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

CERTIFICATION TEST REPORT

For

VEHICULAR GATE OPENER

MODEL NUMBER: SL1000UL, SL600UL

FCC ID: HBWN519

IC: 2666A-N519

REPORT NUMBER: 4791357380-1

ISSUE DATE: September 5, 2024

Prepared for

FCC: Chamberlain Group LLC, The
FCC: 300 Windsor Dr Oak Brook Illinois 60523 United States

ISED: The Chamberlain Group, LLC.
ISED: 300 Windsor Dr Oak Brook IL 60523 USA

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	September 5, 2024	Initial Issue	

Summary of Test Results			
Clause	**Test Items**	**FCC/ISED Rules**	**Test Results**
1	20dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a)(1) (i) RSS-247 Clause 5.1 (c) RSS-Gen Clause 6.7	Pass
2	Conducted Output Power	FCC 15.247 (b) (2) RSS-247 Clause 5.4 (a)	Pass
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (c)	Pass
4	Number of Hopping Frequency	15.247 (a) (i) RSS-247 Clause 5.1 (c)	Pass
5	Time of Occupancy (Dwell Time)	15.247 (a) (i) RSS-247 Clause 5.1 (c)	Pass
6	Conducted Bandedge	FCC 15.247 (d) RSS-247 Clause 5.5	Pass
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
8	Conducted Emission Test for AC Power Port	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
9	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass

Note:
1.This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
2. The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C, ISED RSS-247 > when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Chamberlain Group LLC, The
Address: 300 Windsor Dr Oak Brook Illinois 60523 United States

Manufacturer Information

Company Name: Chamberlain Group LLC, The
Address: 300 Windsor Dr Oak Brook Illinois 60523 United States

EUT Information

EUT Name: VEHICULAR GATE OPENER
Model: SL1000UL
Series Model: SL600UL
Model difference: Please refer to section 5.1
Sample Received Date: August 16, 2024
Sample Status: Normal
Sample ID: 7522687-1
Date of Tested: August 16, 2024~ September 5, 2024

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART C	PASS
ISED RSS-247 Issue 3	PASS
ISED RSS-GEN Issue 5	PASS

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Operations Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 3 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **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 **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. **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. 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

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

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

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%
20dB Emission Bandwidth and 99% Occupied Bandwidth	±0.0196%
Carrier Frequency Separation	±1.9%
Maximum Conducted Output Power	±0.743 dB
Number of Hopping Channel	±1.9%
Time of Occupancy	±0.028%
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	VEHICULAR GATE OPENER
Model	SL1000UL
Series Model:	SL600UL
Model difference:	SL600UL has the same technical construction including circuit diagram, PCB Layout, Product Appearance, components and component layout, all electrical construction and mechanical construction with SL1000UL（Main test model）. Differences between models are: different transformers, different motors and different model number, all these changes do not affect the unwanted emissions of the certified product.
Frequency Range:	902.25 MHz to 926.75 MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	FSK
Data Rates:	96 kbps
Normal Test Voltage:	AC 120 V, 60 Hz

5.2. MAXIMUM PEAK OUTPUT POWER

Test Mode	Bit Rate	Operation Frequency	Maximum Conducted PEAK Output Power (dBm)
FSK	96 kbps	902.25 MHz to 926.75 MHz	13.79

5.3. CHANNEL LIST

Channel List									
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.25	11	907.25	21	912.25	31	917.25	41	922.25
2	902.75	12	907.75	22	912.75	32	917.75	42	922.75
3	903.25	13	908.25	23	913.25	33	918.25	43	923.25
4	903.75	14	908.75	24	913.75	34	918.75	44	923.75
5	904.25	15	909.25	25	914.25	35	919.25	45	924.25
6	904.75	16	909.75	26	914.75	36	919.75	46	924.75
7	905.25	17	910.25	27	915.25	37	920.25	47	925.25
8	905.75	18	910.75	28	915.75	38	920.75	48	925.75
9	906.25	19	911.25	29	916.25	39	921.25	49	926.25
10	906.75	20	911.75	30	916.75	40	921.75	50	926.75

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
FSK	CH 1(Low Channel), CH 26(MID Channel), CH50(High Channel)	902.25 MHz, 914.75 MHz, 926.75 MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 902 ~ 928MHz Band				
Test Software		/		
Modulation Mode	Transmit Antenna Number	Test Channel		
		LCH	MCH	HCH
FSK	1	default	default	default

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency Band (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	912-920	Line antenna	3

Modulation	Transmit and Receive Mode	Description
FSK	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

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

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Remark
/	/	/	/	/

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
/	/	/	/	/	/

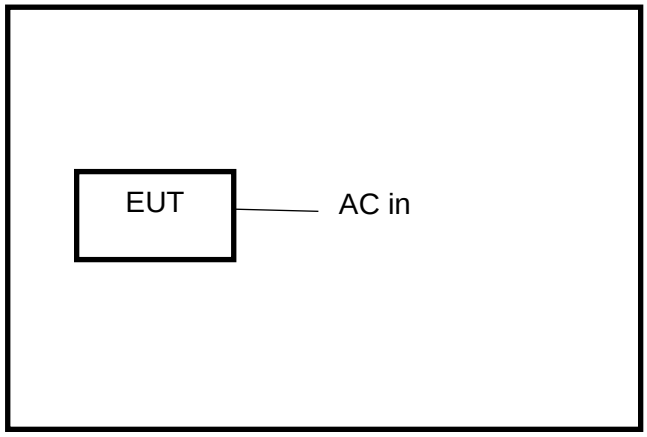
ACCESSORIES

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

TEST SETUP

The EUT can work in engineering mode.

SETUP DIAGRAM FOR TESTS



6. MEASURING INSTRUMENT AND SOFTWARE USED

R&S TS 8997 Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP120	100921	Mar.25,2024	Mar.24,2025
Vector Signal Generator	R&S	SMBV100A	261637	Oct.12, 2023	Oct.11, 2024
Signal Generator	R&S	SMB100A	178553	Oct.12, 2023	Oct.11, 2024
Signal Analyzer	R&S	FSV40	101118	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.	Last Cal.	Due. Date
PXA Signal Analyzer	Keysight	N9030A	MY55410512	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5182B	MY56200284	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5172B	MY56200301	Oct.12, 2023	Oct.11, 2024
Attenuator	Aglient	8495B	2814a12853	Oct.12, 2023	Oct.11, 2024
RF Control Unit	Tonscend	JS0806-2	23B80620666	Mar.25,2024	Mar.24,2025
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.	Last Cal.	Due Date
EMI Test Receiver	R&S	ESR3	101961	Oct.13, 2023	Oct.12, 2024
Two-Line V-Network	R&S	ENV216	101983	Oct.13, 2023	Oct.12, 2024
Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	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.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Oct.12, 2023	Oct.11, 2024
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	June 28, 2024	June 27, 2027
Preamplifier	HP	8447D	2944A09099	Oct.12, 2023	Oct.11, 2024
EMI Measurement Receiver	R&S	ESR26	101377	Oct.12, 2023	Oct.11, 2024
Horn Antenna	TDK	HRN-0118	130939	Apr.29, 2022	Apr.28, 2025
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.12, 2023	Oct.11, 2024
Horn Antenna	Schwarzbeck	BBHA9170	697	June 30, 2024	June 29, 2027
Preamplifier	TDK	PA-02-2	TRS-307-00003	Oct.12, 2023	Oct.11, 2024
Preamplifier	TDK	PA-02-3	TRS-308-00002	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.12, 2023	Oct.11, 2024
Notch Filter	Wainwright	WHJ10-882-980-7000-40SS	23	Oct.12, 2023	Oct.11, 2024
Software					
Description			Manufacturer	Name	Version
Test Software for Radiated Emissions			Farad	EZ-EMC	Ver. UL-3A1

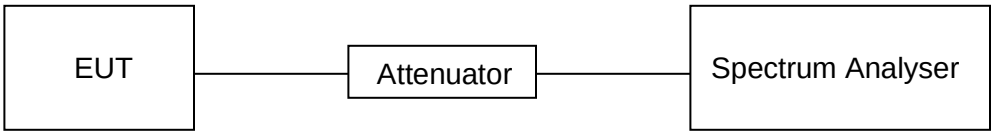
7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

PROCEDURE

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

RESULTS

Please refer to appendix A.

7.2. 20 dB BANDWIDTH AND 99 % OCCUPIED BANDWIDTH

LIMITS

CFR 47FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a)(1) (i) RSS-247 Clause 5.1 (a)	20 dB Bandwidth	500 kHz	902 - 928
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	None; for reporting purposes only.	902 - 928

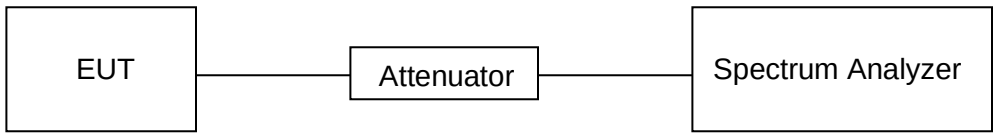
TEST PROCEDURE

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

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

a) Use the occupied bandwidth function of the instrument, allow the trace to stabilize and report the measured 99 % occupied bandwidth and 20 dB Bandwidth.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to appendix B.

7.3. CONDUCTED OUTPUT POWER

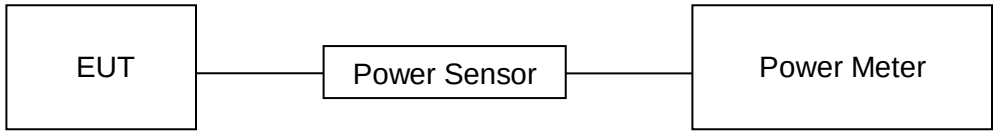
LIMITS

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) (2) ISED RSS-247 Clause 5.4 (a)	Peak Conducted Output Power	1 watt for systems employing at least 50 hopping channels	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.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to appendix C.

7.4. CARRIER FREQUENCY SEPARATION

LIMITS

CFR 47 FCC Part15 (15.247) ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a) (1) ISED RSS-247 Clause 5.1 (b)	Carrier Frequency Separation	Minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.	902 - 928

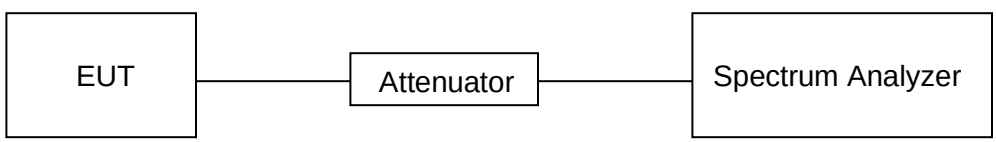
TEST PROCEDURE

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

Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
RBW	Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
VBW	≥RBW
Trace	Max hold
Sweep time	Auto couple

Allow the trace to stabilize and use the marker-delta function to determine the separation between the peaks of the adjacent channels.
Compliance of an EUT with the appropriate regulatory limit shall be determined.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to Appendix D.

7.5. NUMBER OF HOPPING FREQUENCIES

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 3		
Section	Test Item	Limit
CFR 47 15.247 (a) (i) ISED RSS-247 Clause 5.1 (c)	Number of Hopping Frequency	1. if the 20 dB bandwidth of the hopping channel is less than 250 kHz, at least 50 hopping channels 2. if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, at least 25 hopping channels

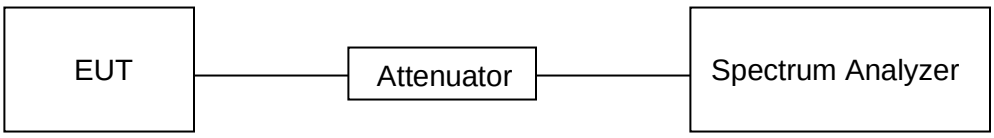
TEST PROCEDURE

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

Detector	Peak
RBW	To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW	≥RBW
Span	The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
Trace	Max hold
Sweep time	Auto couple

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

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to appendix E.

7.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3		
Section	Test Item	Limit
CFR 47 15.247 (a) (i) ISED RSS-247 Clause 5.1 (c)	Time of Occupancy (Dwell Time)	1.If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period. 2. if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

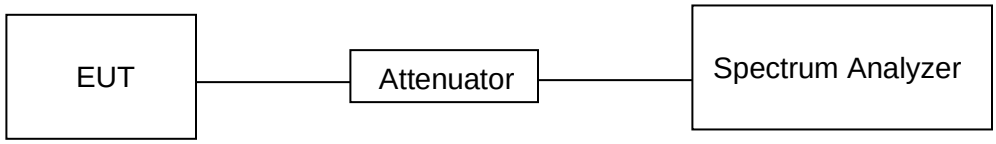
TEST PROCEDURE

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

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
VBW	≥RBW
Span	Zero span, centered on a hopping channel
Trace	Max hold
Sweep time	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. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Measure the maximum time duration of one single pulse.
A Period Time = (channel number)*0.4

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to appendix F.

7.7. CONDUCTED BANDEDGE 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 Spurious Emission	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Connect the EUT to the spectrum analyser 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	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

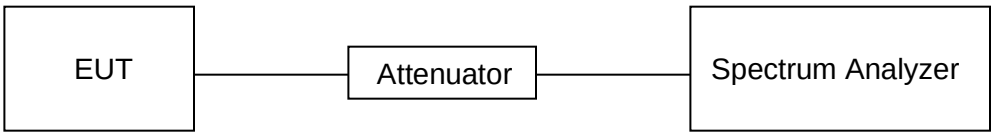
Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

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	≥3 × RBW
measurement points	≥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.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.6 °C	Relative Humidity	62 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Please refer to appendix G&H.

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) (µA/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 - 3.026	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
5.677 - 5.683	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 - 36.5
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 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
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.

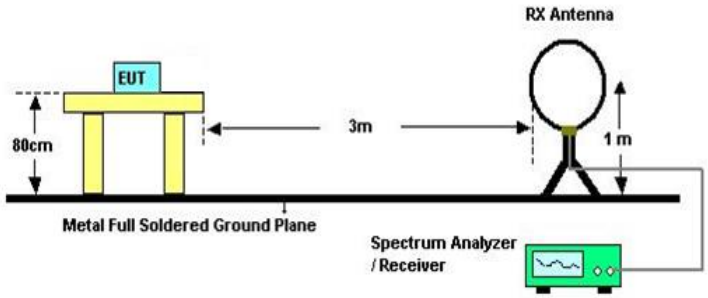
FCC Restricted bands of operation refer to FCC §15.205 (a):

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: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

TEST SETUP AND PROCEDURE

Below 30 MHz



The setting of the spectrum analyser

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
Trace	Max hold

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.

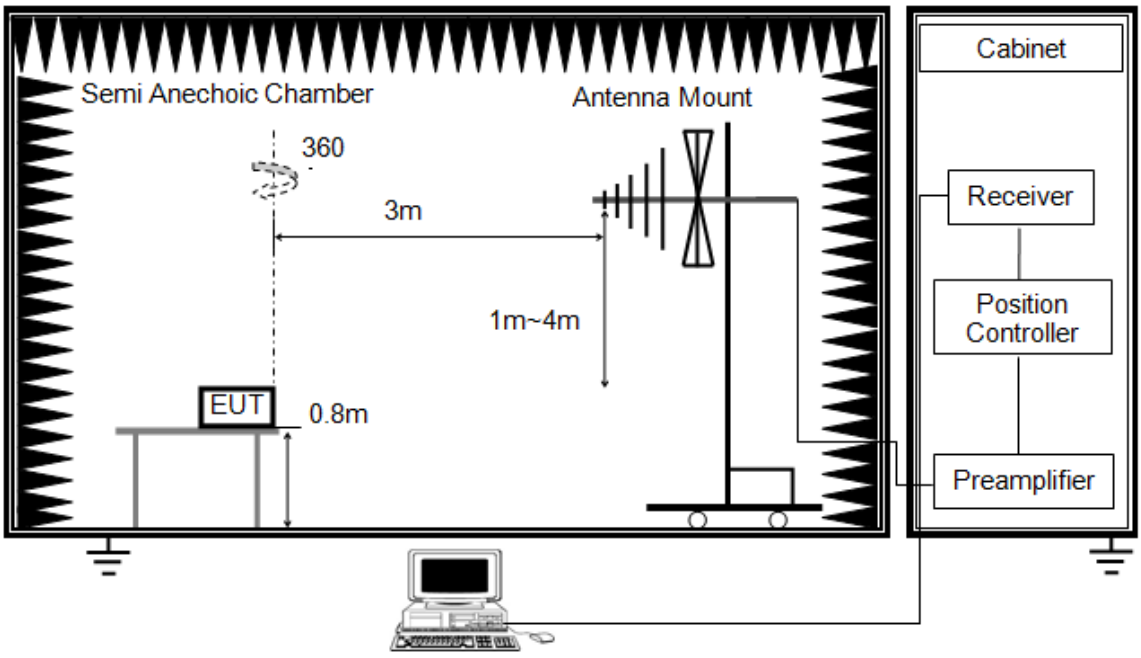
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

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 dBuV/m, which is equivalent to Y-51.5 = Z dBuA/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 analyser

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.

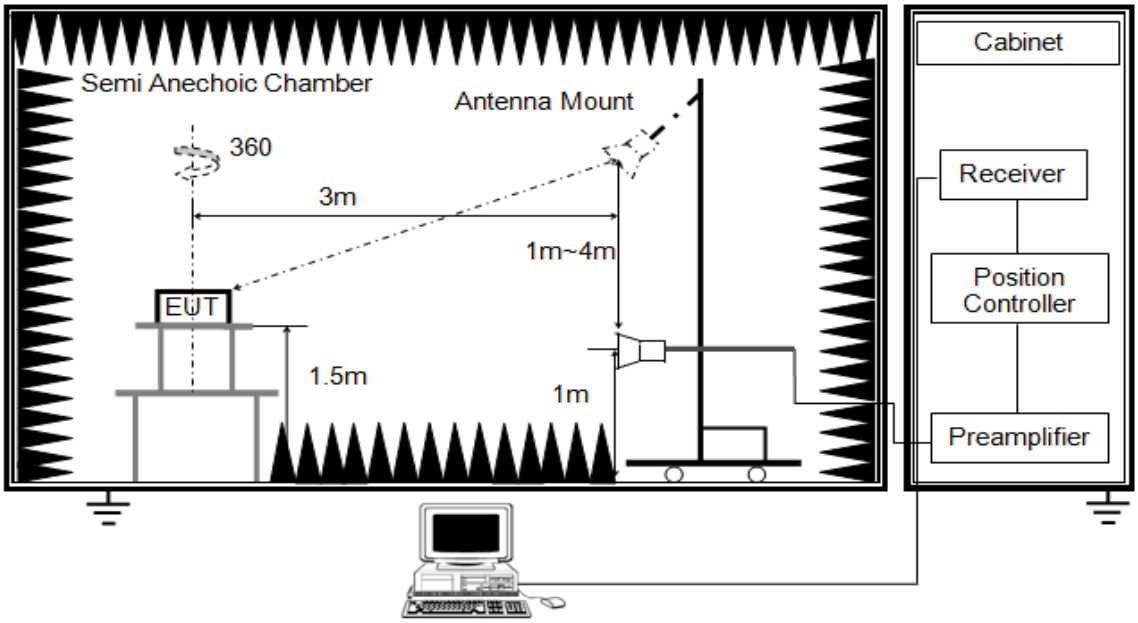
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations 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 analyser

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 7.1.ON TIME AND DUTY CYCLE.

Note 1: The manufacturer has recommended that the EUT only be used in the desktop (horizontal) orientation; therefore, all radiated testing was performed in desktop orientation.

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. dBuA/m= dBuV/m- 20Log10[120π] = 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: VBW=1/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.

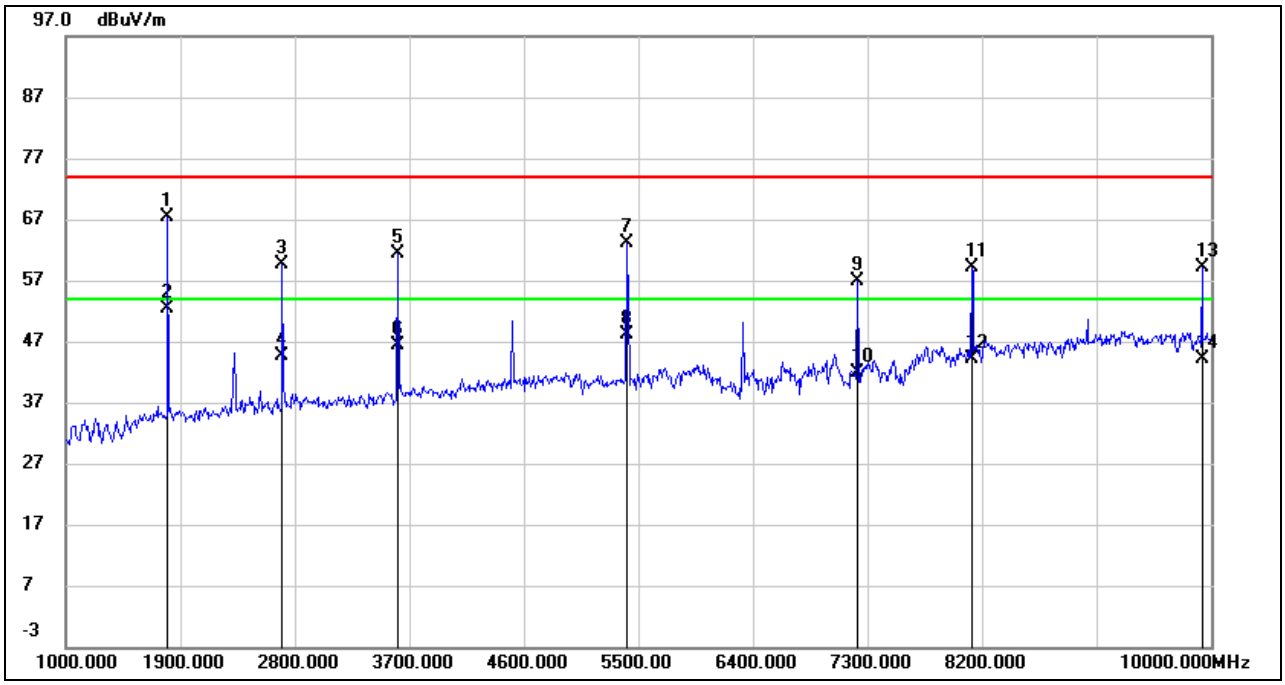
TEST ENVIRONMENT

Temperature	24.8 °C	Relative Humidity	59 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

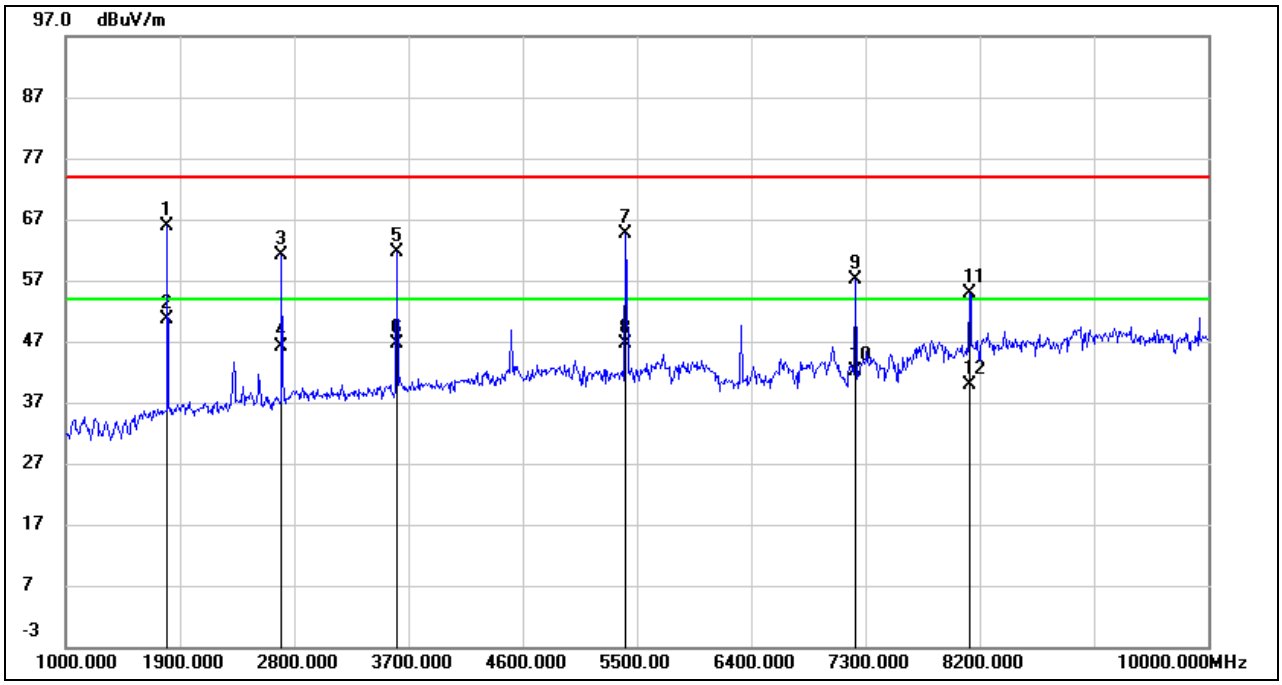
8.1. SPURIOUS EMISSIONS (1 GHz ~ 10 GHz)

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



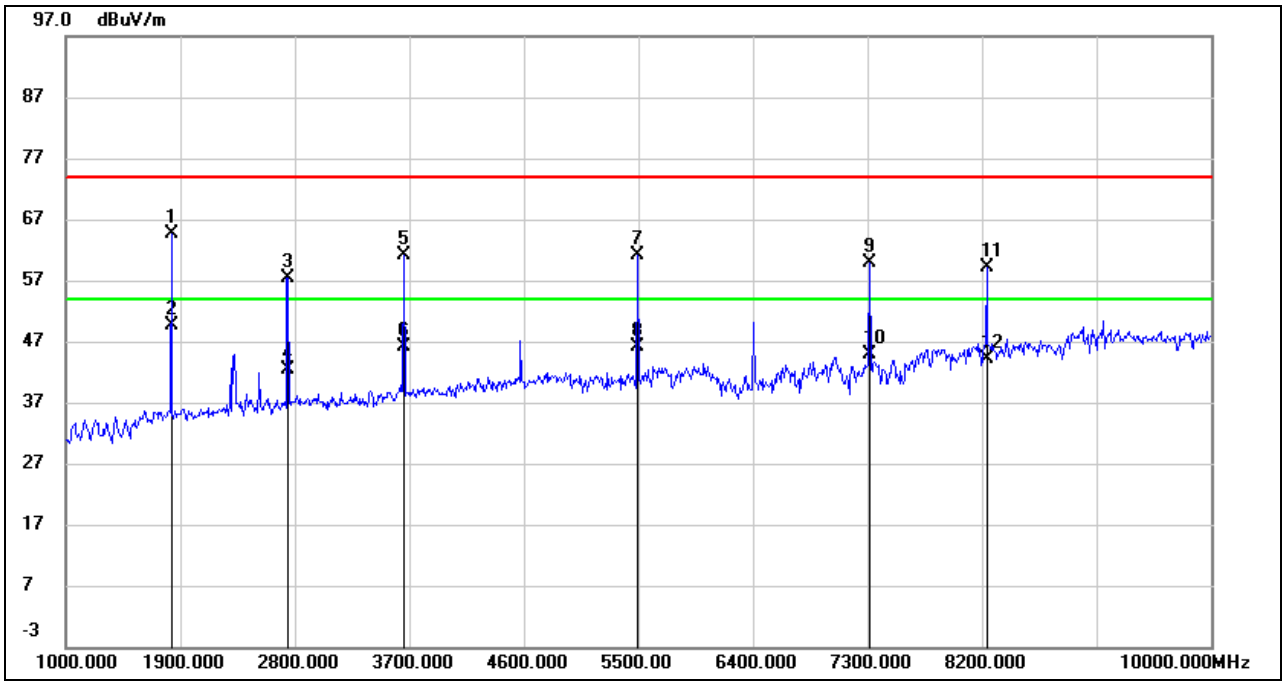
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1801.000	76.97	-9.61	67.36	74.00	-6.64	peak
2	1801.000	/	/	52.34	54.00	-1.66	AVG
3	2701.000	66.62	-7.04	59.58	74.00	-14.42	peak
4	2701.000	/	/	44.56	54.00	-9.44	AVG
5	3610.000	65.35	-3.92	61.43	74.00	-12.57	peak
6	3610.000	/	/	46.41	54.00	-7.59	AVG
7	5410.000	61.67	1.49	63.16	74.00	-10.84	peak
8	5410.000	/	/	48.14	54.00	-5.86	AVG
9	7219.000	50.44	6.52	56.96	74.00	-17.04	peak
10	7219.000	/	/	41.94	54.00	-12.06	AVG
11	8119.000	50.98	8.18	59.16	74.00	-14.84	peak
12	8119.000	/	/	44.14	54.00	-9.86	AVG
13	9928.000	46.54	12.51	59.05	74.00	-14.95	peak
14	9928.000	/	/	44.03	54.00	-9.97	AVG

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Vertical	Test Voltage:	AC 120 V, 60 Hz



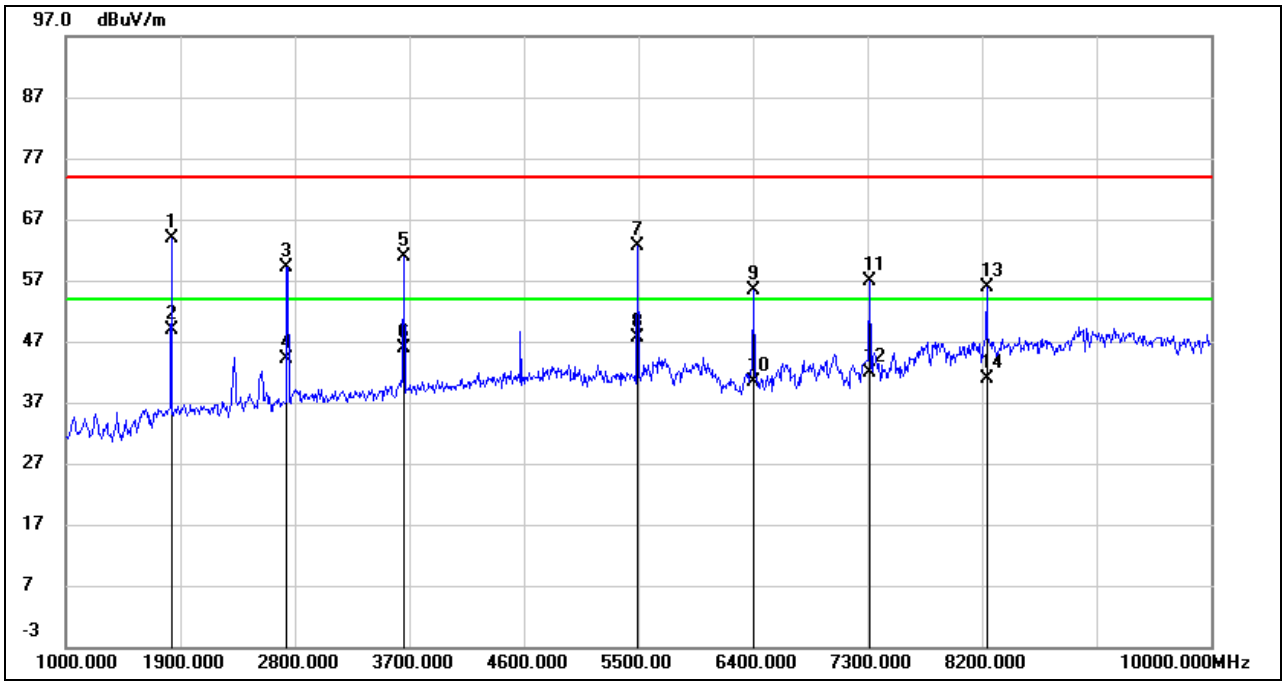
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1801.000	74.80	-9.03	65.77	74.00	-8.23	peak
2	1801.000	/	/	50.75	54.00	-3.25	AVG
3	2701.000	67.16	-6.04	61.12	74.00	-12.88	peak
4	2701.000	/	/	46.10	54.00	-7.90	AVG
5	3610.000	64.62	-2.90	61.72	74.00	-12.28	peak
6	3610.000	/	/	46.70	54.00	-7.30	AVG
7	5410.000	62.02	2.69	64.71	74.00	-9.29	peak
8	5410.000	/	/	46.69	54.00	-7.31	AVG
9	7219.000	49.94	7.24	57.18	74.00	-16.82	peak
10	7219.000	/	/	42.16	54.00	-11.84	AVG
11	8119.000	46.21	8.71	54.92	74.00	-19.08	peak
12	8119.000	/	/	39.90	54.00	-14.10	AVG

Test Mode:	FSK	Frequency(MHz):	914.75
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



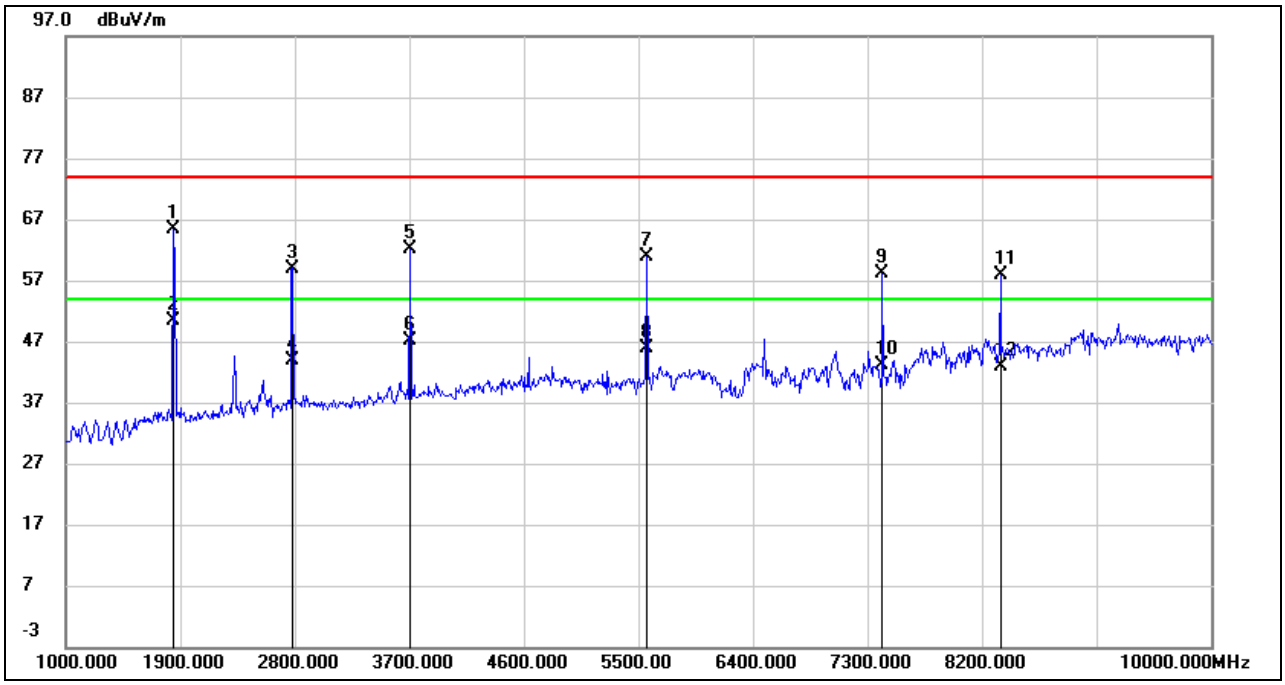
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1828.000	74.35	-9.66	64.69	74.00	-9.31	peak
2	1828.000	/	/	49.67	54.00	-4.33	AVG
3	2746.000	64.10	-6.79	57.31	74.00	-16.69	peak
4	2746.000	/	/	42.29	54.00	-11.71	AVG
5	3655.000	65.04	-3.80	61.24	74.00	-12.76	peak
6	3655.000	/	/	46.22	54.00	-7.78	AVG
7	5491.000	59.27	1.93	61.20	74.00	-12.80	peak
8	5491.000	/	/	46.18	54.00	-7.82	AVG
9	7318.000	52.91	6.97	59.88	74.00	-14.12	peak
10	7318.000	/	/	44.86	54.00	-9.14	AVG
11	8236.000	50.30	8.91	59.21	74.00	-14.79	peak
12	8236.000	/	/	44.19	54.00	-9.81	AVG

Test Mode:	FSK	Frequency(MHz):	914.75
Polarity:	Vertical	Test Voltage:	AC 120 V, 60 Hz



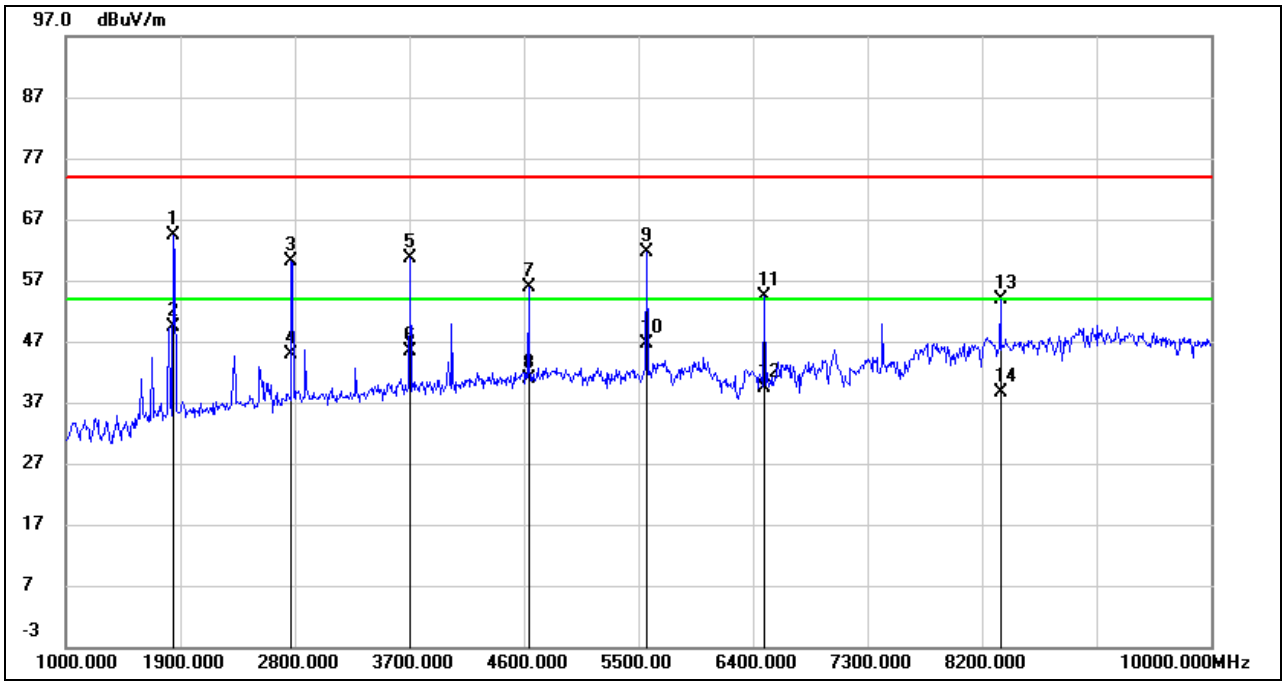
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1828.000	72.94	-9.03	63.91	74.00	-10.09	peak
2	1828.000	/	/	48.89	54.00	-5.11	AVG
3	2737.000	65.04	-5.80	59.24	74.00	-14.76	peak
4	2737.000	/	/	44.22	54.00	-9.78	AVG
5	3655.000	63.59	-2.77	60.82	74.00	-13.18	peak
6	3655.000	/	/	45.80	54.00	-8.20	AVG
7	5491.000	59.57	3.13	62.70	74.00	-11.30	peak
8	5491.000	/	/	47.68	54.00	-6.32	AVG
9	6400.000	50.51	4.83	55.34	74.00	-18.66	peak
10	6400.000	/	/	40.32	54.00	-13.68	AVG
11	7318.000	49.27	7.61	56.88	74.00	-17.12	peak
12	7318.000	/	/	41.86	54.00	-12.14	AVG
13	8236.000	46.46	9.45	55.91	74.00	-18.09	peak
14	8236.000	/	/	40.89	54.00	-13.11	AVG

Test Mode:	FSK	Frequency(MHz):	926.75
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1846.000	75.16	-9.69	65.47	74.00	-8.53	peak
2	1846.000	/	/	50.45	54.00	-3.55	AVG
3	2782.000	65.59	-6.59	59.00	74.00	-15.00	peak
4	2782.000	/	/	43.98	54.00	-10.02	AVG
5	3709.000	65.82	-3.65	62.17	74.00	-11.83	peak
6	3709.000	/	/	47.15	54.00	-6.85	AVG
7	5563.000	58.62	2.35	60.97	74.00	-13.03	peak
8	5563.000	/	/	45.95	54.00	-8.05	AVG
9	7417.000	50.88	7.31	58.19	74.00	-15.81	peak
10	7417.000	/	/	43.17	54.00	-10.83	AVG
11	8344.000	49.30	8.55	57.85	74.00	-16.15	peak
12	8344.000	/	/	42.83	54.00	-11.17	AVG

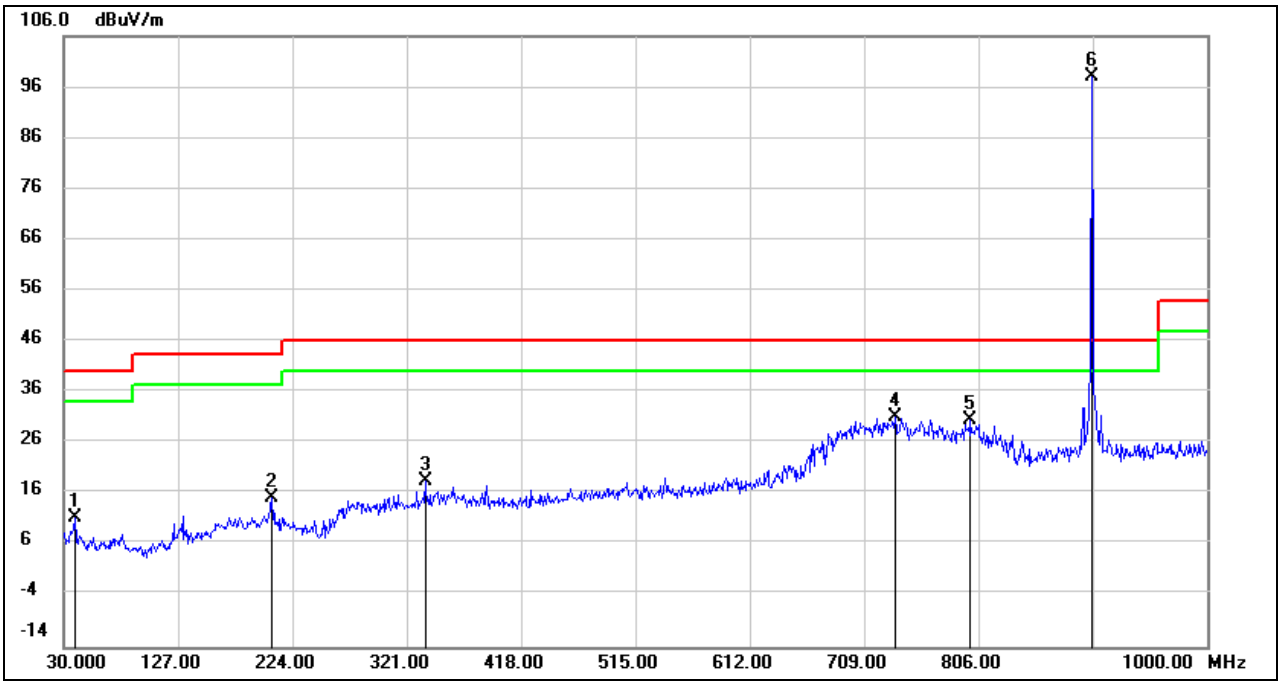
Test Mode:	FSK	Frequency(MHz):	926.75
Polarity:	Vertical	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1846.000	73.44	-9.04	64.40	74.00	-9.60	peak
2	1846.000	/	/	49.38	54.00	-4.62	AVG
3	2773.000	65.58	-5.57	60.01	74.00	-13.99	peak
4	2773.000	/	/	44.99	54.00	-9.01	AVG
5	3709.000	63.12	-2.61	60.51	74.00	-13.49	peak
6	3709.000	/	/	45.49	54.00	-8.51	AVG
7	4636.000	55.55	0.31	55.86	74.00	-18.14	peak
8	4636.000	/	/	40.84	54.00	-13.16	AVG
9	5563.000	58.16	3.53	61.69	74.00	-12.31	peak
10	5563.000	/	/	46.67	54.00	-7.33	AVG
11	6490.000	49.19	5.27	54.46	74.00	-19.54	peak
12	6490.000	/	/	39.44	54.00	-14.56	AVG
13	8344.000	44.65	9.12	53.77	74.00	-20.23	peak
14	8344.000	/	/	38.75	54.00	-15.25	AVG

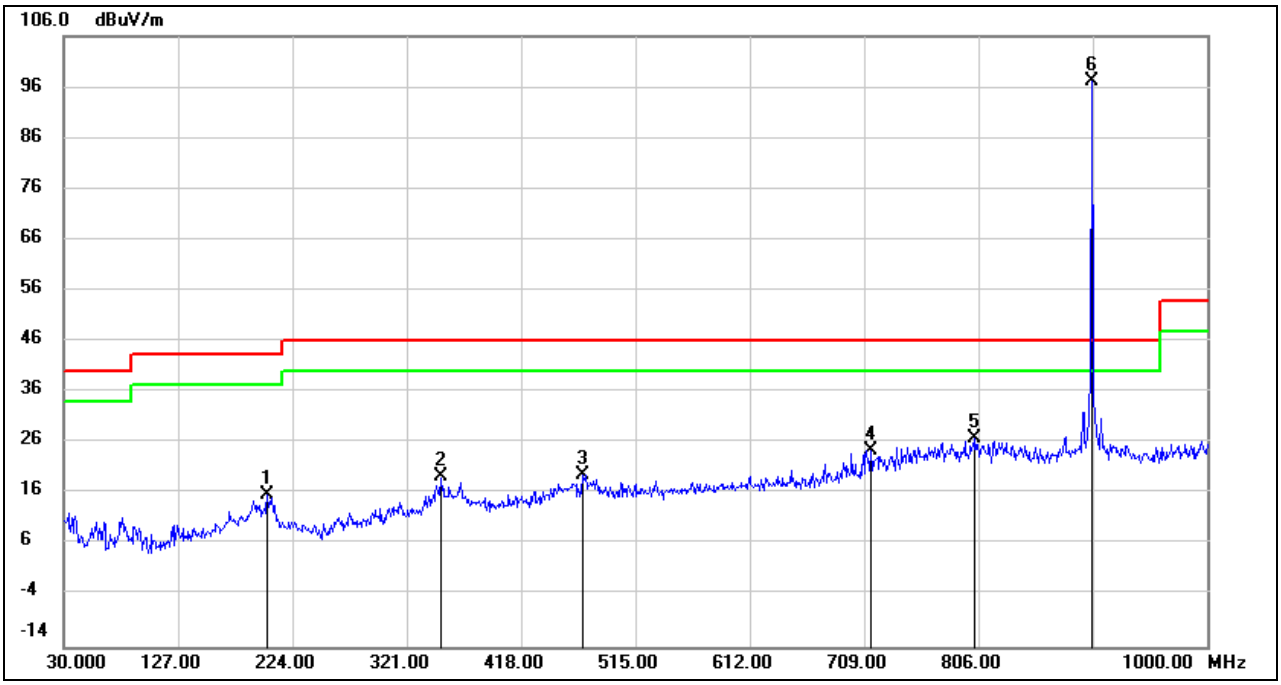
8.2. SPURIOUS EMISSIONS (30 MHz ~ 1 GHz)

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	39.7000	26.05	-14.74	11.31	40.00	-28.69	QP
2	206.5399	27.14	-11.93	15.21	43.50	-28.29	QP
3	336.5200	28.23	-9.75	18.48	46.00	-27.52	QP
4	735.1900	33.90	-2.77	31.13	46.00	-14.87	QP
5	799.2100	32.73	-2.12	30.61	46.00	-15.39	QP
6	902.0300	99.05	-0.86	98.19	/	/	fundamental

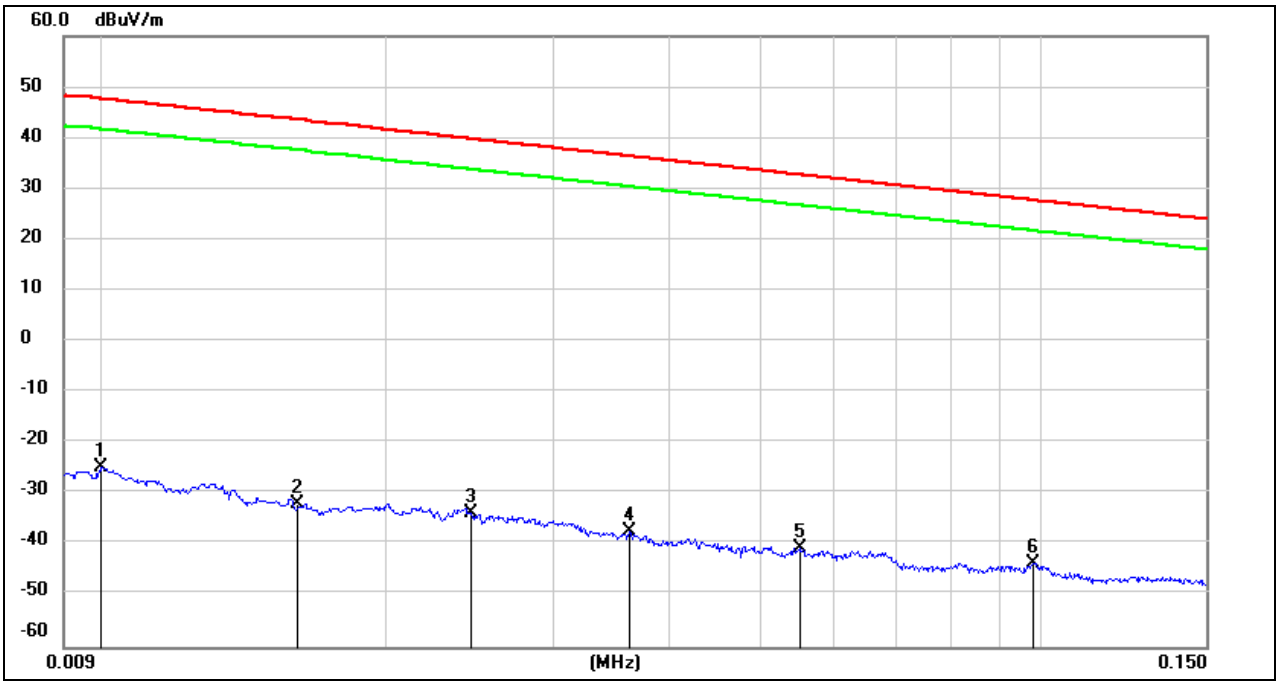
Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Vertical	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	202.6600	27.53	-11.73	15.80	43.50	-27.70	QP
2	350.1000	28.48	-9.18	19.30	46.00	-26.70	QP
3	470.3800	27.42	-7.74	19.68	46.00	-26.32	QP
4	714.8200	28.13	-3.59	24.54	46.00	-21.46	QP
5	803.0900	29.13	-2.10	27.03	46.00	-18.97	QP
6	902.0300	97.92	-0.86	97.06	/	/	fundamental

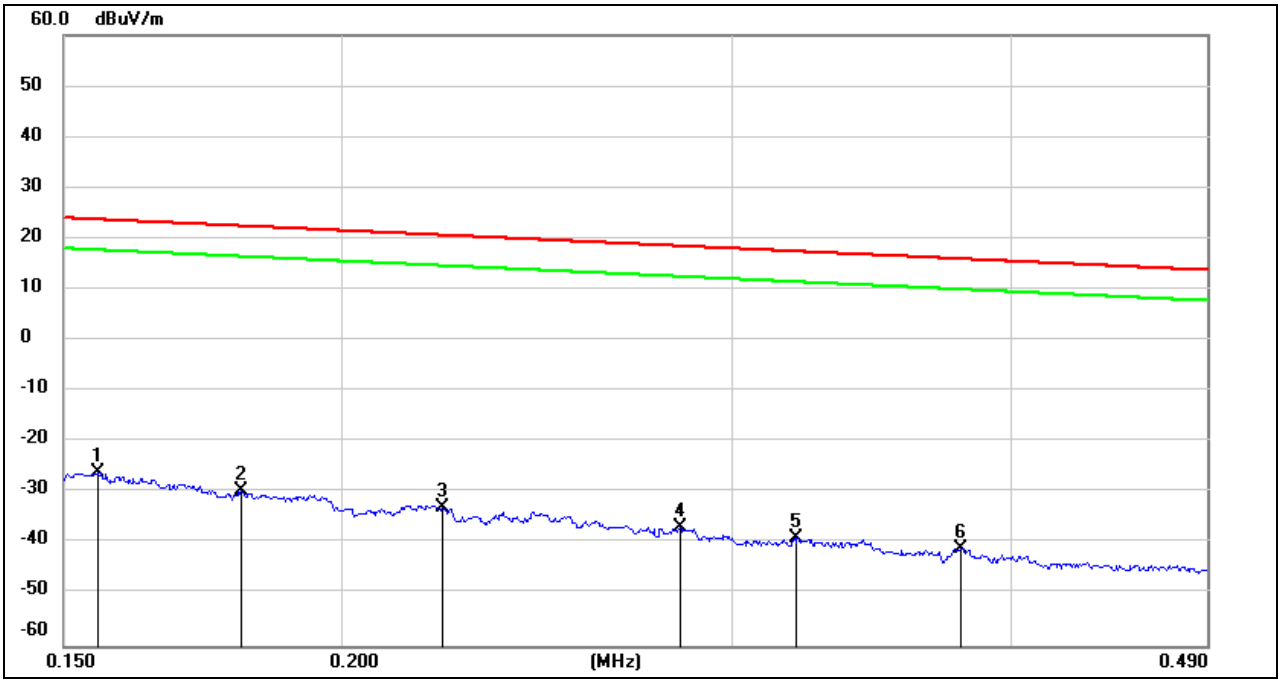
8.3. SPURIOUS EMISSIONS BELOW 30 MHz

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



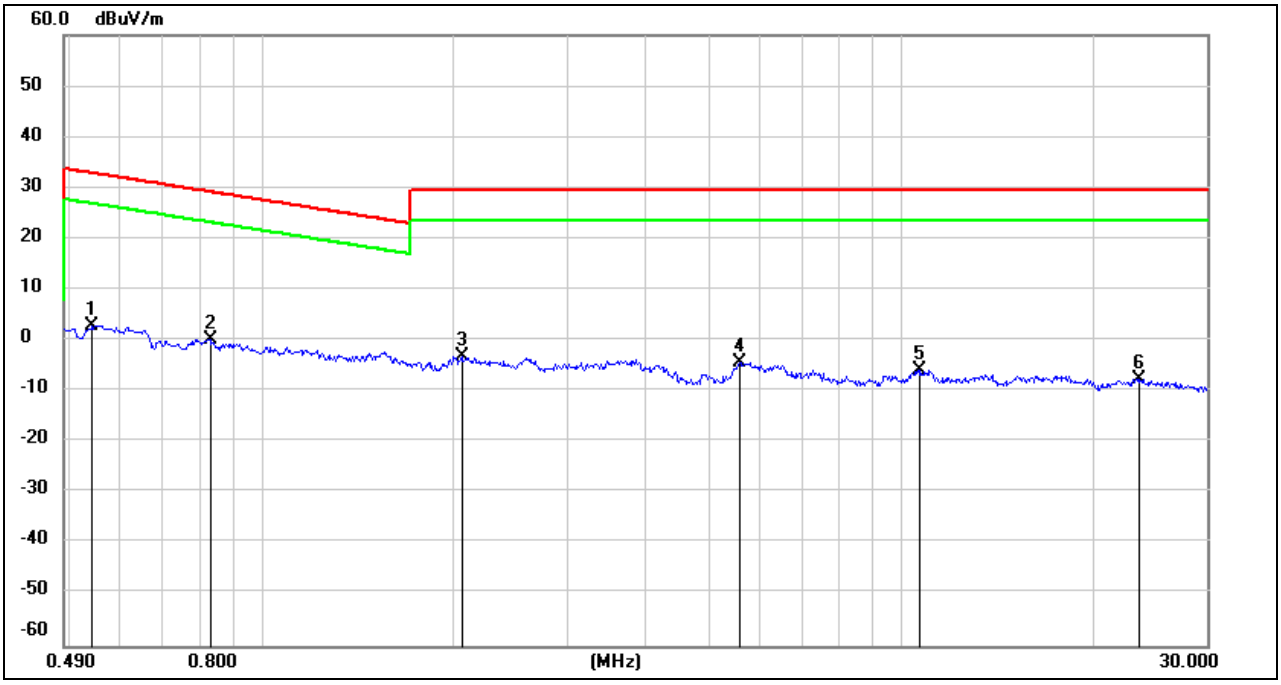
No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.0100	76.72	-101.40	-24.68	47.60	-76.18	-3.90	-72.28	peak
2	0.0160	69.47	-101.37	-31.90	43.52	-83.40	-7.98	-75.42	peak
3	0.0245	67.69	-101.36	-33.67	39.82	-85.17	-11.68	-73.49	peak
4	0.0362	64.01	-101.42	-37.41	36.43	-88.91	-15.07	-73.84	peak
5	0.0551	60.95	-101.50	-40.55	32.78	-92.05	-18.72	-73.33	peak
6	0.0981	58.27	-101.78	-43.51	27.77	-95.01	-23.73	-71.28	peak

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



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	0.1554	75.77	-101.65	-25.88	23.77	-77.38	-27.73	-49.65	peak
2	0.1801	72.03	-101.68	-29.65	22.50	-81.15	-29.00	-52.15	peak
3	0.2220	69.03	-101.75	-32.72	20.67	-84.22	-30.83	-53.39	peak
4	0.2837	65.22	-101.83	-36.61	18.54	-88.11	-32.96	-55.15	peak
5	0.3204	62.97	-101.88	-38.91	17.49	-90.41	-34.01	-56.40	peak
6	0.3800	61.02	-101.94	-40.92	16.01	-92.42	-35.49	-56.93	peak

Test Mode:	FSK	Frequency(MHz):	902.25
Polarity:	Horizontal	Test Voltage:	AC 120 V, 60 Hz



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	0.5431	64.90	-62.08	2.82	32.91	-48.68	-18.59	-30.09	peak
2	0.8296	62.44	-62.17	0.27	29.23	-51.23	-22.27	-28.96	peak
3	2.0539	58.70	-61.81	-3.11	29.54	-54.61	-21.96	-32.65	peak
4	5.5952	57.05	-61.41	-4.36	29.54	-55.86	-21.96	-33.90	peak
5	10.7004	54.86	-60.83	-5.97	29.54	-57.47	-21.96	-35.51	peak
6	23.5960	53.05	-60.56	-7.51	29.54	-59.01	-21.96	-37.05	peak

9. AC POWER LINE CONDUCTED EMISSIONS

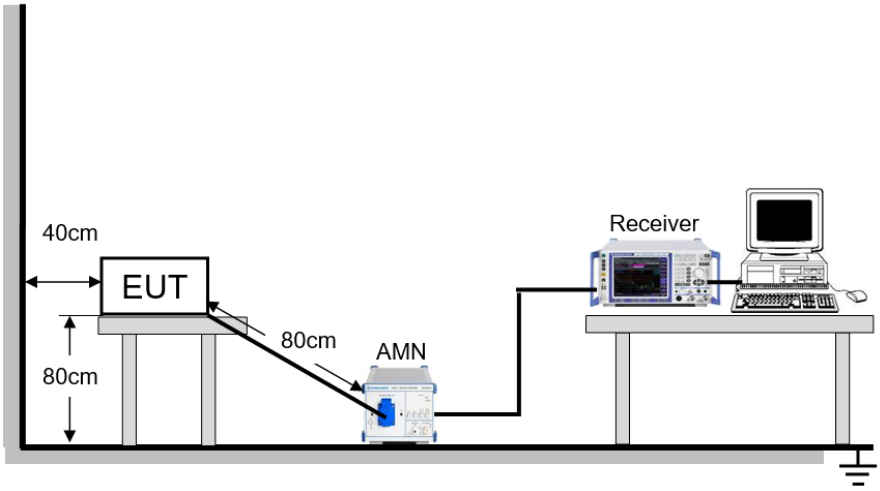
LIMITS

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 SETUP AND PROCEDURE

Refer to ANSI C63.10-2013 clause 6.2.



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.

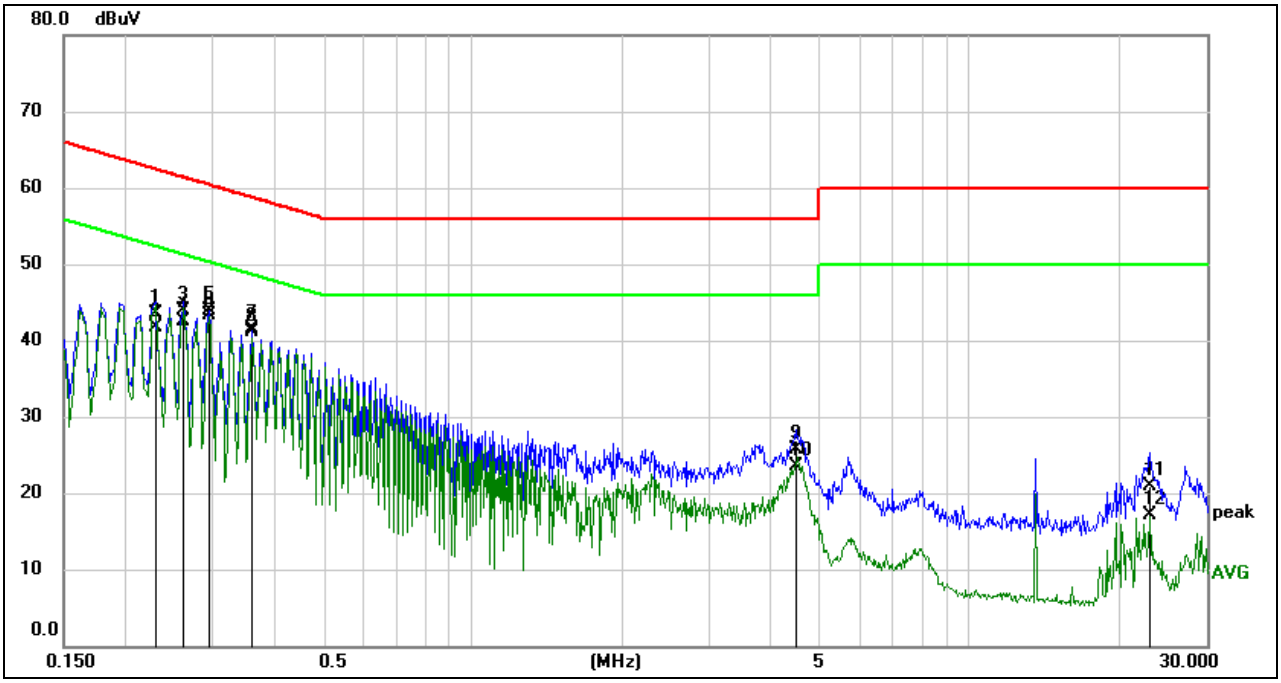
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST ENVIRONMENT

Temperature	22.9 °C	Relative Humidity	55 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V, 60 Hz

RESULTS

Test Mode:	FSK	Frequency(MHz):	902.25
Line:	Line		

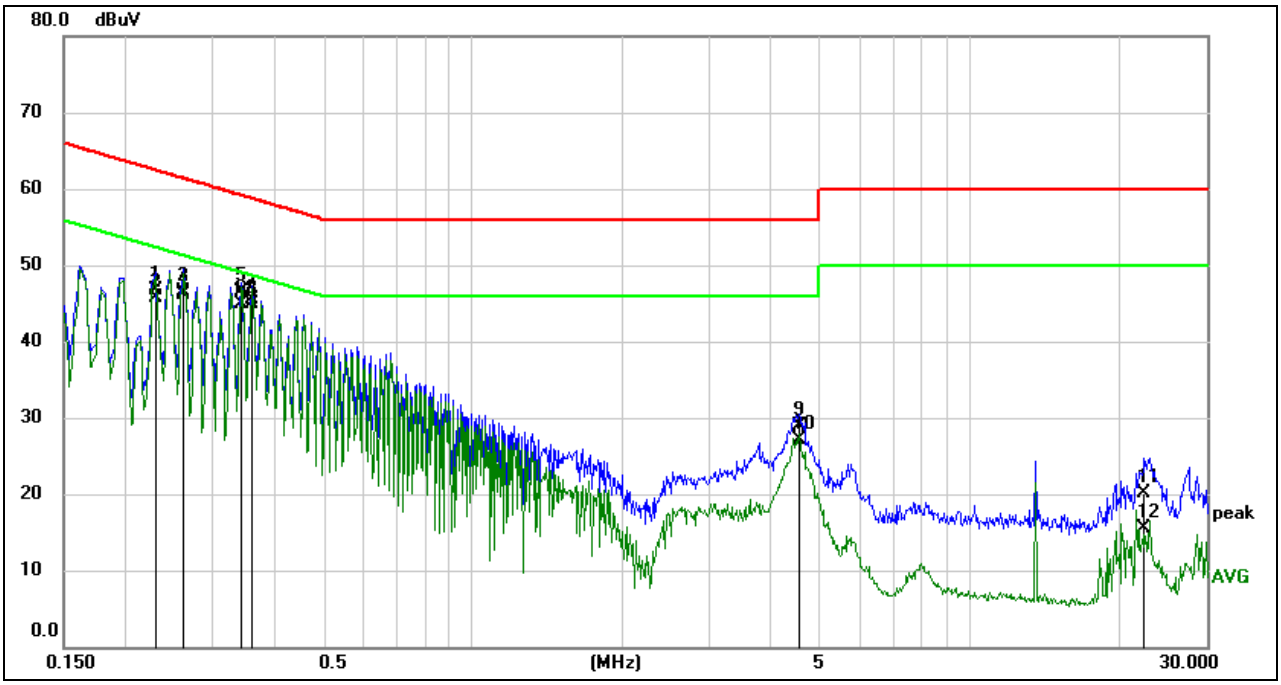


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2299	33.30	10.13	43.43	62.45	-19.02	QP
2	0.2299	31.49	10.13	41.62	52.45	-10.83	AVG
3	0.2621	33.69	10.12	43.81	61.36	-17.55	QP
4	0.2621	32.43	10.12	42.55	51.36	-8.81	AVG
5	0.2940	33.84	10.11	43.95	60.41	-16.46	QP
6	0.2940	33.12	10.11	43.23	50.41	-7.18	AVG
7	0.3593	31.37	10.09	41.46	58.74	-17.28	QP
8	0.3593	31.06	10.09	41.15	48.74	-7.59	AVG
9	4.4744	15.44	10.35	25.79	56.00	-30.21	QP
10	4.4744	13.15	10.35	23.50	46.00	-22.50	AVG
11	23.1282	9.84	11.01	20.85	60.00	-39.15	QP
12	23.1282	6.19	11.01	17.20	50.00	-32.80	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:	FSK	Frequency(MHz):	902.25
Line:	Neutral		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2288	36.39	10.24	46.63	62.49	-15.86	QP
2	0.2288	35.48	10.24	45.72	52.49	-6.77	AVG
3	0.2590	36.28	10.24	46.52	61.46	-14.94	QP
4	0.2590	35.96	10.24	46.20	51.46	-5.26	AVG
5	0.3421	36.25	10.24	46.49	59.15	-12.66	QP
6	0.3421	34.64	10.24	44.88	49.15	-4.27	AVG
7	0.3595	35.29	10.24	45.53	58.74	-13.21	QP
8	0.3595	34.66	10.24	44.90	48.74	-3.84	AVG
9	4.5242	18.58	10.25	28.83	56.00	-27.17	QP
10	4.5242	16.91	10.25	27.16	46.00	-18.84	AVG
11	22.4565	9.17	10.84	20.01	60.00	-39.99	QP
12	22.4565	4.72	10.84	15.56	50.00	-34.44	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.

10. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RESULTS

Complies

11. TEST DATA

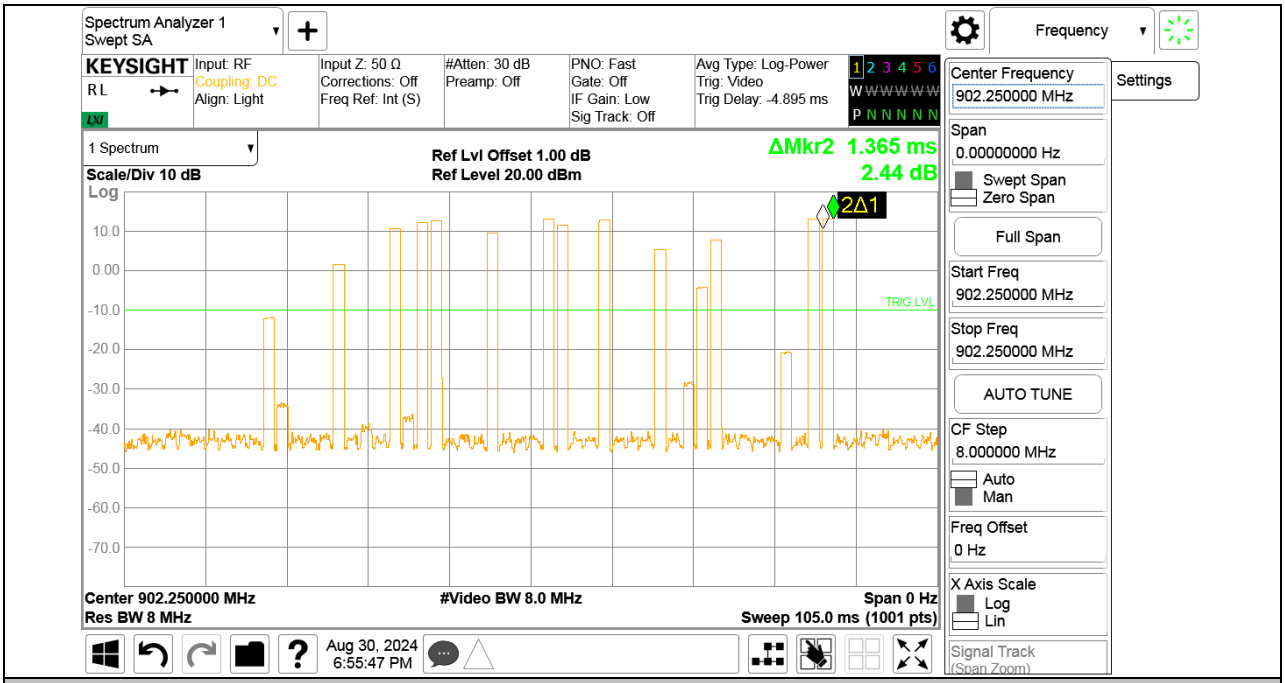
11.1. Appendix A: DUTY CYCLE

11.1.1. Test Result

Test Mode	Burst (msec)	Number of Burst	Total On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
FSK	1.365	13	17.745	100	0.17745	17.745	-15.02

Note:
Duty Cycle Correction Factor=20log (1/x).
Where: x is Duty Cycle (Linear)

Test Graphs



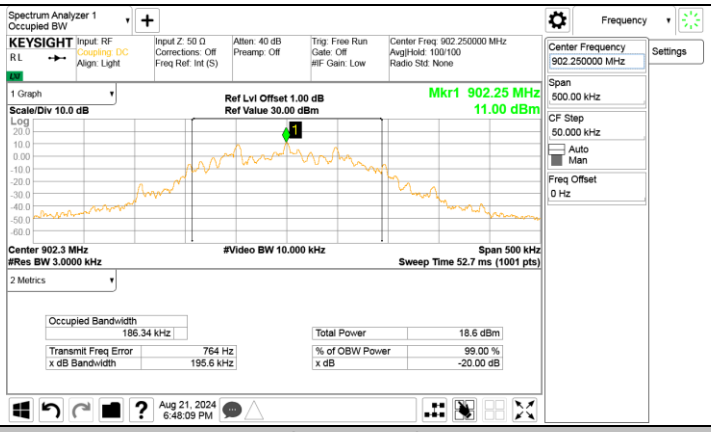
FSK_Ant1

11.2. Appendix B: 20DB BANDWIDTH & OCCUPIED CHANNEL BANDWIDTH

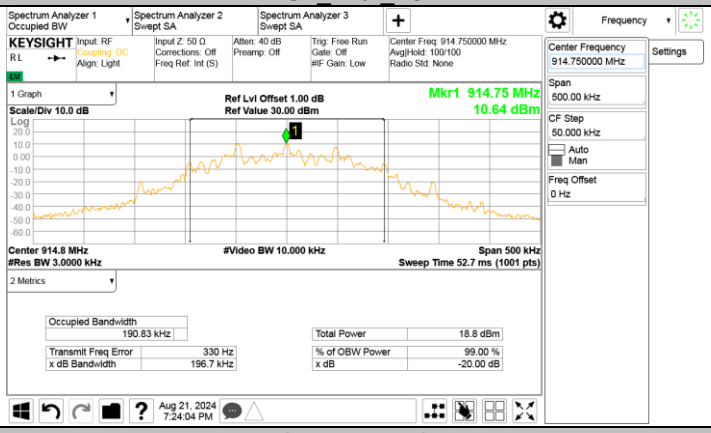
11.2.1. Test Result

Test Mode	Antenna	Channel	20db EBW[MHz]	OCB [MHz]	Verdict
FSK	Ant1	LCH	0.1956	0.18634	PASS
		MCH	0.1967	0.19083	PASS
		HCH	0.1970	0.19207	PASS

11.2.2. Test Graphs



FSK_Ant1_LCH



FSK_Ant1_MCH

FSK_Ant1_HCH

11.3. Appendix C: CONDUCTED OUTPUT POWER

11.3.1. Test Result

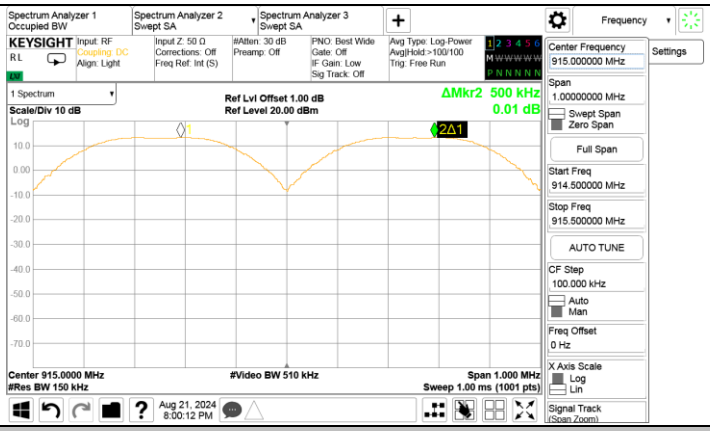
Test Mode	Antenna	Channel	PEAK Result[dBm]	Limit[dBm]	Verdict
FSK	Ant1	LCH	13.78	≤30	PASS
		MCH	13.79	≤30	PASS
		HCH	13.74	≤30	PASS

11.4. Appendix D: CARRIER FREQUENCY SEPARATION

11.4.1. Test Result

Test Mode	Antenna	Channel	Result [MHz]	Limit[MHz]	Verdict
FSK	Ant1	Hop	0.500	≥0.1970	PASS

11.4.2. Test Graphs



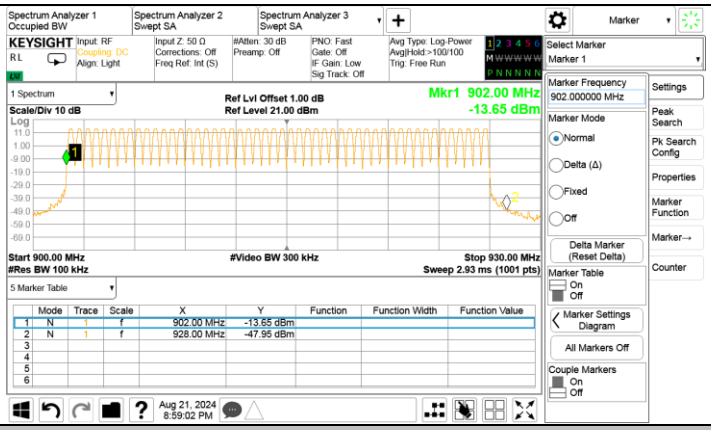
FSK _Ant1_Hop

11.5. Appendix E: NUMBER OF HOPPING FREQUENCIES

11.5.1. Test Result

Test Mode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
FSK	Ant1	Hop	50	≥50	PASS

11.5.2. Test Graphs



FSK _Ant1_Hop

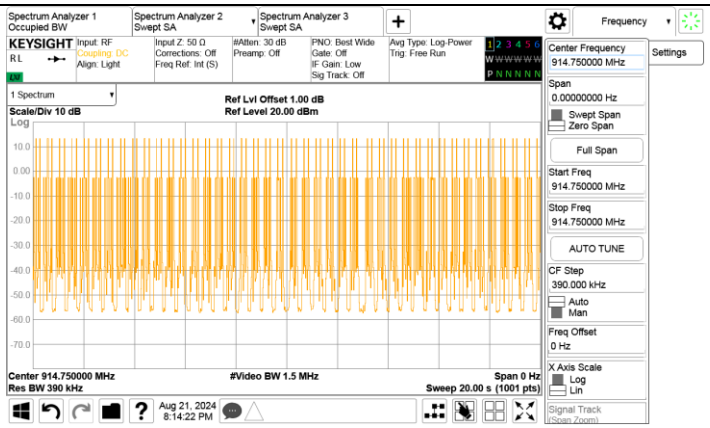
11.6. Appendix F: TIME OF OCCUPANCY (DWELL TIME)

11.6.1. Test Result

Test Mode	Antenna	Channel	Time of single slot 1 [ms]	The number of hop channel appear	Burst Width 1 [ms/hop/ch]	Dwell Time [ms]	Limit [ms]	Results
FSK	Ant1	Hop	1.302	83	108.066	108.066	400	PASS

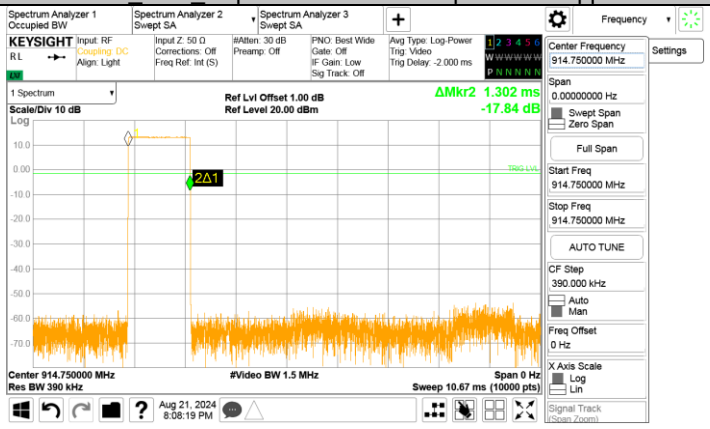
Note:
FSK: The dwell time = Time of single slot * The number of hop channel appear within 20s
BurstWidth =Time of single slot*number of single slot

11.6.2. Test Graphs



FSK _Ant1_Hop- The number of hop channel appear

FSK _Ant1_Hop- The number of hop channel appear



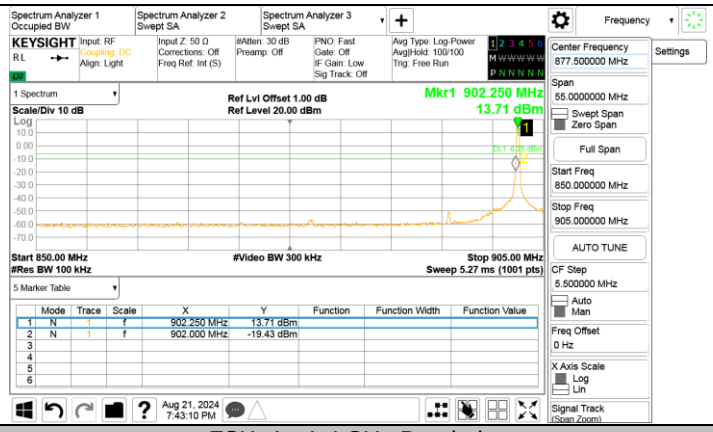
FSK _Ant1_Hop- BurstWidth 1

11.7. Appendix G: CONDUCTED BAND EDGE

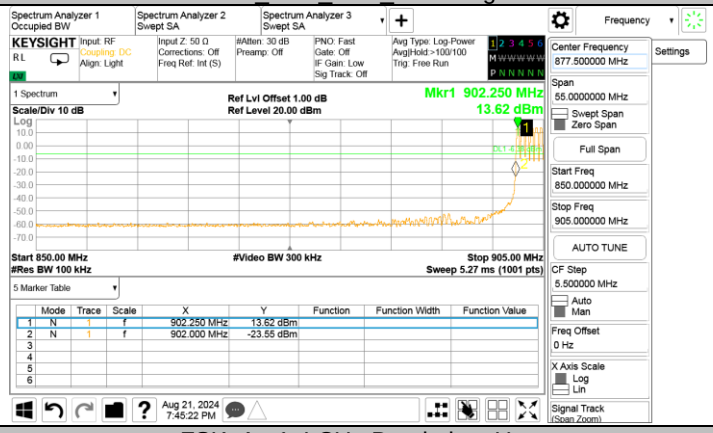
11.7.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
FSK	Ant1	LCH	See the below graphs	PASS
		HCH		PASS
		Hop_ LCH		PASS
		Hop_ HCH		PASS

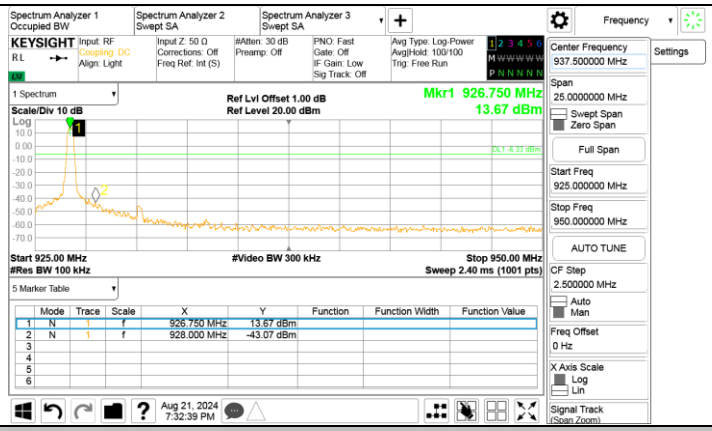
11.7.2. Test Graphs



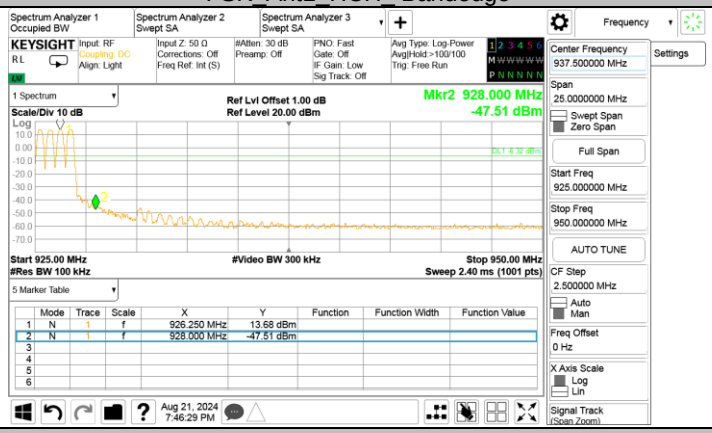
FSK_Ant1_LCH_ Bandedge



FSK_Ant1_LCH_ Bandedge_Hop



FSK_Ant1_HCH_ Bandedge



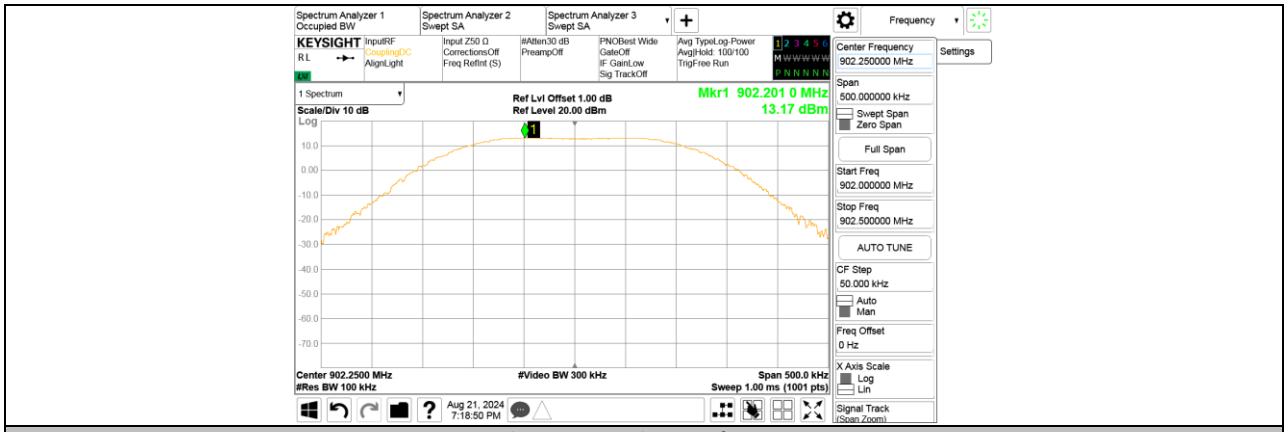
FSK_Ant1_HCH_ Bandedge_Hop

11.1. Appendix H: CONDUCTED SPURIOUS EMISSION

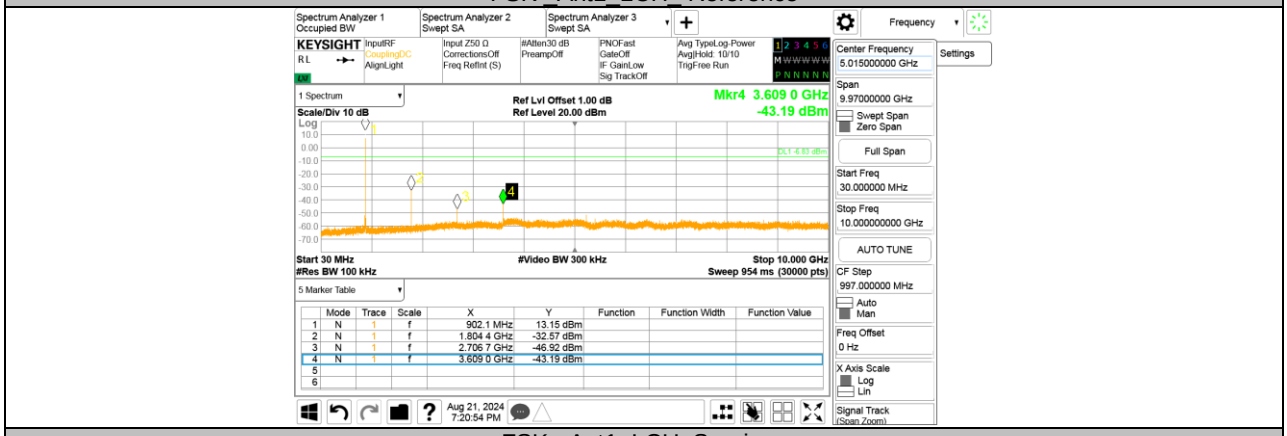
11.1.1. Test Result

Test Mode	Antenna	ChName	Result [dBm]	Verdict
FSK	Ant1	LCH	See the below graphs	PASS
		MCH		PASS
		HCH		PASS

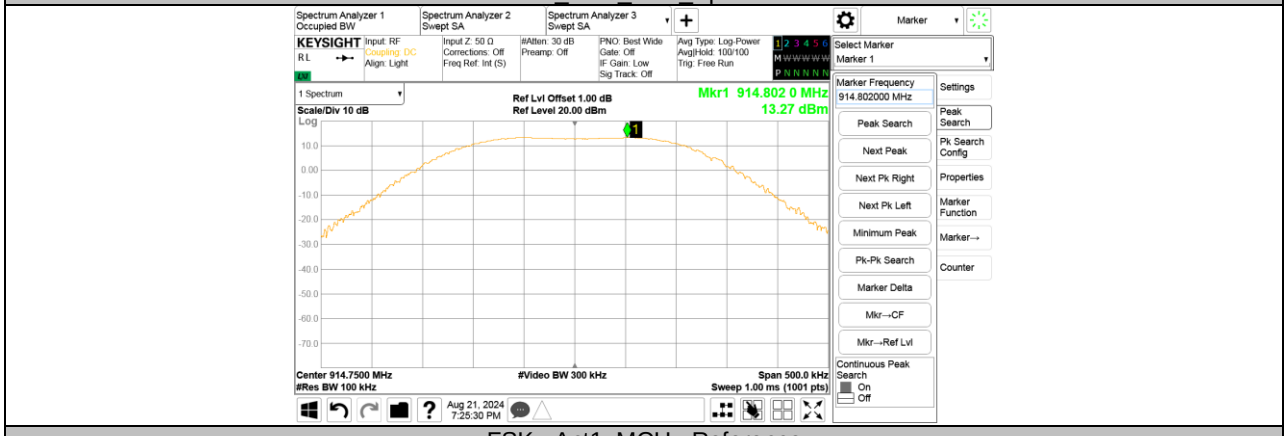
11.1.2. Test Graphs



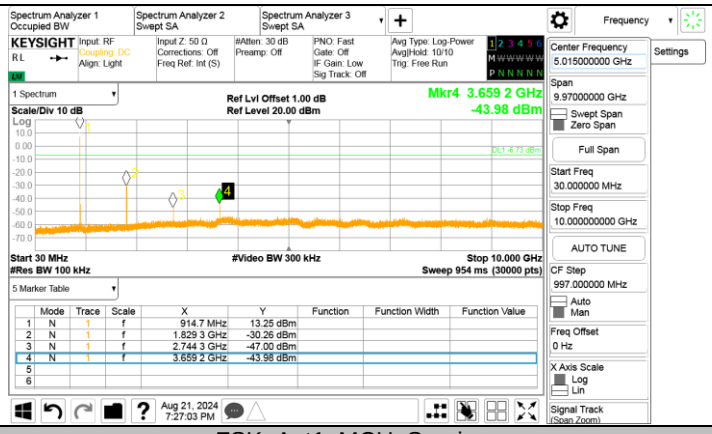
FSK _Ant1_LCH_ Reference



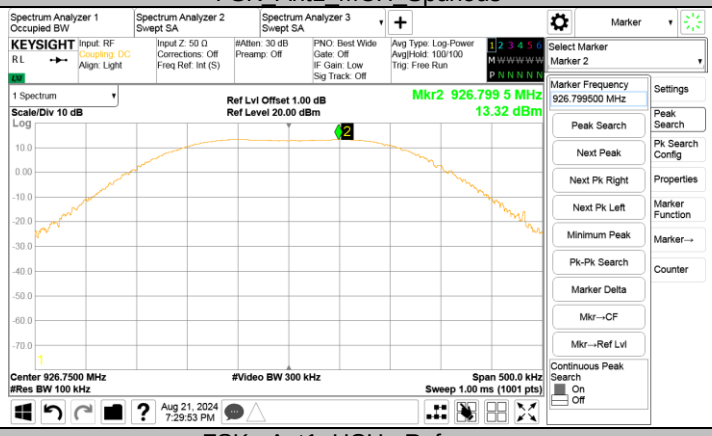
FSK _Ant1_LCH_Spurious



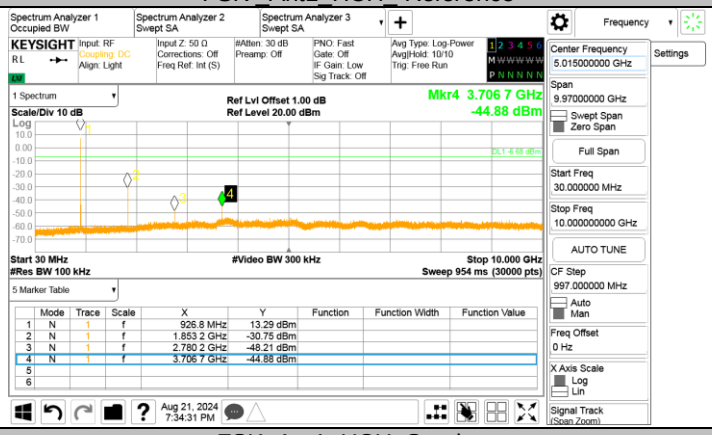
FSK _Ant1_MCH_ Reference



FSK_Ant1_MCH_Spurious



FSK _Ant1_HCH_ Reference



FSK_Ant1_HCH_Spurious

END OF REPORT