	1.0	/

ACCESSORY

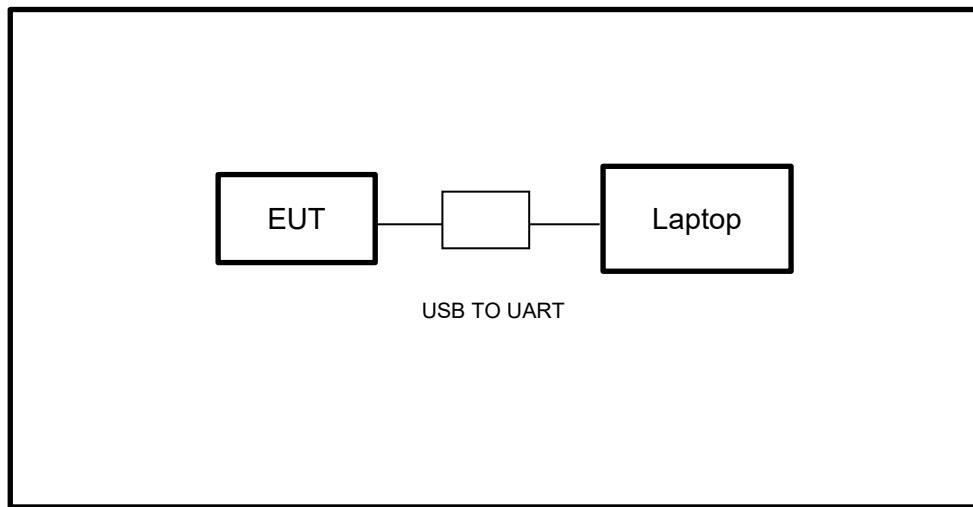
Item	Accessory	Brand Name	Model Name	Description
/	/	/	/	/

TEST SETUP

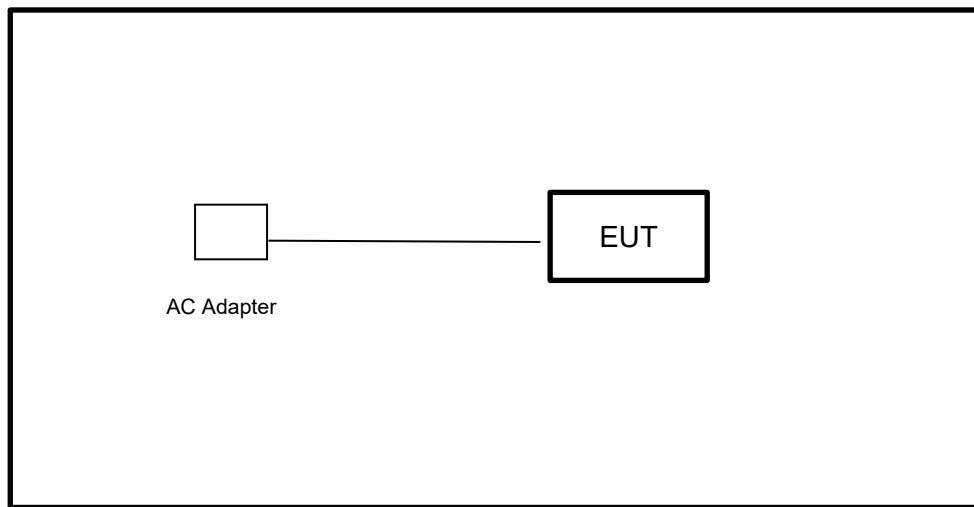
The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS

For others:



For AC POWER LINE CONDUCTED EMISSIONS only:



6. MEASURING EQUIPMENT AND SOFTWARE USED

R&S TS 8997 Test System						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP120	100921	/	Mar.31, 2023	Mar.30, 2024
Vector Signal Generator	R&S	SMBV100A	261637	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Signal Generator	R&S	SMB100A	178553	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Signal Analyzer	R&S	FSV40	101118	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Software						
Description	Manufacturer	Name		Version		
For R&S TS 8997 Test System	Rohde & Schwarz	EMC 32		10.60.10		
Tonsend RF Test System						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Wideband Radio Communication Tester	R&S	CMW500	155523	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Wireless Connectivity Tester	R&S	CMW270	1201.0002N75-102	Sep.28, 2022	Sep.27, 2023	Sep.26, 2024
PXA Signal Analyzer	Keysight	N9030A	MY55410512	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5182B	MY56200284	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5172B	MY56200301	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
DC power supply	Keysight	E3642A	MY55159130	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Temperature & Humidity Chamber	SANMOOD	SG-80-CC-2	2088	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Attenuator	Aglient	8495B	2814a12853	Oct.18, 2022	Oct.12, 2023	Oct.11, 2024
RF Control Unit	Tonsend	JS0806-2	23B80620666	/	April 18,2023	April 17,2024
Software						
Description	Manufacturer	Name		Version		
Tonsend SRD Test System	Tonsend	JS1120-3 RF Test System		V3.2.22		

Conducted Emissions						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
EMI Test Receiver	R&S	ESR3	101961	Oct.17, 2022	Oct.13, 2023	Oct.12, 2024
Two-Line V-Network	R&S	ENV216	101983	Oct.17, 2022	Oct.13, 2023	Oct.12, 2024
Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Oct.17, 2022	Oct.13, 2023	Oct.12, 2024
Software						
Description		Manufacturer		Name	Version	
Test Software for Conducted Emissions		Farad		EZ-EMC	Ver. UL-3A1	

Radiated Emissions						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	/	Aug.02, 2021	Aug.01, 2024
Preamplifier	HP	8447D	2944A09099	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
EMI Measurement Receiver	R&S	ESR26	101377	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Horn Antenna	TDK	HRN-0118	130940	/	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Horn Antenna	Schwarzbeck	BBHA9170	697	/	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-2	TRS-307-00003	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Preamplifier	TDK	PA-02-3	TRS-308-00002	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Loop antenna	Schwarzbeck	1519B	00008	/	Dec.14, 2021	Dec.13, 2024
Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Preamplifier	Mini-Circuits	ZX60-83LN-S+	SUP01202035	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Dec.01,2022	Oct.12, 2023	Oct.11, 2024

Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	4	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCJV20-5120-5150-5350-5380-60SS	2	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCD5-1879-1879.85-1880.15-1881-40SS	1	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Notch Filter	Wainwright	WHJ10-882-980-7000-40SS	1	Dec.01,2022	Oct.12, 2023	Oct.11, 2024
Software						
Description		Manufacturer	Name	Version		
Test Software for Radiated Emissions		Farad	EZ-EMC	Ver. UL-3A1		

Other Instrument						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.22, 2022	Oct.19, 2023	Oct.18, 2024
Barometer	Yiyi	Baro	N/A	Oct.24, 2022	Oct.19, 2023	Oct.18, 2024
Attenuator	Agilent	8495B	2814a12853	Oct.18, 2022	Oct.12, 2023	Oct.11, 2024
Power Sensor	Keysight	USB Wideband Power Sensor	MY5100022	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024

Other Instruments					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Dual Channel Power Meter	Keysight	N1912A	MY55416024	Oct.30, 2021	Oct.29, 2022
Power Sensor	Keysight	USB Wideband Power Sensor	MY5100022	Oct.30, 2021	Oct.29, 2022
Signal Analyzer	R&S	FSV40	101118	Oct.30, 2021	Oct.29, 2022

7. ANTENNA PORT TEST RESULTS

7.1. CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3) ISED RSS-247 5.4 (d)	AVG Conduct Output Power	1 watt or 30 dBm	902 - 928

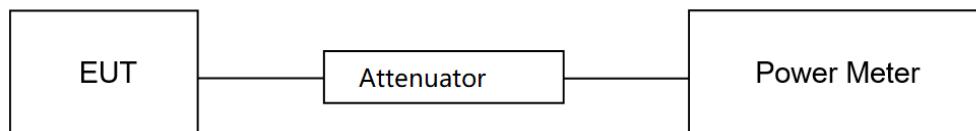
TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).

Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

The test result in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.8 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

TEST RESULTS

Please refer to section "Test Data" - Appendix C1-C4

7.2. 6DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6 dB Bandwidth	≥ 500 kHz	902 - 928
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	For reporting purposes only.	902 - 928

TEST PROCEDURE

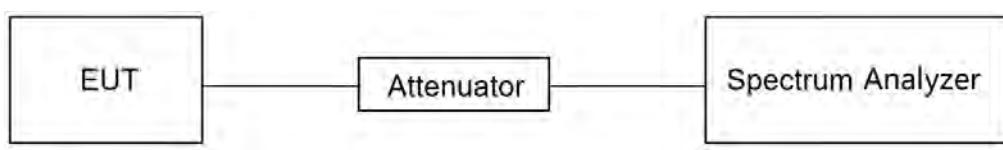
Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

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

Center Frequency	The center frequency of the channel under test
Frequency Span	For 6 dB Bandwidth: Enough to capture all products of the modulation carrier emission For 99 % Occupied Bandwidth: Between 1.5 times and 5.0 times the OBW
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth
VBW	For 6 dB Bandwidth: $\geq 3 \times$ RBW For 99 % Occupied Bandwidth: $\geq 3 \times$ RBW
Trace	Max hold
Sweep	Auto couple

- Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.
- 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 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.8 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

TEST RESULTS

Please refer to section "Test Data" - Appendix A1-A4&B1-B4.

7.3. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm in any 3 kHz band	902 - 928

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.10.5.

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

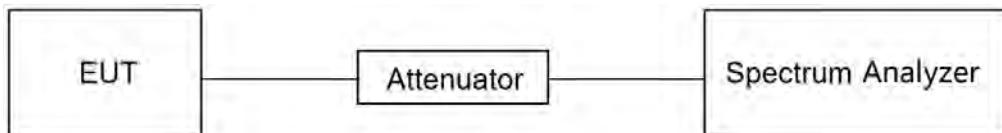
Center Frequency	The center frequency of the channel under test
Detector	power averaging (rms)
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	$1.5 \times \text{OBW}$ bandwidth
Trace	Employ trace averaging(rms)mode over a minimum of 100 traces
Sweep time	Auto couple

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

The test result in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.8 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

TEST RESULTS

Please refer to section "Test Data" - Appendix D1-D4.

7.4. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.11 and 11.13.

Connect the EUT to the spectrum analyzer and use the following settings for reference level measurement:

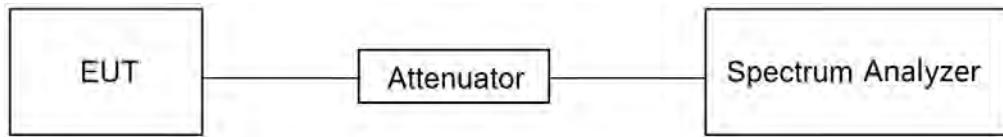
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
measurement points	\geq span/RBW
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11.

TEST SETUP**TEST ENVIRONMENT**

Temperature	23.8 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

TEST RESULTS

Please refer to section "Test Data" - Appendix E1-E4.

7.5. DUTY CYCLE

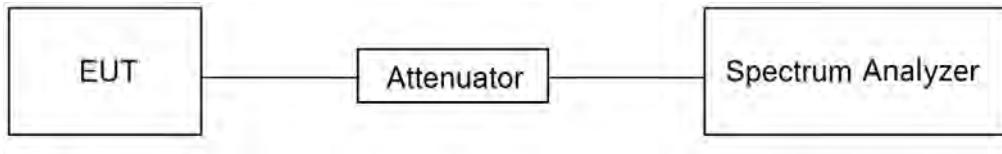
LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.6 Zero – Span Spectrum Analyzer method.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.8 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

TEST RESULTS

Please refer to section "Test Data" - Appendix G1-G4.

8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Please refer to ISED RSS-GEN Clause 8.9 and Clause 8.10.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz ~ 1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz					
Frequency Range (MHz)		Field Strength Limit (uV/m) at 3 m		Field Strength Limit (dBuV/m) at 3 m	
				Quasi-Peak	
30 - 88		100		40	
88 - 216		150		43.5	
216 - 960		200		46	
Above 960		500		54	
Above 1000		500		Peak	Average
				74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
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

ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	Magnetic field strength (H-Field) (μ A/m)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

ISED Restricted bands please refer to ISED RSS-GEN Clause 8.10

Table 7 – Restricted frequency bands ^{Note 1}		
MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.028	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.877 - 5.883	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 38.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2380	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2665 - 2900	
13.36 - 13.41	3280 - 3287	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

FCC Restricted bands of operation refer to FCC §15.205 (a):

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 PROCEDURE

Below 30 MHz

The setting of the spectrum analyzer

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

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
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, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m 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 1 GHz, 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 and average 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 and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.
8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency X kHz resulted in a level of Y dB μ V/m, which is equivalent to $Y-51.5 = Z$ dB μ A/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.
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 80 cm 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 1 GHz, 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.

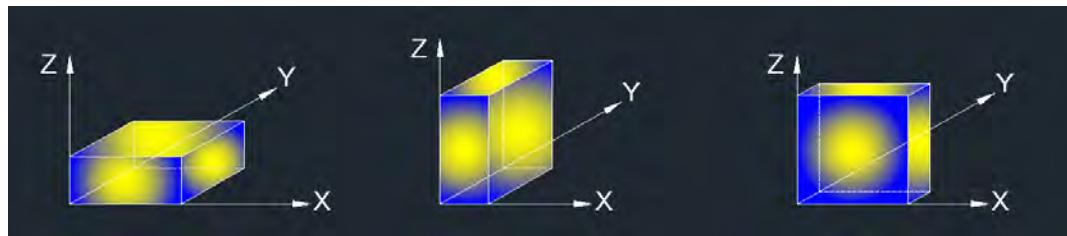
Above 1 GHz

The setting of the spectrum analyzer

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.
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 1.5 m 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 1 GHz, 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 average measurements. For the Duty Cycle please refer to clause 7.5. ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: 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.

Note 2: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

For Radiate Spurious emission (9 kHz ~ 30 MHz):

Note:

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
4. All modes have been tested, but only the worst data was recorded in the report.
5. $\text{dBuA/m} = \text{dBuV/m} - 20\log_{10}[120\pi] = \text{dBuV/m} - 51.5$

For Radiate Spurious Emission (30 MHz ~ 1 GHz):

Note:

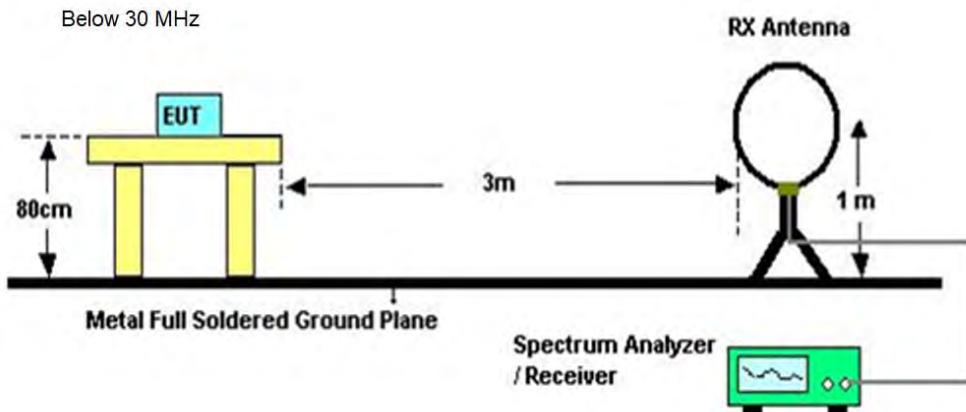
1. Result Level = Read Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
3. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
4. All modes have been tested, but only the worst data was recorded in the report.

For Radiate Spurious Emission (1 GHz ~ 10 GHz):

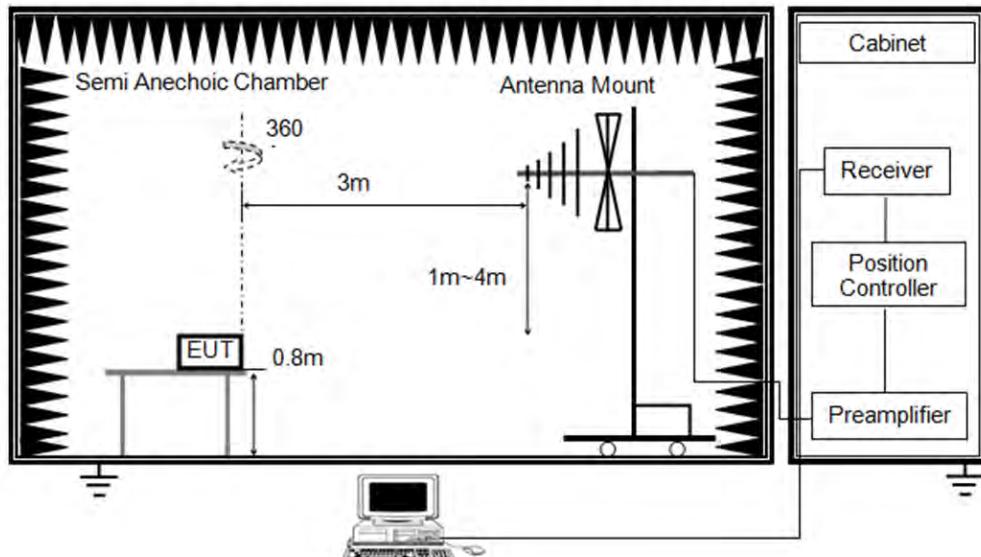
Note:

1. Peak Result = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG: $\text{VBW}=1/\text{Ton}$, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.5.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. All modes have been tested, but only the worst data was recorded in the report.

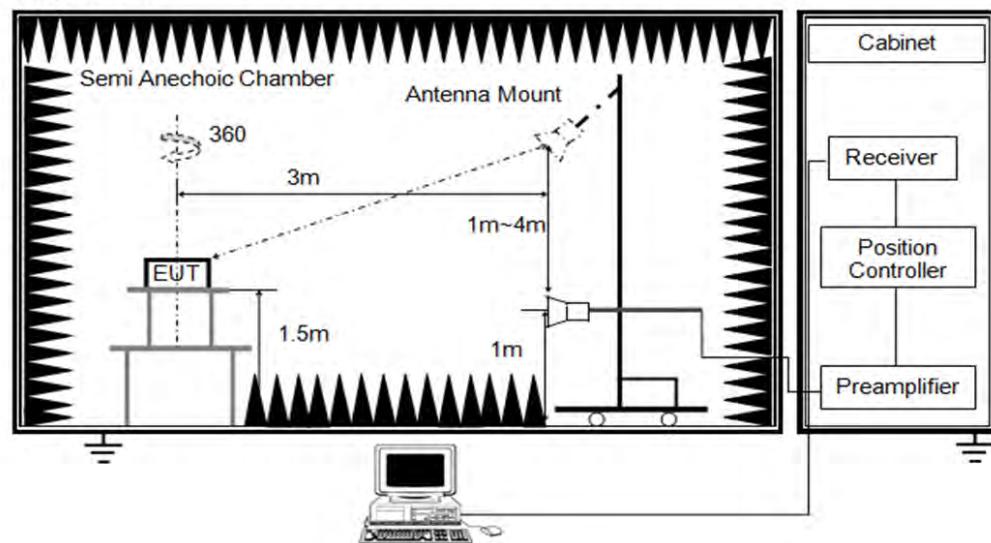
TEST SETUP



Below 1 GHz and above 30 MHz



Above 1 GHz



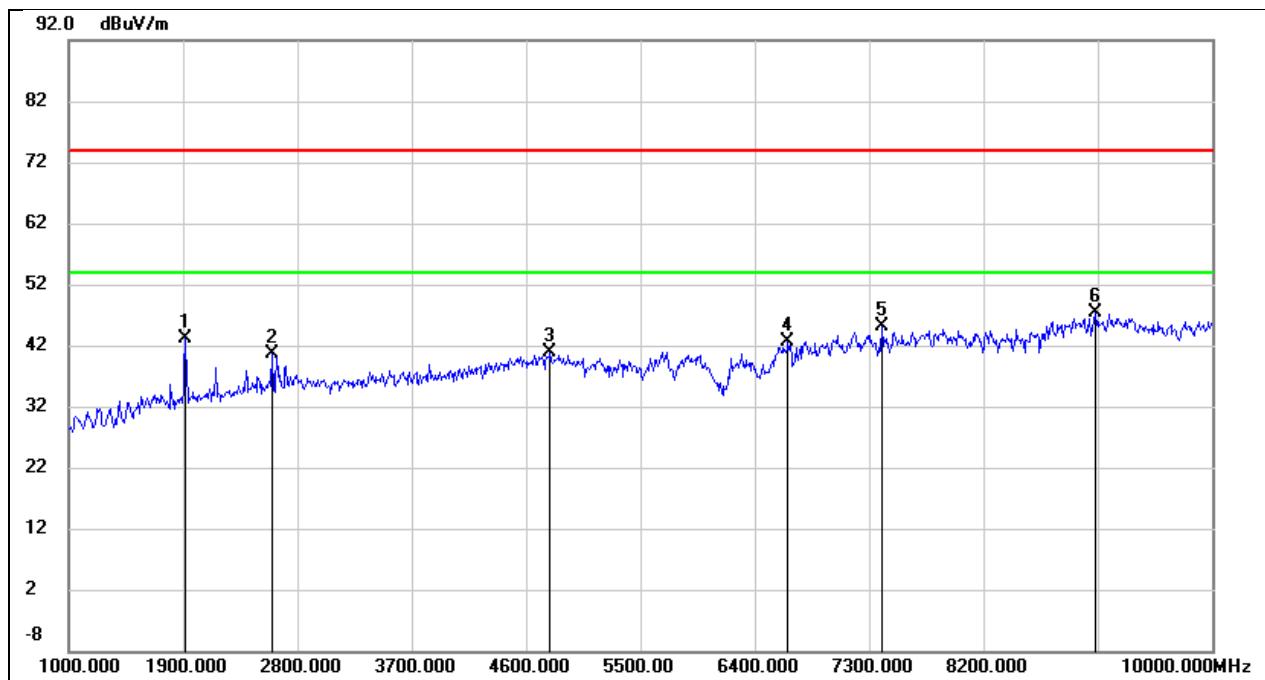
TEST ENVIRONMENT

Temperature	24.2 °C	Relative Humidity	55 %
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST RESULTS

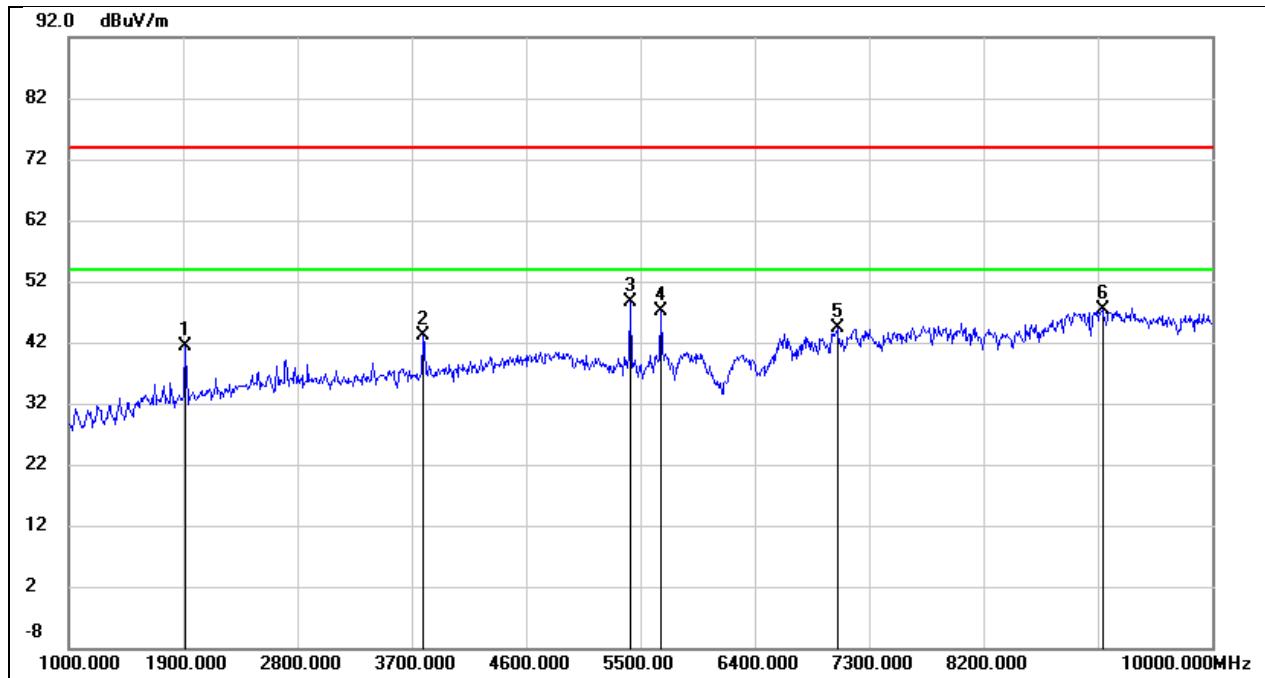
8.1. SPURIOUS EMISSIONS (1 GHZ ~ 10 GHZ)

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Horizontal	Test Voltage:	DC 5 V



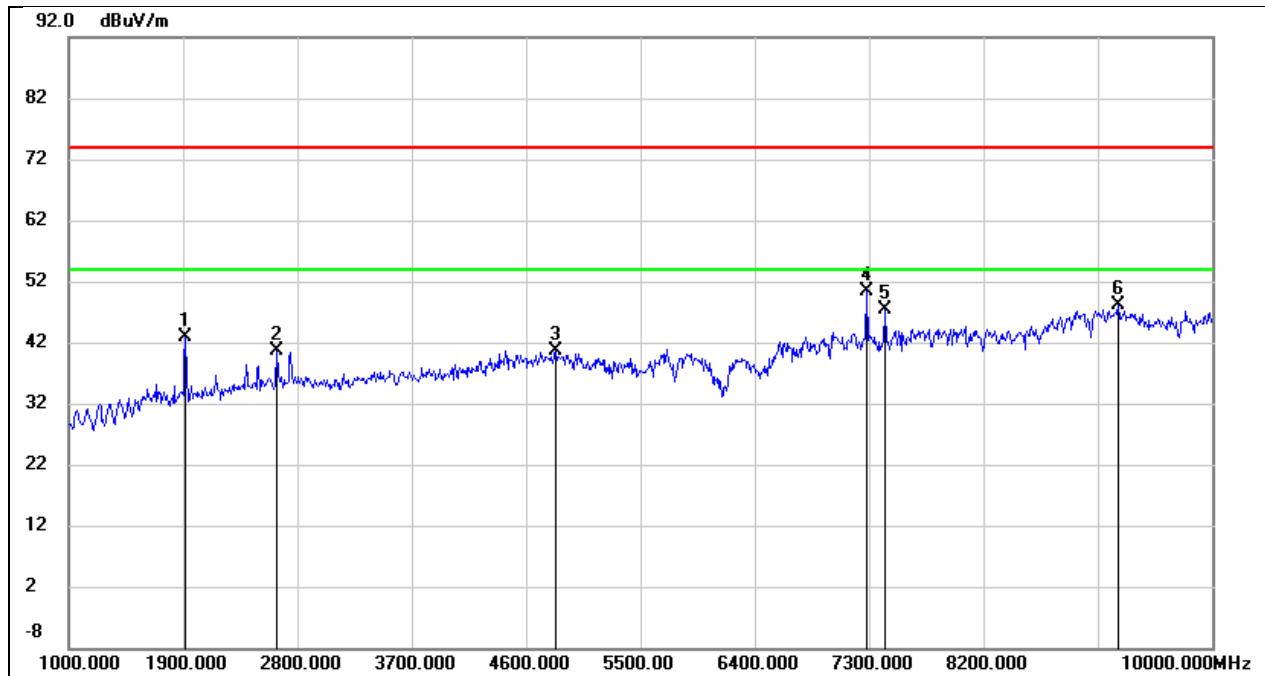
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.46	-11.33	43.13	74.00	-30.87	peak
2	2602.000	48.85	-8.19	40.66	74.00	-33.34	peak
3	4789.000	41.81	-1.00	40.81	74.00	-33.19	peak
4	6661.000	38.05	4.52	42.57	74.00	-31.43	peak
5	7399.000	39.25	5.79	45.04	74.00	-28.96	peak
6	9082.000	37.51	9.77	47.28	74.00	-26.72	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Vertical	Test Voltage:	DC 5 V



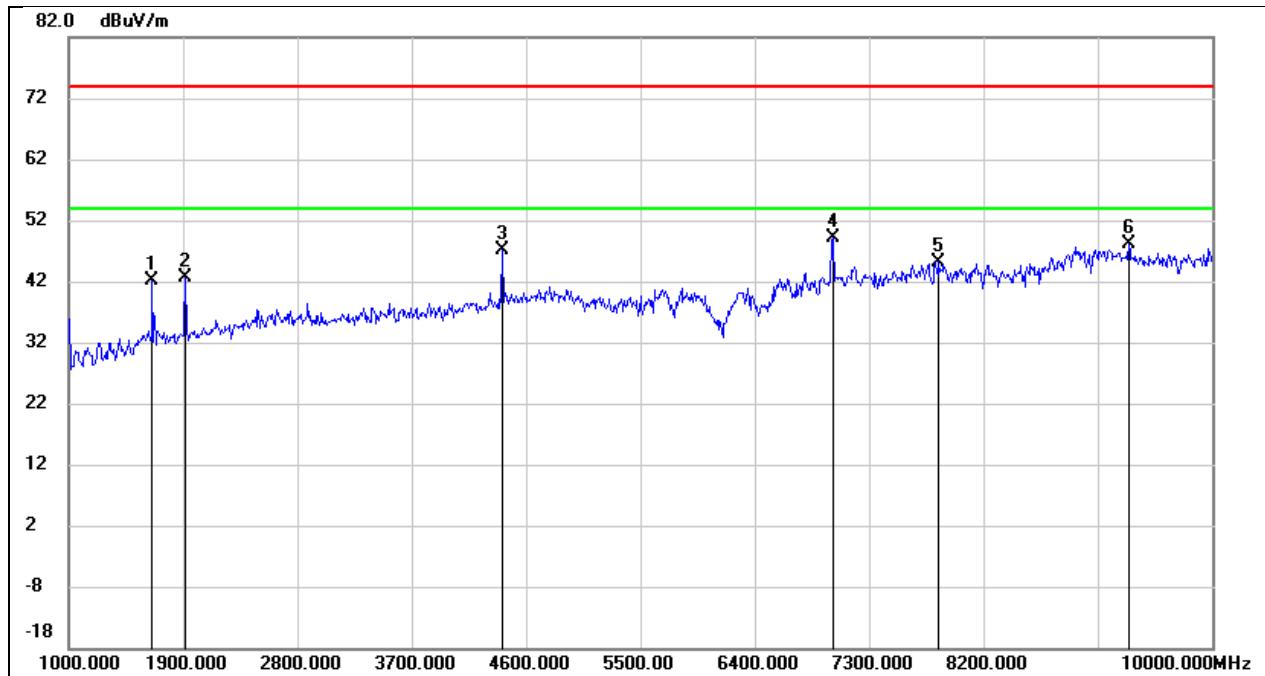
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	52.80	-11.33	41.47	74.00	-32.53	peak
2	3790.000	48.30	-5.06	43.24	74.00	-30.76	peak
3	5419.000	48.42	0.33	48.75	74.00	-25.25	peak
4	5662.000	46.23	0.89	47.12	74.00	-26.88	peak
5	7048.000	38.16	6.16	44.32	74.00	-29.68	peak
6	9136.000	37.59	9.80	47.39	74.00	-26.61	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	914.985
Polarity:	Horizontal	Test Voltage:	DC 5 V



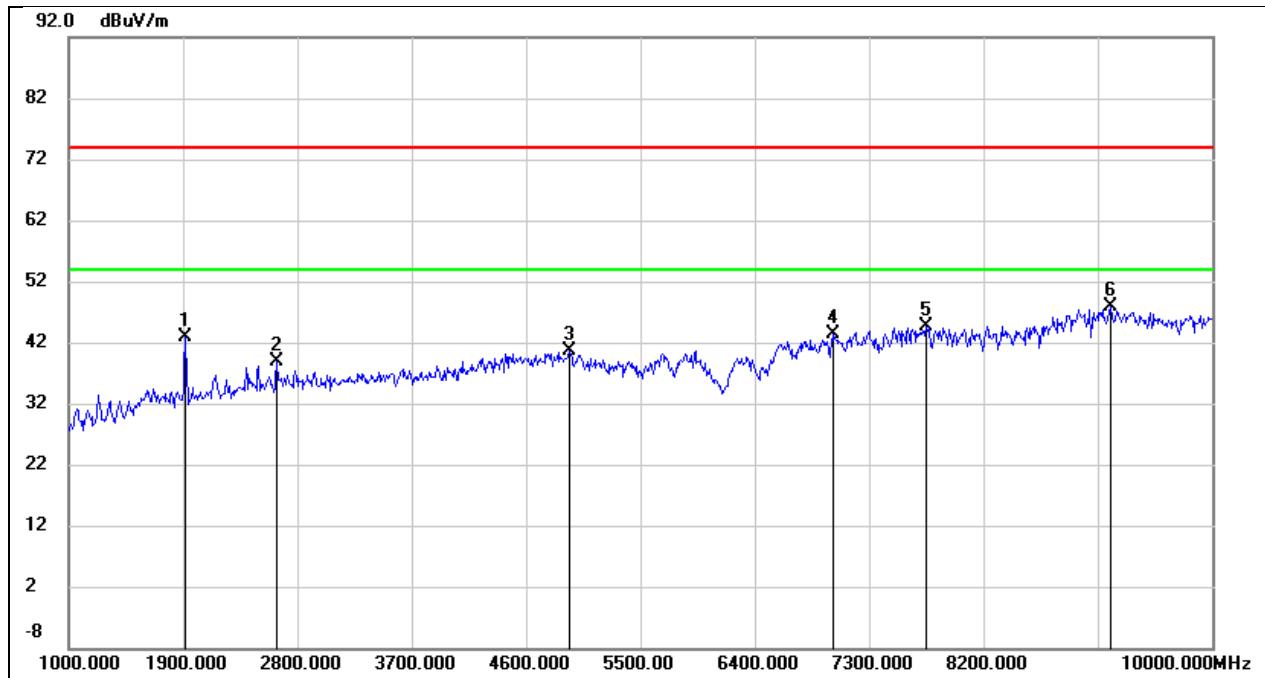
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.26	-11.33	42.93	74.00	-31.07	peak
2	2638.000	48.74	-8.07	40.67	74.00	-33.33	peak
3	4834.000	41.51	-0.81	40.70	74.00	-33.30	peak
4	7282.000	44.43	5.91	50.34	74.00	-23.66	peak
5	7426.000	41.64	5.77	47.41	74.00	-26.59	peak
6	9262.000	38.28	9.84	48.12	74.00	-25.88	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	914.985
Polarity:	Vertical	Test Voltage:	DC 5 V



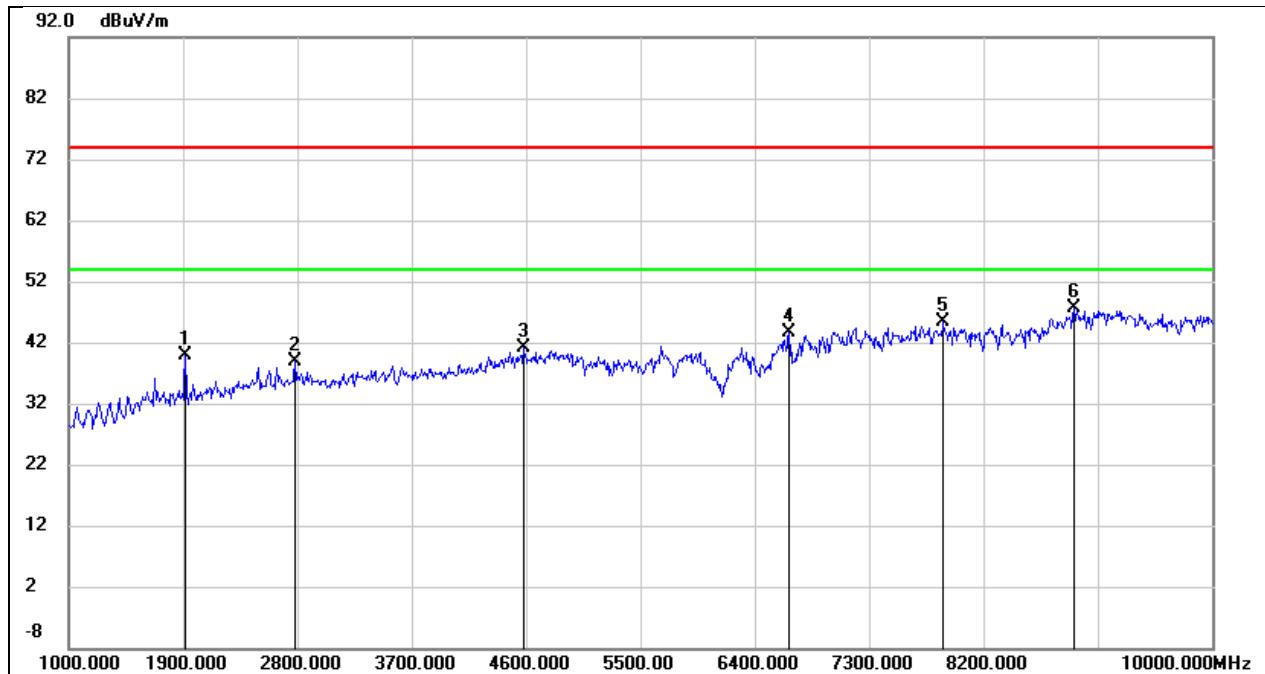
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1657.000	54.41	-12.19	42.22	74.00	-31.78	peak
2	1918.000	54.03	-11.33	42.70	74.00	-31.30	peak
3	4411.000	49.71	-2.56	47.15	74.00	-26.85	peak
4	7012.000	43.00	6.18	49.18	74.00	-24.82	peak
5	7849.000	39.43	5.67	45.10	74.00	-28.90	peak
6	9343.000	38.22	9.88	48.10	74.00	-25.90	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	927.1
Polarity:	Horizontal	Test Voltage:	DC 5 V



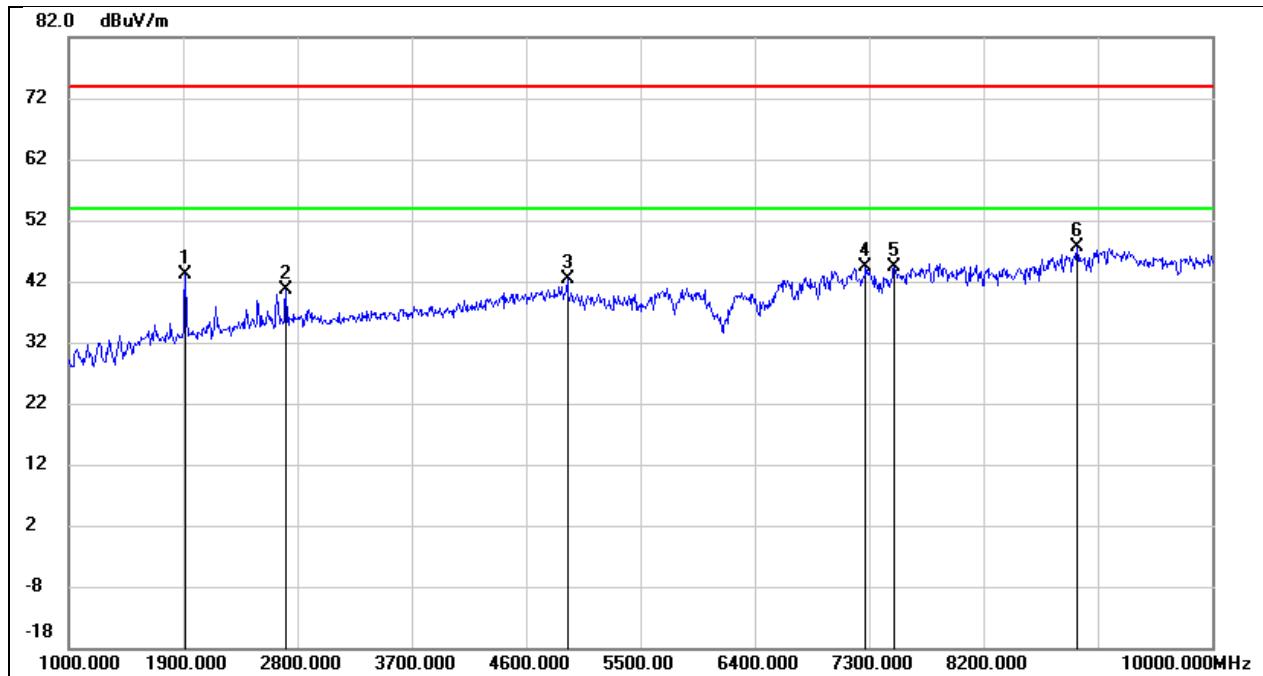
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.17	-11.33	42.84	74.00	-31.16	peak
2	2638.000	46.95	-8.07	38.88	74.00	-35.12	peak
3	4942.000	41.03	-0.38	40.65	74.00	-33.35	peak
4	7021.000	37.08	6.19	43.27	74.00	-30.73	peak
5	7750.000	38.96	5.67	44.63	74.00	-29.37	peak
6	9199.000	38.06	9.82	47.88	74.00	-26.12	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	927.1
Polarity:	Vertical	Test Voltage:	DC 5 V



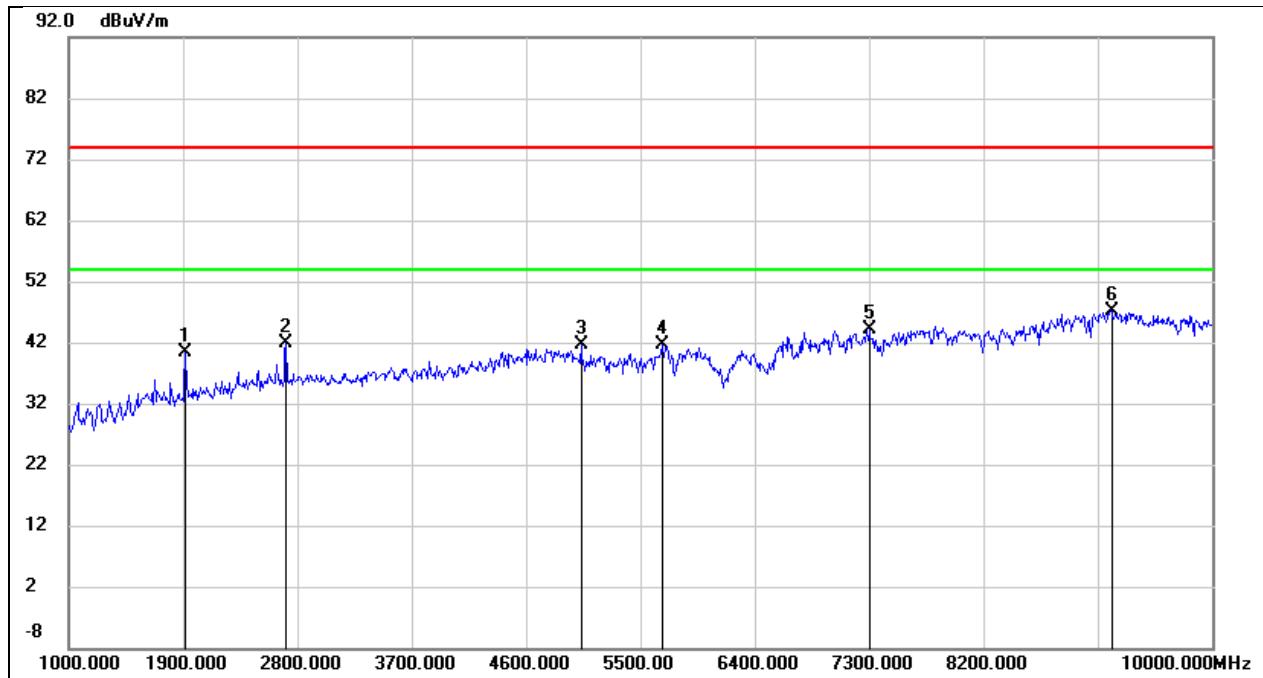
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	51.09	-11.33	39.76	74.00	-34.24	peak
2	2782.000	46.47	-7.63	38.84	74.00	-35.16	peak
3	4582.000	42.88	-1.82	41.06	74.00	-32.94	peak
4	6670.000	39.01	4.57	43.58	74.00	-30.42	peak
5	7885.000	39.83	5.66	45.49	74.00	-28.51	peak
6	8911.000	38.47	9.11	47.58	74.00	-26.42	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	903.24
Polarity:	Horizontal	Test Voltage:	DC 5 V



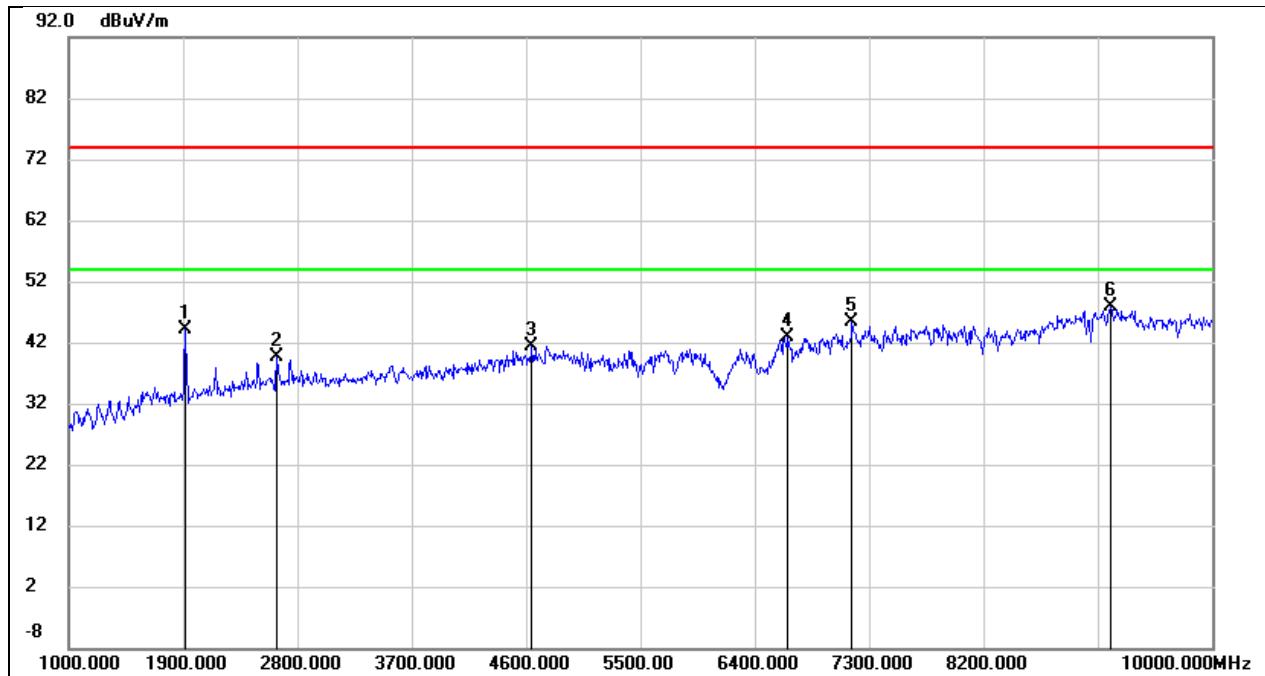
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.52	-11.33	43.19	74.00	-30.81	peak
2	2710.000	48.43	-7.85	40.58	74.00	-33.42	peak
3	4924.000	42.74	-0.45	42.29	74.00	-31.71	peak
4	7273.000	38.46	5.92	44.38	74.00	-29.62	peak
5	7498.000	38.77	5.69	44.46	74.00	-29.54	peak
6	8938.000	38.27	9.31	47.58	74.00	-26.42	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	903.24
Polarity:	Vertical	Test Voltage:	DC 5 V



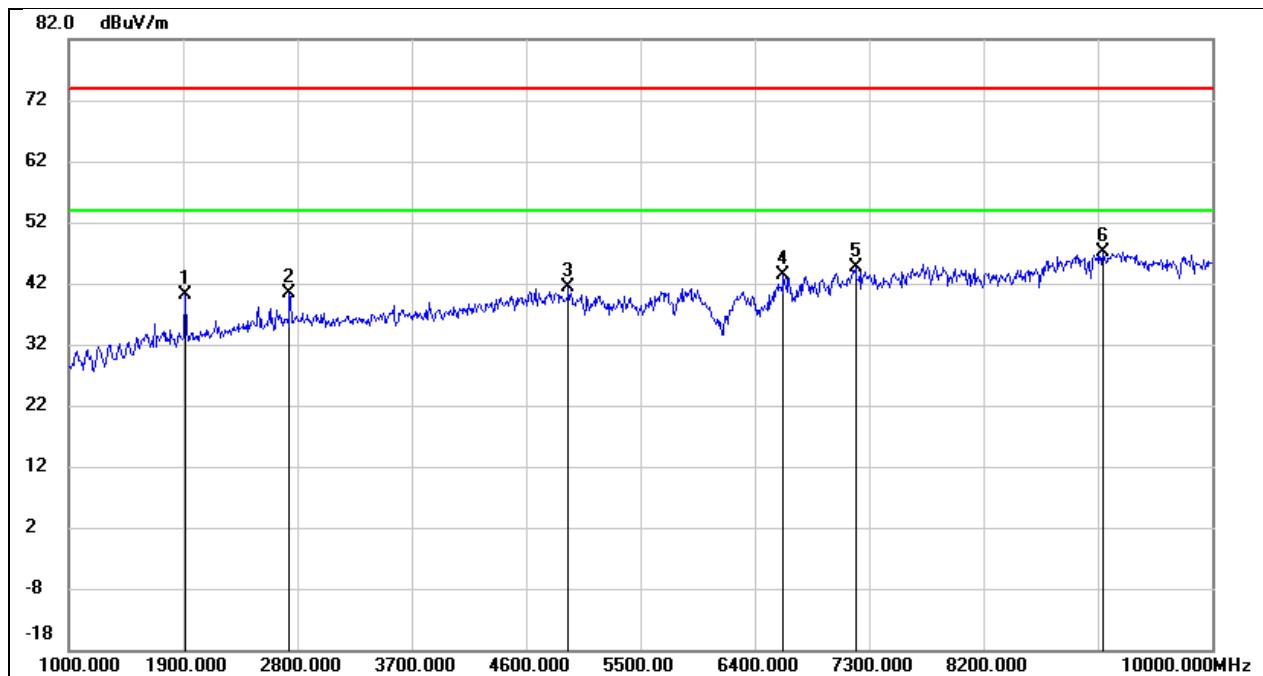
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	51.83	-11.33	40.50	74.00	-33.50	peak
2	2710.000	49.69	-7.85	41.84	74.00	-32.16	peak
3	5032.000	41.72	-0.12	41.60	74.00	-32.40	peak
4	5671.000	40.79	0.91	41.70	74.00	-32.30	peak
5	7300.000	38.22	5.89	44.11	74.00	-29.89	peak
6	9208.000	37.37	9.82	47.19	74.00	-26.81	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	915
Polarity:	Horizontal	Test Voltage:	DC 5 V



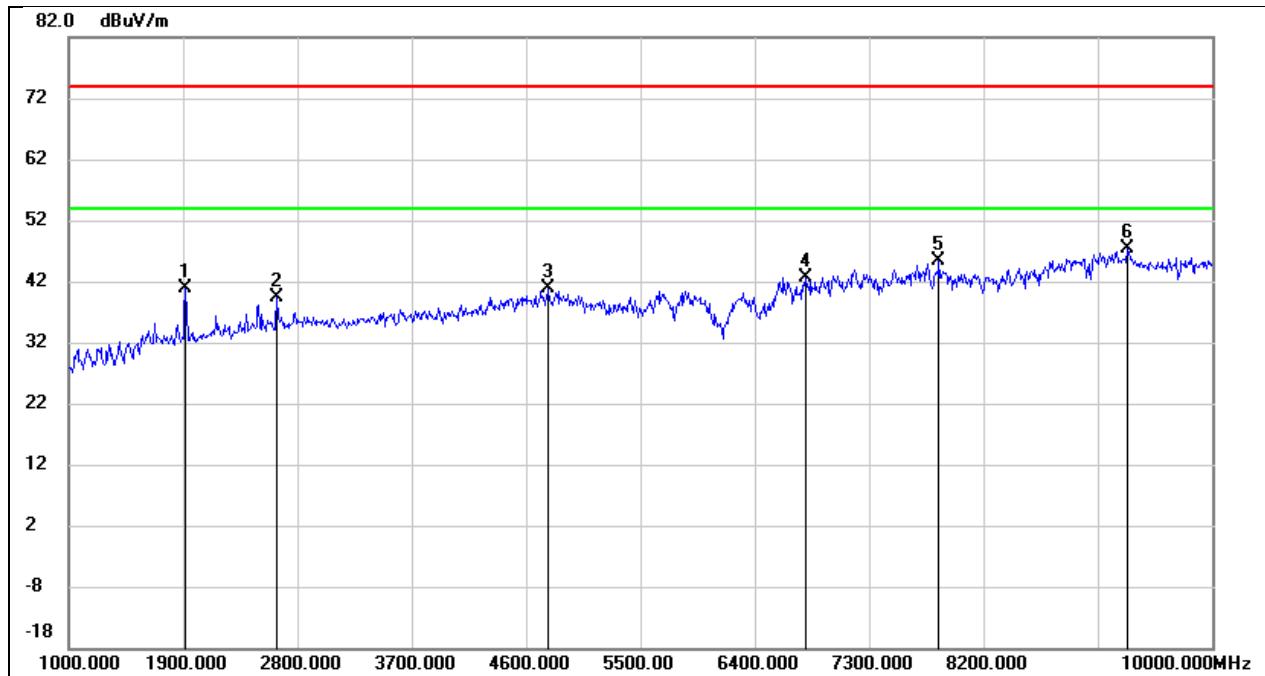
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	55.54	-11.33	44.21	74.00	-29.79	peak
2	2638.000	47.60	-8.07	39.53	74.00	-34.47	peak
3	4645.000	42.87	-1.57	41.30	74.00	-32.70	peak
4	6661.000	38.45	4.52	42.97	74.00	-31.03	peak
5	7165.000	39.27	6.03	45.30	74.00	-28.70	peak
6	9199.000	38.14	9.82	47.96	74.00	-26.04	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	915
Polarity:	Vertical	Test Voltage:	DC 5 V



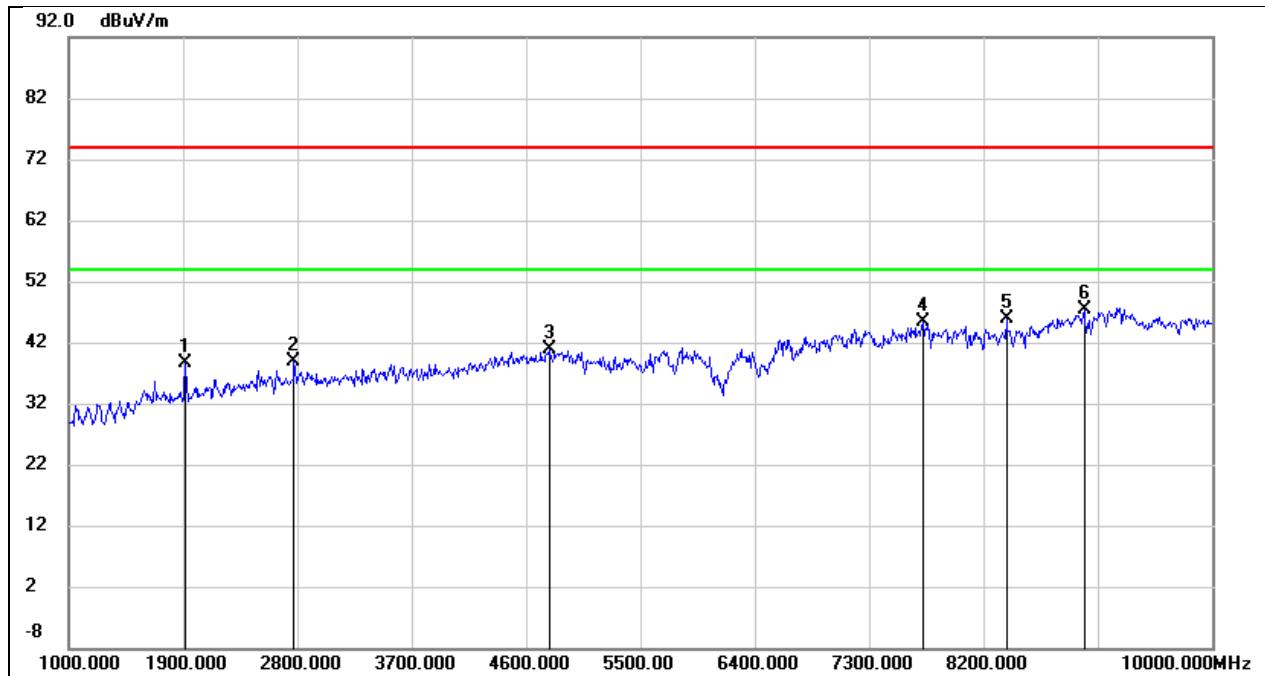
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	51.50	-11.33	40.17	74.00	-33.83	peak
2	2737.000	48.23	-7.77	40.46	74.00	-33.54	peak
3	4933.000	41.82	-0.42	41.40	74.00	-32.60	peak
4	6625.000	39.14	4.35	43.49	74.00	-30.51	peak
5	7192.000	38.70	6.00	44.70	74.00	-29.30	peak
6	9136.000	37.34	9.80	47.14	74.00	-26.86	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	926.76
Polarity:	Horizontal	Test Voltage:	DC 5 V



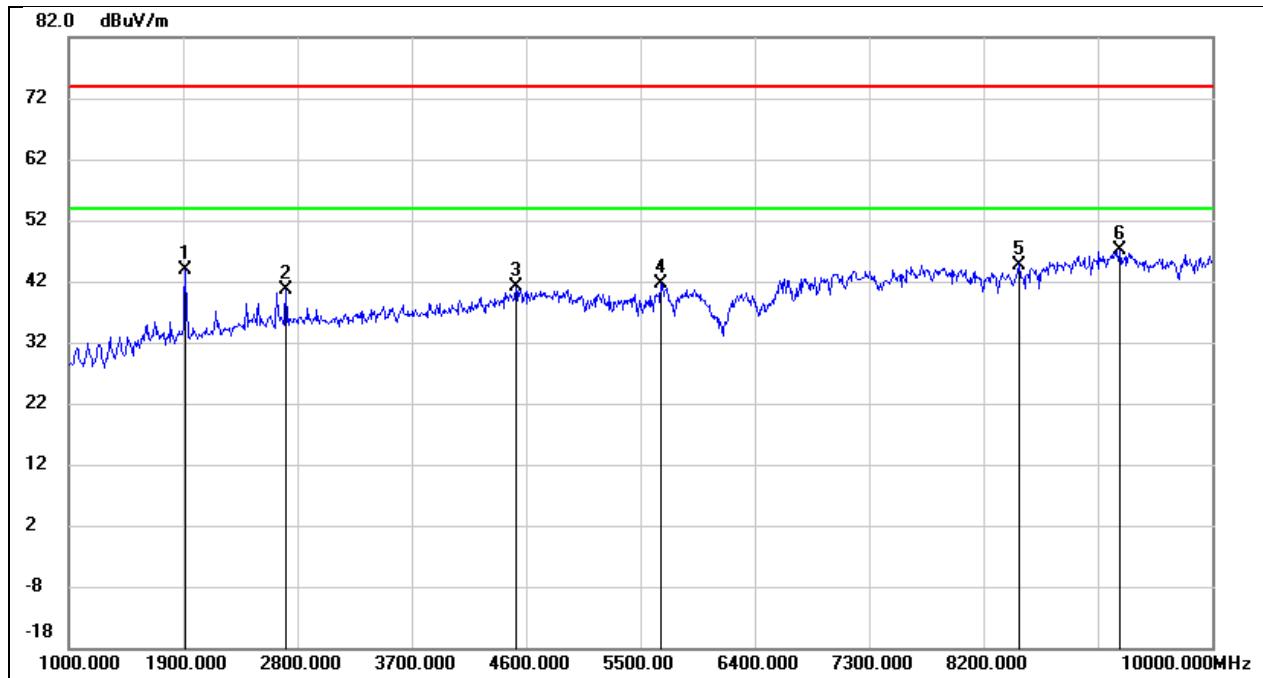
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	52.21	-11.33	40.88	74.00	-33.12	peak
2	2638.000	47.53	-8.07	39.46	74.00	-34.54	peak
3	4771.000	41.99	-1.06	40.93	74.00	-33.07	peak
4	6796.000	37.43	5.19	42.62	74.00	-31.38	peak
5	7849.000	39.71	5.67	45.38	74.00	-28.62	peak
6	9334.000	37.50	9.87	47.37	74.00	-26.63	peak

Test Mode:	SubG.2GFSK.1000kbps	Frequency(MHz):	926.76
Polarity:	Vertical	Test Voltage:	DC 5 V



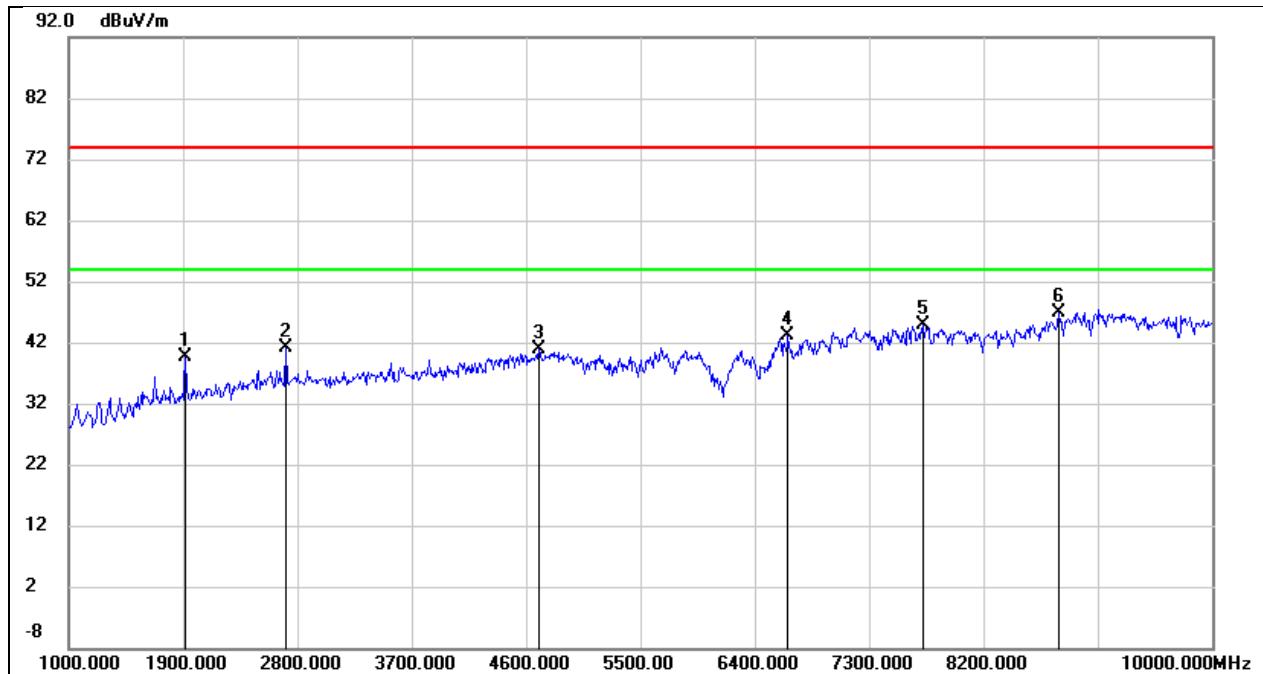
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	50.05	-11.33	38.72	74.00	-35.28	peak
2	2773.000	46.60	-7.67	38.93	74.00	-35.07	peak
3	4780.000	41.84	-1.02	40.82	74.00	-33.18	peak
4	7723.000	39.65	5.67	45.32	74.00	-28.68	peak
5	8380.000	39.87	6.09	45.96	74.00	-28.04	peak
6	8992.000	37.63	9.68	47.31	74.00	-26.69	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	903.905
Polarity:	Horizontal	Test Voltage:	DC 5 V



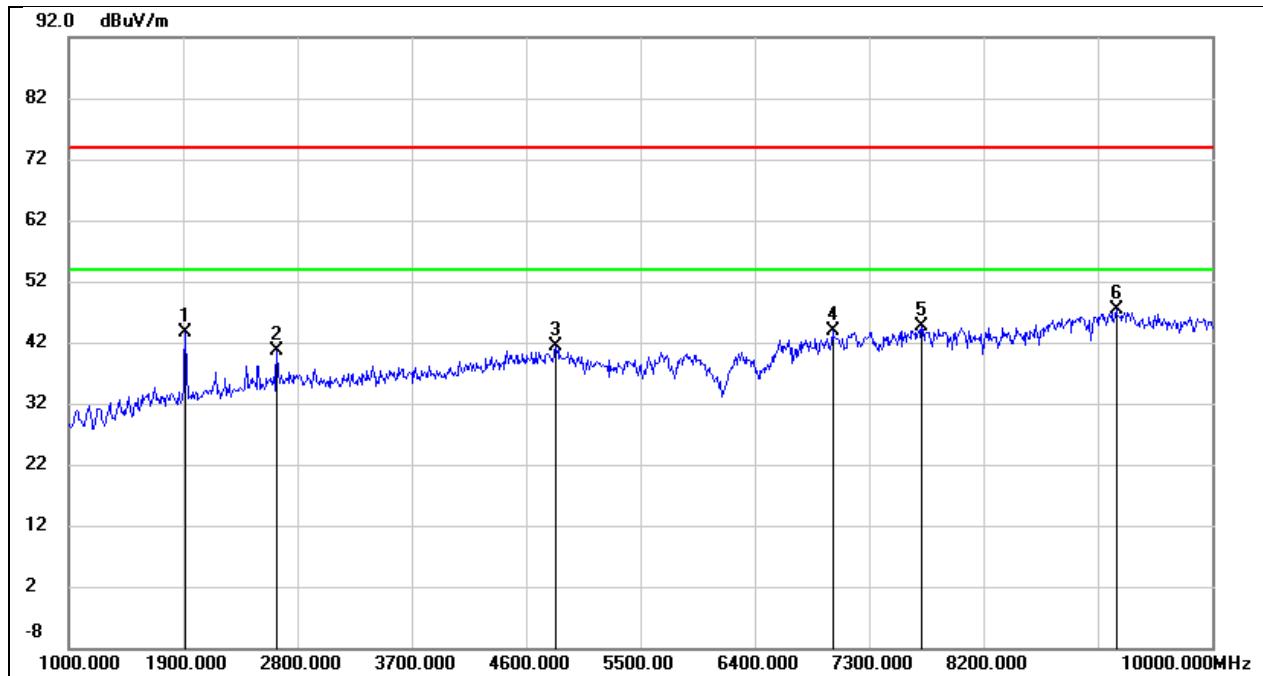
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	55.29	-11.33	43.96	74.00	-30.04	peak
2	2710.000	48.59	-7.85	40.74	74.00	-33.26	peak
3	4519.000	43.14	-2.06	41.08	74.00	-32.92	peak
4	5662.000	40.75	0.89	41.64	74.00	-32.36	peak
5	8479.000	38.54	6.21	44.75	74.00	-29.25	peak
6	9271.000	37.29	9.84	47.13	74.00	-26.87	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	903.905
Polarity:	Vertical	Test Voltage:	DC 5 V



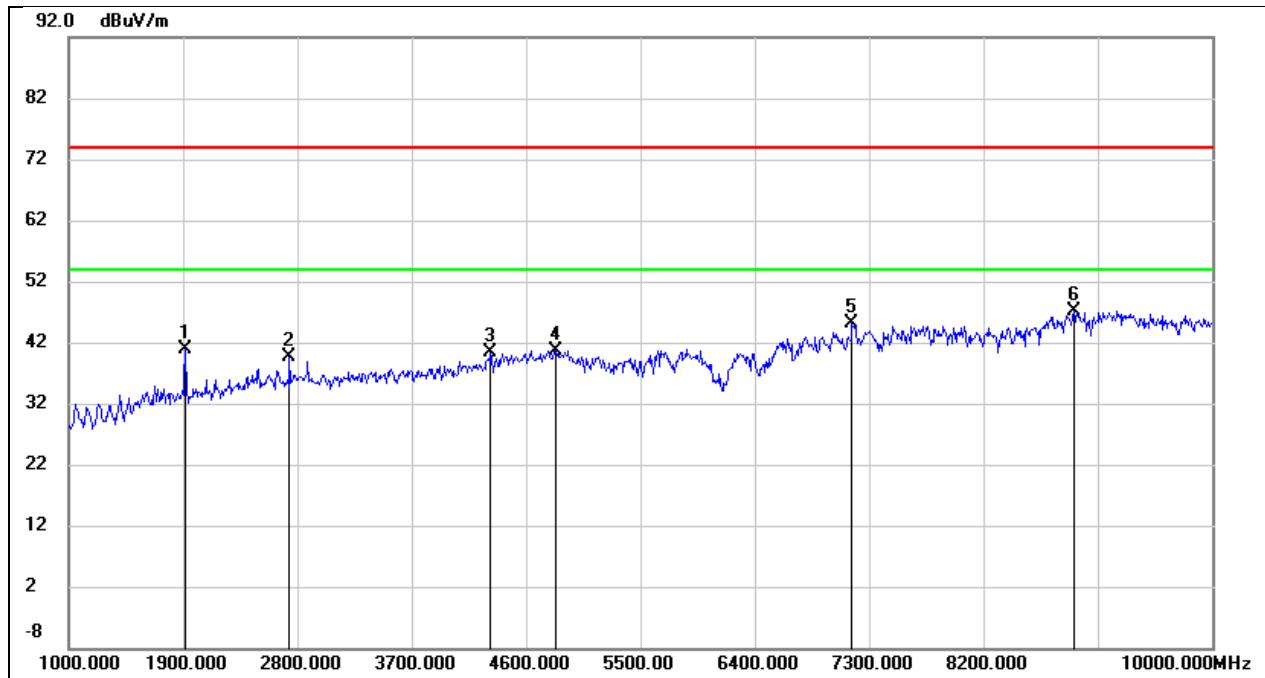
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	51.06	-11.33	39.73	74.00	-34.27	peak
2	2710.000	48.89	-7.85	41.04	74.00	-32.96	peak
3	4699.000	42.26	-1.35	40.91	74.00	-33.09	peak
4	6661.000	38.53	4.52	43.05	74.00	-30.95	peak
5	7723.000	39.27	5.67	44.94	74.00	-29.06	peak
6	8794.000	38.50	8.29	46.79	74.00	-27.21	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	913.415
Polarity:	Horizontal	Test Voltage:	DC 5 V



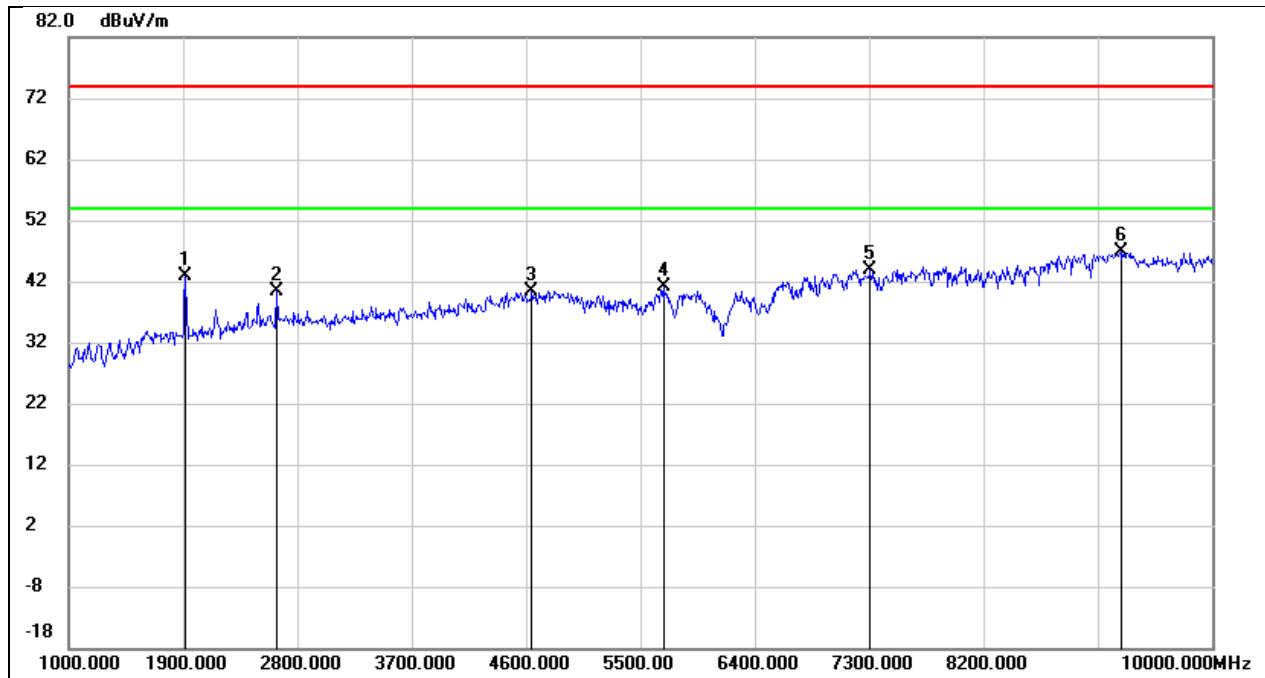
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	55.08	-11.33	43.75	74.00	-30.25	peak
2	2638.000	48.75	-8.07	40.68	74.00	-33.32	peak
3	4834.000	42.16	-0.81	41.35	74.00	-32.65	peak
4	7012.000	37.81	6.18	43.99	74.00	-30.01	peak
5	7714.000	38.83	5.68	44.51	74.00	-29.49	peak
6	9244.000	37.49	9.83	47.32	74.00	-26.68	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	913.415
Polarity:	Vertical	Test Voltage:	DC 5 V



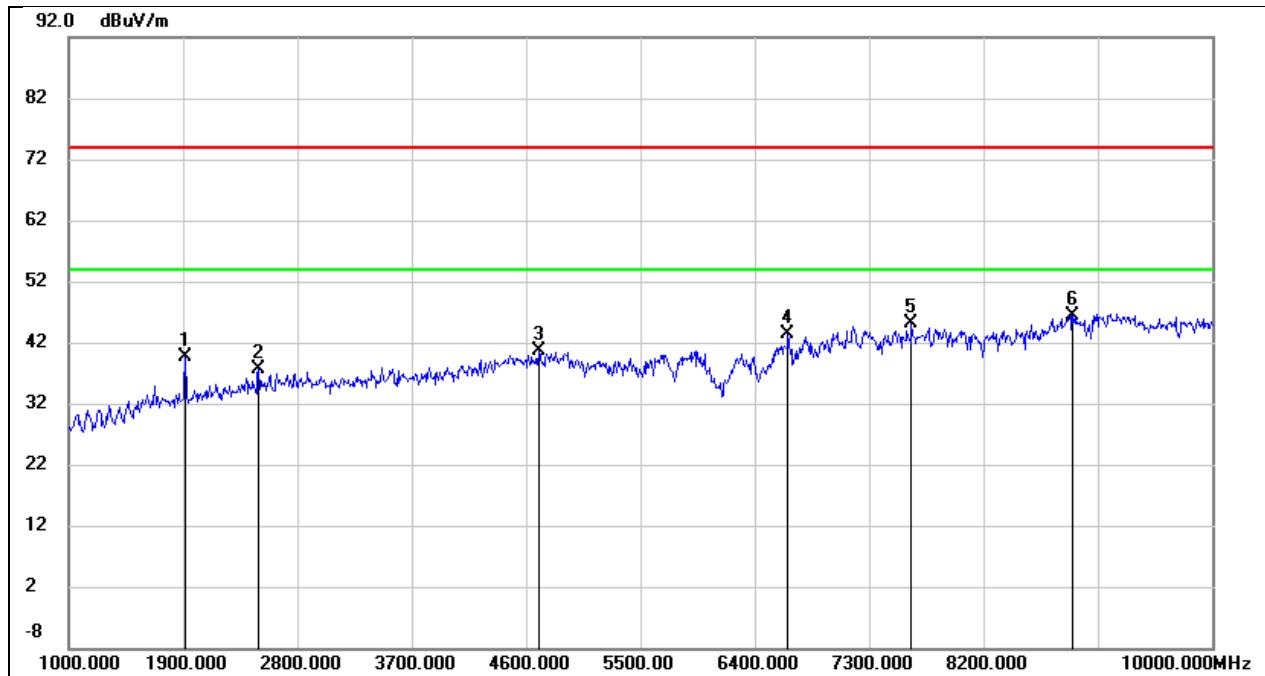
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	52.33	-11.33	41.00	74.00	-33.00	peak
2	2737.000	47.39	-7.77	39.62	74.00	-34.38	peak
3	4321.000	43.45	-2.98	40.47	74.00	-33.53	peak
4	4834.000	41.54	-0.81	40.73	74.00	-33.27	peak
5	7165.000	39.13	6.03	45.16	74.00	-28.84	peak
6	8911.000	37.97	9.11	47.08	74.00	-26.92	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	926.095
Polarity:	Horizontal	Test Voltage:	DC 5 V



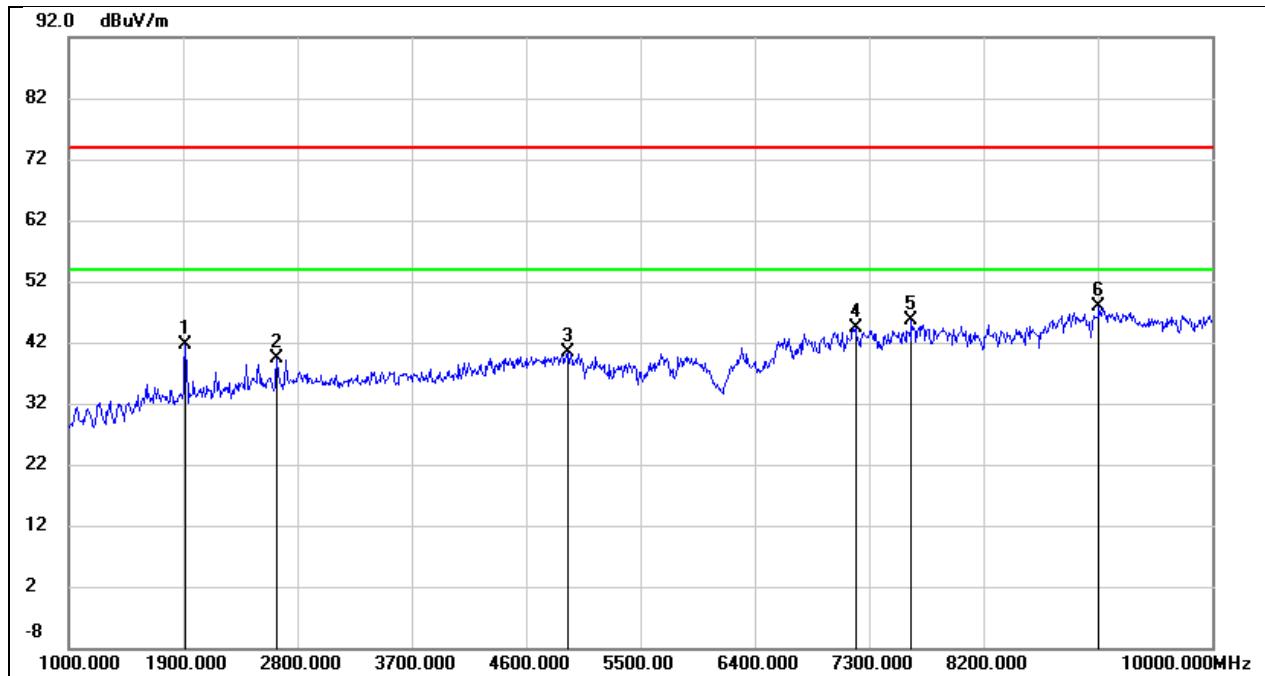
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.14	-11.33	42.81	74.00	-31.19	peak
2	2638.000	48.34	-8.07	40.27	74.00	-33.73	peak
3	4645.000	42.03	-1.57	40.46	74.00	-33.54	peak
4	5680.000	40.07	0.94	41.01	74.00	-32.99	peak
5	7309.000	38.00	5.88	43.88	74.00	-30.12	peak
6	9280.000	37.13	9.85	46.98	74.00	-27.02	peak

Test Mode:	SubG.2GFSK.1600kbps	Frequency(MHz):	926.095
Polarity:	Vertical	Test Voltage:	DC 5 V



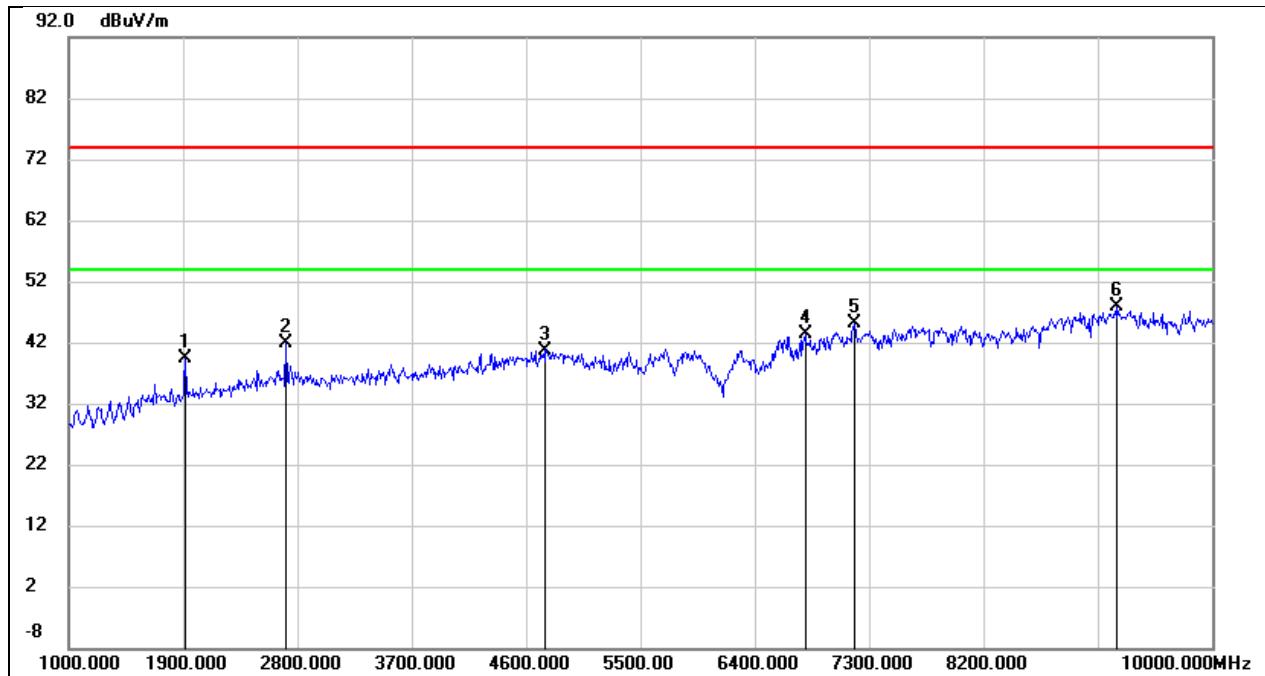
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	51.05	-11.33	39.72	74.00	-34.28	peak
2	2494.000	46.03	-8.52	37.51	74.00	-36.49	peak
3	4699.000	41.87	-1.35	40.52	74.00	-33.48	peak
4	6661.000	38.84	4.52	43.36	74.00	-30.64	peak
5	7633.000	39.56	5.68	45.24	74.00	-28.76	peak
6	8902.000	37.33	9.05	46.38	74.00	-27.62	peak

Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	904.38
Polarity:	Horizontal	Test Voltage:	DC 5 V



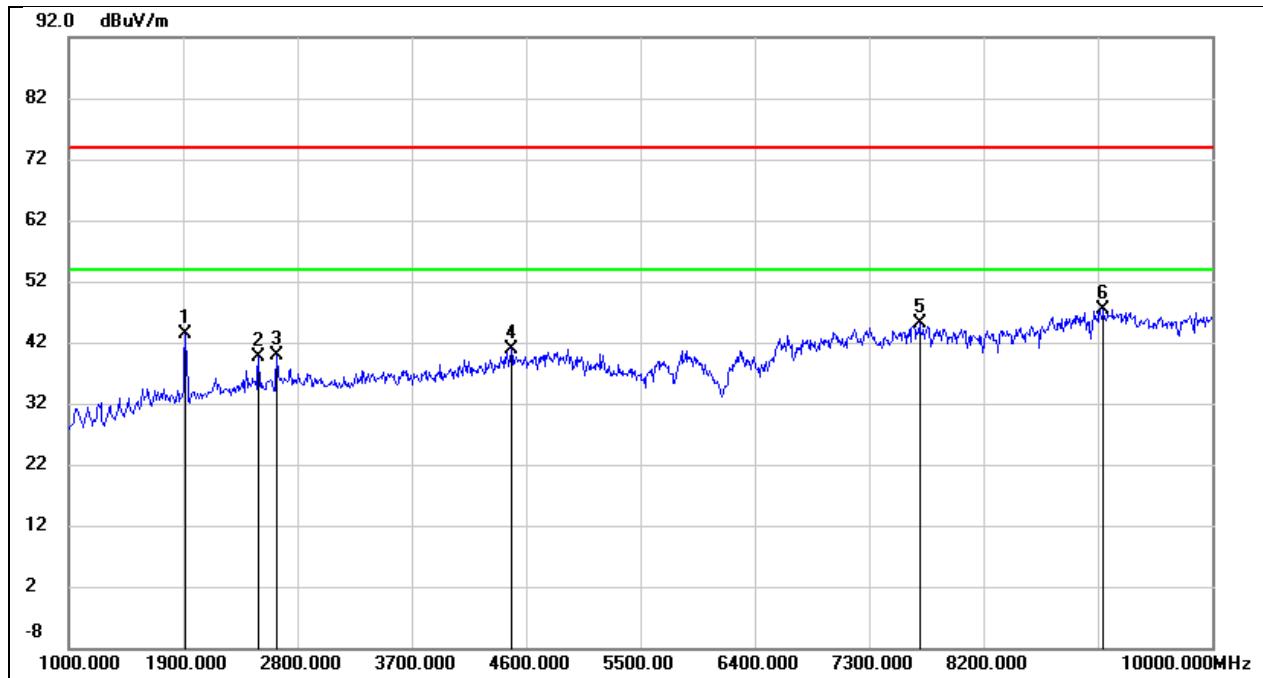
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	53.00	-11.33	41.67	74.00	-32.33	peak
2	2638.000	47.39	-8.07	39.32	74.00	-34.68	peak
3	4924.000	40.73	-0.45	40.28	74.00	-33.72	peak
4	7192.000	38.38	6.00	44.38	74.00	-29.62	peak
5	7633.000	39.88	5.68	45.56	74.00	-28.44	peak
6	9109.000	37.99	9.78	47.77	74.00	-26.23	peak

Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	904.38
Polarity:	Vertical	Test Voltage:	DC 5 V



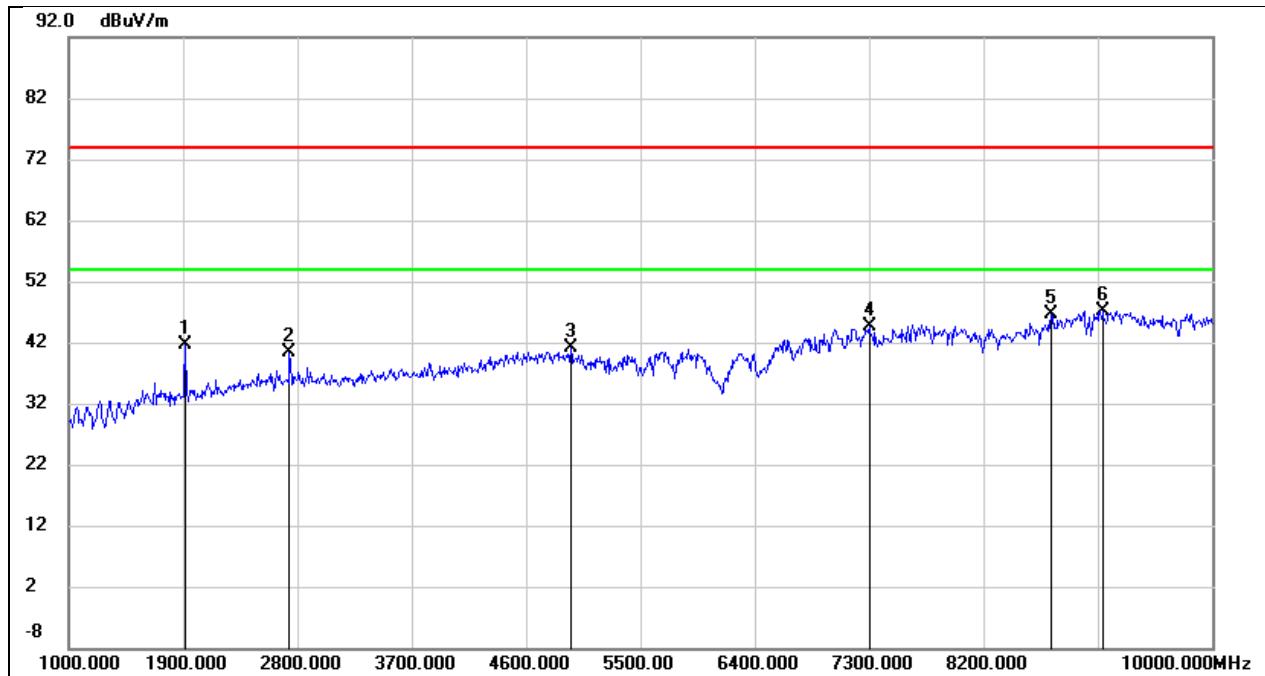
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	50.69	-11.33	39.36	74.00	-34.64	peak
2	2710.000	49.66	-7.85	41.81	74.00	-32.19	peak
3	4753.000	41.88	-1.13	40.75	74.00	-33.25	peak
4	6796.000	38.16	5.19	43.35	74.00	-30.65	peak
5	7183.000	39.06	6.01	45.07	74.00	-28.93	peak
6	9253.000	38.09	9.83	47.92	74.00	-26.08	peak

Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	915
Polarity:	Horizontal	Test Voltage:	DC 5 V



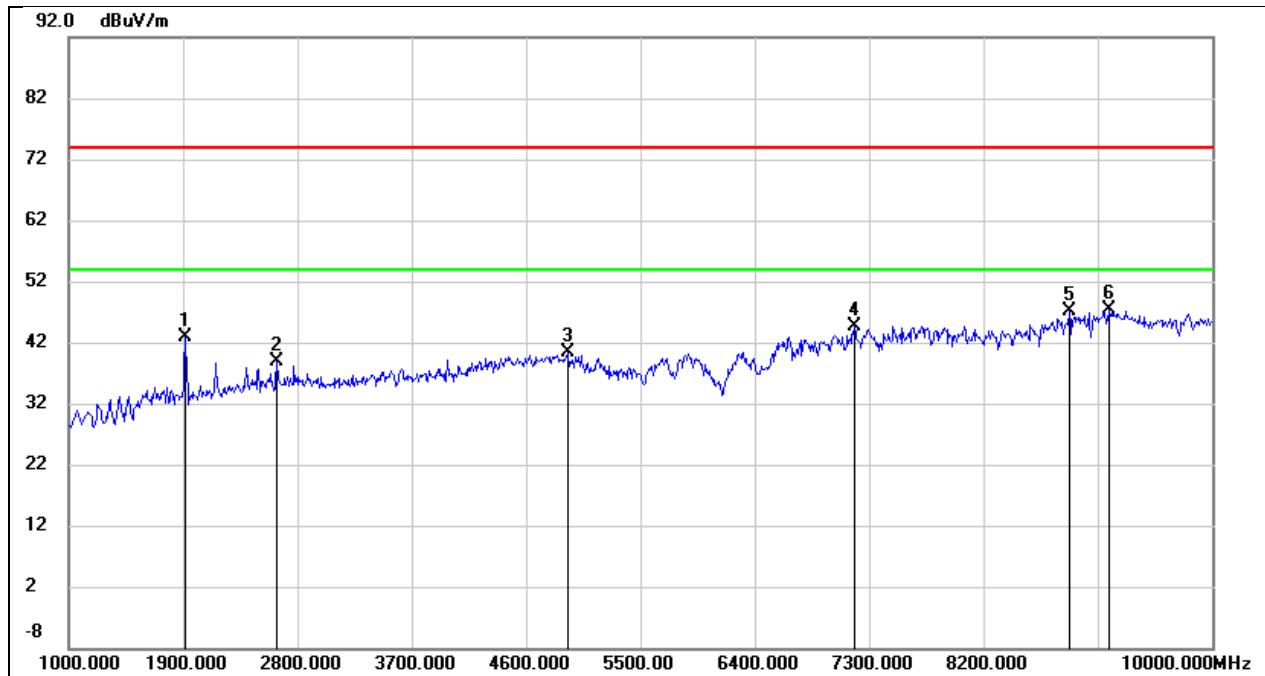
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.63	-11.33	43.30	74.00	-30.70	peak
2	2494.000	48.10	-8.52	39.58	74.00	-34.42	peak
3	2638.000	48.00	-8.07	39.93	74.00	-34.07	peak
4	4483.000	43.05	-2.21	40.84	74.00	-33.16	peak
5	7696.000	39.40	5.68	45.08	74.00	-28.92	peak
6	9145.000	37.55	9.80	47.35	74.00	-26.65	peak

Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	915
Polarity:	Vertical	Test Voltage:	DC 5 V



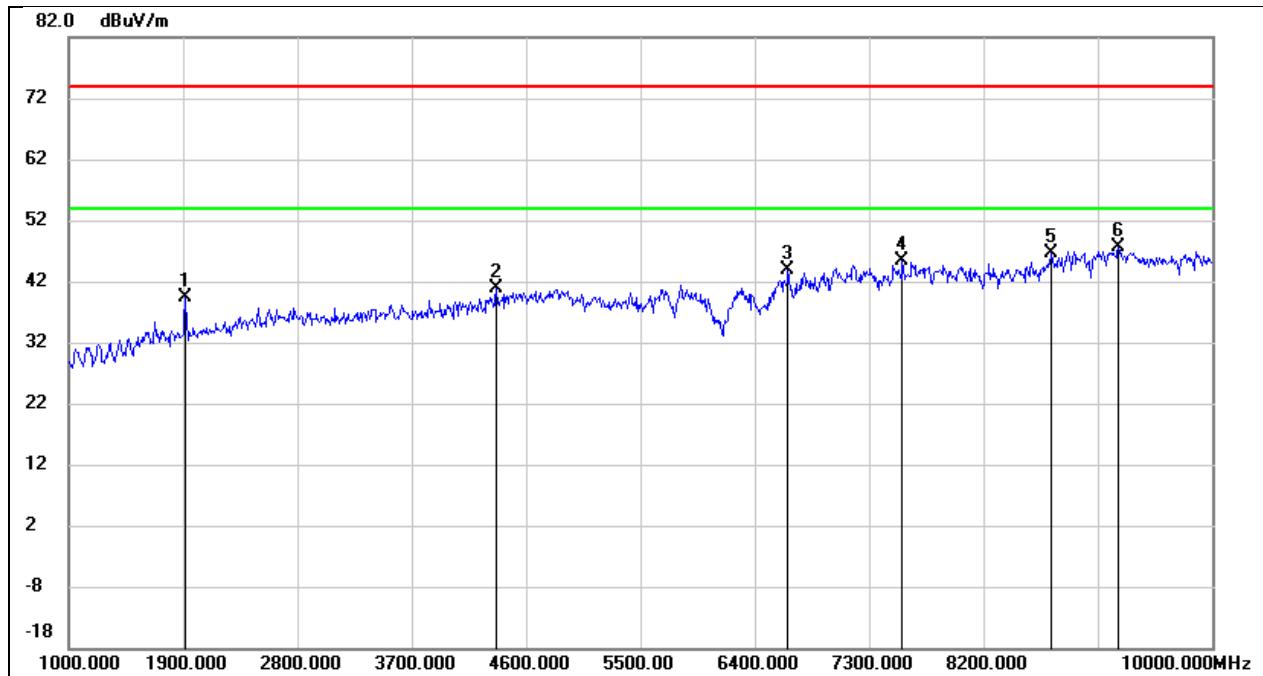
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	52.93	-11.33	41.60	74.00	-32.40	peak
2	2737.000	48.23	-7.77	40.46	74.00	-33.54	peak
3	4951.000	41.38	-0.34	41.04	74.00	-32.96	peak
4	7300.000	38.71	5.89	44.60	74.00	-29.40	peak
5	8731.000	38.81	7.85	46.66	74.00	-27.34	peak
6	9136.000	37.43	9.80	47.23	74.00	-26.77	peak

Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	925.62
Polarity:	Horizontal	Test Voltage:	DC 5 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	54.20	-11.33	42.87	74.00	-31.13	peak
2	2638.000	46.85	-8.07	38.78	74.00	-35.22	peak
3	4924.000	40.90	-0.45	40.45	74.00	-33.55	peak
4	7183.000	38.51	6.01	44.52	74.00	-29.48	peak
5	8875.000	38.29	8.86	47.15	74.00	-26.85	peak
6	9190.000	37.49	9.81	47.30	74.00	-26.70	peak

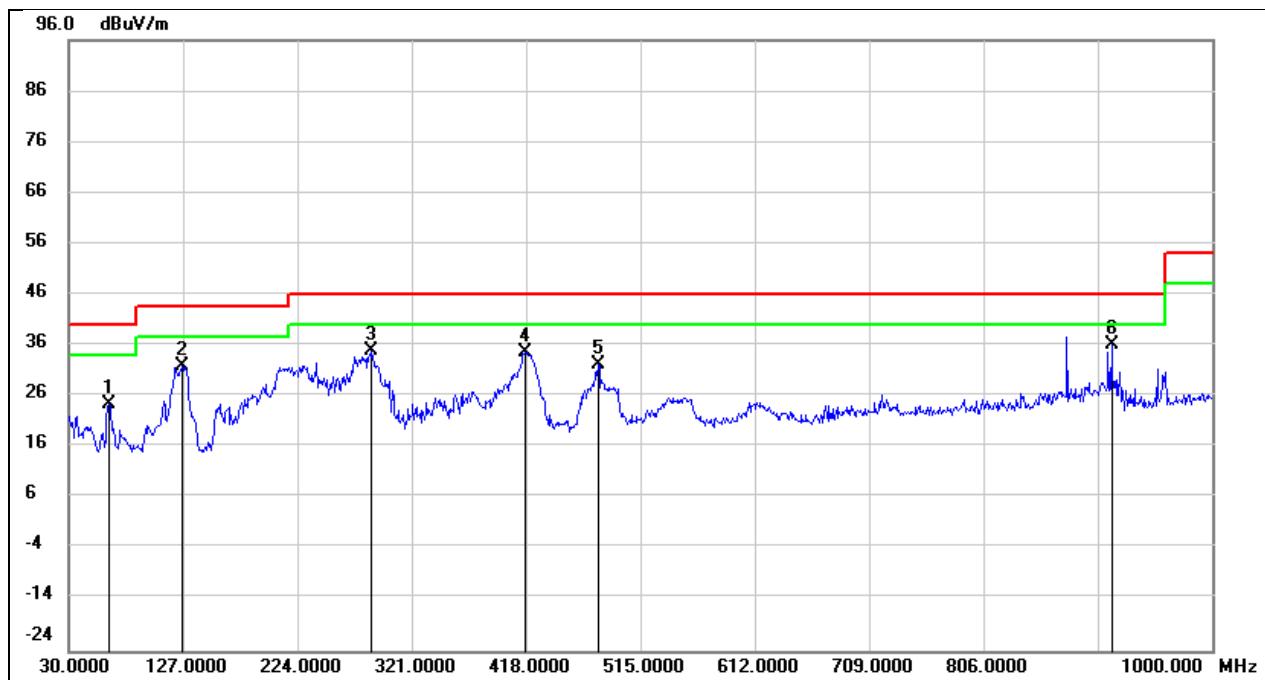
Test Mode:	SubG.2GFSK.2000kbps	Frequency(MHz):	925.62
Polarity:	Vertical	Test Voltage:	DC 5 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1918.000	50.83	-11.33	39.50	74.00	-34.50	peak
2	4366.000	43.60	-2.77	40.83	74.00	-33.17	peak
3	6661.000	39.32	4.52	43.84	74.00	-30.16	peak
4	7561.000	39.79	5.68	45.47	74.00	-28.53	peak
5	8731.000	38.75	7.85	46.60	74.00	-27.40	peak
6	9262.000	37.84	9.84	47.68	74.00	-26.32	peak

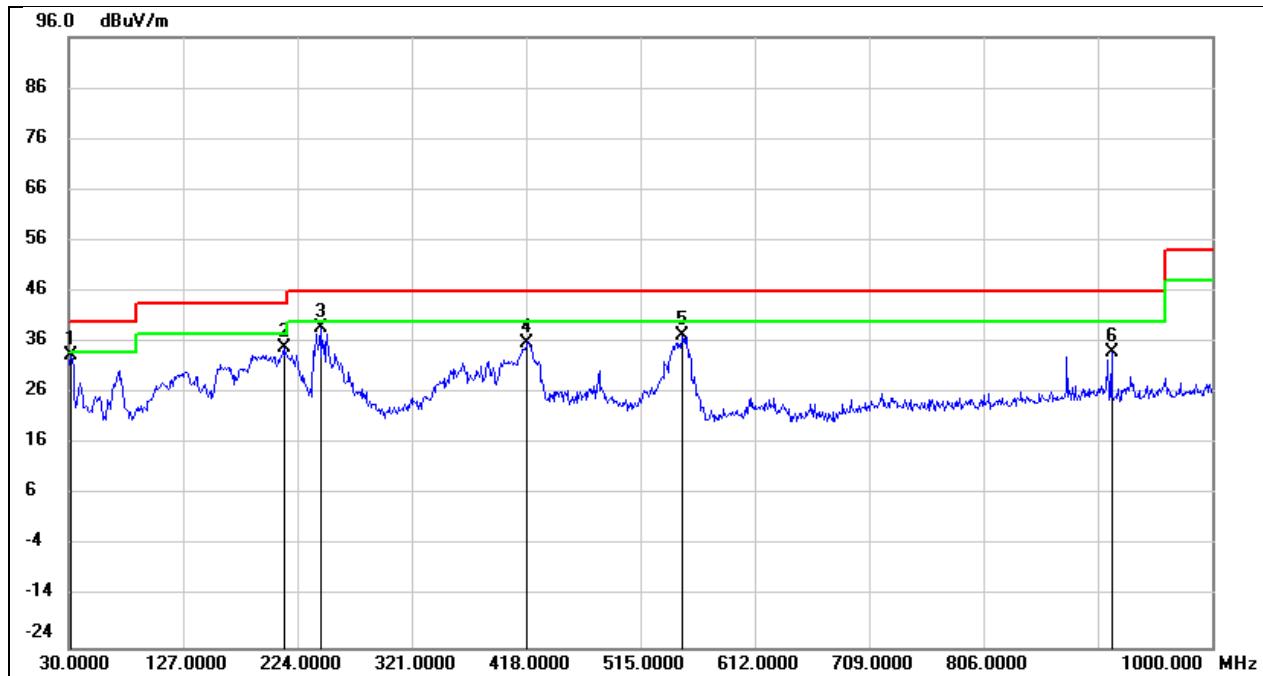
8.2. SPURIOUS EMISSIONS (30 MHZ ~ 1 GHZ)

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Horizontal	Test Voltage:	DC 5 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	63.9500	44.29	-19.97	24.32	40.00	-15.68	QP
2	126.0300	50.98	-19.08	31.90	43.50	-11.60	QP
3	286.0799	50.63	-15.80	34.83	46.00	-11.17	QP
4	417.0300	46.91	-12.13	34.78	46.00	-11.22	QP
5	479.1100	43.19	-10.80	32.39	46.00	-13.61	QP
6	914.6400	40.69	-4.48	36.21	46.00	-9.79	QP

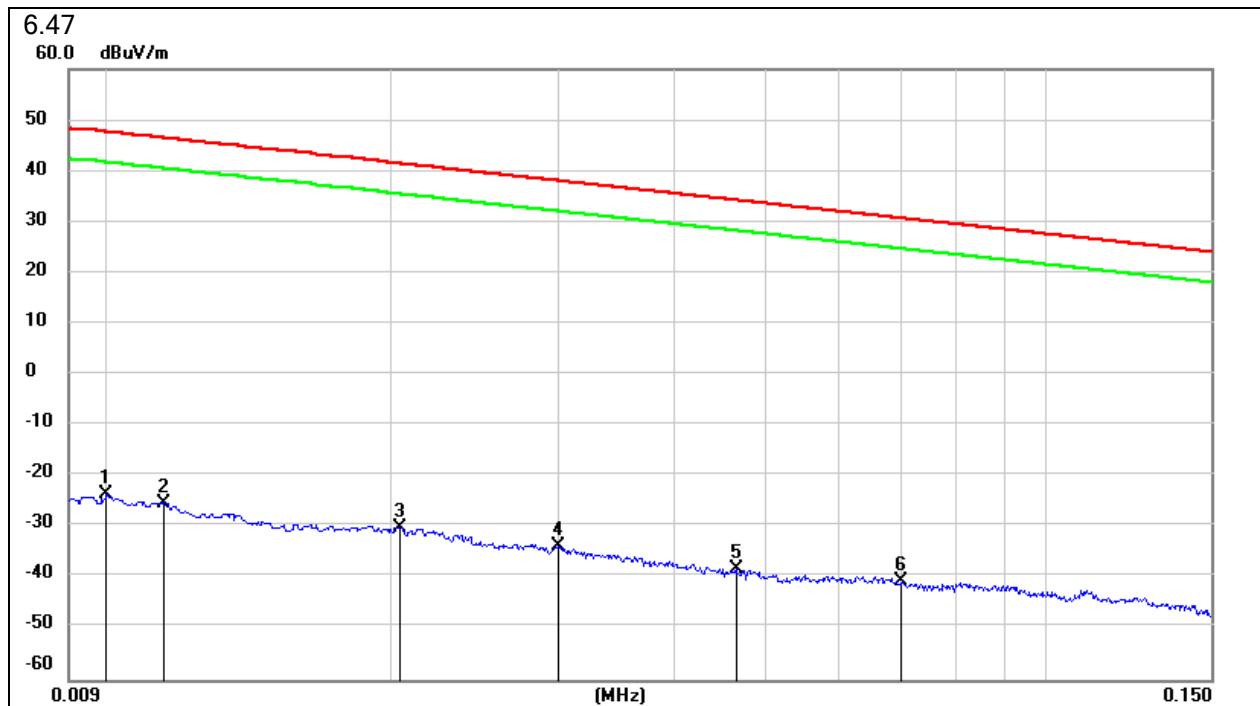
Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Vertical	Test Voltage:	DC 5 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.9400	51.34	-17.99	33.35	40.00	-6.65	QP
2	212.3600	51.27	-16.43	34.84	43.50	-8.66	QP
3	243.4000	56.85	-18.03	38.82	46.00	-7.18	QP
4	418.9700	47.85	-12.10	35.75	46.00	-10.25	QP
5	550.8900	47.55	-10.25	37.30	46.00	-8.70	QP
6	914.6400	38.41	-4.48	33.93	46.00	-12.07	QP

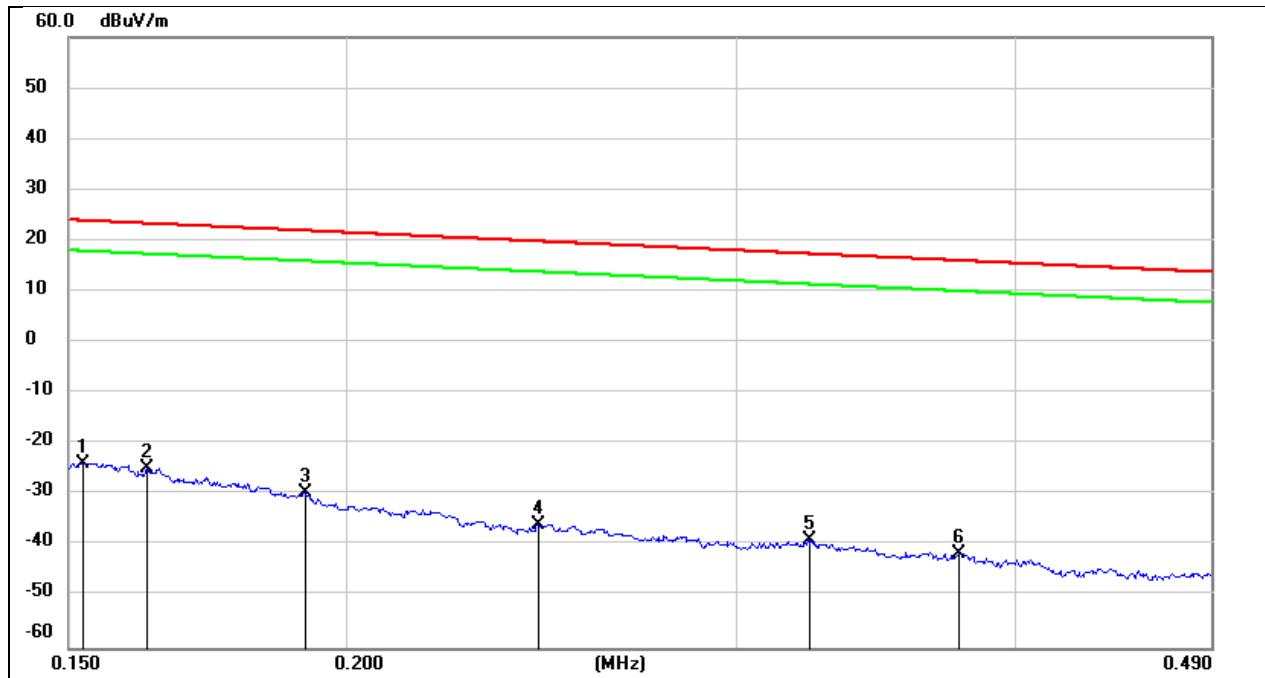
8.3. SPURIOUS EMISSIONS BELOW 30 MHZ

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Horizontal	Test Voltage:	DC 5 V



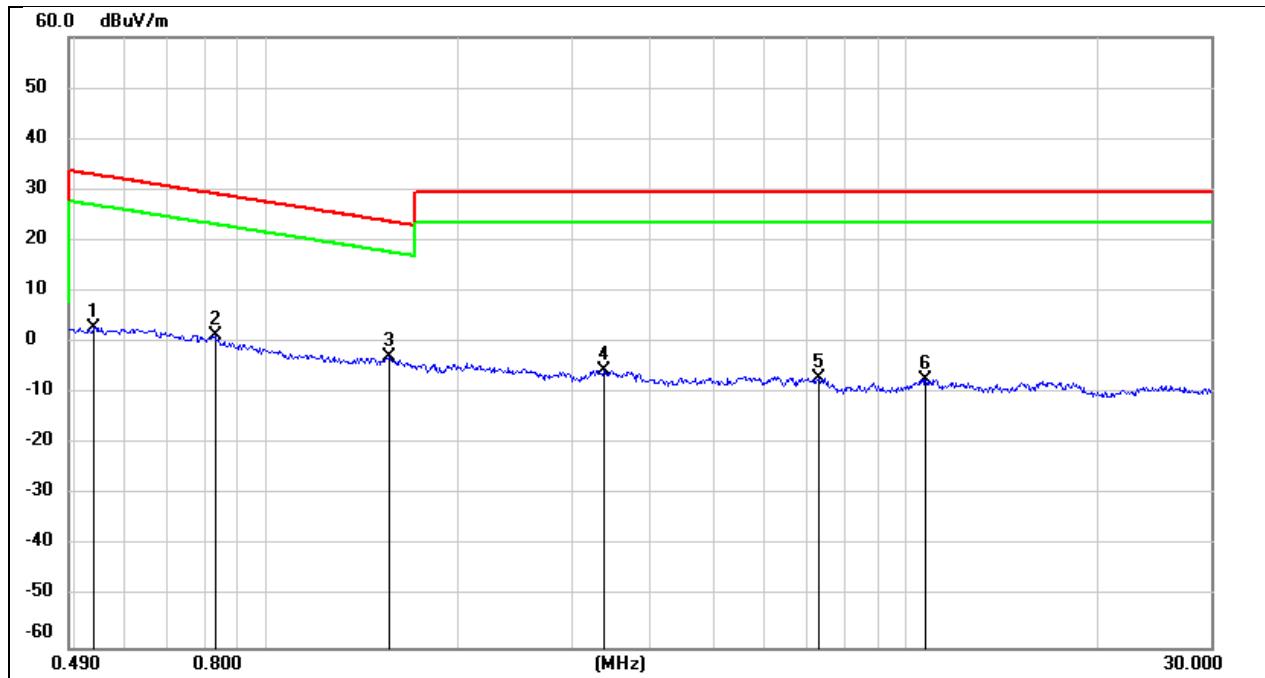
No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.0100	77.72	-101.40	-23.68	47.60	-75.18	-3.90	-71.28	peak
2	0.0114	76.00	-101.40	-25.40	46.46	-76.90	-5.04	-71.86	peak
3	0.0204	71.20	-101.35	-30.15	41.41	-81.65	-10.09	-71.56	peak
4	0.0300	67.68	-101.39	-33.71	38.06	-85.21	-13.44	-71.77	peak
5	0.0466	63.17	-101.46	-38.29	34.23	-89.79	-17.27	-72.52	peak
6	0.0700	60.82	-101.57	-40.75	30.70	-92.25	-20.80	-71.45	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Horizontal	Test Voltage:	DC 5 V



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1524	77.80	-101.63	-23.83	23.94	-75.33	-27.56	-47.77	peak
2	0.1625	76.89	-101.65	-24.76	23.39	-76.26	-28.11	-48.15	peak
3	0.1917	72.04	-101.70	-29.66	21.95	-81.16	-29.55	-51.61	peak
4	0.2442	66.03	-101.79	-35.76	19.85	-87.26	-31.65	-55.61	peak
5	0.3234	62.98	-101.88	-38.90	17.41	-90.40	-34.09	-56.31	peak
6	0.3775	60.35	-101.94	-41.59	16.06	-93.09	-35.44	-57.65	peak

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Polarity:	Horizontal	Test Voltage:	DC 5 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	FCC Result (dBuV/m)	FCC Limit (dBuV/m)	ISED Result (dBuA/m)	ISED Limit (dBuA/m)	Margin (dB)	Remark
1	0.5361	64.96	-62.08	2.88	33.02	-48.62	-18.48	-30.14	peak
2	0.8296	63.44	-62.17	1.27	29.23	-50.23	-22.27	-27.96	peak
3	1.5564	59.18	-62.02	-2.84	23.76	-54.34	-27.74	-26.60	peak
4	3.3820	55.95	-61.48	-5.53	29.54	-57.03	-21.96	-35.07	peak
5	7.3361	54.08	-61.17	-7.09	29.54	-58.59	-21.96	-36.63	peak
6	10.7299	53.48	-60.83	-7.35	29.54	-58.85	-21.96	-36.89	peak

9. ANTENNA REQUIREMENT

REQUIREMENT

Please refer to FCC part 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 part 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.

DESCRIPTION

Pass

10. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

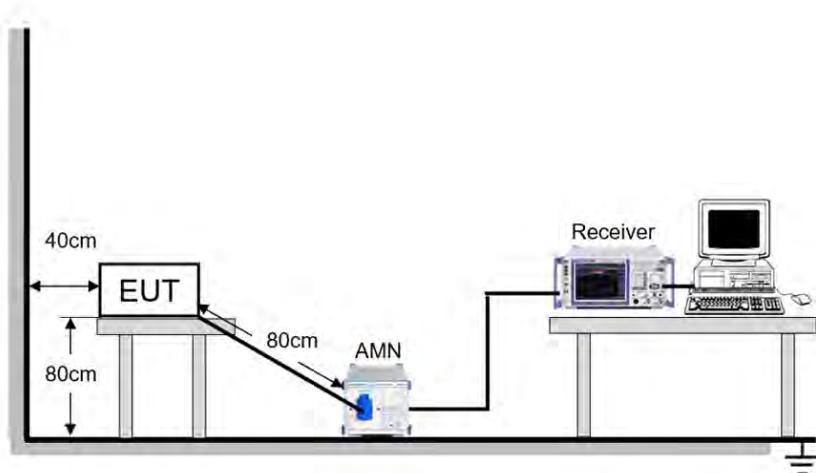
FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST PROCEDURE

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A 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 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

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 SETUP

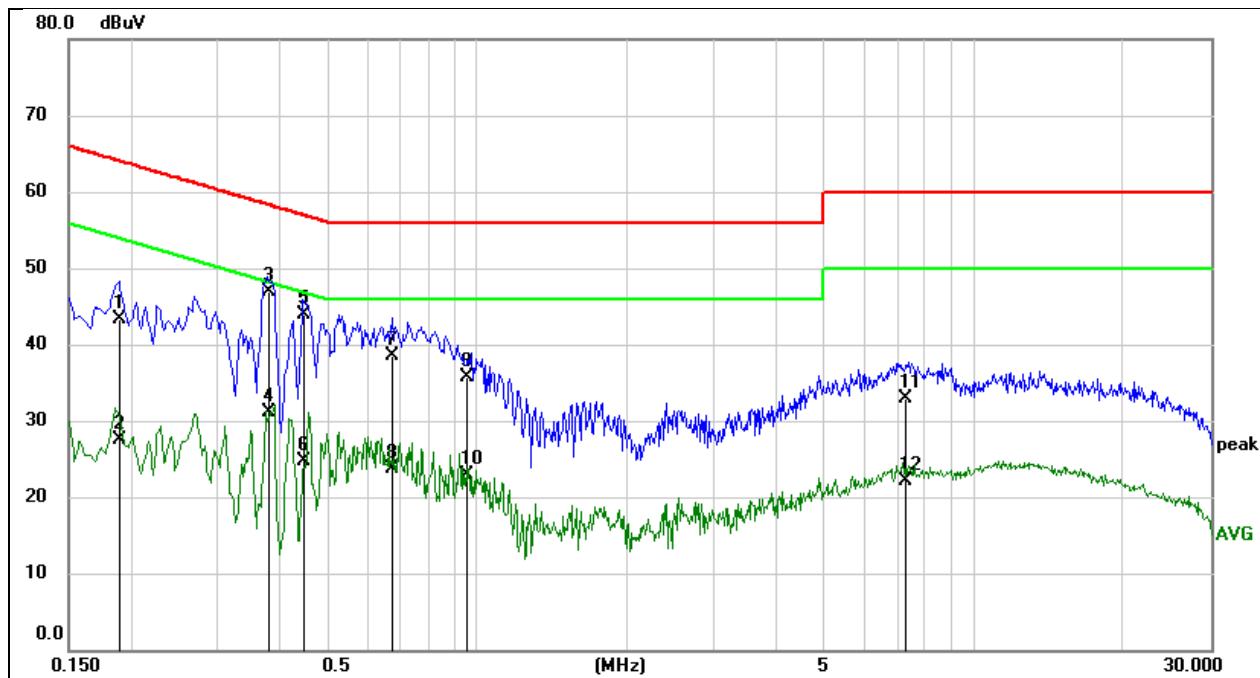


TEST ENVIRONMENT

Temperature	23.6 °C	Relative Humidity	57 %
Atmosphere Pressure	101kPa	Test Voltage	AC 120 V, 60 Hz

TEST RESULTS

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Line:	Line		



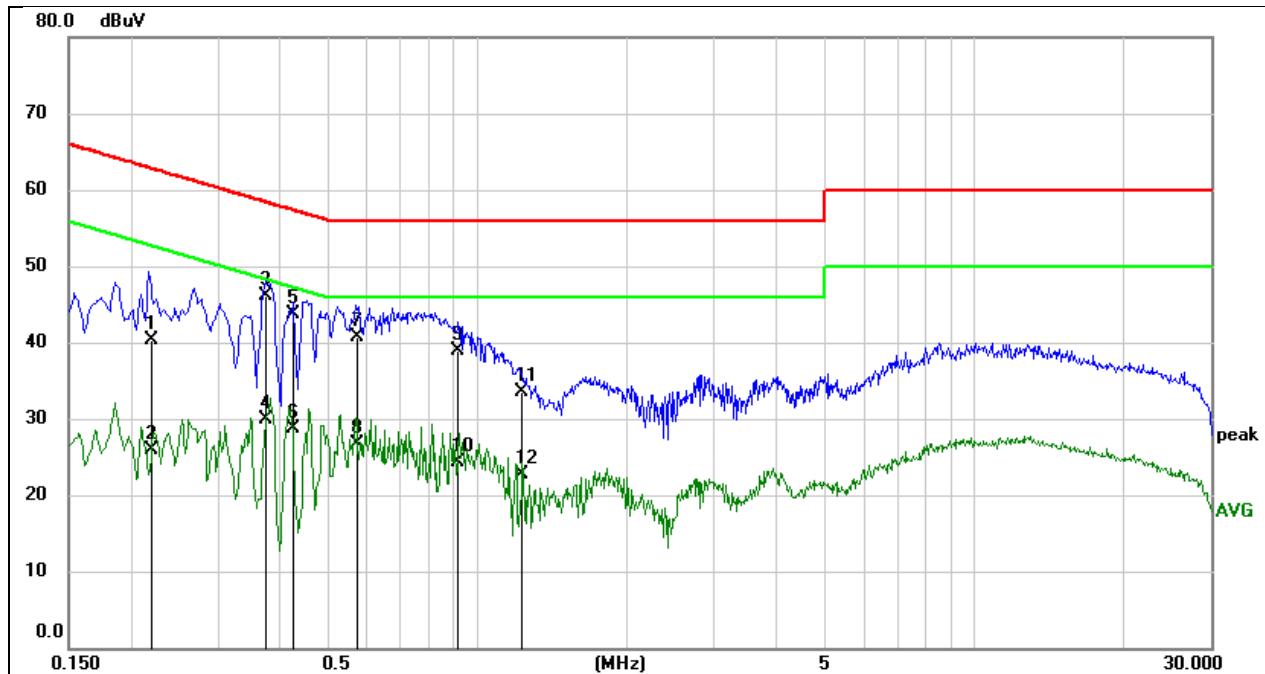
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1901	33.64	9.59	43.23	64.03	-20.80	QP
2	0.1901	17.87	9.59	27.46	54.03	-26.57	AVG
3	0.3794	37.37	9.59	46.96	58.29	-11.33	QP
4	0.3794	21.48	9.59	31.07	48.29	-17.22	AVG
5	0.4470	34.37	9.60	43.97	56.93	-12.96	QP
6	0.4470	15.17	9.60	24.77	46.93	-22.16	AVG
7	0.6762	28.91	9.60	38.51	56.00	-17.49	QP
8	0.6762	14.17	9.60	23.77	46.00	-22.23	AVG
9	0.9603	26.03	9.61	35.64	56.00	-20.36	QP
10	0.9603	13.22	9.61	22.83	46.00	-23.17	AVG
11	7.3411	23.09	9.72	32.81	60.00	-27.19	QP
12	7.3411	12.39	9.72	22.11	50.00	-27.89	AVG

Note:

1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

Test Mode:	SubG.2GFSK.640kbps	Frequency(MHz):	902.9
Line:	Neutral		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2214	30.80	9.59	40.39	62.77	-22.38	QP
2	0.2214	16.24	9.59	25.83	52.77	-26.94	AVG
3	0.3765	36.47	9.59	46.06	58.36	-12.30	QP
4	0.3765	20.32	9.59	29.91	48.36	-18.45	AVG
5	0.4239	34.20	9.60	43.80	57.37	-13.57	QP
6	0.4239	19.16	9.60	28.76	47.37	-18.61	AVG
7	0.5734	31.19	9.60	40.79	56.00	-15.21	QP
8	0.5734	17.10	9.60	26.70	46.00	-19.30	AVG
9	0.9160	29.27	9.61	38.88	56.00	-17.12	QP
10	0.9160	14.66	9.61	24.27	46.00	-21.73	AVG
11	1.2334	23.90	9.61	33.51	56.00	-22.49	QP
12	1.2334	13.19	9.61	22.80	46.00	-23.20	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: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

TEST DATA

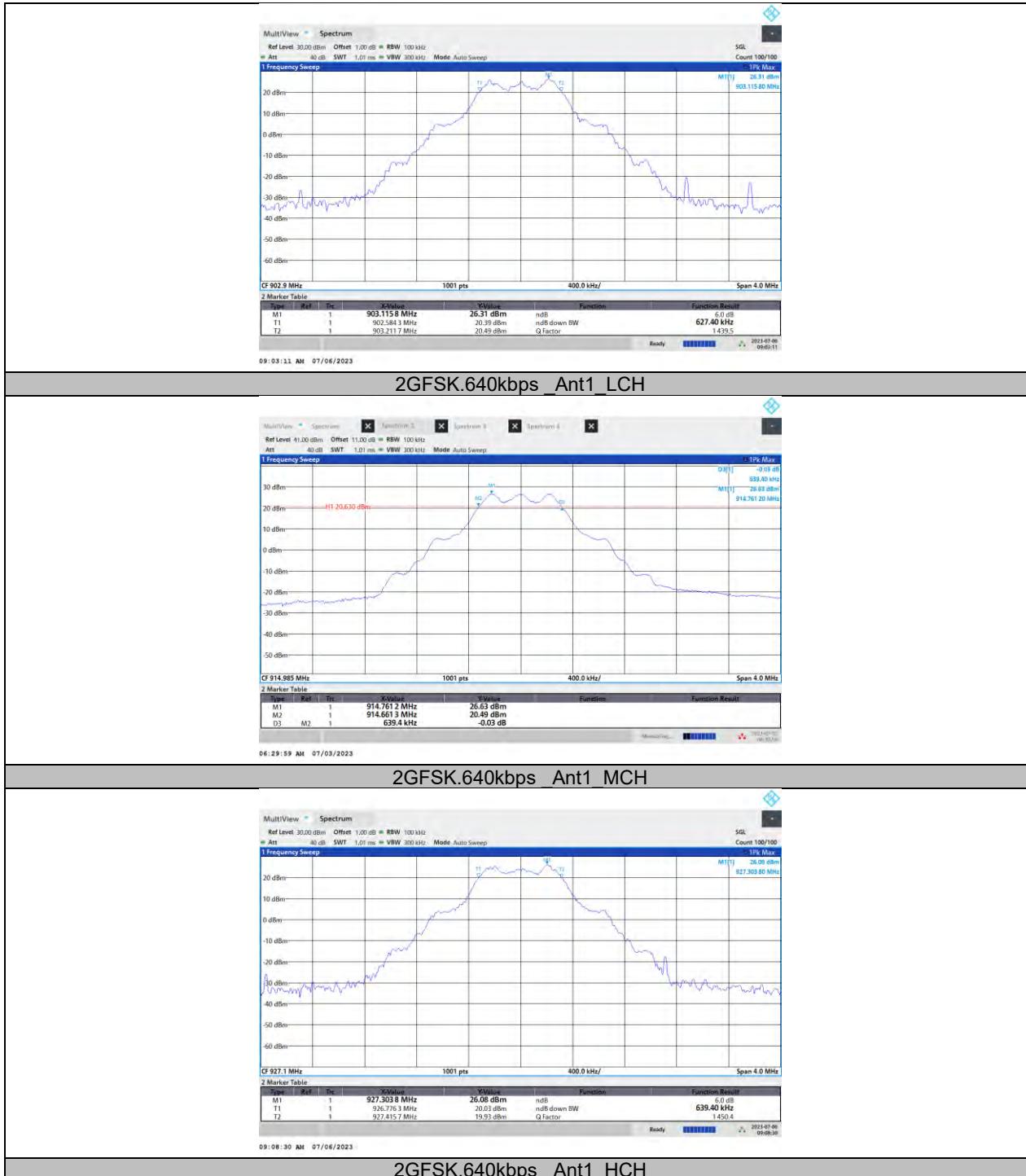
11. FCC.SubG.2GFSK.640kbps

11.1. APPENDIX A1: DTS BANDWIDTH

11.1.1. Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2GFSK.640kbps	Ant1	LCH	0.6274	902.5843	903.2117	0.5	PASS
		MCH	0.6394	914.6613	915.3007	0.5	PASS
		HCH	0.6394	926.7763	927.4157	0.5	PASS

11.1.2. Test Graphs



11.2. APPENDIX B1: OCCUPIED CHANNEL BANDWIDTH

11.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Verdict
2GFSK.640kbps	Ant1	LCH	0.92998	PASS
		MCH	0.96089	PASS
		HCH	0.89356	PASS

11.2.1. Test Graphs



11.3. APPENDIX C1: MAXIMUM CONDUCTED OUTPUT POWER

11.3.1. Test Result

Test Mode	Antenna	Channel	AVG Result[dBm]	Limit[dBm]	Verdict
2GFSK.640kbps	Ant1	LCH	25.67	≤30	PASS
		MCH	25.78	≤30	PASS
		HCH	25.81	≤30	PASS

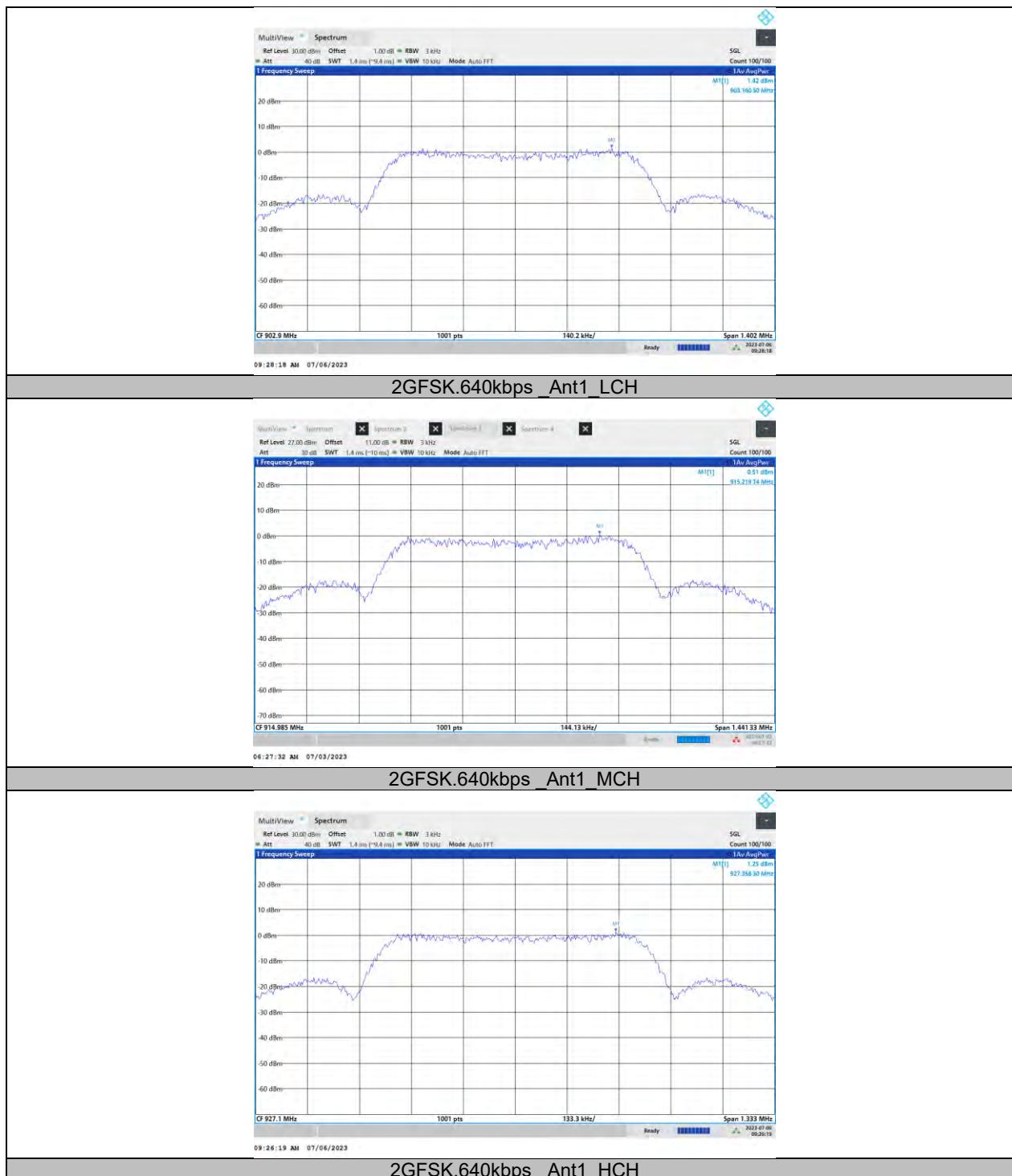
11.4. APPENDIX D1: MAXIMUM POWER SPECTRAL DENSITY

11.4.1. Test Result

Test Mode	Antenna	Channel	Reading Result [dBm/3kHz]	Duty Factor	Final Result [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
2GFSK. 640kbps	Ant1	LCH	1.42	4.03	5.45	≤8.00	PASS
		MCH	0.51	4.03	4.54	≤8.00	PASS
		HCH	1.25	4.03	5.28	≤8.00	PASS

Note: Final Result = Reading Result + Duty Factor

11.4.2. Test Graphs

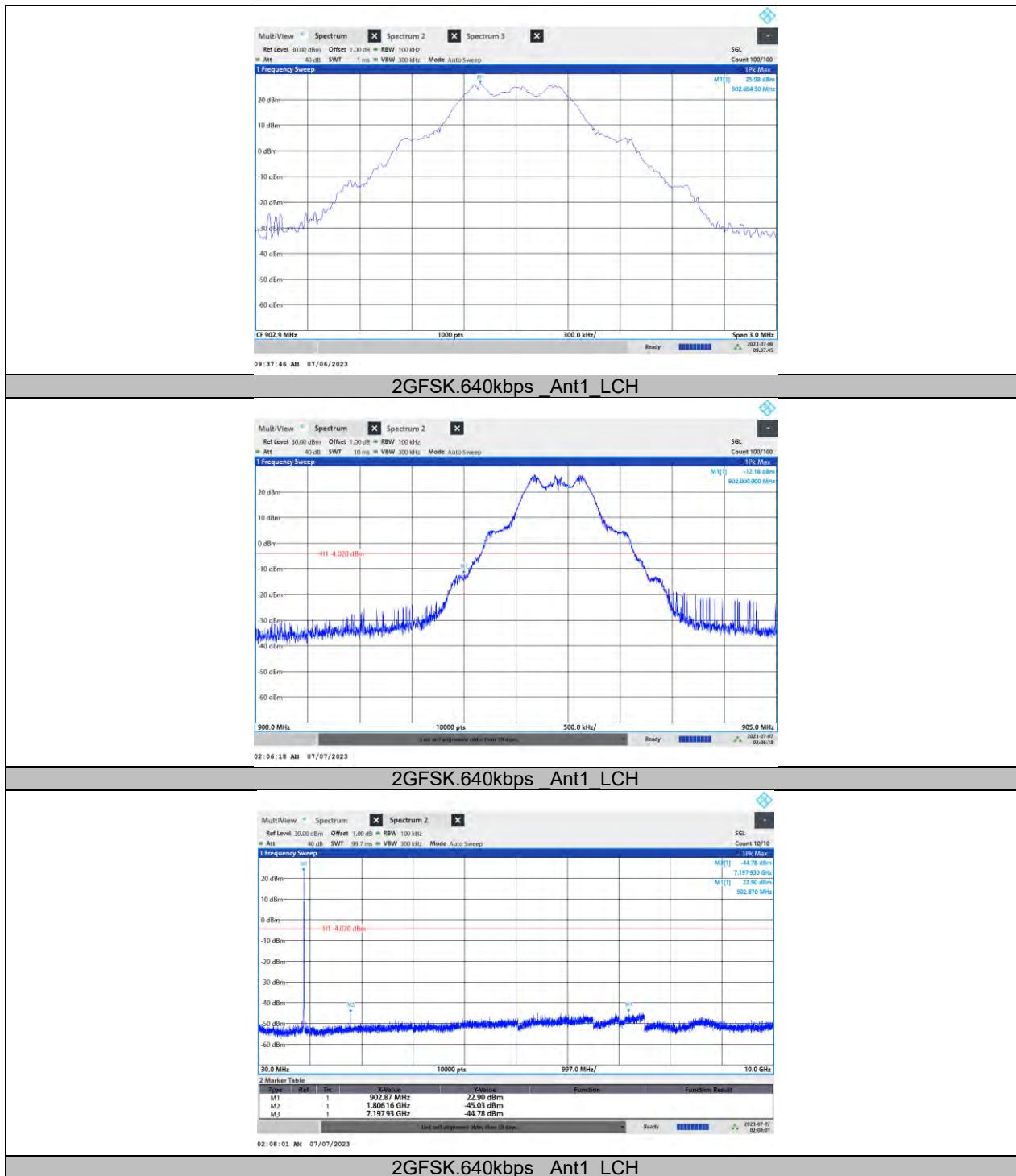


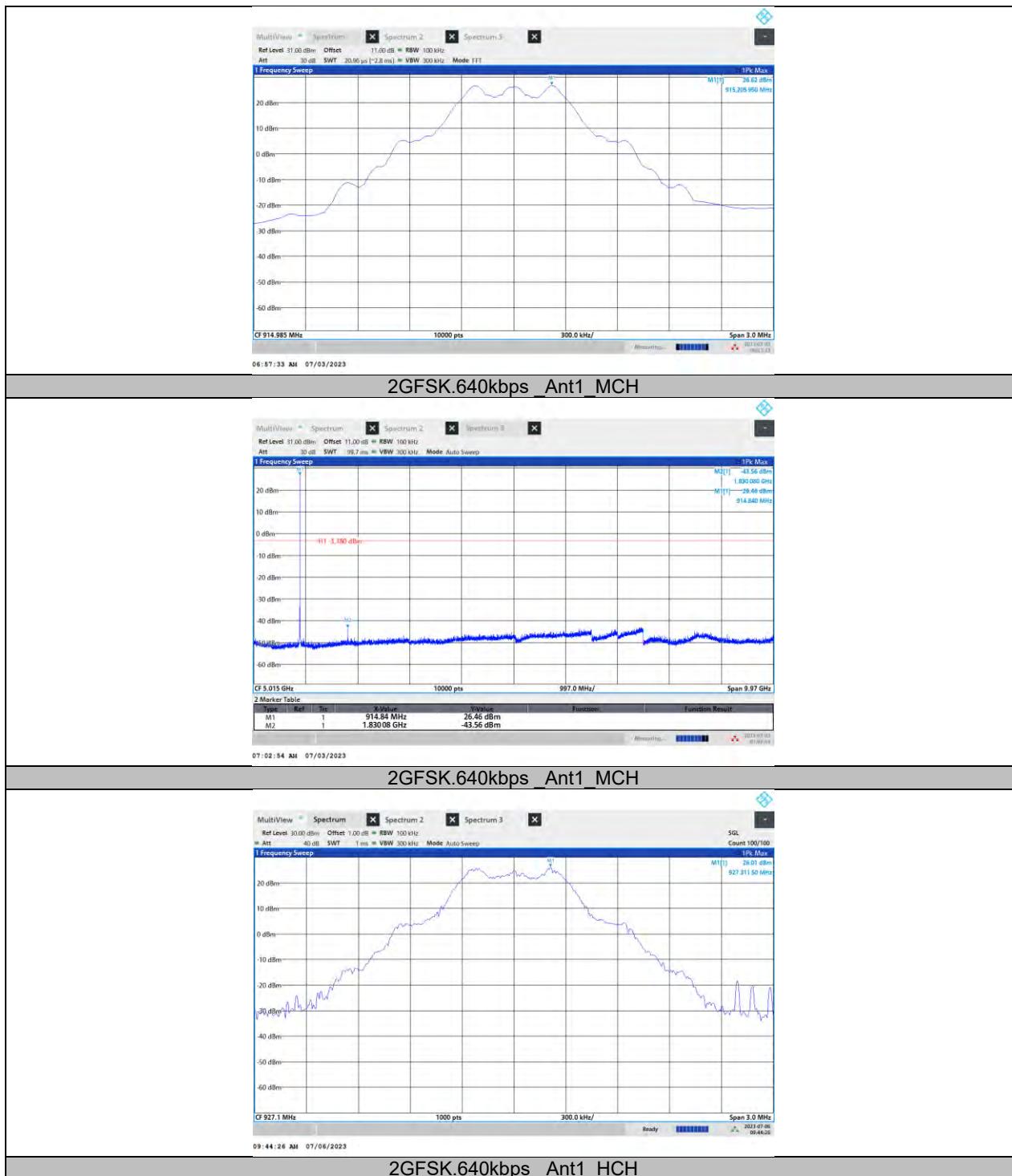
11.5. APPENDIX E1: BAND EDGE MEASUREMENTS & CONDUCTED SPURIOUS EMISSION

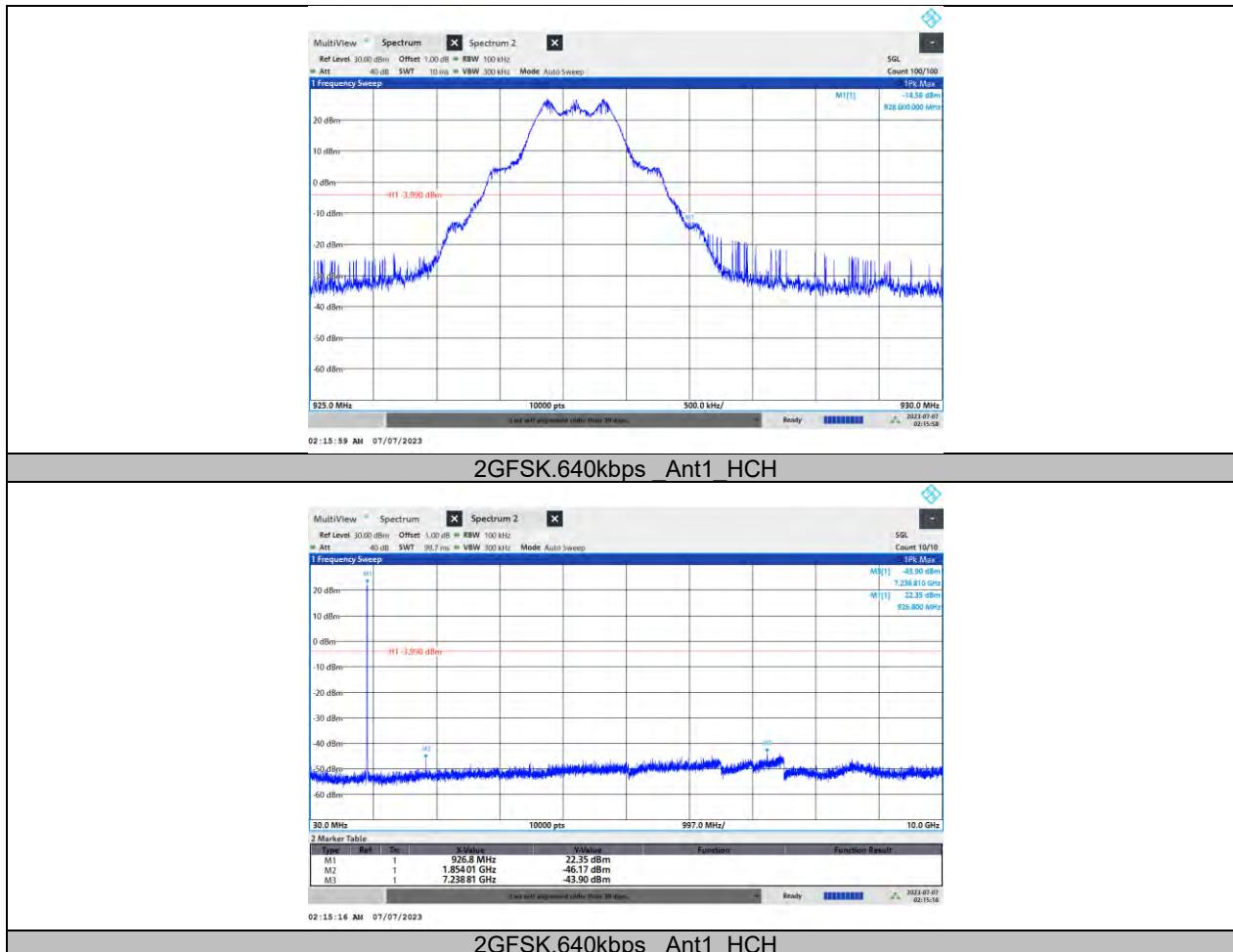
11.5.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
2GFSK.640kbps	Ant1	LCH	See the below graphs	PASS
		MCH		PASS
		HCH		PASS

11.5.2. Test Graphs







11.6. APPENDIX F1: DUTY CYCLE

11.6.1. Test Result

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
2GFSK-640 kbps LP	39.5369	100	0.3954	39.54	4.03	0.025	1

Note:

Duty Cycle Correction Factor=10log (1/x).

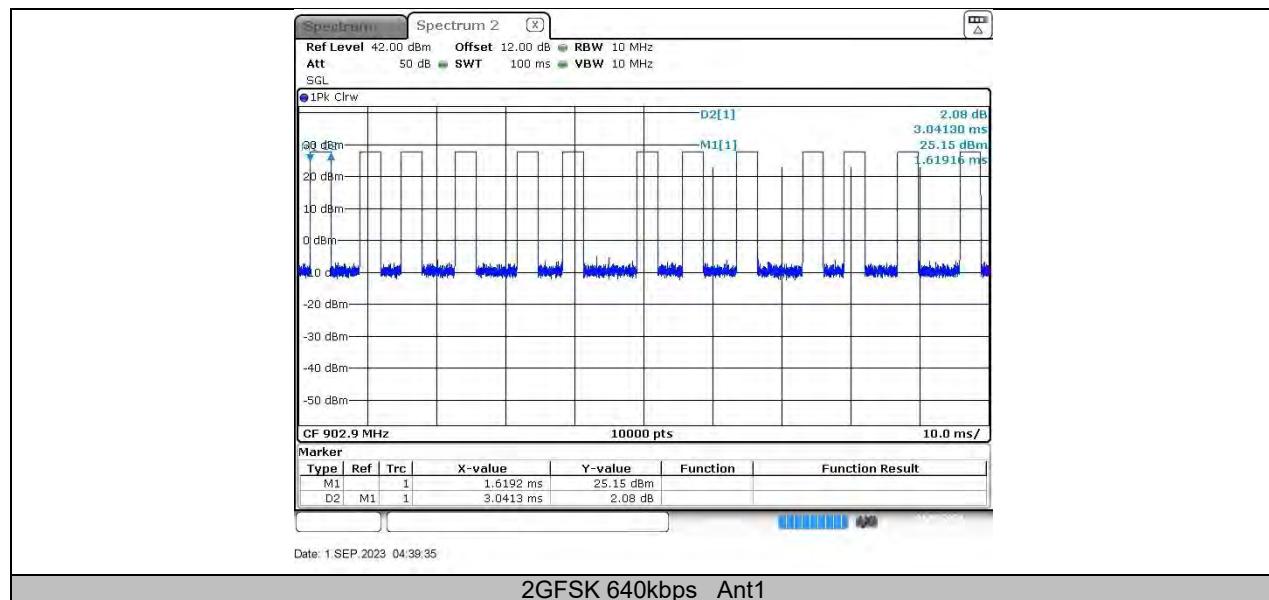
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time=D2*15=3.0413*13=39.5369 ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

11.6.2. Test Graphs



12. FCC.SubG.2GFSK.1000kbps

12.1. APPENDIX A2: DTS BANDWIDTH

12.1.1. Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2GFSK.1000kbps	Ant1	LCH	0.9581	902.7587	903.7168	≥0.5	PASS
		MCH	0.9524	914.52156	915.47396	≥0.5	PASS
		HCH	0.9572	926.28035	927.23755	≥0.5	PASS

12.1.2. Test Graphs

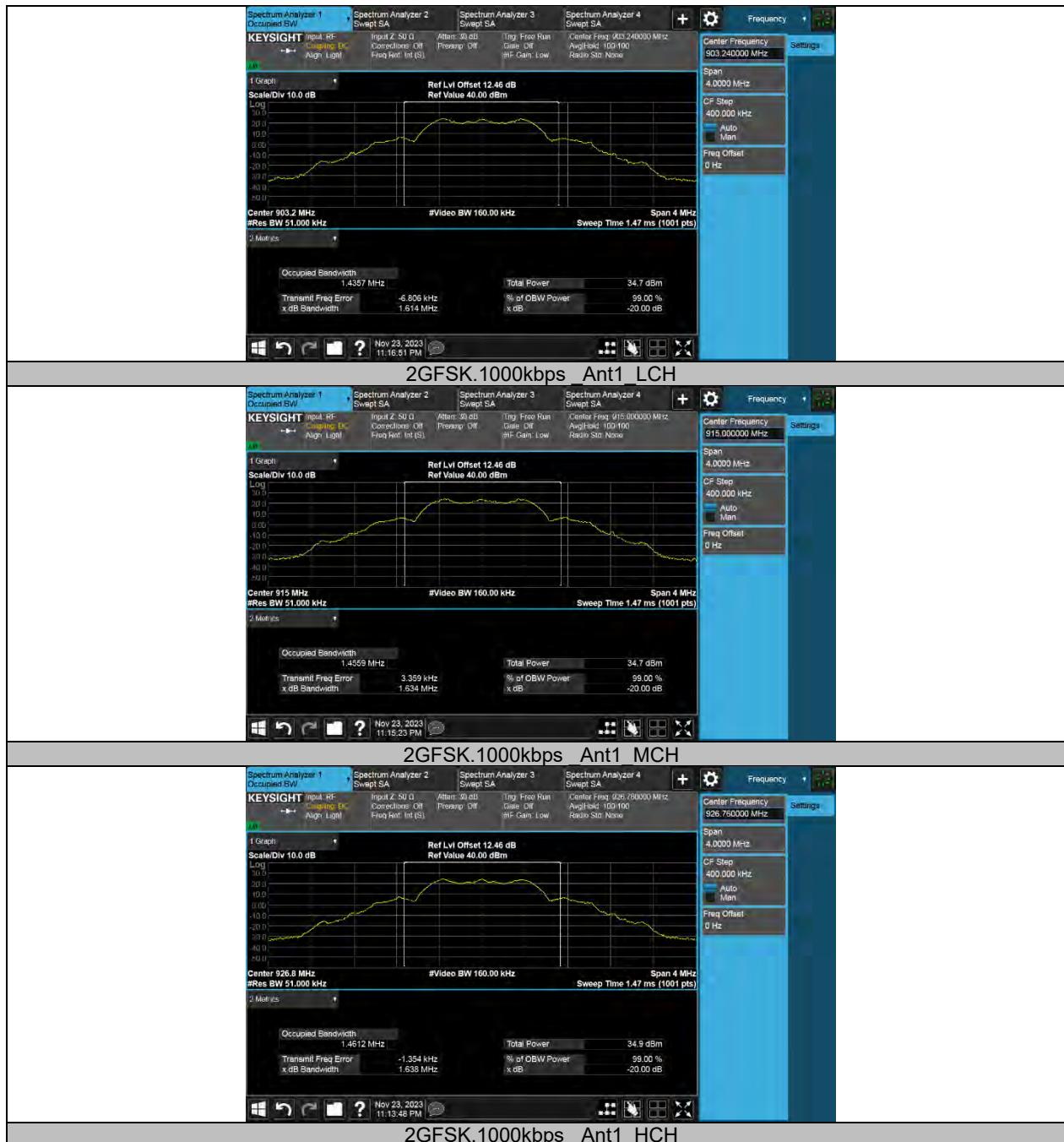


12.2. APPENDIX B2: OCCUPIED CHANNEL BANDWIDTH

12.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Verdict
2GFSK.1000kbps	Ant1	LCH	1.4357	PASS
		MCH	1.4559	PASS
		HCH	1.4612	PASS

12.2.2. Test Graphs



12.3. APPENDIX C2: MAXIMUM CONDUCTED OUTPUT POWER

12.3.1. Test Result

Test Mode	Antenna	Channel	AVG Result[dBm]	Limit[dBm]	Verdict
2GFSK.1000kbps	Ant1	LCH	25.74	≤30	PASS
		MCH	25.78	≤30	PASS
		HCH	26.04	≤30	PASS

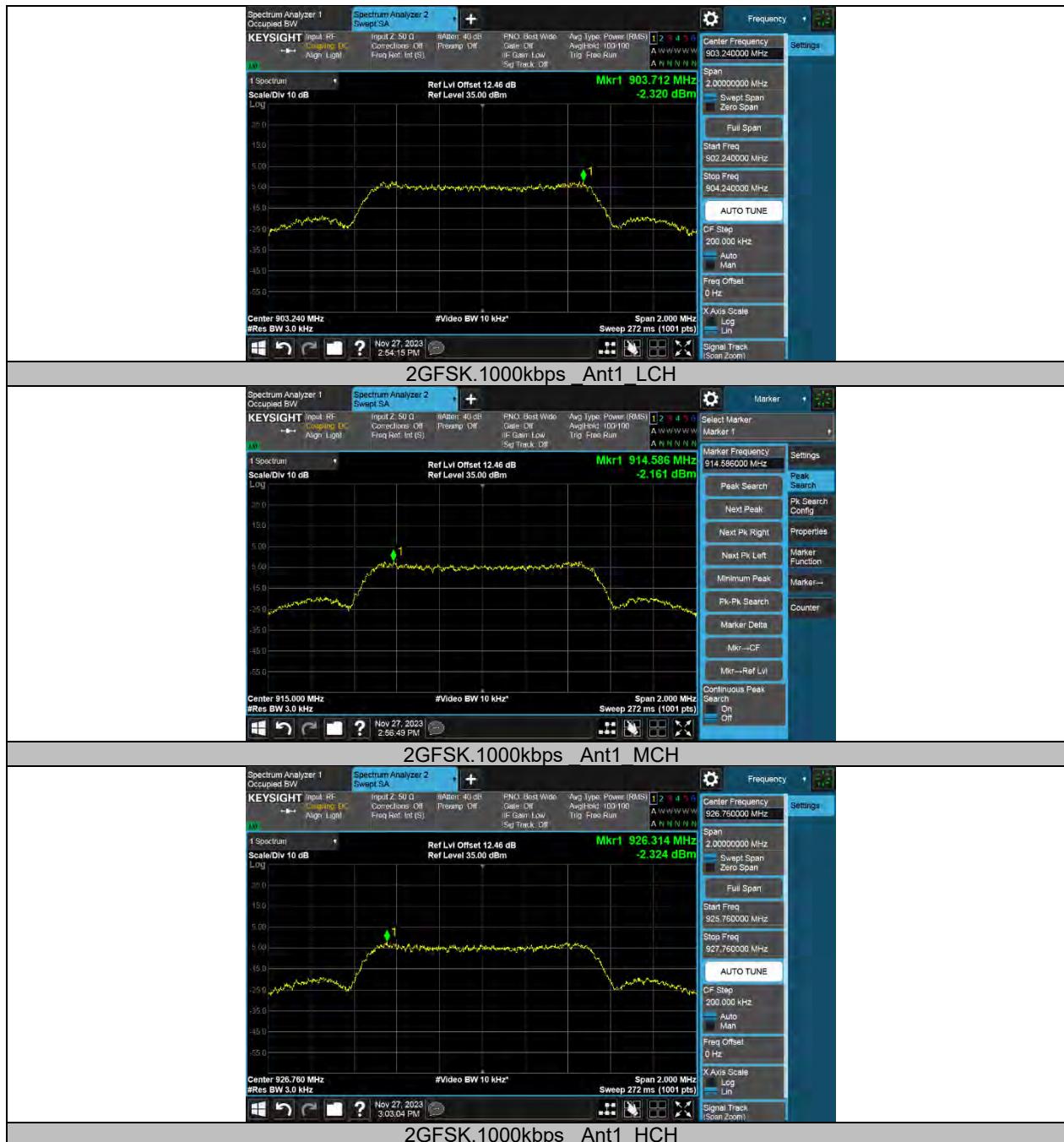
12.4. APPENDIX D2: MAXIMUM POWER SPECTRAL DENSITY

12.4.1. Test Result

Test Mode	Antenna	Channel	Reading Result [dBm/3kHz]	Duty Factor	Final Result [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
2GFSK. 1000kbps	Ant1	LCH	-2.320	5.34	3.020	≤8.00	PASS
		MCH	-2.161	5.34	3.179	≤8.00	PASS
		HCH	-2.324	5.34	3.016	≤8.00	PASS

Note: Final Result = Reading Result + Duty Factor

12.4.2. Test Graphs



12.5. APPENDIX E2: BAND EDGE MEASUREMENTS & CONDUCTED SPURIOUS EMISSION

12.5.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
2GFSK.1000kbps	Ant1	LCH	See the below graphs	PASS
		MCH		PASS
		HCH		PASS

12.5.2. Test Graphs





12.6. APPENDIX F2: DUTY CYCLE

12.6.1. Test Result

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
2GFSK-1000 kbps	29.268	100	0.2927	29.27	5.34	0.034	1

Note:

Duty Cycle Correction Factor=10log (1/x).

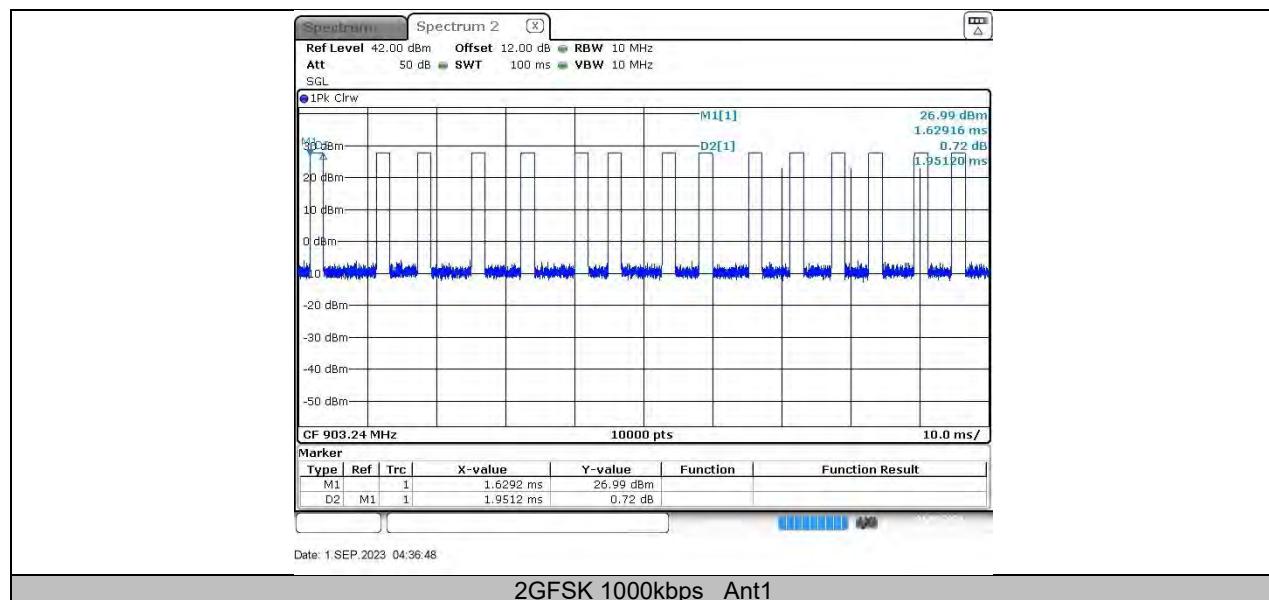
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time=D2*15=1.9512*15=29.268 ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

12.6.2. Test Graphs



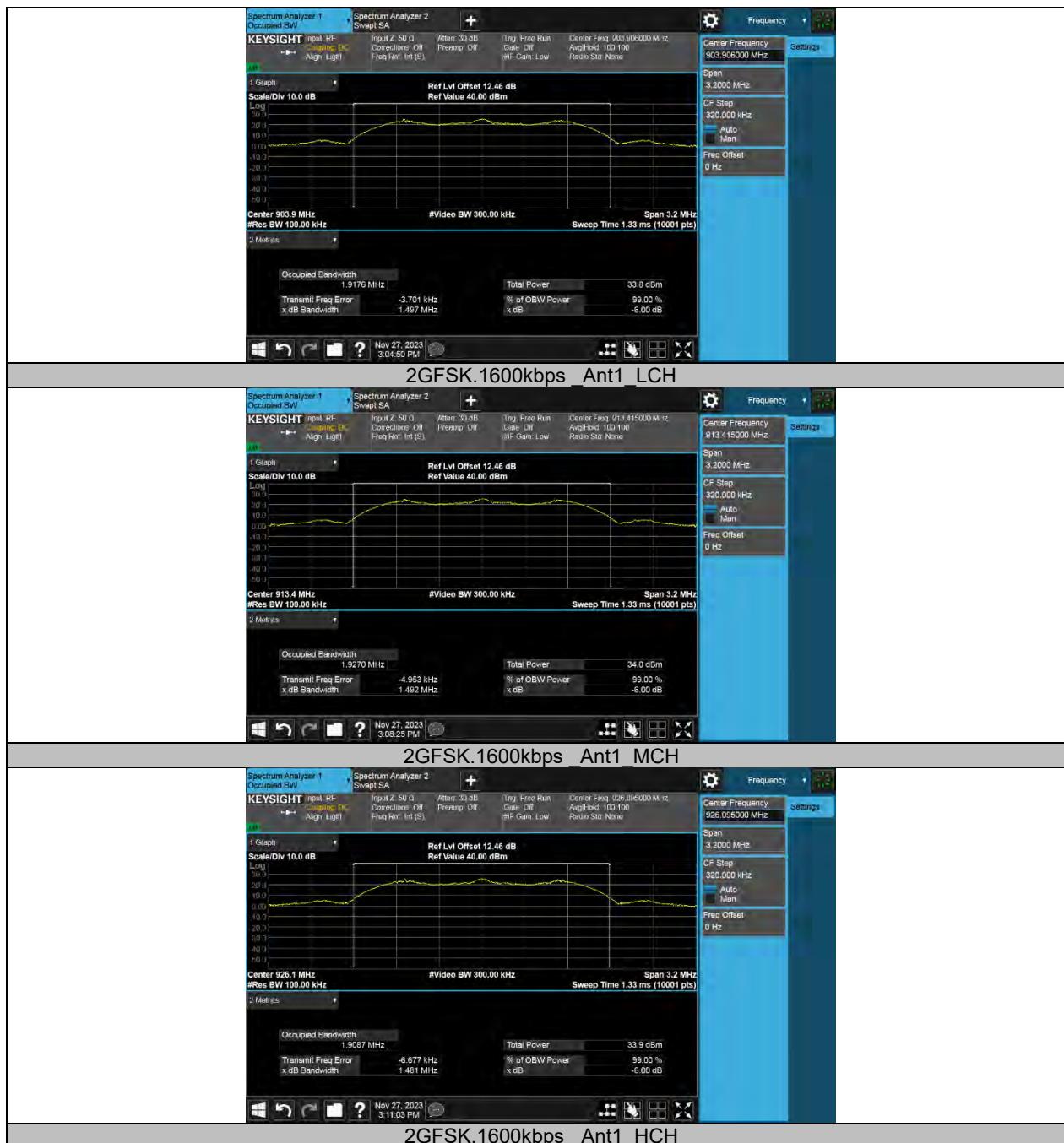
13. FCC.SubG.2GFSK.1600kbps

13.1. APPENDIX A3: DTS BANDWIDTH

13.1.1. Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2GFSK.1600kbps	Ant1	LCH	1.497	903.1528	904.6498	≥0.5	PASS
		MCH	1.492	912.6641	914.1561	≥0.5	PASS
		HCH	1.481	925.3478	926.8288	≥0.5	PASS

13.1.2. Test Graphs

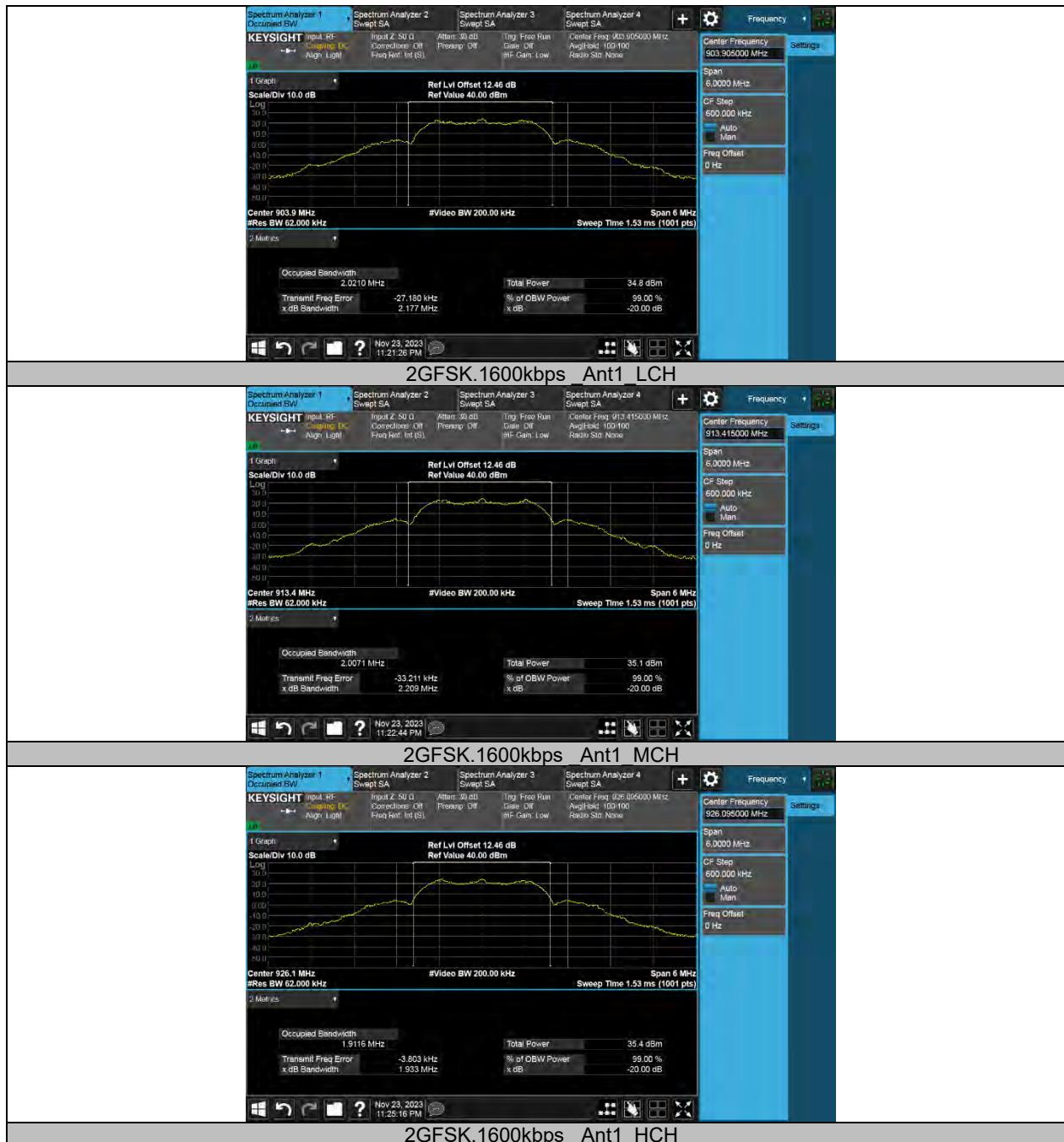


13.2. APPENDIX B3: OCCUPIED CHANNEL BANDWIDTH

13.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Verdict
2GFSK.1600kbps	Ant1	LCH	2.0210	PASS
		MCH	2.0071	PASS
		HCH	1.9116	PASS

13.2.2. Test Graphs



13.3. APPENDIX C3: MAXIMUM CONDUCTED OUTPUT POWER

13.3.1. Test Result

Test Mode	Antenna	Channel	AVG Result[dBm]	Limit[dBm]	Verdict
2GFSK.1600kbps	Ant1	LCH	25.43	≤30	PASS
		MCH	25.71	≤30	PASS
		HCH	25.73	≤30	PASS

13.4. APPENDIX D3: MAXIMUM POWER SPECTRAL DENSITY

13.4.1. Test Result

Test Mode	Antenna	Channel	Reading Result [dBm/3kHz]	Duty Factor	Final Result [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
2GFSK. 1600kbps	Ant1	LCH	-5.185	6.79	1.605	≤8.00	PASS
		MCH	-4.678	6.79	2.112	≤8.00	PASS
		HCH	-5.242	6.79	1.548	≤8.00	PASS

Note: Final Result = Reading Result + Duty Factor

13.4.2. Test Graphs



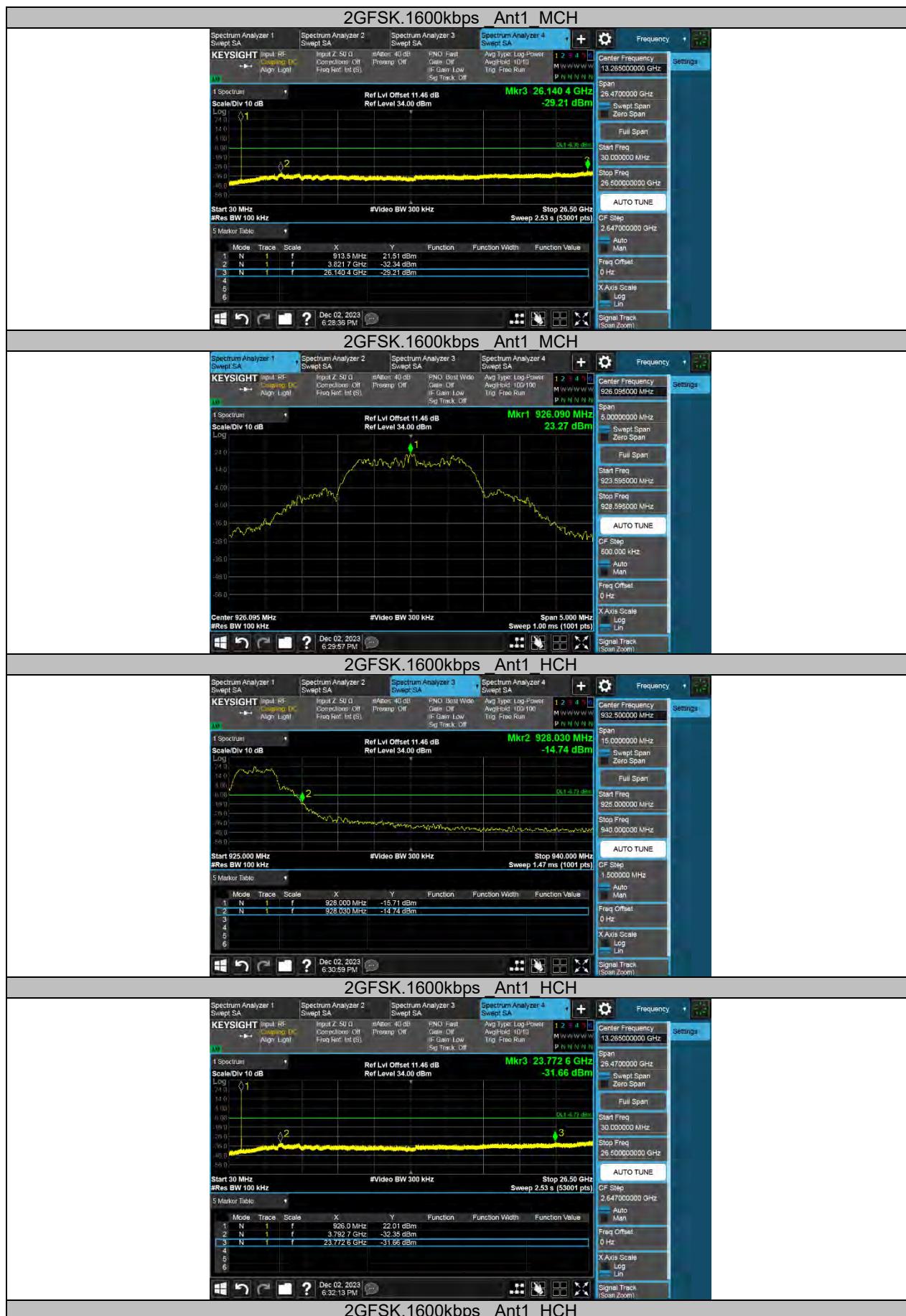
13.5. APPENDIX E3: BAND EDGE MEASUREMENTS & CONDUCTED SPURIOUS EMISSION

13.5.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
2GFSK.1600kbps	Ant1	LCH	See the below graphs	PASS
		MCH		PASS
		HCH		PASS

13.5.2. Test Graphs





13.6. APPENDIX F3: DUTY CYCLE

13.6.1. Test Result

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
2GFSK-1600 kbps	20.9287	100	0.2093	20.93	6.79	0.048	1

Note:

Duty Cycle Correction Factor=10log (1/x).

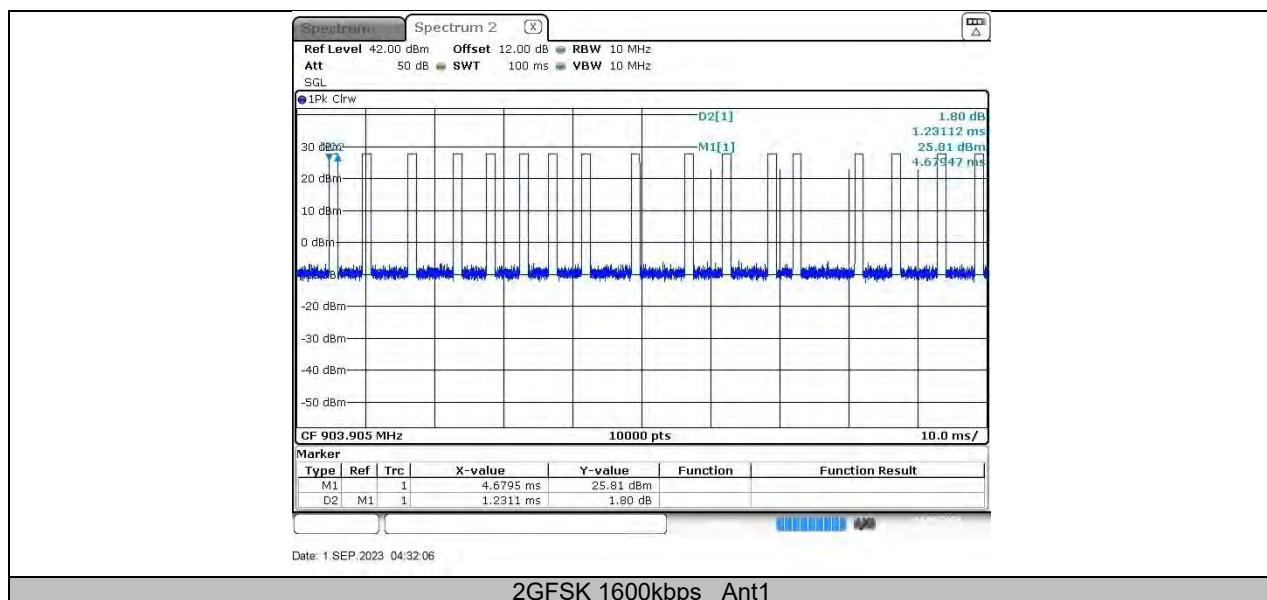
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time=D2*15=1.2311*17=20.9287 ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

13.6.2. Test Graphs



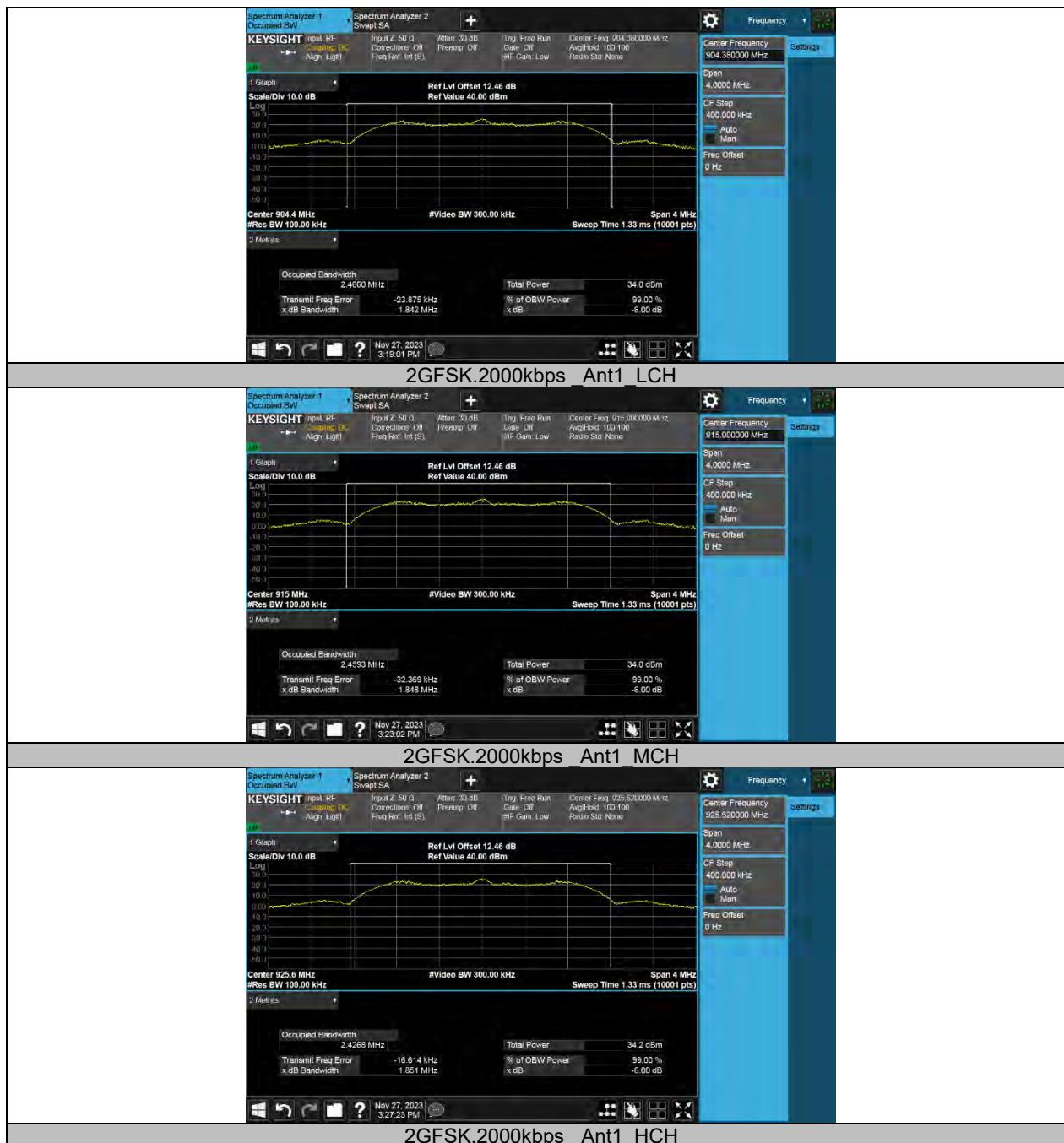
14. FCC.SubG.2GFSK.2000kbps

14.1. APPENDIX A4: DTS BANDWIDTH

14.1.1. Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2GFSK.2000kbps	Ant1	LCH	1.842	903.43513	905.27713	≥0.5	PASS
		MCH	1.848	914.04363	915.89163	≥0.5	PASS
		HCH	1.851	924.67789	926.52889	≥0.5	PASS

14.1.2. Test Graphs

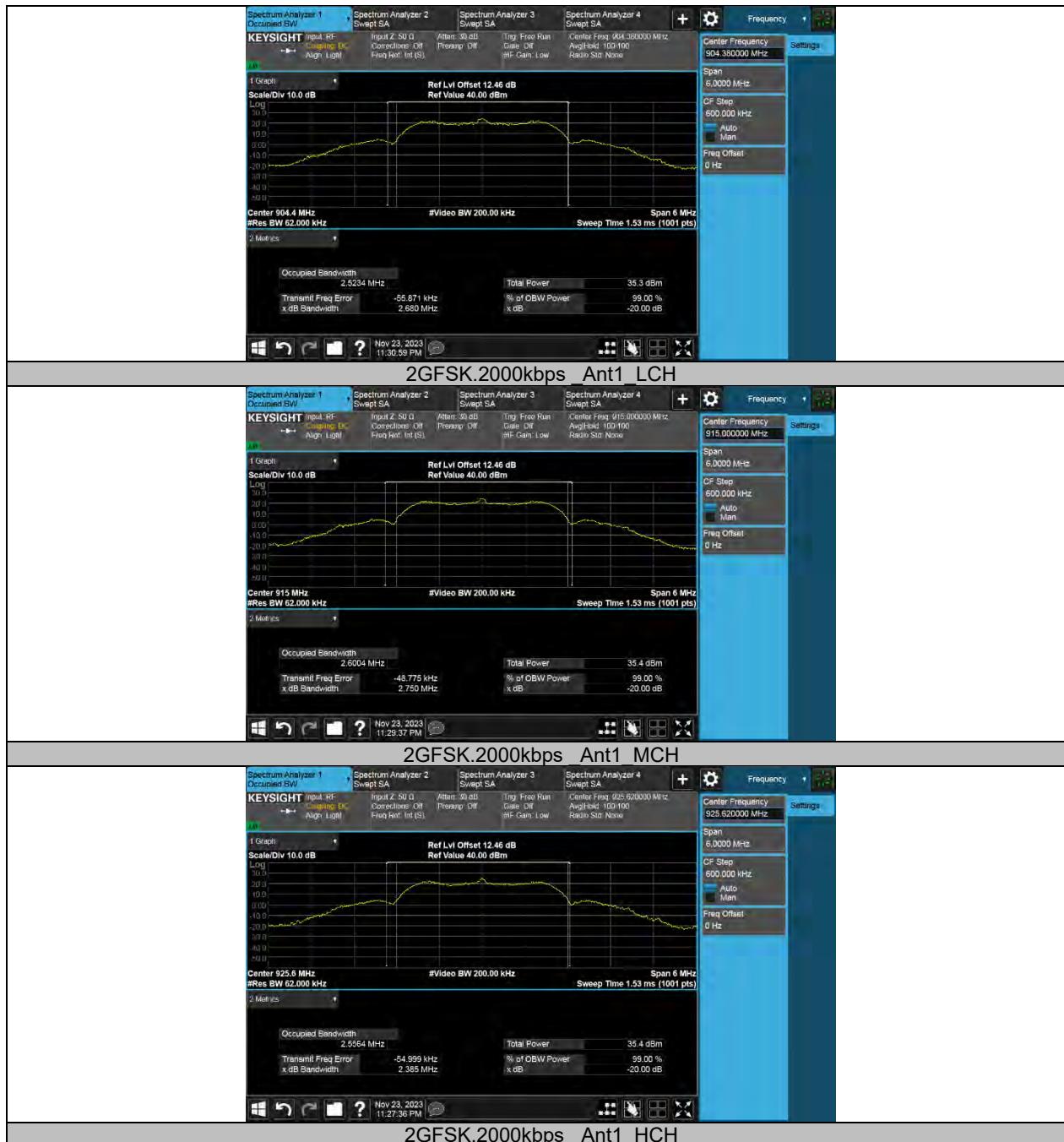


14.2. APPENDIX B4: OCCUPIED CHANNEL BANDWIDTH

14.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Verdict
2GFSK.2000kbps	Ant1	LCH	2.5234	PASS
		MCH	2.6004	PASS
		HCH	2.5564	PASS

14.2.2. Test Graphs



14.3. APPENDIX C4: MAXIMUM CONDUCTED OUTPUT POWER

14.3.1. Test Result

Test Mode	Antenna	Channel	AVG Result[dBm]	Limit[dBm]	Verdict
2GFSK.2000kbps	Ant1	LCH	25.82	≤30	PASS
		MCH	25.93	≤30	PASS
		HCH	25.86	≤30	PASS

14.4. APPENDIX D4: MAXIMUM POWER SPECTRAL DENSITY

14.4.1. Test Result

Test Mode	Antenna	Channel	Reading Result [dBm/3kHz]	Duty Factor	Final Result [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
2GFSK. 2000kbps	Ant1	LCH	-7.661	7.73	0.069	≤8.00	PASS
		MCH	-7.317	7.73	0.413	≤8.00	PASS
		HCH	-7.406	7.73	0.324	≤8.00	PASS

Note: Final Result = Reading Result + Duty Factor

14.4.2. Test Graphs

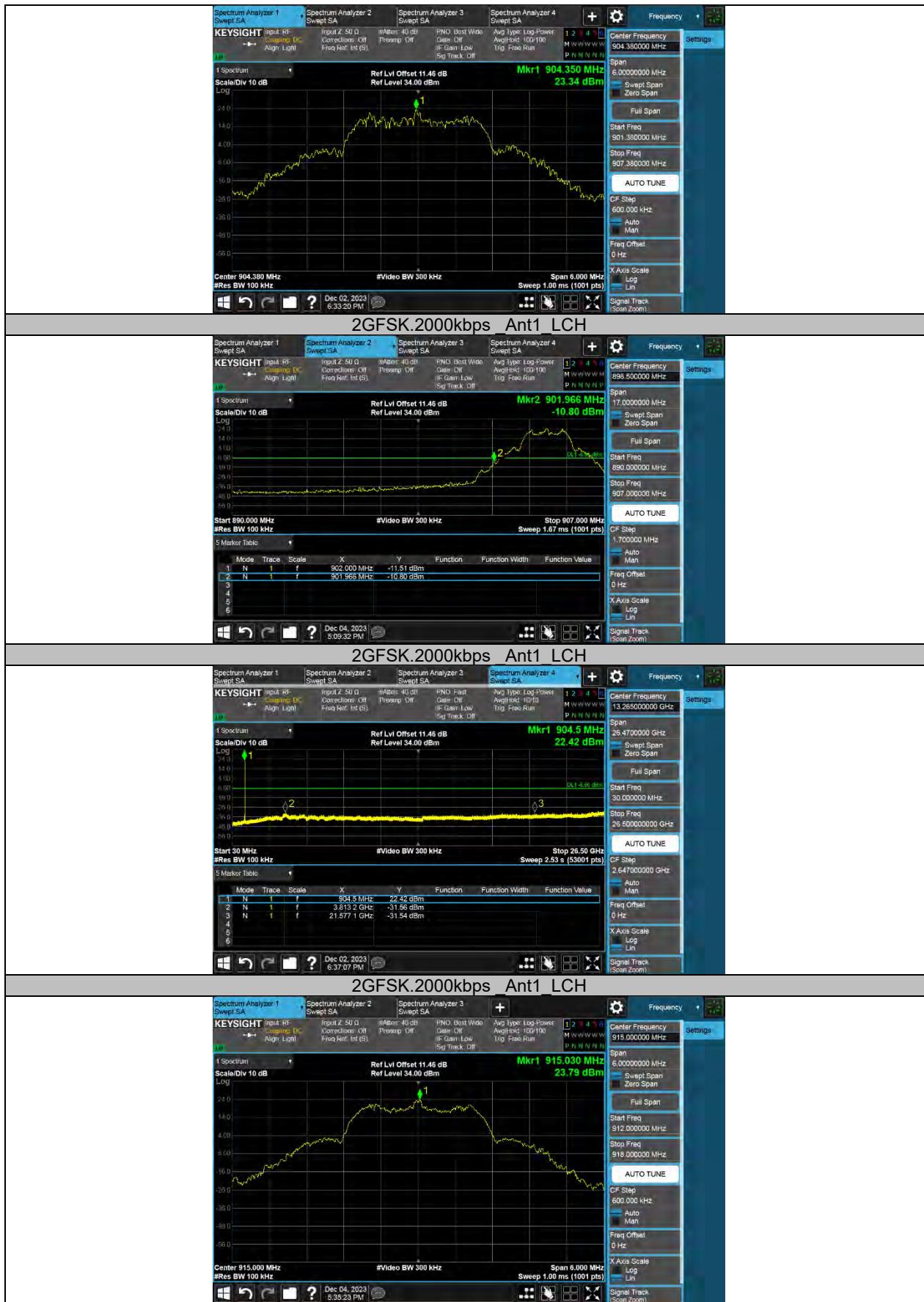


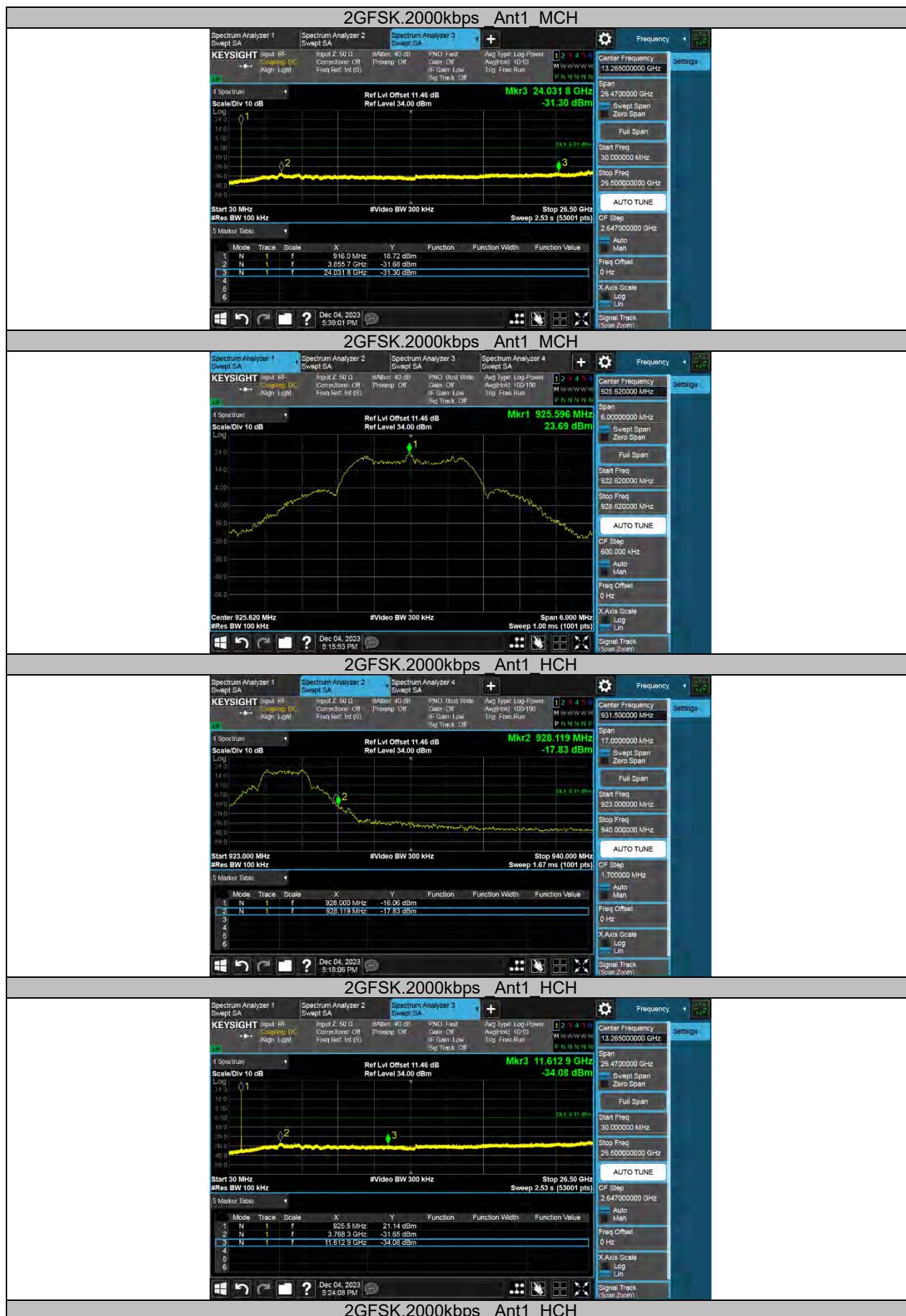
14.5. APPENDIX E4: BAND EDGE MEASUREMENTS & CONDUCTED SPURIOUS EMISSION

14.5.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
2GFSK.2000kbps	Ant1	LCH	See the below graphs	PASS
		MCH		PASS
		HCH		PASS

14.5.2. Test Graphs





14.6. APPENDIX F4: DUTY CYCLE

14.6.1. Test Result

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
2GFSK-2000 kbps	16.8487	100	0.1685	16.85	7.73	0.059	1

Note:

Duty Cycle Correction Factor=10log (1/x).

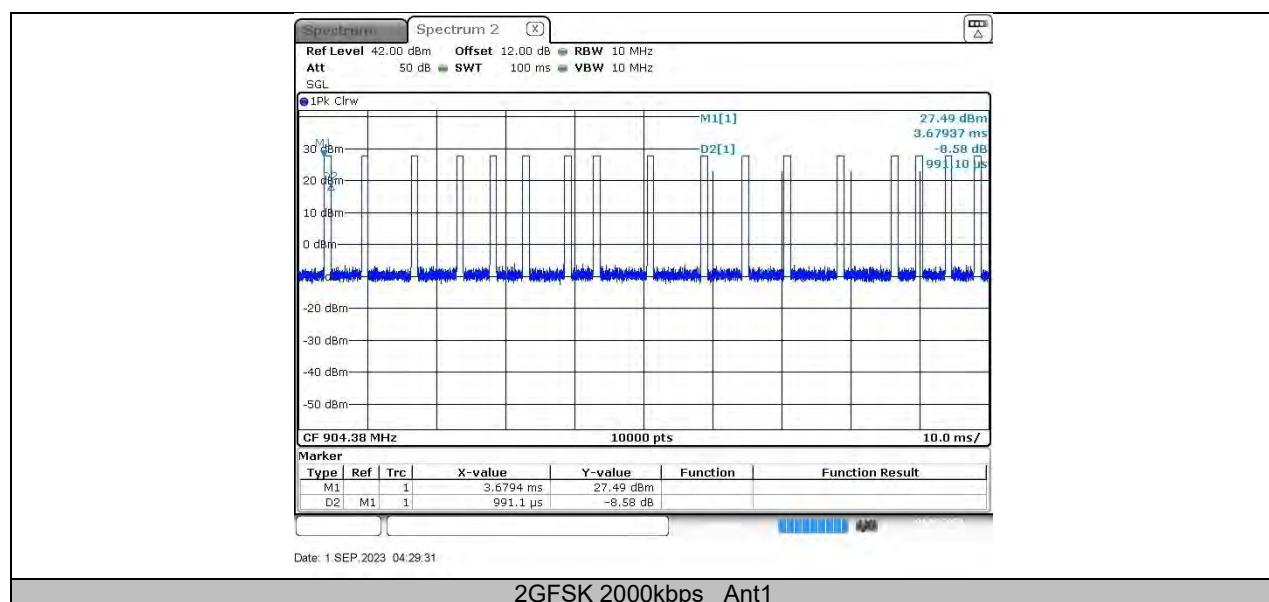
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time=D2*15=0.9911*17=16.8487 ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

14.6.2. Test Graphs



END OF REPORT