



**CFR 47 FCC PART 15 SUBPART C
ISED RSS-210 ISSUE 10**

CERTIFICATION TEST REPORT

For

Activity key

MODEL NUMBER: ACTIVITY KEY

FCC ID: 2AVSM-AK02

IC: 25906-AK02

REPORT NUMBER: 4789359232-5

ISSUE DATE: January 24, 2022

Prepared for

**Flextronics Computing (Suzhou) Co., Ltd
No.1 Guanpu Road, Guoxiang Street, WuZhong District Suzhou, Jiangsu, China,
215124**

Prepared by

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

Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China

Tel: +86 769 22038881

Fax: +86 769 33244054

Website: www.ul.com



Revision History

Rev.	Issue Date	Revisions	Revised By
V0	08/21/2020	Initial Issue	
V1	01/24/2022	Updated antenna gain	Denny Huang



Summary of Test Results			
Clause	Test Items	FCC / ISSED Rules	Test Results
1	Transmitter Timeout	CFR 47 FCC §15.231 (a) (1) ISED RSS-210 Annex A.1.1	Pass
2	20dB Bandwidth and 99% Occupied Bandwidth	CFR 47 FCC §15.231 (c) ISED RSS-210 Annex A.1.3	Pass
3	Radiated Emission	CFR 47 FCC §15.231 (b)(e) CFR 47 FCC §15.205 and §15.209 RSS-210 Annex A.1.2 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
4	Conducted Emission Test for AC Power Port	CFR 47 FCC §15.207 RSS-GEN Clause 8.8	Pass
5	Antenna Requirement	CFR 47 FCC §15.203 ISED RSS-Gen Clause 6.3	Pass
<p>Note 1: This test report is only published to and used by the applicant, and it is not for evidence purpose in China.</p> <p>Note 2: The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C, ISSED RSS-210 Issue 10 and ISSED RSS-GEN Issue 5 > when <Accuracy Method> decision rule is applied.</p>			



TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	7
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>7</i>
4.2. <i>MEASUREMENT UNCERTAINTY</i>	<i>7</i>
5. EQUIPMENT UNDER TEST	8
5.1. <i>DESCRIPTION OF EUT</i>	<i>8</i>
5.2. <i>MAXIMUM FIELD STRENGTH</i>	<i>8</i>
5.3. <i>TEST CHANNEL CONFIGURATION</i>	<i>8</i>
5.4. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	<i>9</i>
5.5. <i>TEST ENVIRONMENT</i>	<i>9</i>
5.6. <i>DESCRIPTION OF TEST SETUP</i>	<i>10</i>
5.7. <i>MEASURING INSTRUMENT AND SOFTWARE USED</i>	<i>11</i>
6. ANTENNA PORT TEST RESULTS	12
6.1. <i>ON TIME AND DUTY CYCLE</i>	<i>12</i>
6.2. <i>TRANSMITTER TIMEOUT</i>	<i>15</i>
6.3. <i>20dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH</i>	<i>18</i>
6.4. <i>RADIATED TEST RESULTS</i>	<i>24</i>
6.4.1. <i>SPURIOUS EMISSIONS BELOW 1GHz AND ABOVE 30MHz</i>	<i>33</i>
6.4.2. <i>SPURIOUS EMISSIONS ABOVE 1GHz</i>	<i>45</i>
6.4.3. <i>SPURIOUS EMISSIONS BELOW 30MHz</i>	<i>57</i>
7. AC POWER LINE CONDUCTED EMISSIONS	60
8. ANTENNA REQUIREMENTS	64



1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Flextronics Computing (Suzhou) Co., Ltd
Address: Address: No.1 Guanpu Road, Guoxiang Street, WuZhong District
Suzhou, Jiangsu, China, 215124

Manufacturer Information

Company Name: Flextronics Computing (Suzhou) Co., Ltd
Address: Address: No.1 Guanpu Road, Guoxiang Street, WuZhong District
Suzhou, Jiangsu, China, 215124

EUT Information

EUT Name: Activity key
Model: ACTIVITY KEY
Serial Model: /
Brand: flex
Sample Status: Normal
Date of Tested: January 20, 2020 ~ August 21, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	PASS
ISED RSS-210 Issue 10	PASS
ISED RSS-GEN Issue 5	PASS

Prepared By:

Denny Huang
Project Engineer

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo
Laboratory Manager



2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, ISED RSS-210 Issue 10 and 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>IC (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.</p> <p>Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011</p>
---------------------------	---

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 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz 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 recognize 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	3.62dB
Radiation Emission test (include Fundamental emission) (9KHz-30MHz)	2.2dB
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	4.00dB
Radiation Emission test (1GHz to 26GHz) (include Fundamental emission)	5.78dB (1GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	Activity key	
EUT Description	The device is a car key.	
Model	JLR Activity Key	
Product Description	Operation Frequency	314.682 MHz ~ 315.315 MHz
	Modulation Type	FSK
		ASK
Ratings	DC 5V	
Battery	DC 3.7V/100mAh	

5.2. MAXIMUM FIELD STRENGTH

Frequency (MHz)	Max AVG field strength (dB μ V/m)
315.000	73.79

5.3. TEST CHANNEL CONFIGURATION

Test Mode	Frequency
FSK	314.682 MHz
	315.000 MHz
	315.315 MHz
ASK	314.682 MHz
	315.000 MHz
	315.315 MHz



5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
314.682 ~ 315.315	Integral Antenna	-17.20

Note: The antenna gain was provided by customer.

5.5. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage:	VL	/
	VN	DC 3.7V
	VH	/

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature



5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N	Description
3	Power Adapter	HUAWEI	HW-050200C01		Input: AC 100 ~ 240V, 50/60Hz, 0.5A Output: DC 5V/2A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	DC	DC	Unshielded	1	/

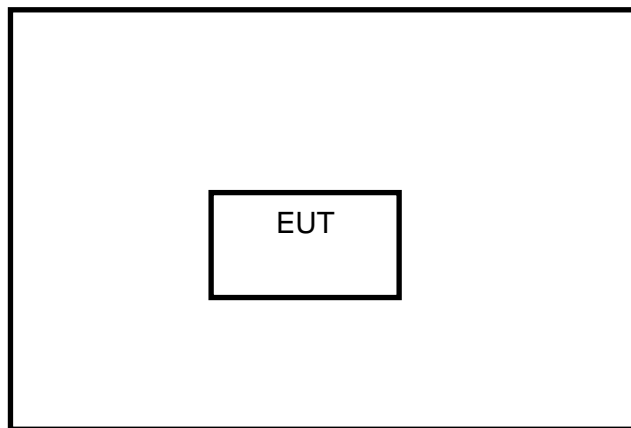
ACCESSORY

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

TEST SETUP

1. A fully charged battery was used for all tests.
2. The test sample can be into a transmission mode through the power on.

SETUP DIAGRAM FOR TEST



5.7. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	101961	Dec.5,2019	Dec.5,2020
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	101983	Dec.5,2019	Dec.5,2020
<input checked="" type="checkbox"/>	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.5,2019	Dec.5,2020
Software						
Used	Description		Manufacturer	Name	Version	
<input checked="" type="checkbox"/>	Test Software for Conducted disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec. 6, 2019	Dec. 6, 2020
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	Sept.17, 2018	Sept.17,2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A09099	Dec. 5, 2019	Dec. 5, 2020
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec. 05, 2019	Dec.05, 2020
<input checked="" type="checkbox"/>	Horn Antenna	TDK	HRN-0118	130939	Sept. 17, 2018	Sept.17,2021
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305-00067	Dec. 05, 2019	Dec.05, 2020
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbeck	1519B	00008	Jan.17, 2019	Jan.17, 2022
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Dec. 05, 2019	Dec.05, 2020
Software						
Used	Description		Manufacturer	Name	Version	
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec. 6, 2019	Dec. 6, 2020
<input checked="" type="checkbox"/>	Signal & Spectrum Analyzer	R&S	FSW	103950	Dec. 6, 2019	Dec. 6, 2020
<input checked="" type="checkbox"/>	Signal Analyzer	R&S	FSV40	A1512015	Dec.06,2019	Dec.06,2020

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

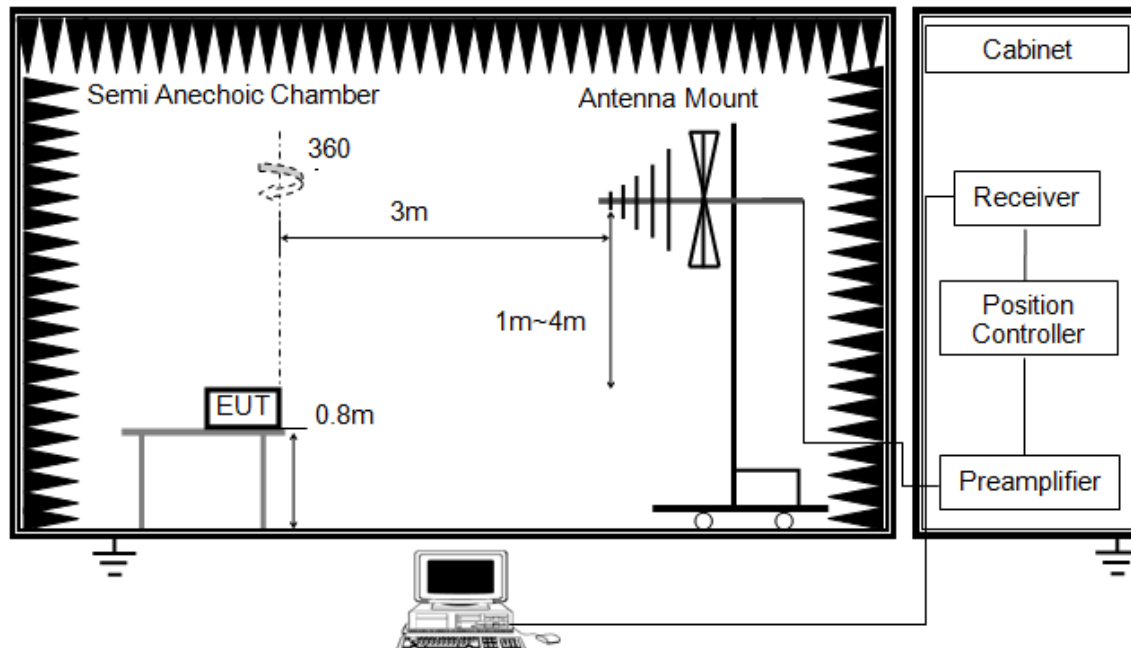
LIMITS

None; for reporting purposes only

PROCEDURE

FCC Reference:	CFR 47 §15.35(c)
Test Method Used:	ANSI C63.10 Section 7.5

TEST SETUP



- Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is at least a 100 ms.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.

TEST ENVIRONMENT

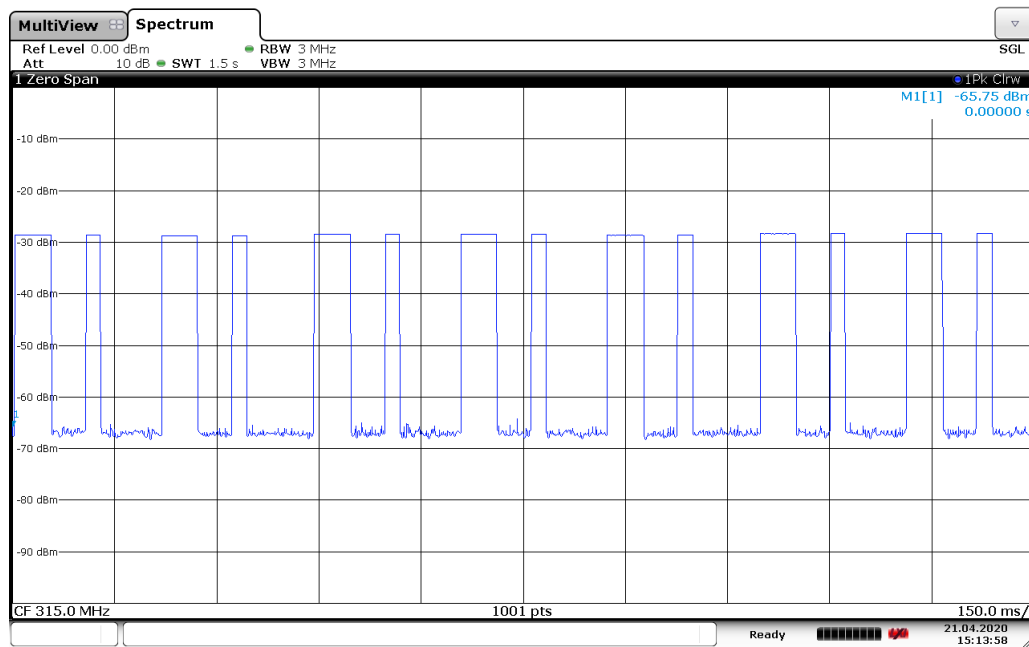
Temperature	23.5°C	Relative Humidity	64%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

RESULTS

ASK Ton Time (ms)	FSK Ton Time (ms)	Totally Ton Time (ms)	Period (ms)	Worst Case Duty Cycle (Linear)	Duty Cycle Correction Factor	Frame Encoding
26.9	22.0	48.9	100	48.90 %	-6.21	Only a single ASK or FSK frame may occur within any given 100ms window upon manual activation by button press. Each ASK frame consists of 26.9ms of OOK data with a 50% duty cycle.

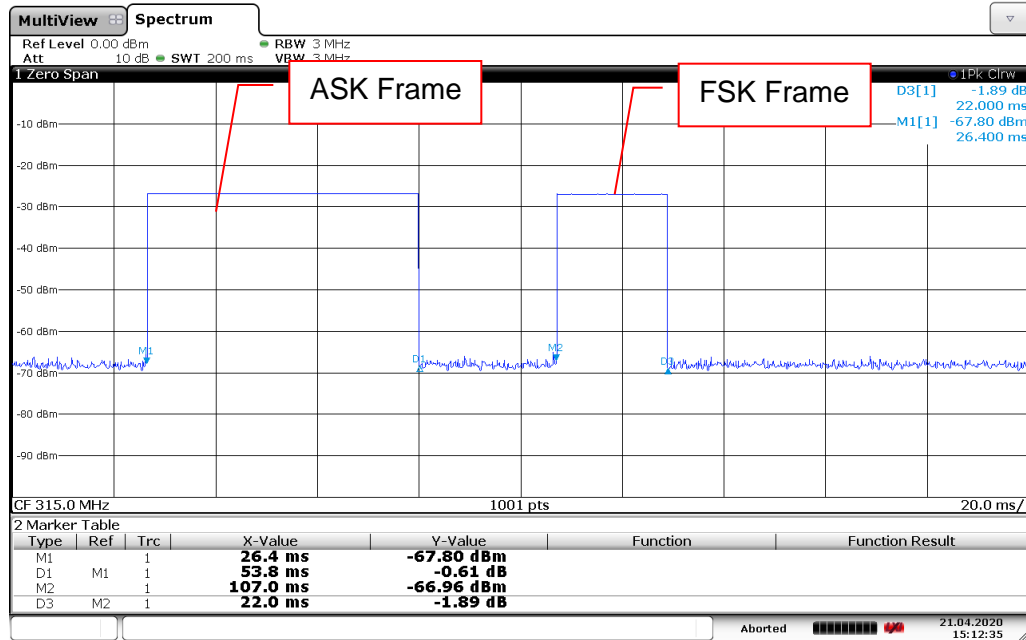
Note: Duty Cycle Correction Factor=20log(x).
Where: x is Duty Cycle

Test Plot - 1



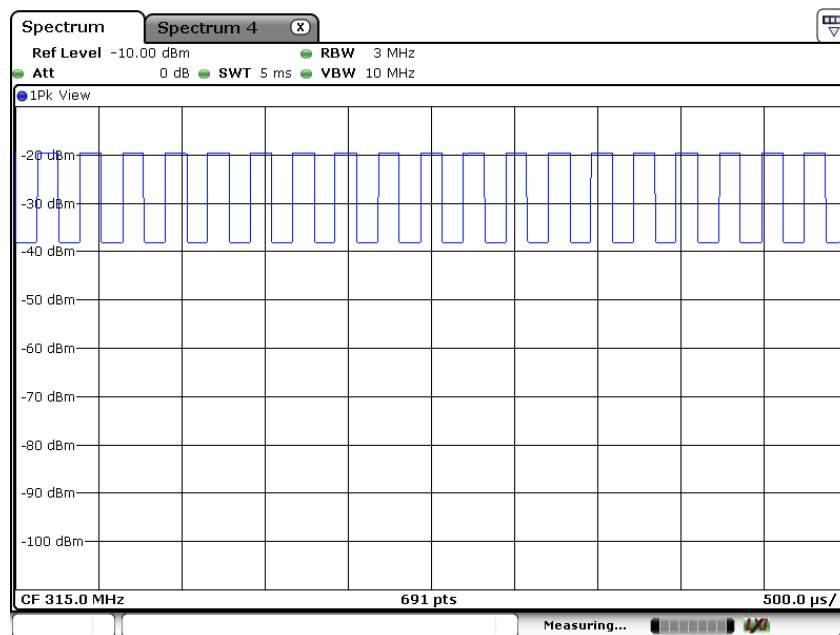
15:13:58 21.04.2020

Test Plot - 2



15:12:35 21.04.2020

Zoom Plot for ASK Frame



Date: 21 AUG 2020 04:37:06

Note 1: Because the transmit period of the EUT already exceed 100ms, so 100ms was used for calculated.

Note 2: All the frequencies have the same duty cycle, so only one frequency's data recorded in the report.

Note 3: All the modes and buttons had been tested, only the worst data record in the report.

6.2. TRANSMITTER TIMEOUT

LIMITS

CFR 47 §15.231(a):

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

RSS-210 Issue 10 Annex A.1.1 Types of Momentarily Operated Devices

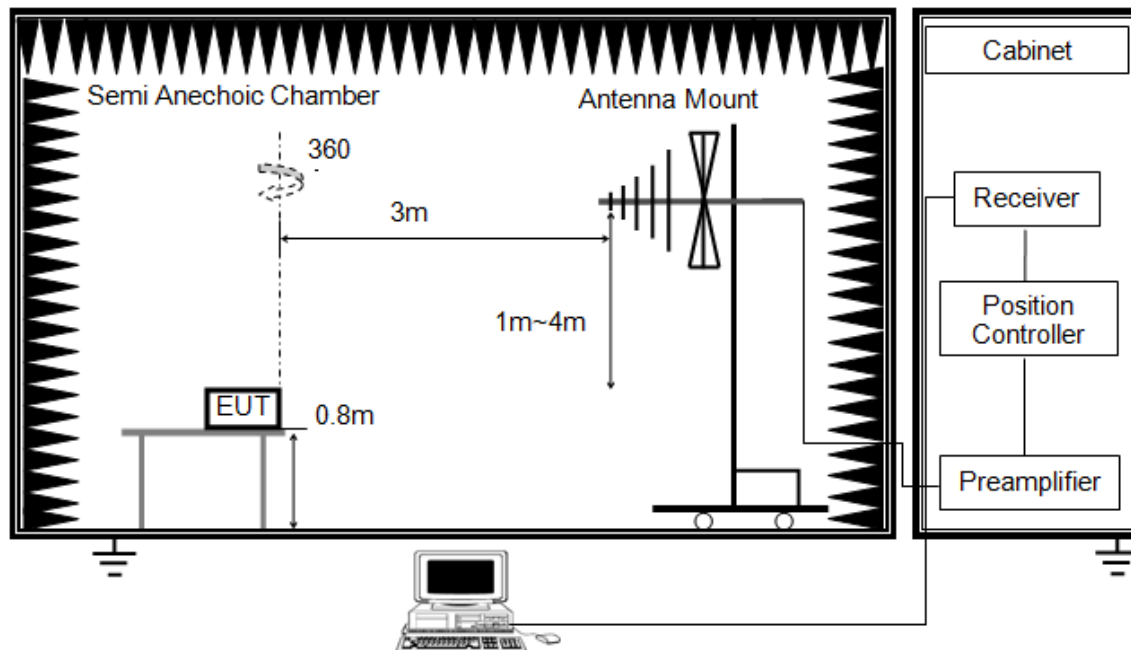
Devices shall comply with the following for momentary operation:

a. A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all times during transmission. When released, the transmitter shall cease transmission within no more than 5 seconds of being released.

TEST PROCEDURE

FCC Reference:	CFR 47 FCC §15.231(a)
Test Method Used:	The EUT transmitter was activated and monitored using a spectrum analyser for a period of 10 seconds.
FCC Reference:	CFR 47 FCC §15.231(e)
Test Method Used:	The duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

TEST SETUP





For CFR 47 Part 15.231(a):

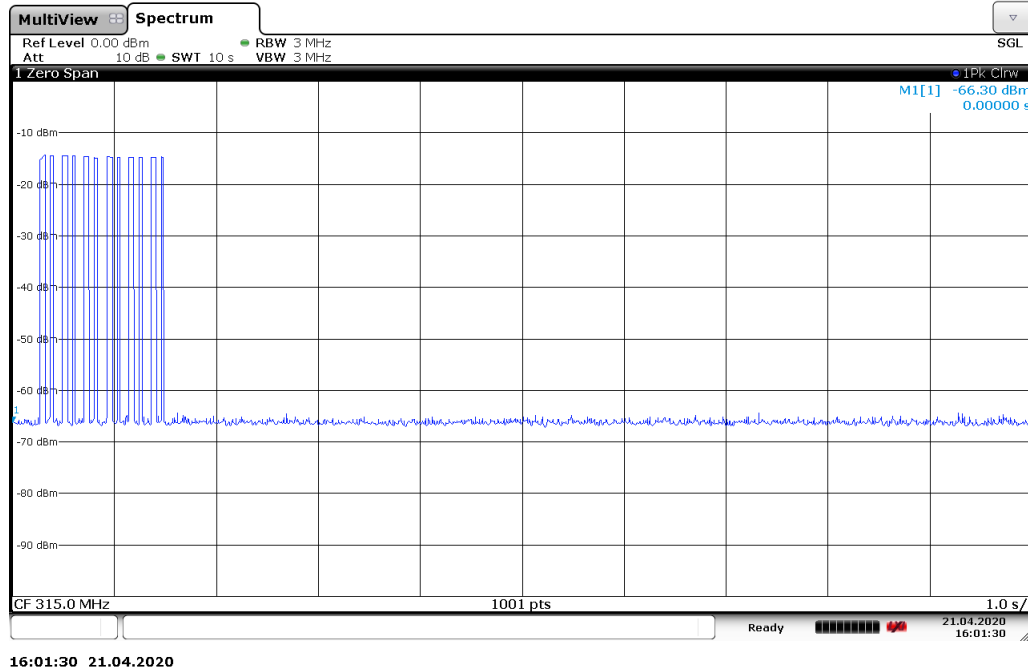
- a. Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz.
- b. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- c. Set Sweep Time to 10 s.
- d. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- e. Measure the maximum time duration of one single pulse.

TEST ENVIRONMENT

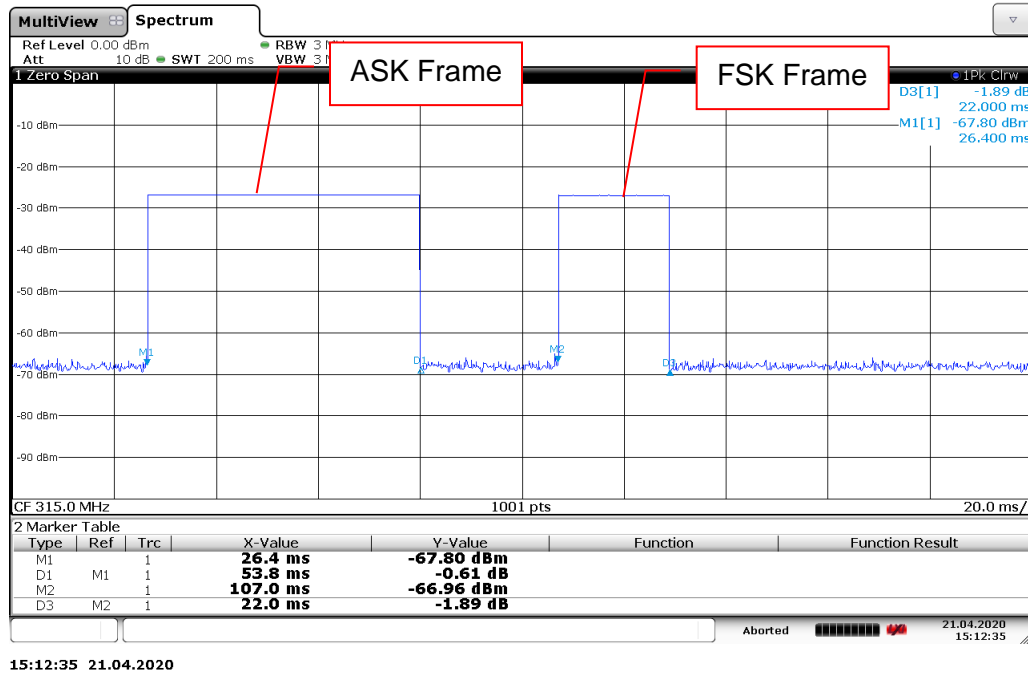
Temperature	23.5°C	Relative Humidity	64%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

RESULTS

Test Plot-1



Test Plot-2



Note 1: Test Plot-1 shows the transmission ends within 2 seconds of the stating and therefore meets the 5 second requirement.

Note 2: All the frequencies have the same duty cycle, so only one frequency's data recorded in the report.

Note 3: All the modes and buttons had been tested, only the worst data record in the report.



6.3. 20dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC §15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

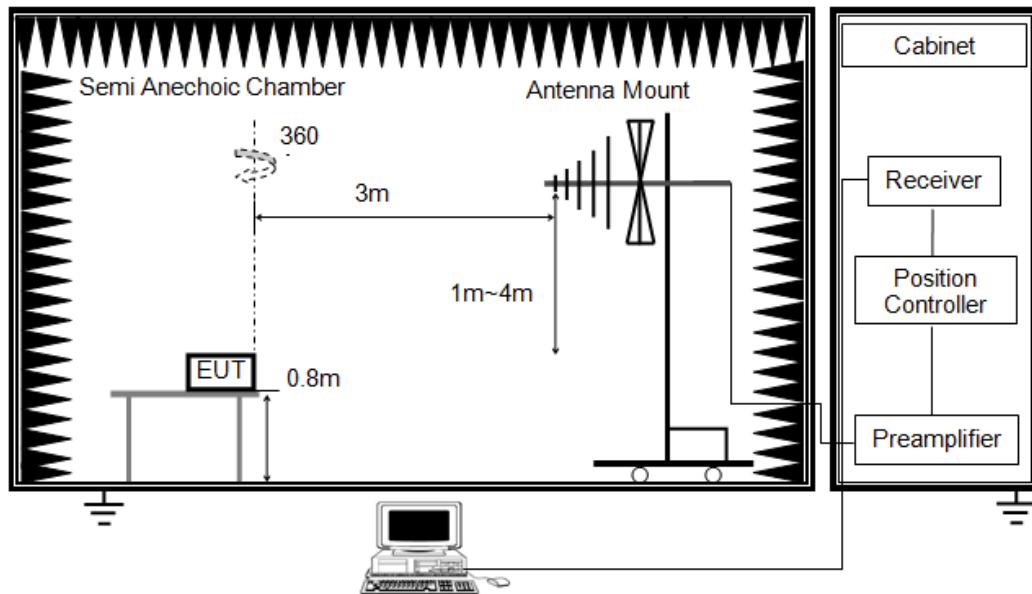
RSS-210 Issue 10 Annex A.1.3 Bandwidth of Momentary Signals

The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900MHz. For devices operating above 900 MHz, the 99% bandwidth shall be less or equal to 0.5% of the centre frequency.

TEST PROCEDURE

FCC Reference:	CFR 47 Part 15.231(c)
Test Method Used:	ANSI C63.10 Section 6.9.2
RBW Setting	1% to 5% of the OBW
VBW Setting	3*RBW

TEST SETUP



1. 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.
2. The EUT was placed on a turntable with 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower
4. Set the spectrum analyzer in the following setting as:
RBW is set to 1% to 5% of the OBW, VBW Setting is set to 3*RBW.

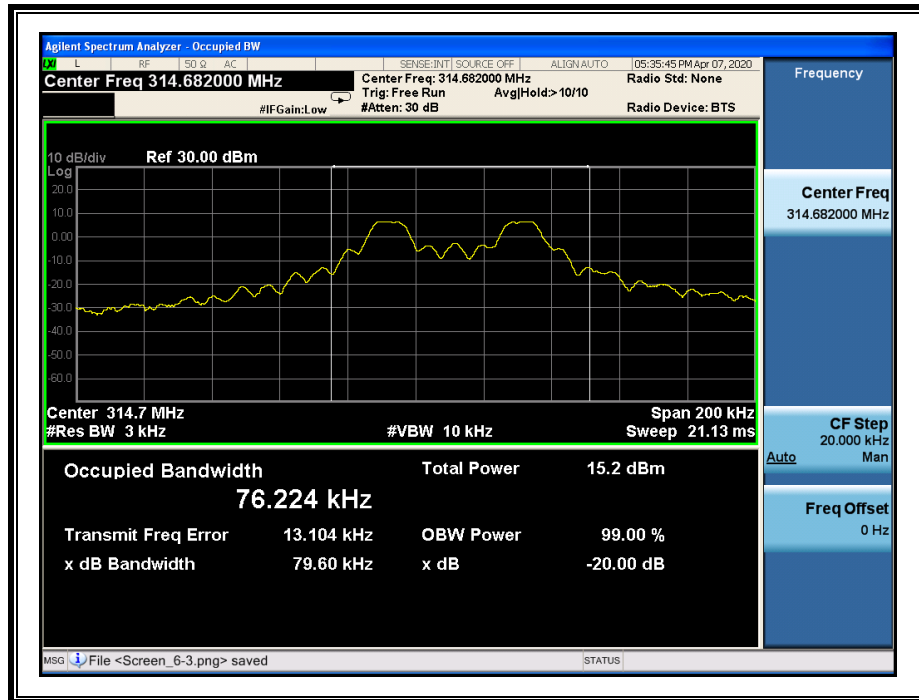
TEST ENVIRONMENT

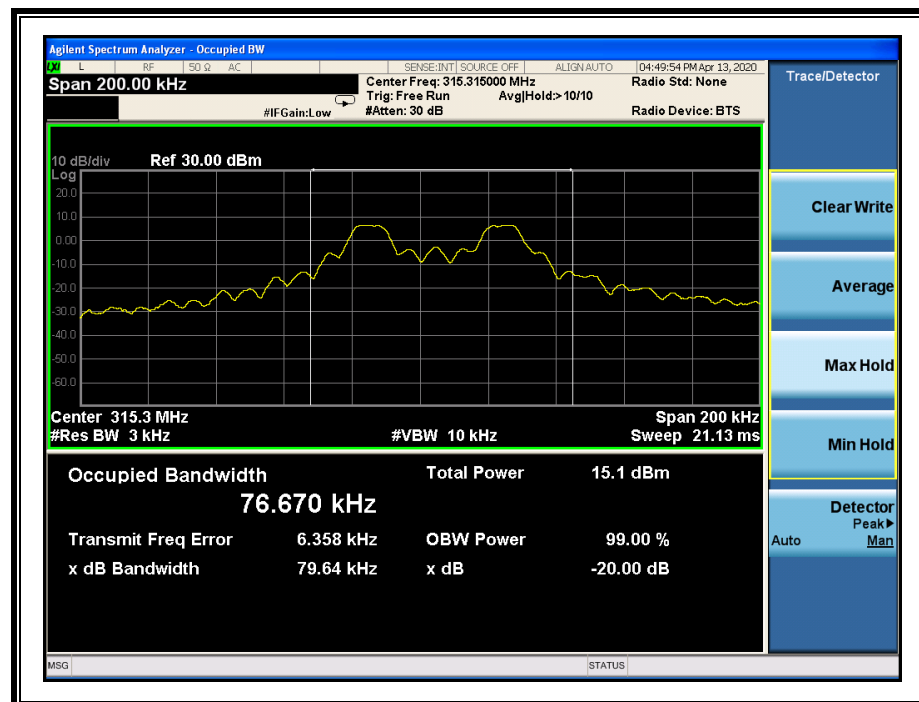
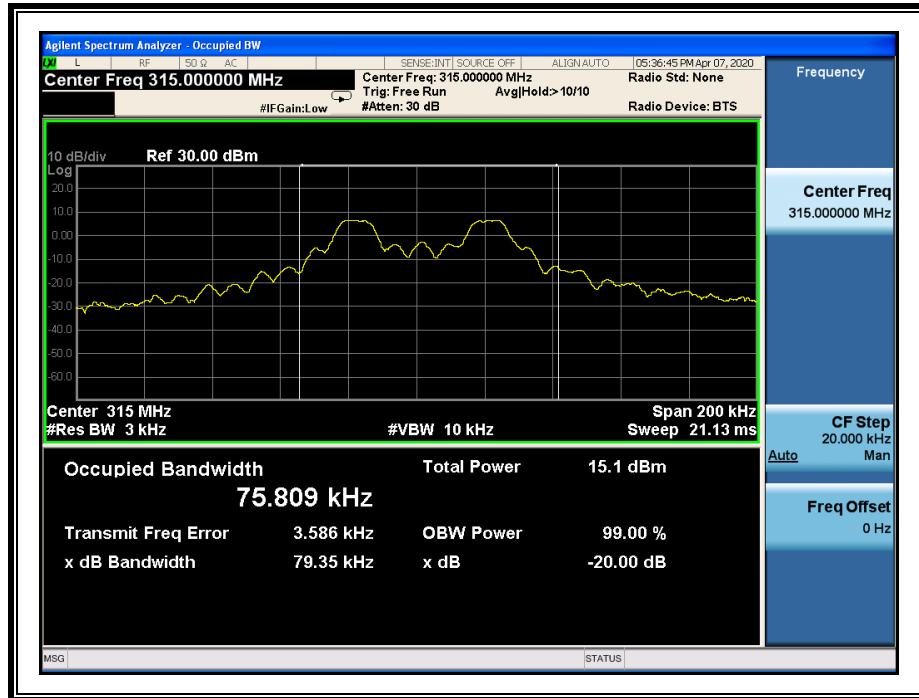
Temperature	24.5°C	Relative Humidity	65%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V



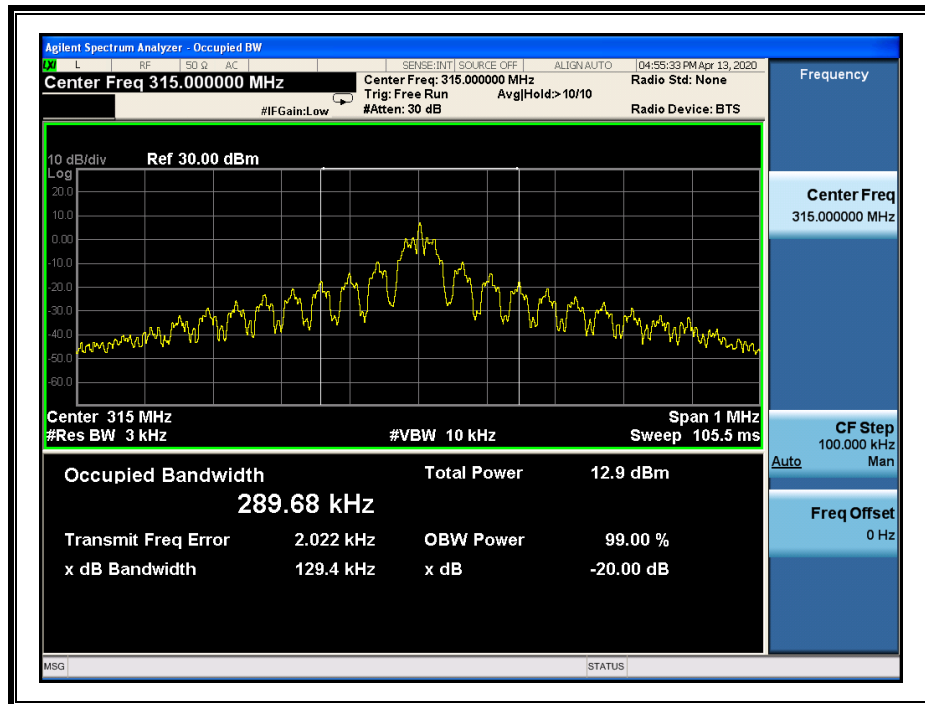
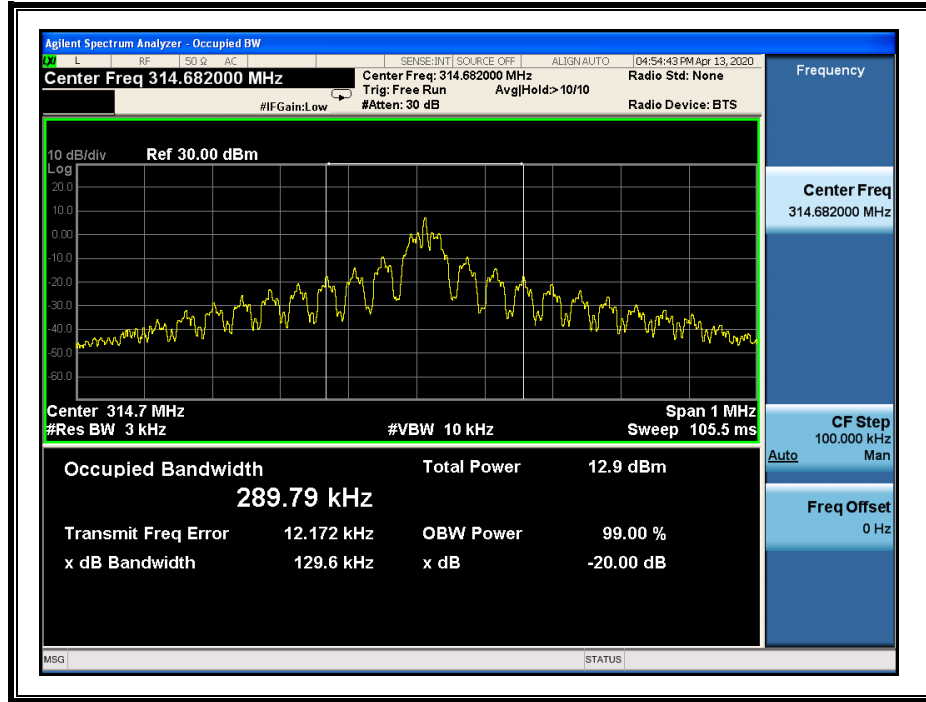
RESULTS

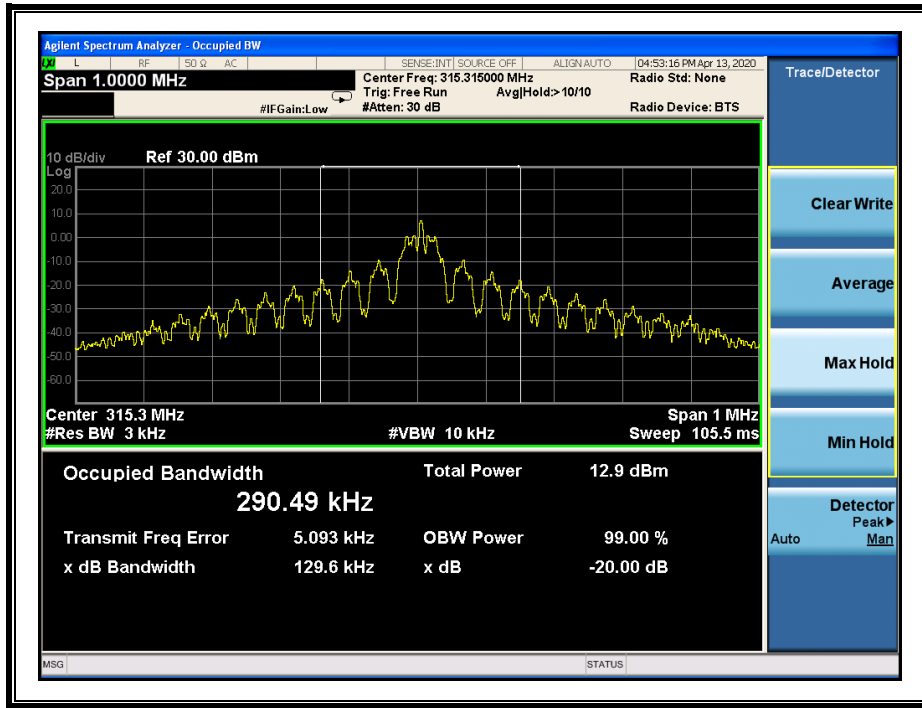
Mode	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
FSK	314.682	79.60	76.224	786.7	Pass
	315.000	79.35	75.809	787.5	Pass
	315.315	79.64	76.670	788.3	Pass





Mode	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
ASK	314.682	129.60	289.79	786.7	Pass
	315.000	129.40	289.68	787.5	Pass
	315.315	129.60	290.49	788.3	Pass





Note: All the modes and buttons had been tested, only the worst data record in the report.

6.4. RADIATED TEST RESULTS

LIMITS

CFR 47 FCC §15.231 (b)(e)

CFR 47 FCC §15.205 and §15.209

ISED RSS-210 Issue 10 Annex A.1.2 Field Strengths

ISED RSS-GEN Clause 8.9

1. In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

Note:

1. To obtain the average limit at the test frequency the values given in the table of FCC part 15.231(b) have to be linear interpolated and then converted to dBµV/m. The limit at 260 MHz is 3750 µV/m and at 470 MHz it is 12500 µV/m. Limit at 315 MHz is calculated as shown in ANSI C63.10 Section 7.6.2:

For the fundamental:

Limit [µV/m] = Limlower + ΔF [(Limupper – Limlower) / (fupper – flower)]
where ΔF = fc – flower = 315 – 260 = 55

Limit = 3750 + 55 * [(12500 – 3750) / (470 -260)]
= 3750 + 55 * [8750 / 210]
= 6041.7 µV/m

dBµV/m = 20 * log (µV/m)
= 20 * log (6041.7)

Average Limit at 315 MHz = 75.6 dBµV/m

For spurious emission:

Limit [$\mu\text{V/m}$] = $\text{Lim}_{\text{lower}} + \Delta F [(\text{Lim}_{\text{upper}} - \text{Lim}_{\text{lower}}) / (f_{\text{upper}} - f_{\text{lower}})]$
where $\Delta F = f_c - f_{\text{lower}} = 315 - 260 = 55$

Limit = $375 + 55 * [(12500 - 3750) / (470 - 260)]$
= $375 + 55 * [875 / 210]$
= $604.17 \mu\text{V/m}$

$\text{dB}\mu\text{V/m} = 20 * \log (\mu\text{V/m})$
= $20 * \log (604.17)$

Average Limit at 315 MHz = 55.6 dB $\mu\text{V/m}$

2. If the average limit is specified for the EUT, the peak limit is 20 dB above the average limit as specified in FCC 15.35 (b)

2. Please refer to CFR 47 FCC part 15.231(e)

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 ¹	50 to 150 ¹
174-260	1,500	150
260-470	1,500 to 5,000 ¹	150 to 500 ¹
Above 470	5,000	500

Note:

1. To obtain the average limit at the test frequency the values given in the table of FCC part 15.231(b) have to be linear interpolated and then converted to dB $\mu\text{V/m}$. The limit at 260 MHz is 3750 $\mu\text{V/m}$ and at 470 MHz it is 12500 $\mu\text{V/m}$. Limit at 315 MHz is calculated as shown in ANSI C63.10 Section 7.6.2:

Limit [$\mu\text{V/m}$] = $\text{Lim}_{\text{lower}} + \Delta F [(\text{Lim}_{\text{upper}} - \text{Lim}_{\text{lower}}) / (f_{\text{upper}} - f_{\text{lower}})]$
where $\Delta F = f_c - f_{\text{lower}} = 315 - 260 = 55$

Limit = $1500 + 55 * [(5000 - 1500) / (470 - 260)]$
= $1500 + 55 * [3500 / 210]$
= $2416.7 \mu\text{V/m}$

$\text{dB}\mu\text{V/m} = 20 * \log (\mu\text{V/m})$
= $20 * \log (2416.7)$

Average Limit at 315 MHz = 67.66 dB $\mu\text{V/m}$

If the average limit is specified for the EUT, the peak limit is 20 dB above the average limit as specified in FCC 15.35 (b)

3. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

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

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

Note: (1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).
Note: (2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30MHz.

Restricted bands of operation



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

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

²Above 38.6c



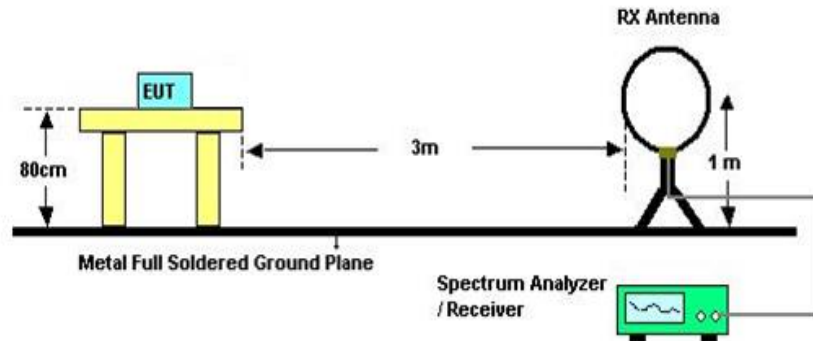
IC Restricted bands please refer to ISED RSS-GEN Clause 8.10

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.

TEST SETUP AND PROCEDURE

Below 30MHz

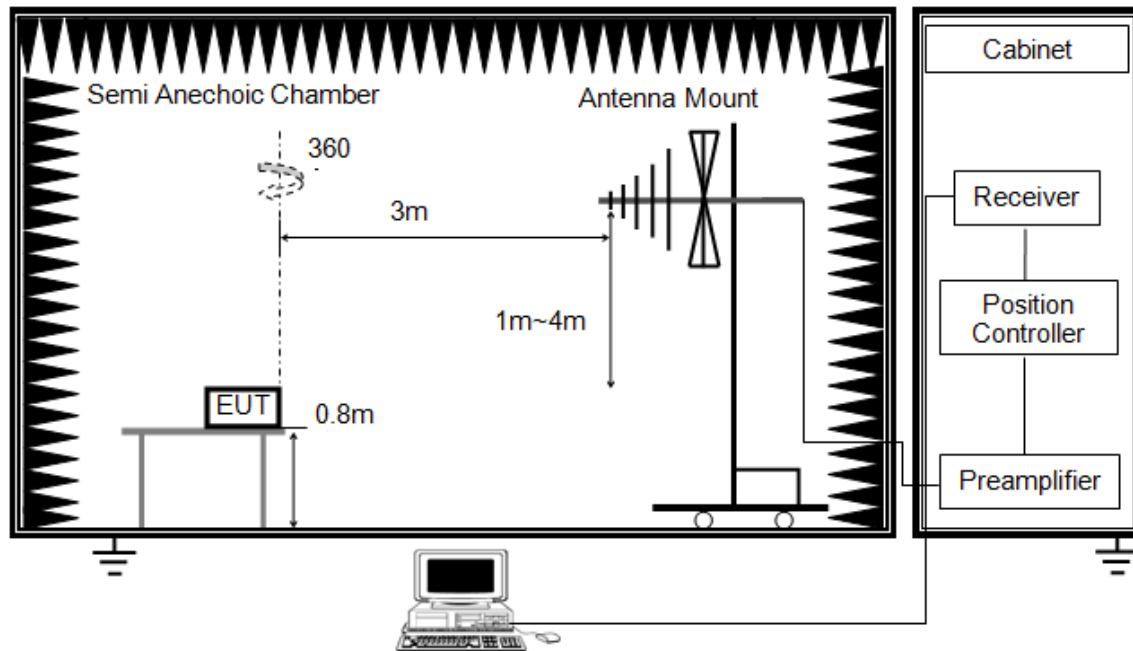


The setting of the spectrum analyser

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

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m 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 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
6. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open field site. Therefore, the sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Below 1G

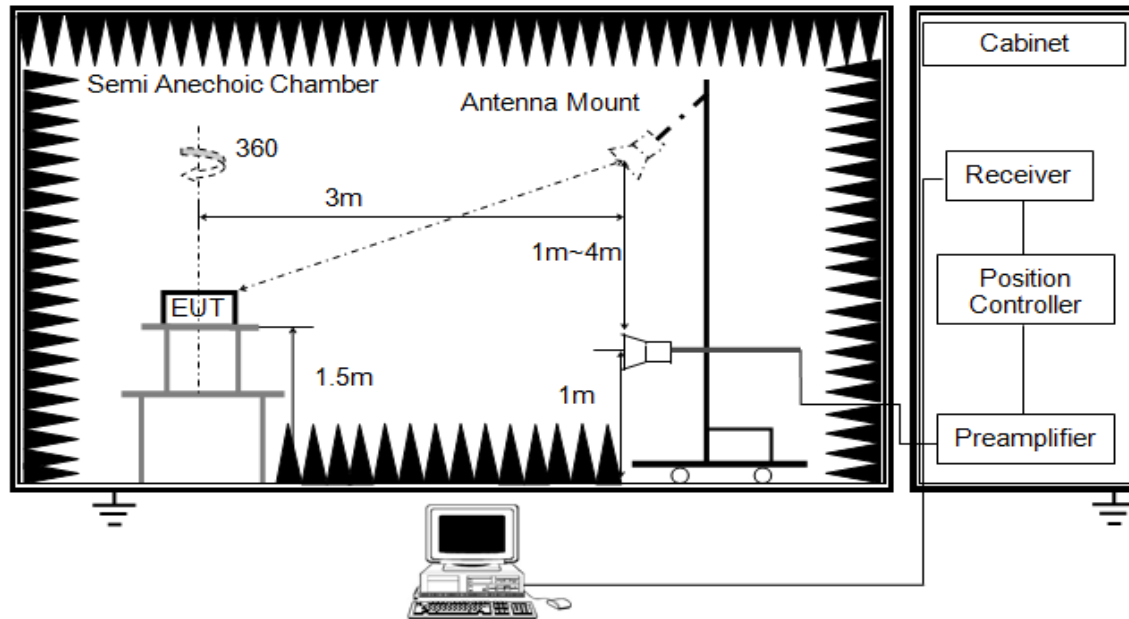


The setting of the spectrum analyser

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

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 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. 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.

Above 1G

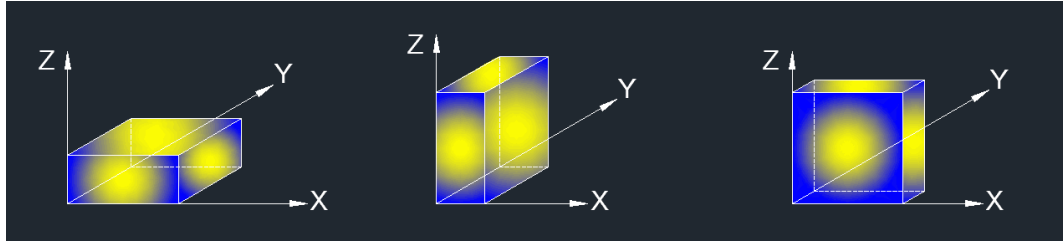


The setting of the spectrum analyser

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

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter or band reject 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 150 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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements. Where necessary, average emission are determined by applying the Duty Cycle Correction Factor to the peak measurements. For the Duty Cycle and Correction Factor please refer to clause 6.1. 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 for horizontal and Z axis for vertical) data recorded in the report.

Note 2: Both the battery mode and AC adaptor mode has been considered, but only the worst data was recorded in the report.

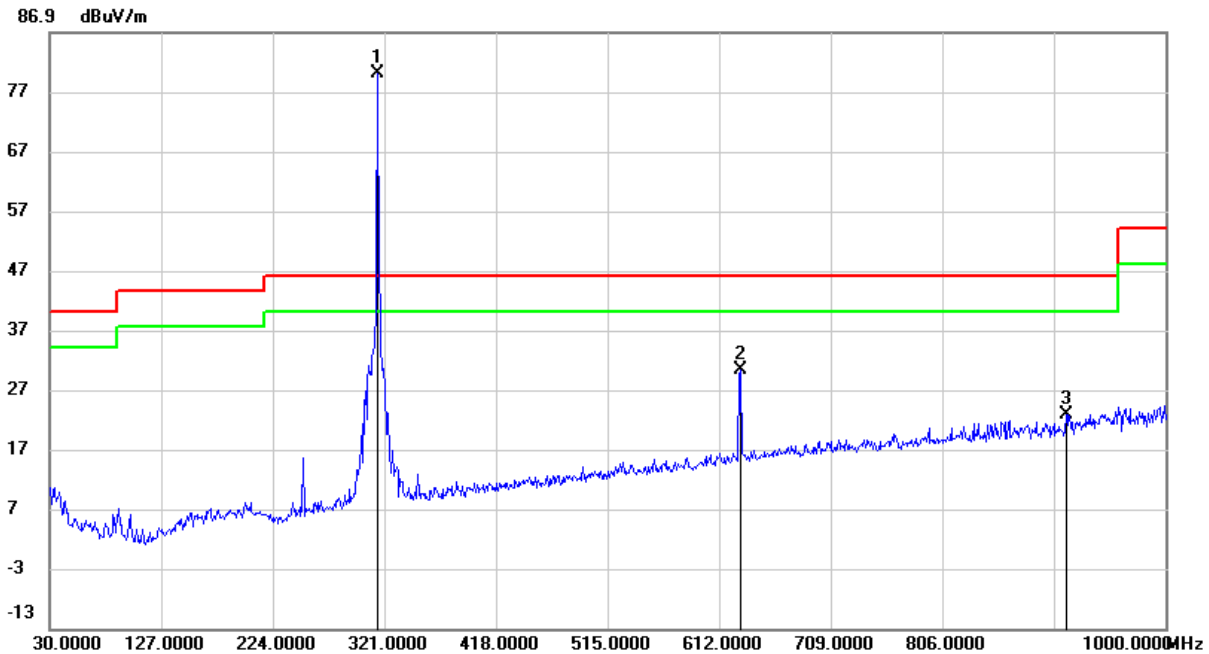
TEST ENVIRONMENT

Temperature	23.7°C	Relative Humidity	66%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

RESULTS

6.4.1. SPURIOUS EMISSIONS BELOW 1GHz AND ABOVE 30MHz

ASK 315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)



No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.0000	94.04	-14.04	80.00	/	95.60	-15.6	peak
1(Fundamental)	315.0000	/	/	/	73.79	75.60	-1.81	Average
2(2 th harmonic)	630.0000	38.72	-8.42	30.30	/	75.60	-45.30	peak
2(2 th harmonic)	630.0000	/	/	/	24.09	55.60	-31.51	Average
3	913.6700	26.84	-4.04	22.80	/	46.00	-23.20	QP

Note: 1. Result Level = Read Level + Correct Factor.

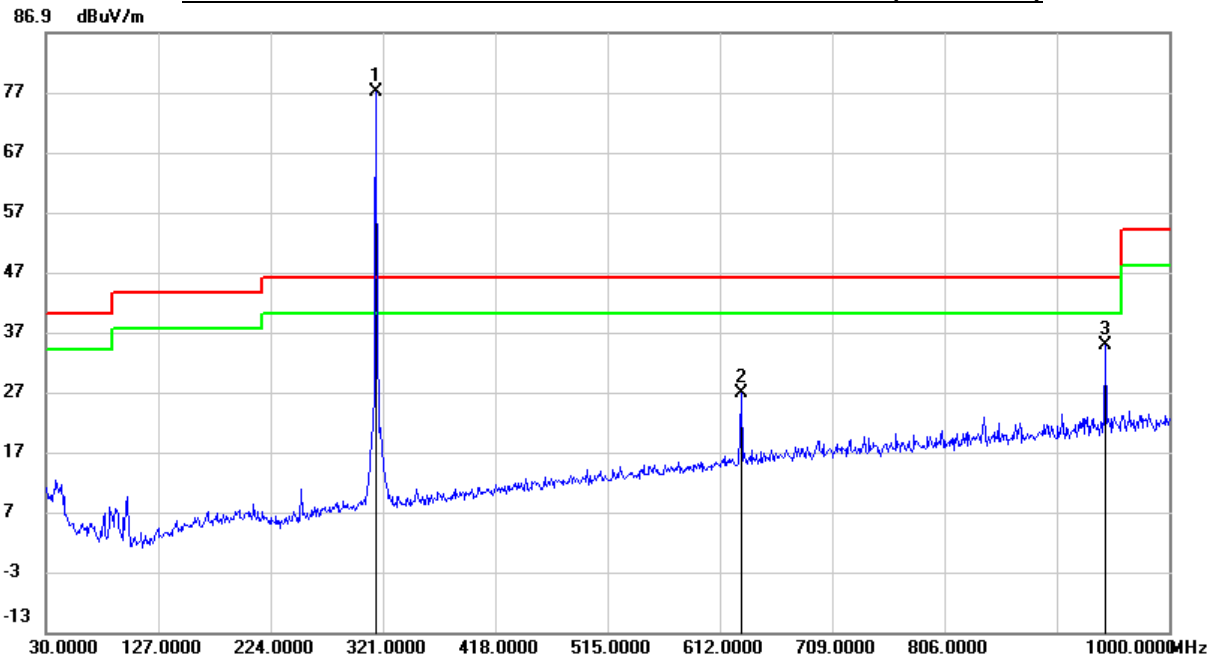
2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

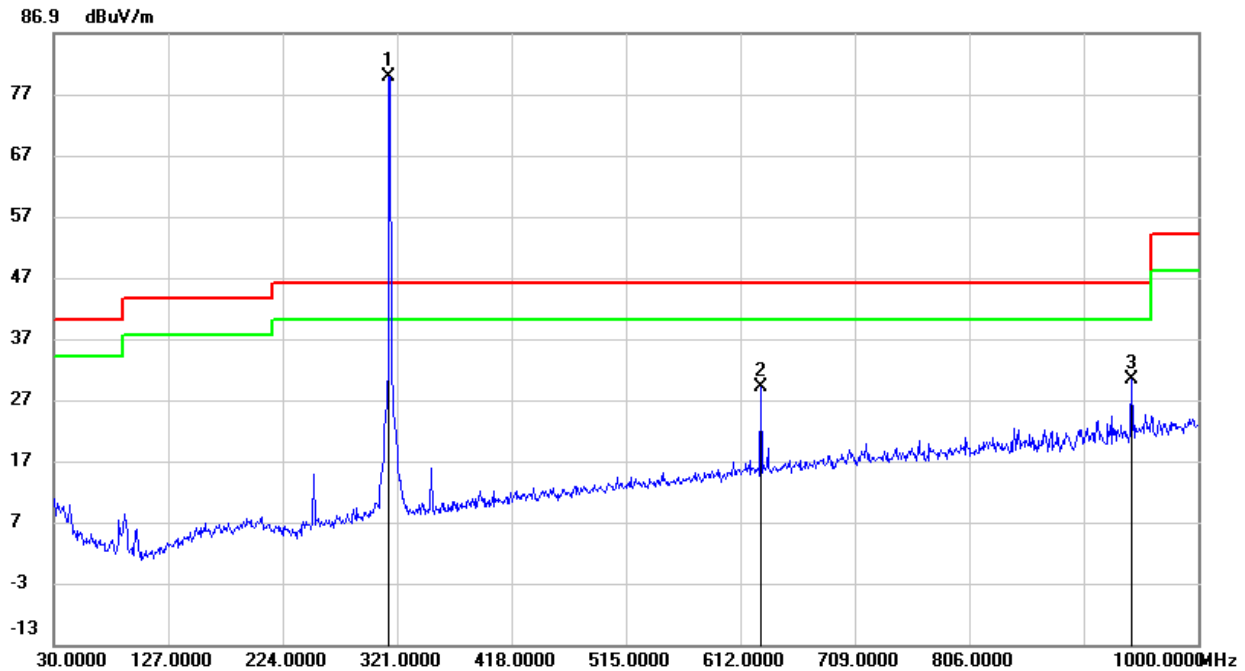
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

ASK 315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.0000	91.04	-14.04	77.00	/	95.60	-19.00	peak
1(Fundamental)	315.0000	/	/	/	70.79	75.60	-4.81	Average
2(2 th harmonic)	630.0000	35.30	-8.42	26.88	/	75.60	-48.72	peak
2(2 th harmonic)	630.0000	/	/	/	20.67	55.60	-34.93	Average
3(3 th harmonic)	945.0000	38.43	-3.57	34.86	/	75.60	-40.74	peak
3(3 th harmonic)	945.0000	/	/	/	28.65	55.60	-26.95	Average

- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic, Mark 3 is 3th harmonic.

**ASK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	314.6820	93.94	-14.06	79.88	/	95.60	-15.72	peak
1(Fundamental)	314.6820	/	/	/	73.67	75.6	-1.93	Average
2(2 th harmonic)	629.3640	37.58	-8.43	29.15	/	75.60	-46.45	peak
2(2 th harmonic)	629.3640	/	/	/	22.94	55.6	-32.66	Average
2(3 th harmonic)	944.0460	33.79	-3.60	30.19	/	75.60	-45.41	peak
2(3 th harmonic)	945.0460	/	/	/	23.98	55.6	-31.62	Average

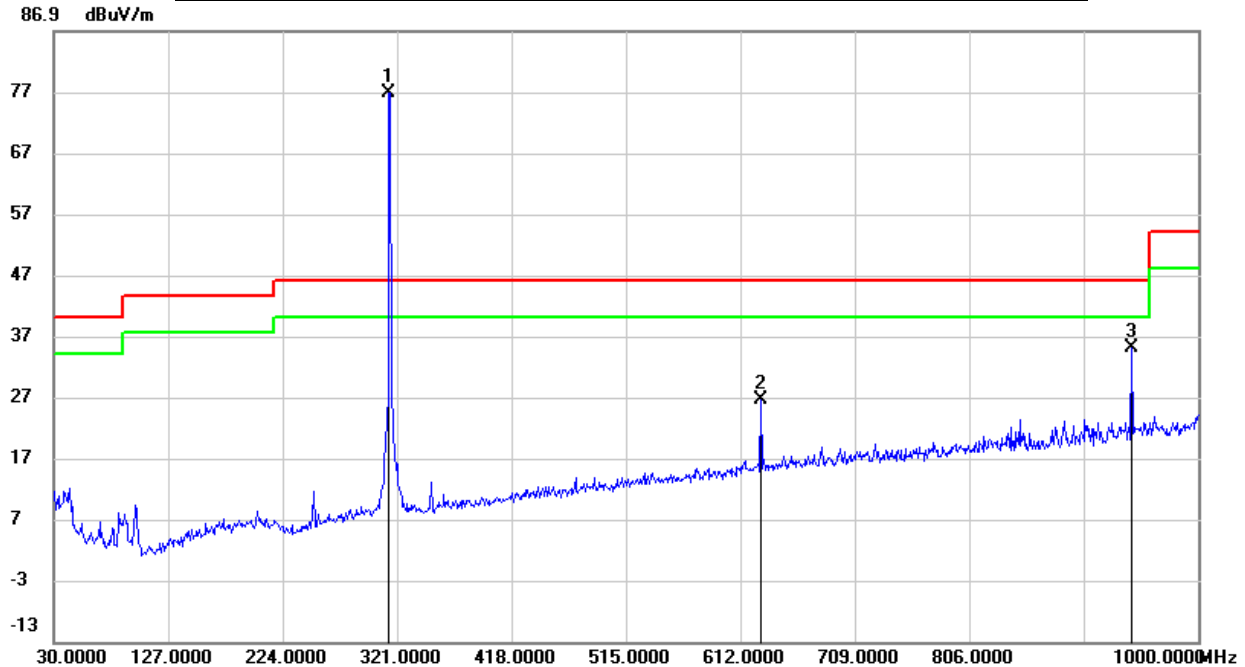
Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic, Mark 3 is 3th harmonic.

**ASK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	314.6820	90.81	-14.06	76.75	/	95.60	-18.85	peak
1(Fundamental)	314.6820	/	/	/	70.54	75.6	-5.06	Average
2(2 th harmonic)	629.3640	34.95	-8.43	26.52	/	75.60	-49.08	peak
2(2 th harmonic)	629.3640	/	/	/	20.31	55.6	-35.29	Average
2(3 th harmonic)	944.0460	38.56	-3.60	34.96	/	75.60	-40.64	peak
2(3 th harmonic)	945.0460	/	/	/	28.75	55.6	-26.85	Average

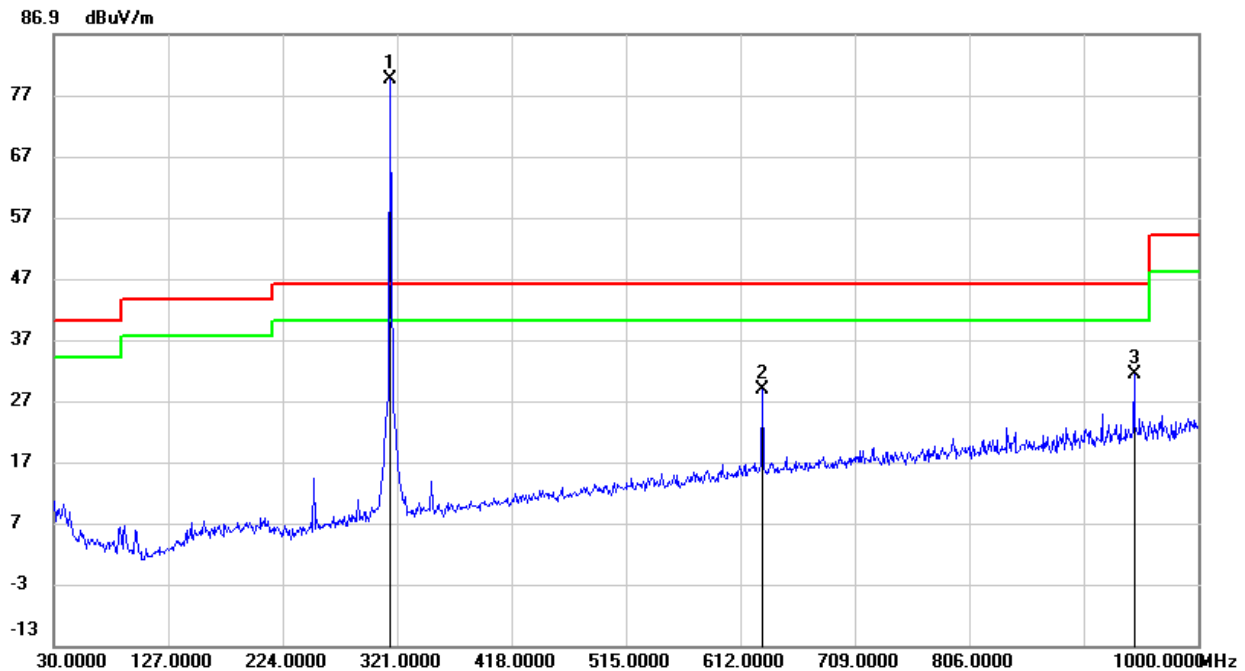
Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

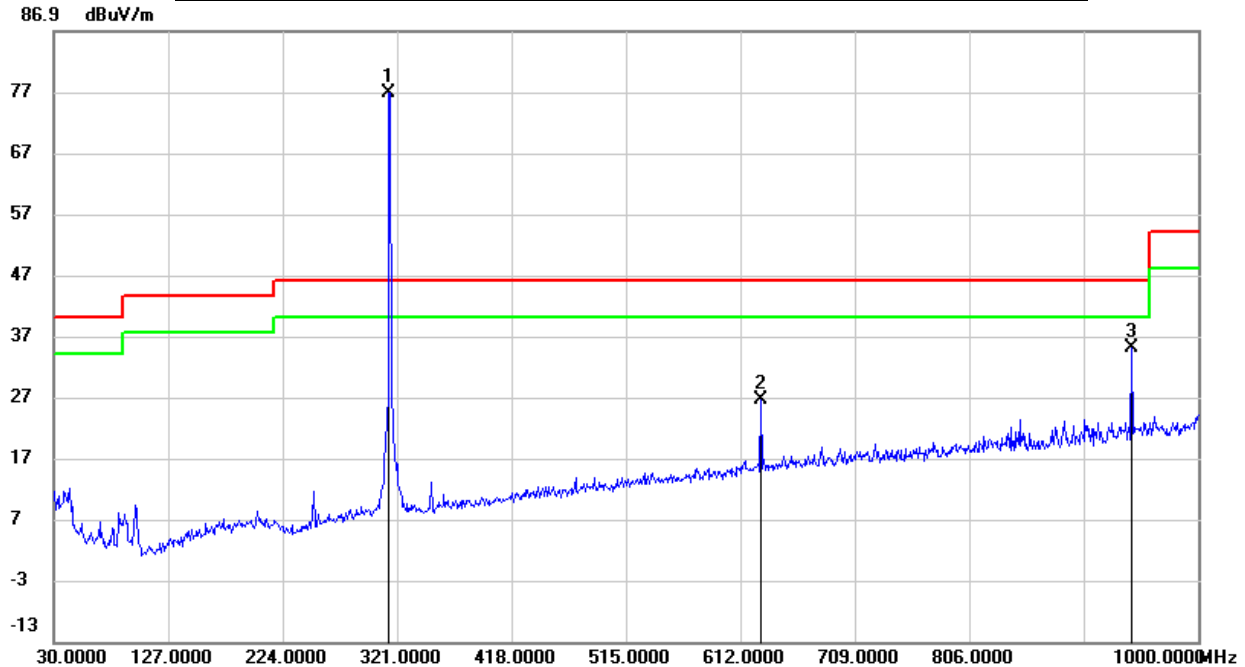
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic, Mark 3 is 3th harmonic.

**ASK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.3150	93.67	-14.04	79.63	/	95.60	-15.97	peak
1(Fundamental)	315.3150	/	/	/	73.42	75.60	-2.18	Average
2(2 th harmonic)	630.6300	37.17	-8.42	28.75	/	75.60	-46.85	peak
2(2 th harmonic)	630.6300	/	/	/	22.54	55.60	-33.06	Average
3(3 th harmonic)	945.9450	34.72	-3.54	31.18	/	75.60	-44.42	peak
3(3 th harmonic)	945.9450	/	/	/	24.97	55.60	-30.63	Average

- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic, Mark 3 is 3th harmonic.

**ASK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.3150	90.81	-14.06	76.75	/	95.60	-18.85	peak
1(Fundamental)	315.3150	/	/	/	70.54	75.60	-5.06	Average
2(2 th harmonic)	630.6300	34.95	-8.43	26.52	/	75.60	-49.08	peak
2(2 th harmonic)	630.6300	/	/	/	24.97	55.60	-30.63	Average
3(3 th harmonic)	945.9450	38.56	-3.60	34.96	/	75.60	-40.64	peak
3(3 th harmonic)	945.9450	/	/	/	28.75	55.60	-26.85	Average

Note: 1. Result Level = Read Level + Correct Factor.

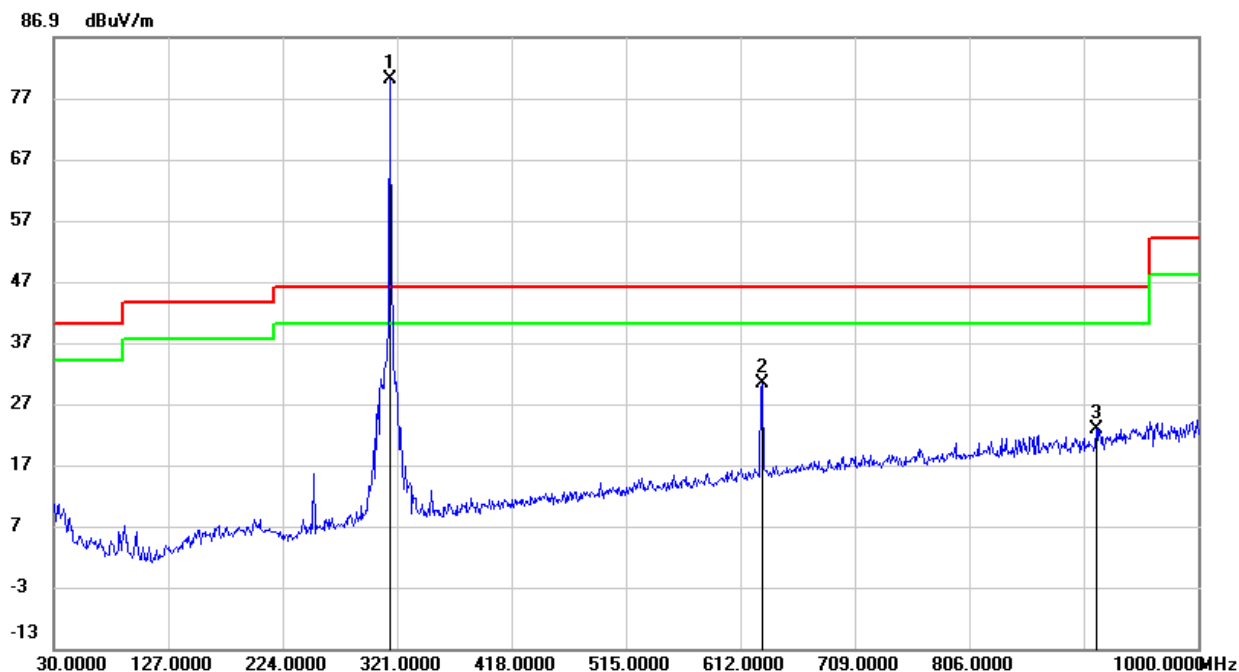
2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic, Mark 3 is 3th harmonic.

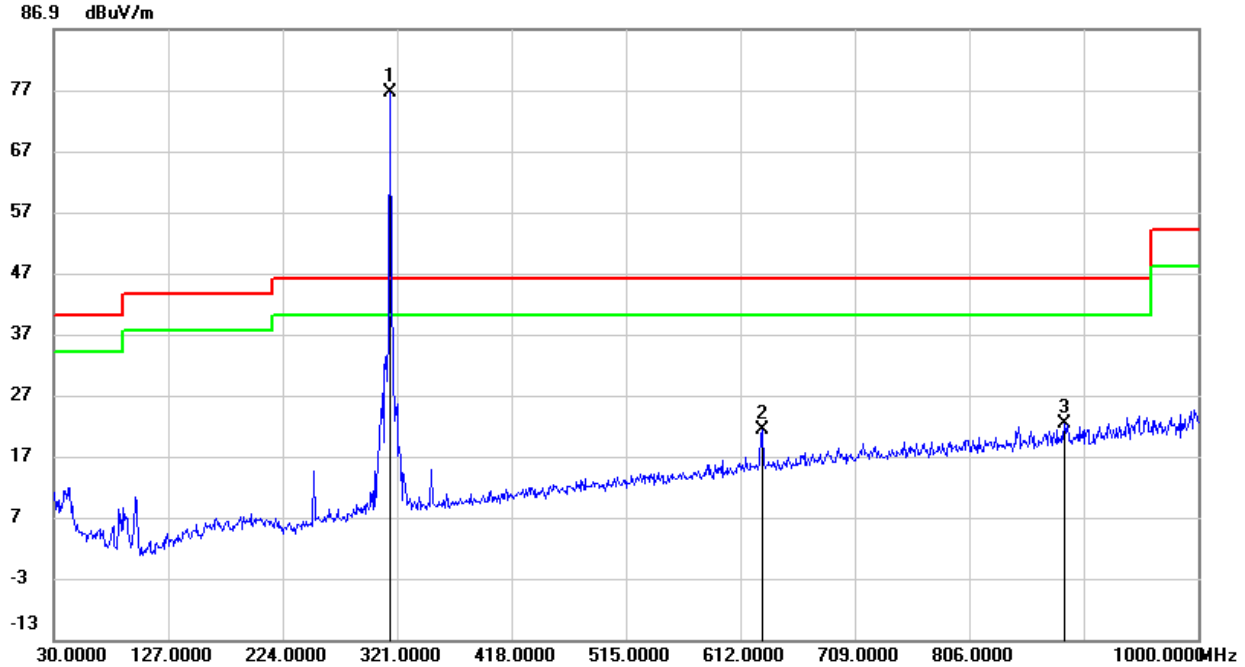
FSK 315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)



No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.0000	94.04	-14.04	80.00	/	95.60	-15.60	peak
1(Fundamental)	315.0000	/	/	/	73.79	75.60	-1.81	Average
2(2 th harmonic)	630.0000	38.72	-8.42	30.30	/	75.60	-45.30	peak
2(2 th harmonic)	630.0000	/	/	/	24.09	55.60	-31.51	Average
3	913.6700	26.84	-4.04	22.80	/	46.00	-23.20	QP

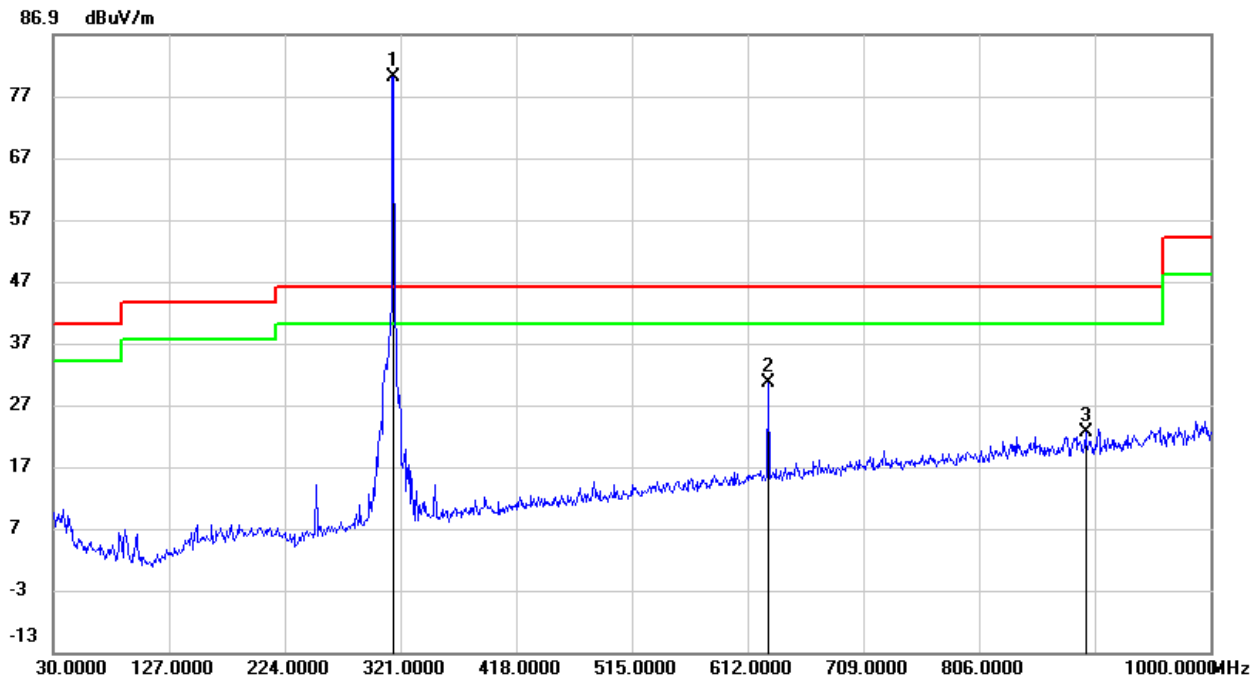
- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

FSK 315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.0000	90.64	-14.04	76.60	/	95.60	-19.00	peak
1(Fundamental)	315.0000	/	/	/	70.39	75.60	-5.21	Average
2(2 th harmonic)	630.0000	29.72	-8.42	21.30	/	75.60	-54.30	peak
2(2 th harmonic)	630.0000	/	/	/	15.09	55.60	-40.51	Average
3	886.5100	26.65	-4.35	22.30	/	46.00	-23.70	QP

- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

**FSK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	314.6820	93.96	-14.04	79.92	/	95.60	-15.68	peak
1(Fundamental)	314.6820	/	/	/	73.71	75.60	-1.89	Average
2(2 th harmonic)	629.3640	39.05	-8.43	30.62	/	75.60	-44.98	peak
2(2 th harmonic)	629.3640	/	/	/	24.41	55.60	-31.19	Average
3	895.2400	26.71	-4.30	22.41	/	46.00	-23.59	QP

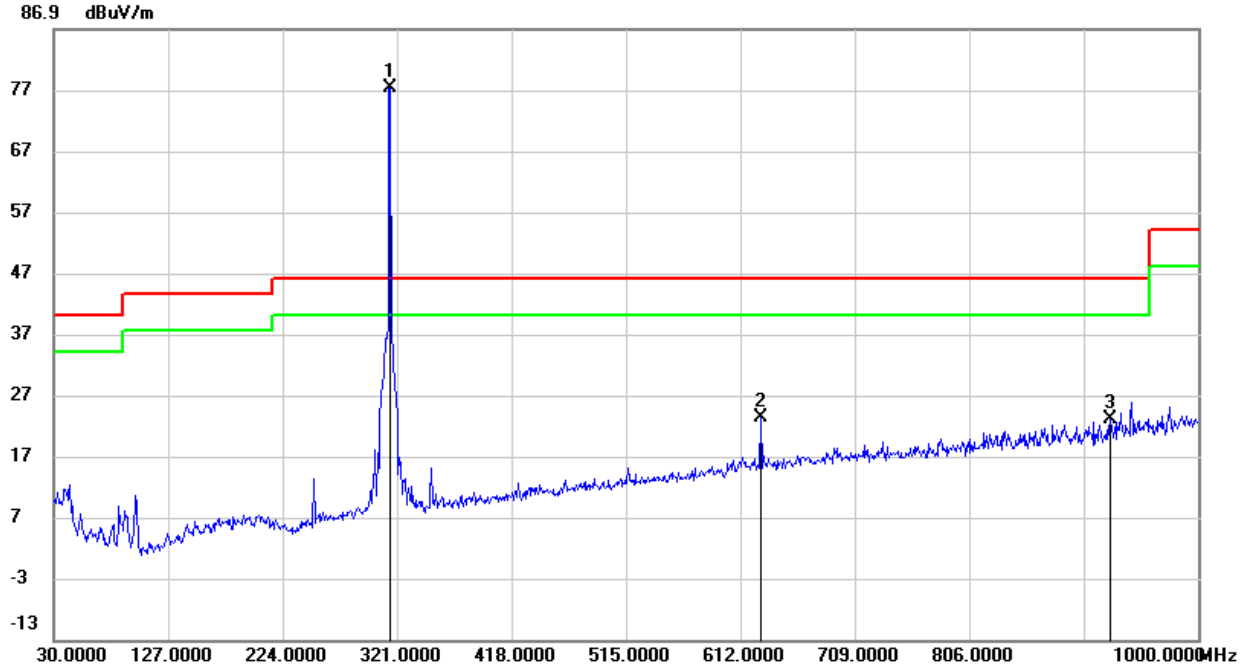
Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

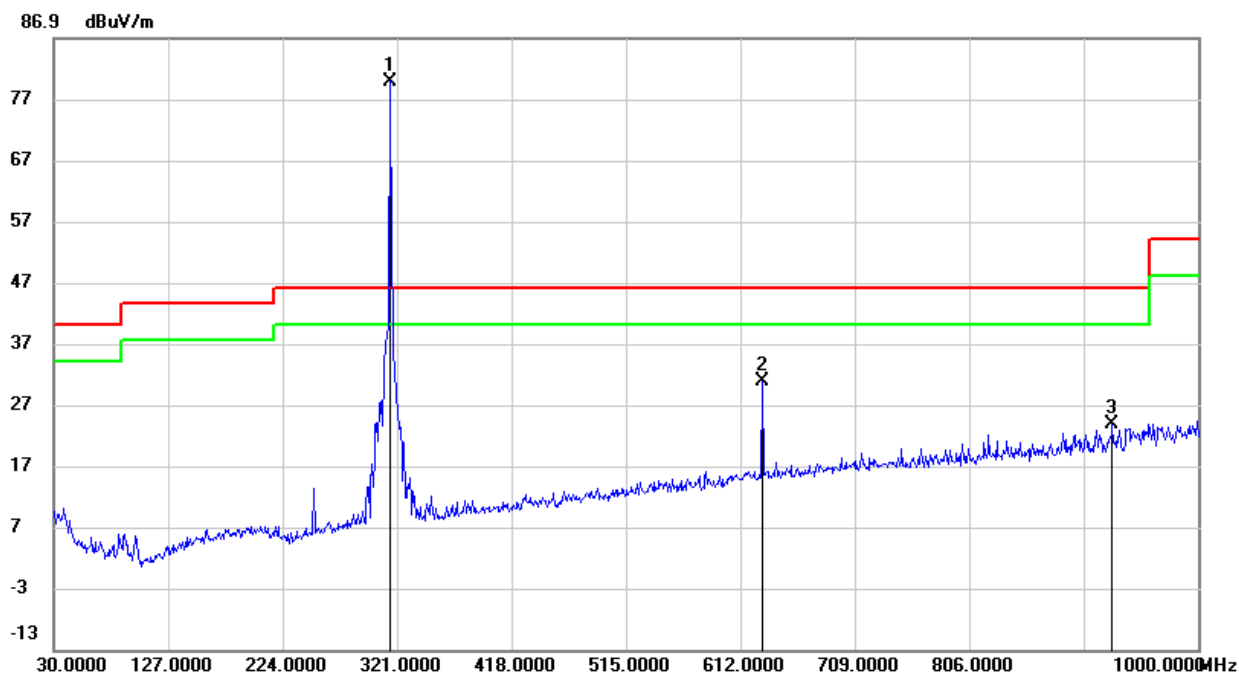
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

**FSK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	314.6820	91.35	-14.04	77.31	/	95.60	-18.29	peak
1(Fundamental)	314.6820	/	/	/	71.1	75.60	-4.50	Average
2(2 th harmonic)	629.3640	31.82	-8.43	23.39	/	75.60	-52.21	peak
2(2 th harmonic)	629.3640	/	/	/	17.18	55.60	-38.42	Average
3	925.3100	26.81	-3.85	22.96	/	46.00	-23.04	QP

- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

**FSK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.3150	93.94	-14.04	79.90	/	95.60	-15.70	peak
1(Fundamental)	315.3150	/	/	/	73.69	75.60	-1.91	Average
2(2 th harmonic)	630.6300	39.14	-8.42	30.72	/	75.60	-44.88	peak
2(2 th harmonic)	630.6300	/	/	/	24.51	55.60	-31.09	Average
3	927.2500	27.70	-3.81	23.89	/	46.00	-22.11	QP

Note: 1. Result Level = Read Level + Correct Factor.

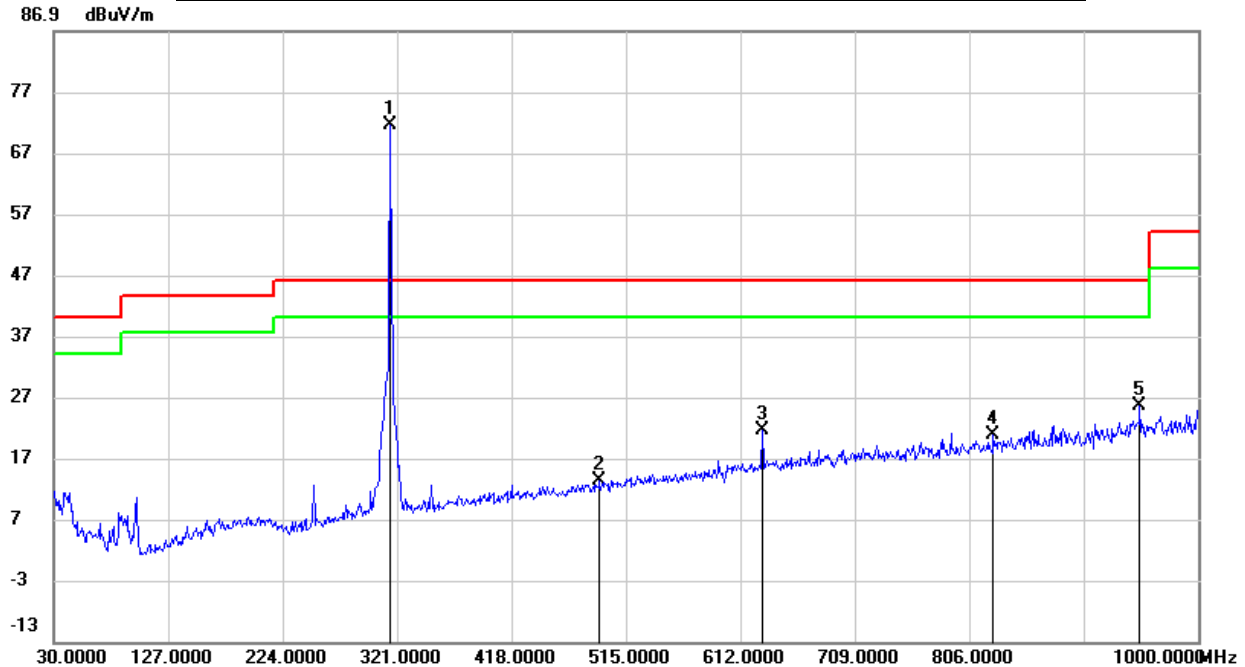
2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

5. Mark 1 is the fundamental frequency, Mark 2 is 2th harmonic.

FSK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency	Reading	Correct	Peak Result	Average Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1(Fundamental)	315.3150	85.68	-14.04	71.64	/	95.60	-23.96	peak
1(Fundamental)	315.3150	/	/	/	65.43	75.60	-10.17	Average
2	492.6900	24.23	-11.05	13.18	/	46.00	-32.82	QP
3(3 th harmonic)	630.6300	29.94	-8.42	21.52	/	75.60	-54.08	peak
3(3 th harmonic)	630.6300	/	/	/	15.31	55.60	-40.29	Average
4	826.3700	25.81	-5.11	20.70	/	46.00	-25.30	QP
5	950.5300	28.83	-3.42	25.41	/	46.00	-20.59	QP

Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

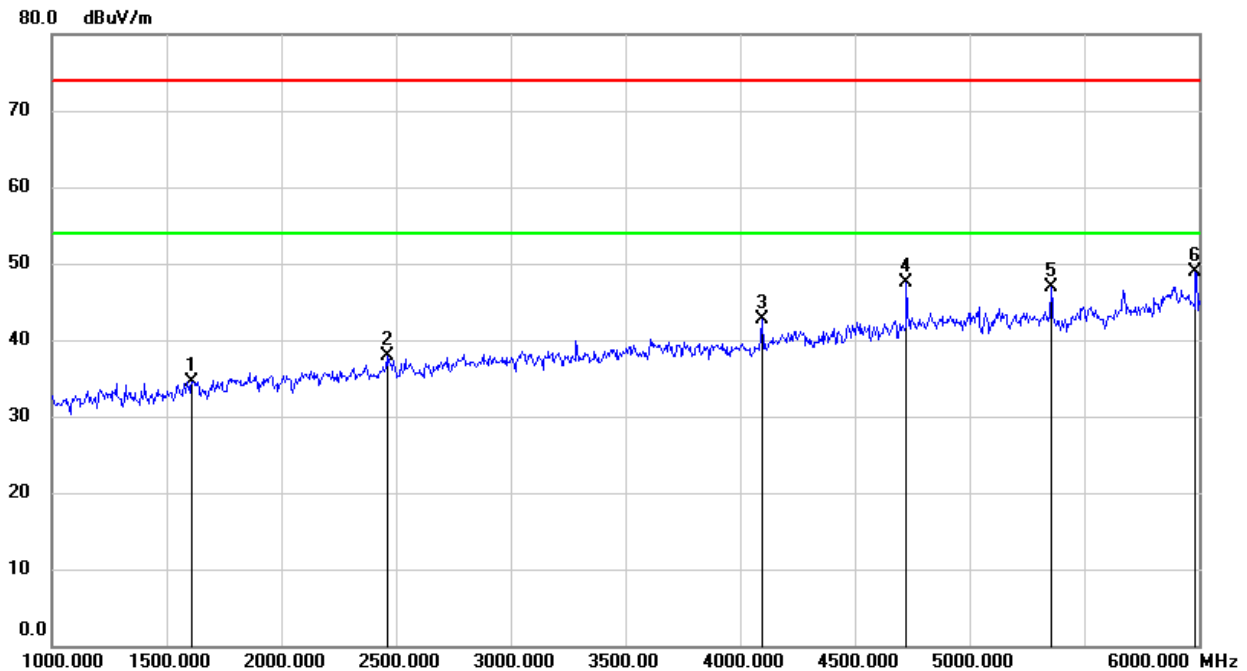
5. Mark 1 is the fundamental frequency, Mark 3 is 3th harmonic.

Note: All the modes and buttons had been tested, only the worst data record in the report.



6.4.2. SPURIOUS EMISSIONS ABOVE 1GHz

ASK 315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1610.000	46.53	-11.99	34.54	74.00	-39.46	peak
2	2460.000	46.29	-8.42	37.87	74.00	-36.13	peak
3	4095.000	46.70	-3.94	42.76	74.00	-31.24	peak
4	4725.000	48.30	-0.73	47.57	74.00	-26.43	peak
5	5355.000	45.79	1.19	46.98	74.00	-27.02	peak
6	5985.000	46.07	2.86	48.93	74.00	-25.07	peak

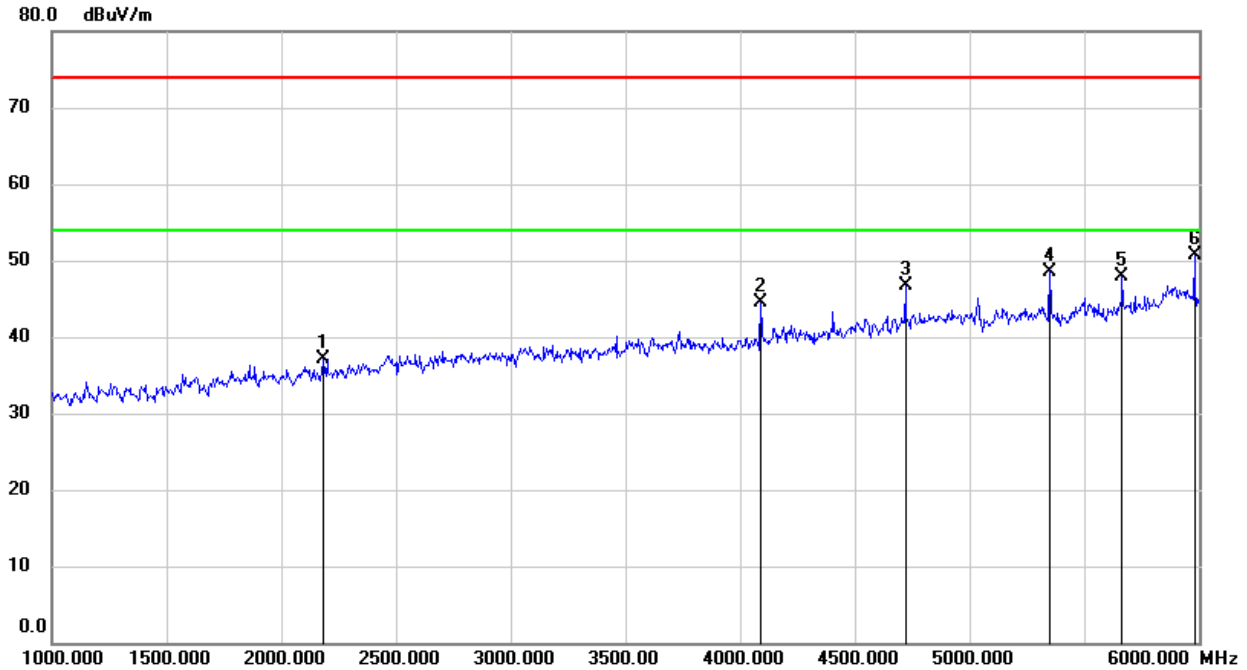
Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

ASK 315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



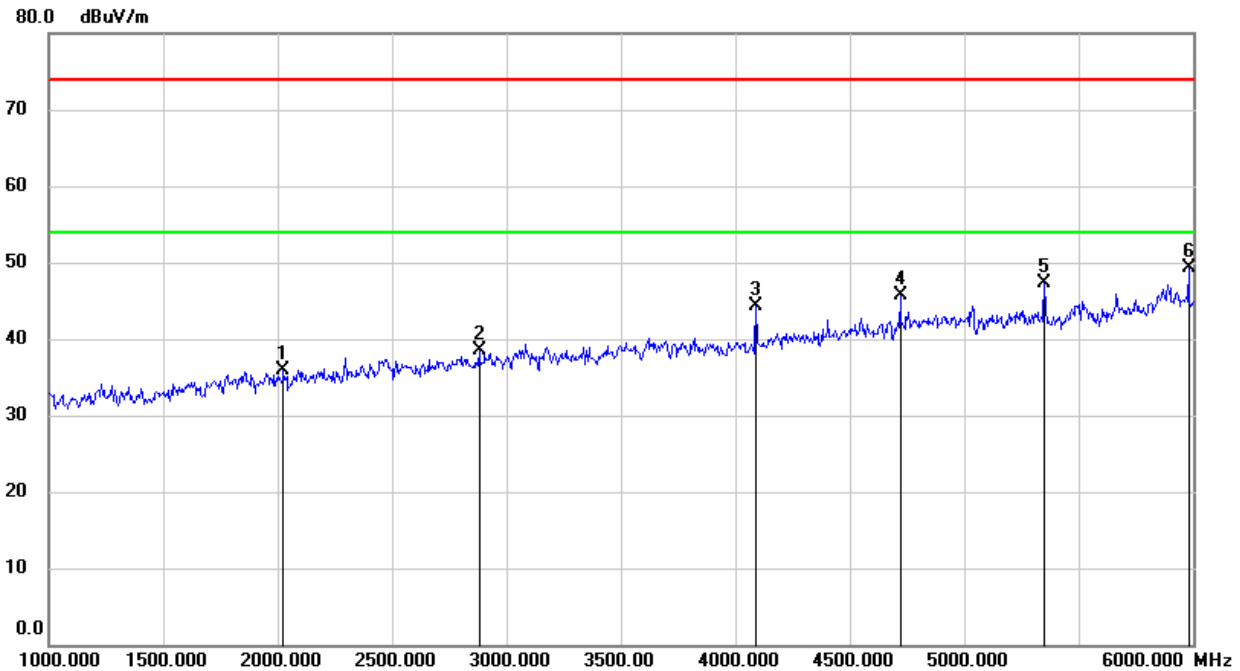
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2185.000	46.84	-9.73	37.11	74.00	-36.89	peak
2	4090.000	48.38	-3.95	44.43	74.00	-29.57	peak
3	4720.000	47.35	-0.74	46.61	74.00	-27.39	peak
4	5350.000	47.41	1.19	48.60	74.00	-25.40	peak
5	5665.000	45.86	1.99	47.85	74.00	-26.15	peak
6	5980.000	47.69	2.95	50.64	74.00	-23.36	peak

Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

**ASK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

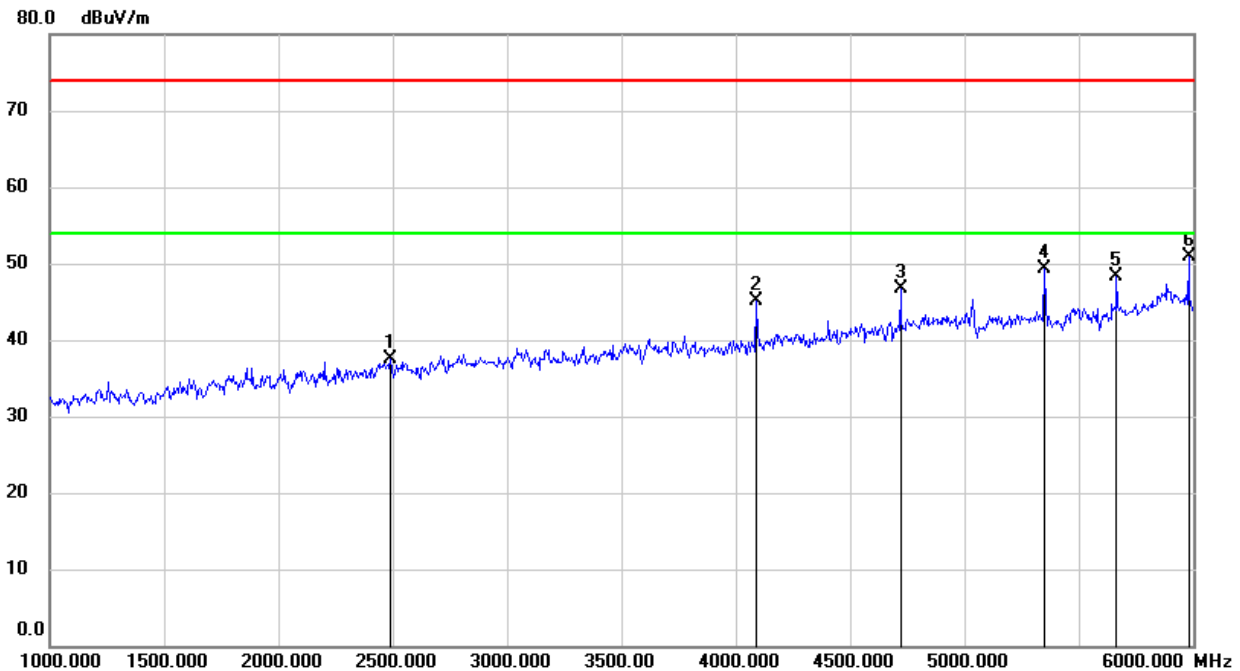
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2025.000	46.52	-10.53	35.99	74.00	-38.01	peak
2	2880.000	45.27	-6.82	38.45	74.00	-35.55	peak
3	4090.000	48.33	-3.95	44.38	74.00	-29.62	peak
4	4720.000	46.45	-0.74	45.71	74.00	-28.29	peak
5	5350.000	46.03	1.19	47.22	74.00	-26.78	peak
6	5980.000	46.32	2.95	49.27	74.00	-24.73	peak

Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

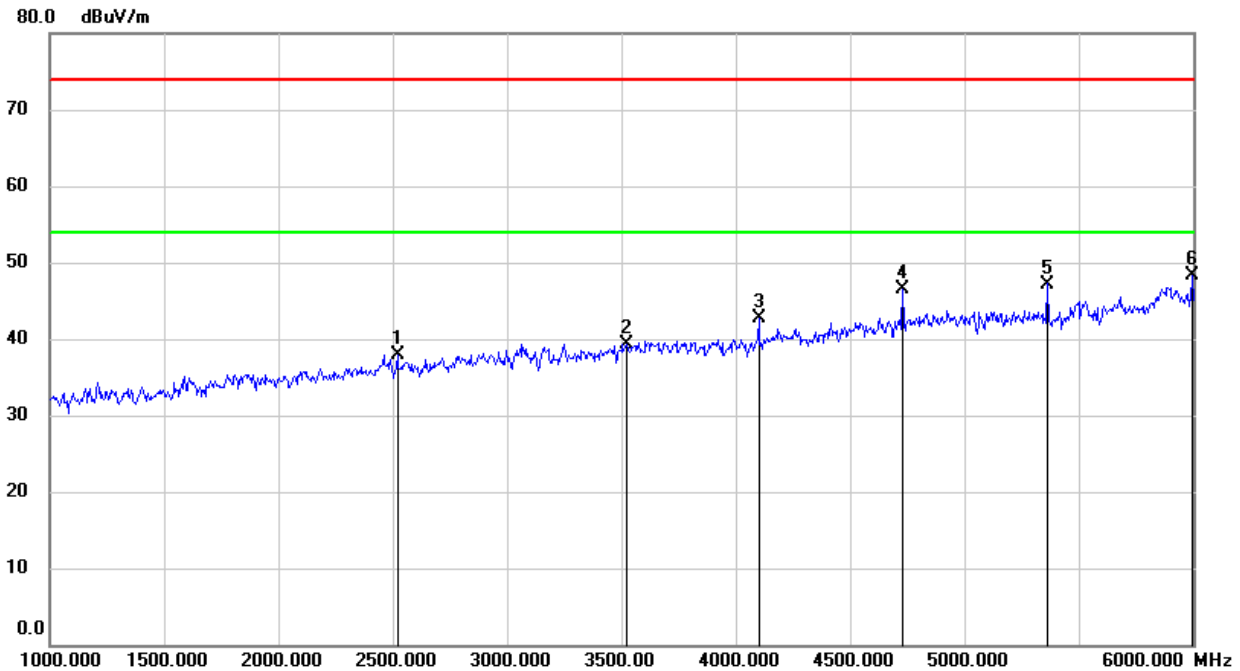
3. Average Result = Peak Result + Duty Correction Factor.

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

**ASK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2490.000	45.75	-8.16	37.59	74.00	-36.41	peak
2	4090.000	49.12	-3.95	45.17	74.00	-28.83	peak
3	4720.000	47.36	-0.74	46.62	74.00	-27.38	peak
4	5350.000	48.19	1.19	49.38	74.00	-24.62	peak
5	5665.000	46.26	1.99	48.25	74.00	-25.75	peak
6	5980.000	47.96	2.95	50.91	74.00	-23.09	peak

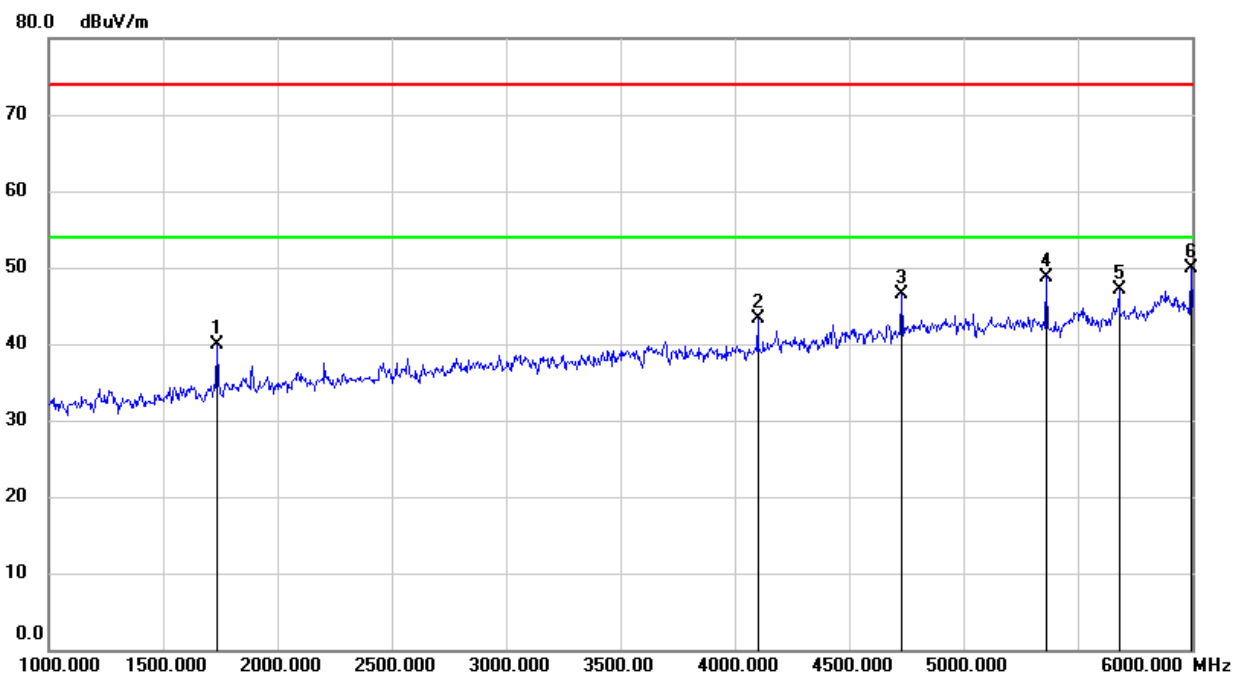
Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

**ASK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2520.000	46.04	-8.17	37.87	74.00	-36.13	peak
2	3525.000	44.71	-5.33	39.38	74.00	-34.62	peak
3	4100.000	46.67	-3.93	42.74	74.00	-31.26	peak
4	4730.000	47.12	-0.69	46.43	74.00	-27.57	peak
5	5360.000	46.03	1.17	47.20	74.00	-26.80	peak
6	5995.000	45.69	2.68	48.37	74.00	-25.63	peak

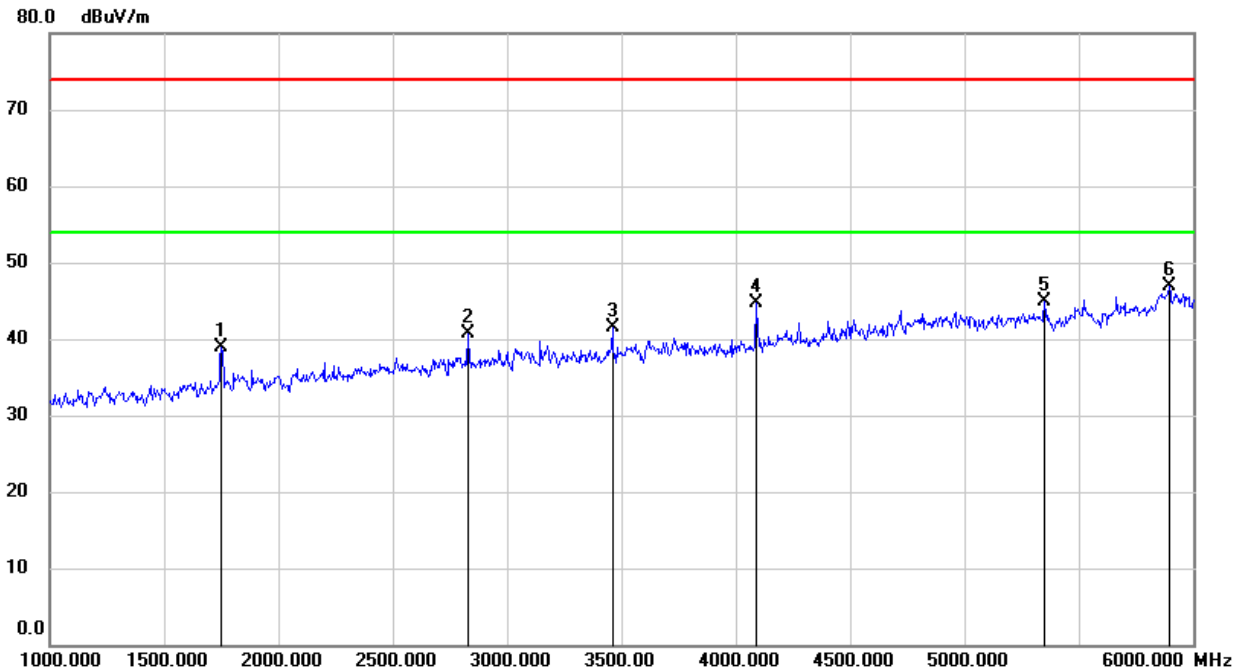
- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

ASK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1735.000	51.36	-11.42	39.94	74.00	-34.06	peak
2	4100.000	47.28	-3.93	43.35	74.00	-30.65	peak
3	4730.000	47.20	-0.69	46.51	74.00	-27.49	peak
4	5360.000	47.63	1.17	48.80	74.00	-25.20	peak
5	5680.000	45.14	1.99	47.13	74.00	-26.87	peak
6	5995.000	47.23	2.68	49.91	74.00	-24.09	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

**FSK 315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

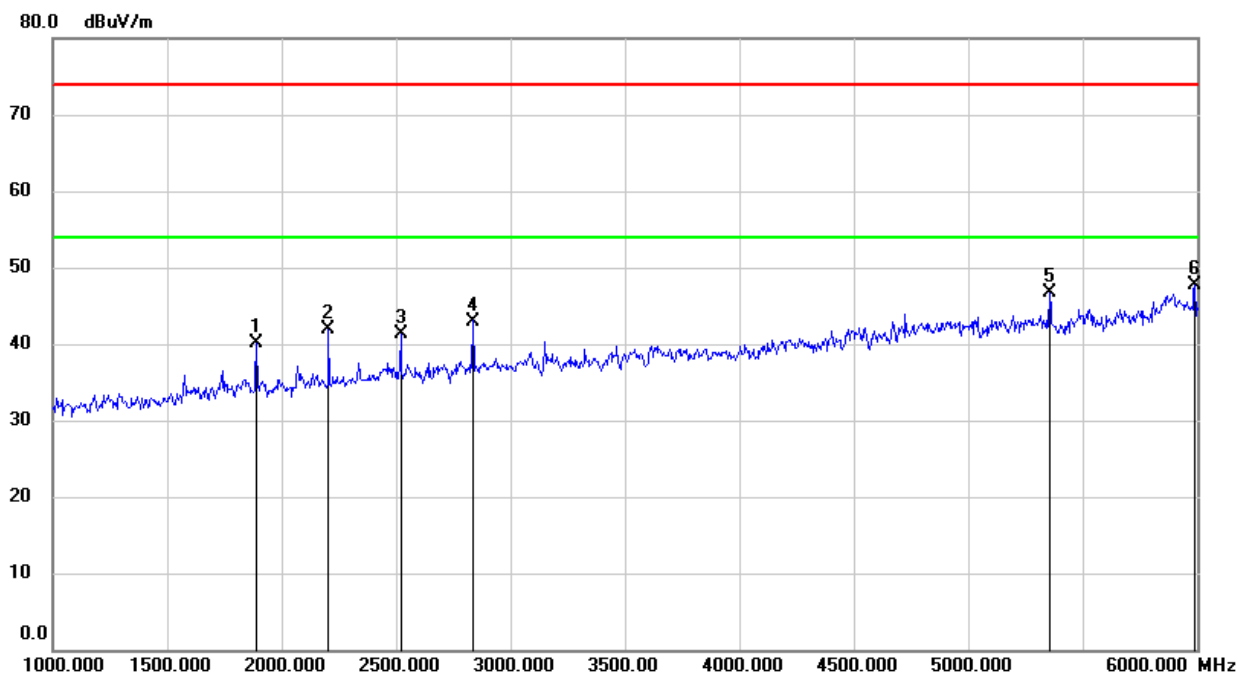
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1750.000	50.20	-11.26	38.94	74.00	-35.06	peak
2	2830.000	47.78	-7.07	40.71	74.00	-33.29	peak
3	3460.000	47.15	-5.59	41.56	74.00	-32.44	peak
4	4090.000	48.65	-3.95	44.70	74.00	-29.30	peak
5	5350.000	43.70	1.19	44.89	74.00	-29.11	peak
6	5895.000	42.76	4.22	46.98	74.00	-27.02	peak

Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

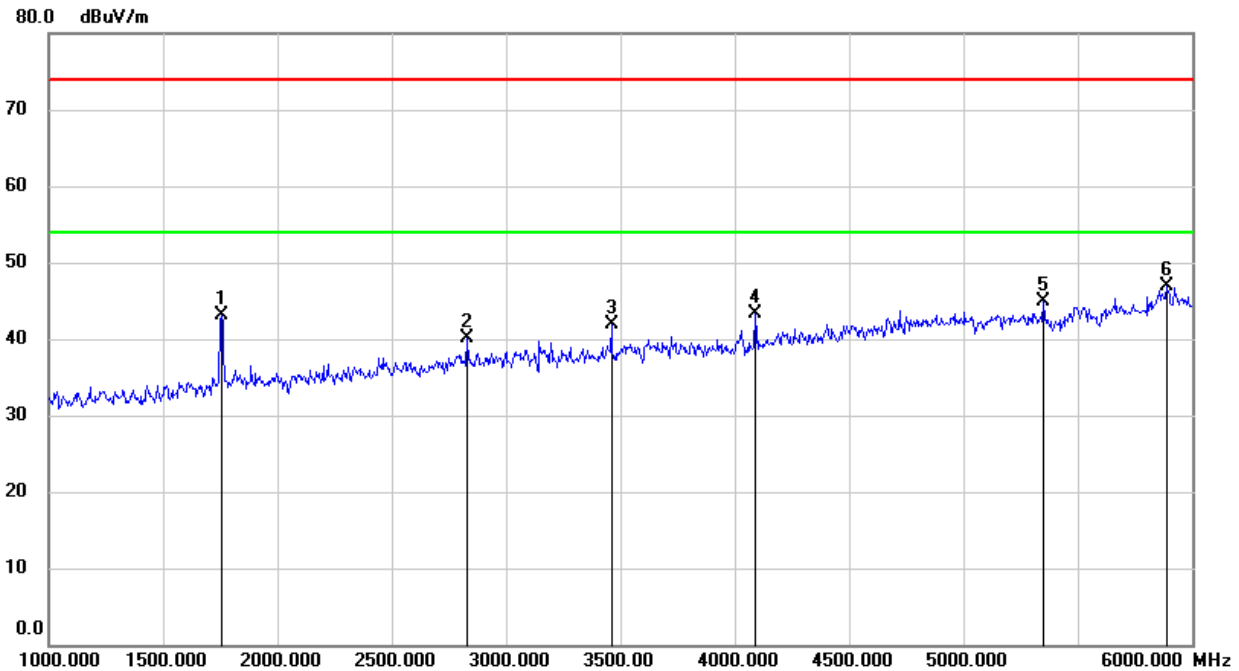
3. Average Result = Peak Result + Duty Correction Factor.

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

**FSK 315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1890.000	50.77	-10.65	40.12	74.00	-33.88	peak
2	2205.000	51.65	-9.66	41.99	74.00	-32.01	peak
3	2520.000	49.42	-8.17	41.25	74.00	-32.75	peak
4	2835.000	50.04	-7.04	43.00	74.00	-31.00	peak
5	5355.000	45.57	1.19	46.76	74.00	-27.24	peak
6	5990.000	45.01	2.77	47.78	74.00	-26.22	peak

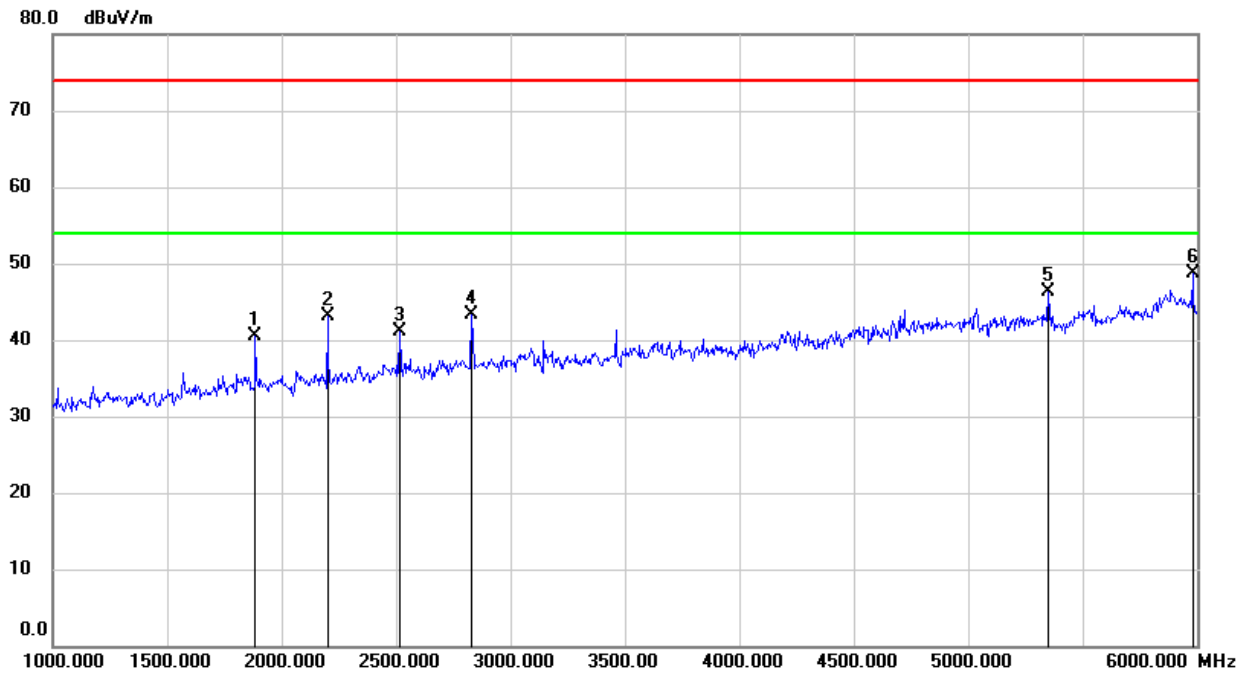
- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

**FSK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1755.000	54.29	-11.21	43.08	74.00	-30.92	peak
2	2830.000	47.26	-7.07	40.19	74.00	-33.81	peak
3	3460.000	47.53	-5.59	41.94	74.00	-32.06	peak
4	4090.000	47.18	-3.95	43.23	74.00	-30.77	peak
5	5350.000	43.68	1.19	44.87	74.00	-29.13	peak
6	5890.000	42.72	4.15	46.87	74.00	-27.13	peak

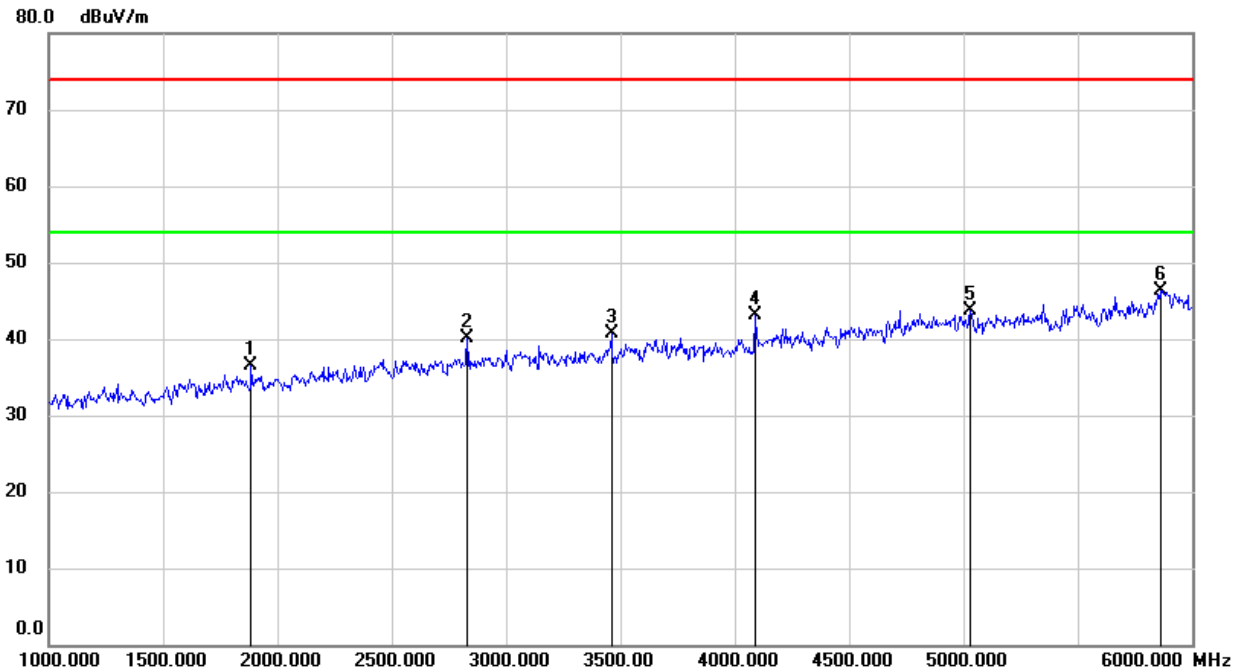
- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

FSK 314.682MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1885.000	51.24	-10.66	40.58	74.00	-33.42	peak
2	2200.000	52.86	-9.67	43.19	74.00	-30.81	peak
3	2515.000	49.19	-8.15	41.04	74.00	-32.96	peak
4	2830.000	50.32	-7.07	43.25	74.00	-30.75	peak
5	5350.000	45.17	1.19	46.36	74.00	-27.64	peak
6	5980.000	45.83	2.95	48.78	74.00	-25.22	peak

- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

**FSK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)**

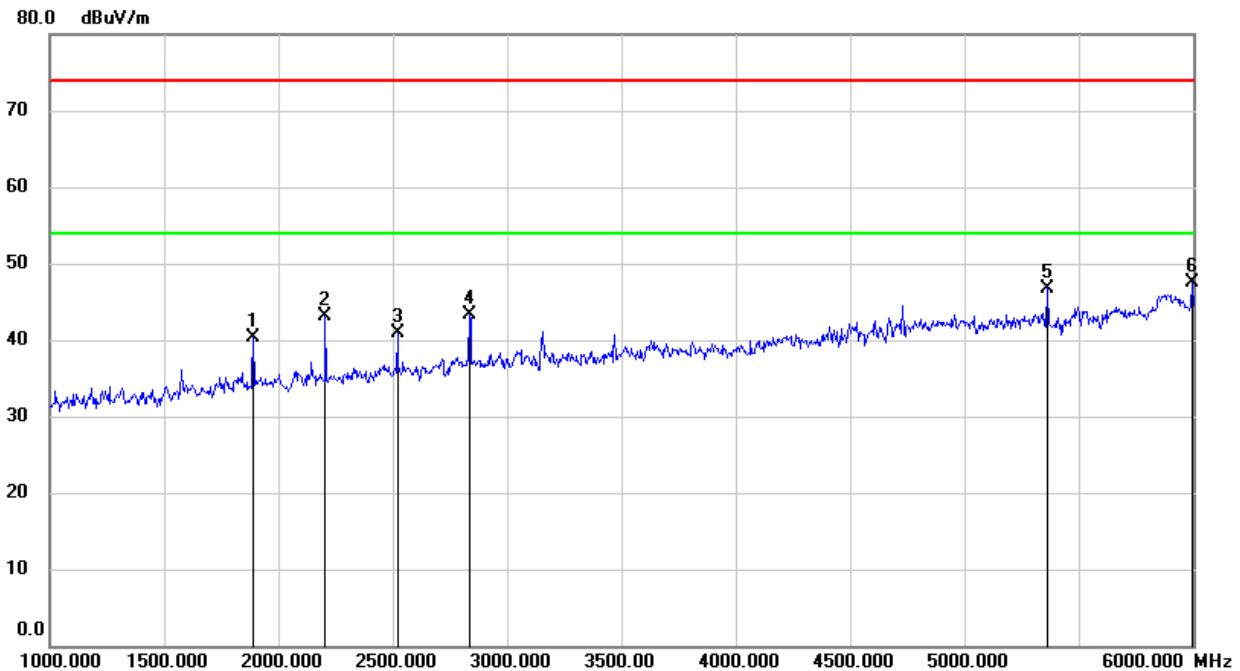
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1885.000	47.12	-10.66	36.46	74.00	-37.54	peak
2	2830.000	47.17	-7.07	40.10	74.00	-33.90	peak
3	3460.000	46.27	-5.59	40.68	74.00	-33.32	peak
4	4090.000	46.97	-3.95	43.02	74.00	-30.98	peak
5	5030.000	42.97	0.73	43.70	74.00	-30.30	peak
6	5860.000	42.77	3.60	46.37	74.00	-27.63	peak

Note: 1. Result Level = Read Level + Correct Factor.

2. Peak: Peak detector.

3. Average Result = Peak Result + Duty Correction Factor.

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

**FSK 315.315MHz HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1890.000	50.89	-10.65	40.24	74.00	-33.76	peak
2	2205.000	52.79	-9.66	43.13	74.00	-30.87	peak
3	2520.000	49.02	-8.17	40.85	74.00	-33.15	peak
4	2835.000	50.27	-7.04	43.23	74.00	-30.77	peak
5	5360.000	45.63	1.17	46.80	74.00	-27.20	peak
6	5995.000	44.92	2.68	47.60	74.00	-26.40	peak

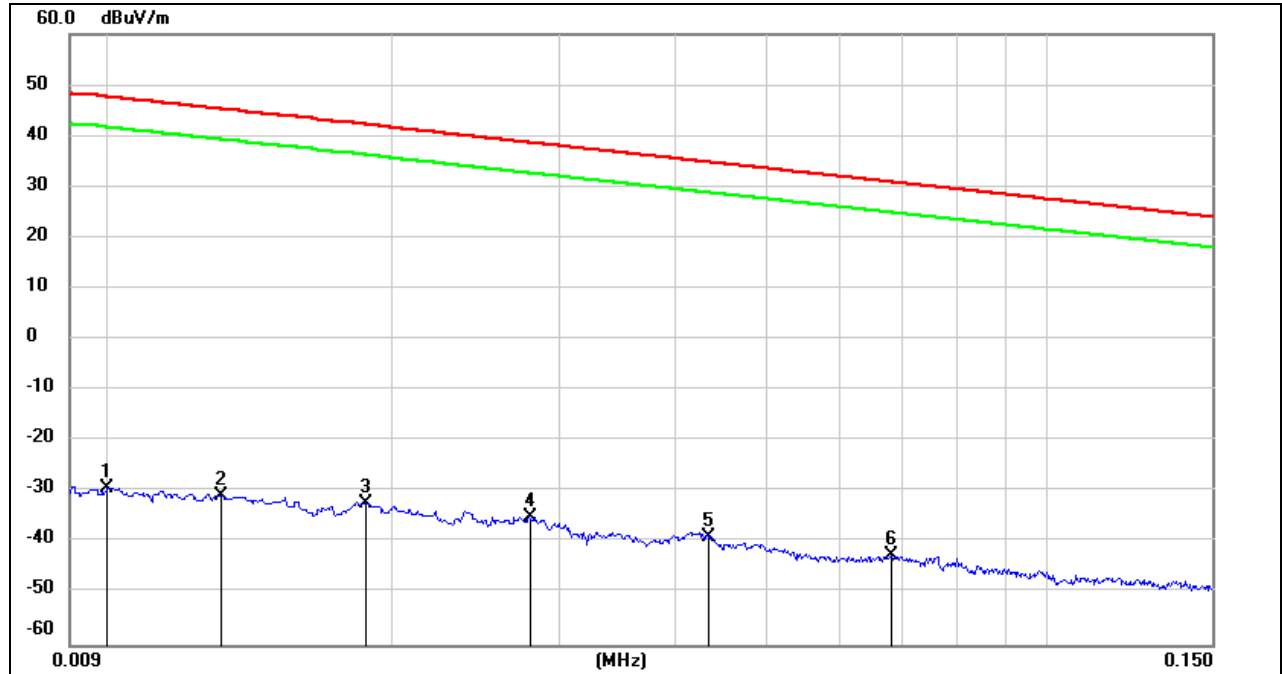
- Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

Note: All the modes and buttons had been tested, only the worst data record in the report.

6.4.3. SPURIOUS EMISSIONS BELOW 30MHz

ASK 315MHz SPURIOUS EMISSIONS (LOOP ANTENNA FACE ON TO THE EUT)

0.09kHz~ 150kHz



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	0.0100	72.22	-101.40	-29.18	47.60	-80.68	-3.90	-76.78	peak
2	0.0131	70.75	-101.38	-30.63	45.25	-82.13	-6.25	-75.88	peak
3	0.0187	69.20	-101.35	-32.15	42.16	-83.65	-9.34	-74.31	peak
4	0.0280	66.29	-101.38	-35.09	38.66	-86.59	-12.84	-73.75	peak
5	0.0434	62.61	-101.45	-38.84	34.85	-90.34	-16.65	-73.69	peak
6	0.0680	59.04	-101.56	-42.52	30.95	-94.02	-20.55	-73.47	peak

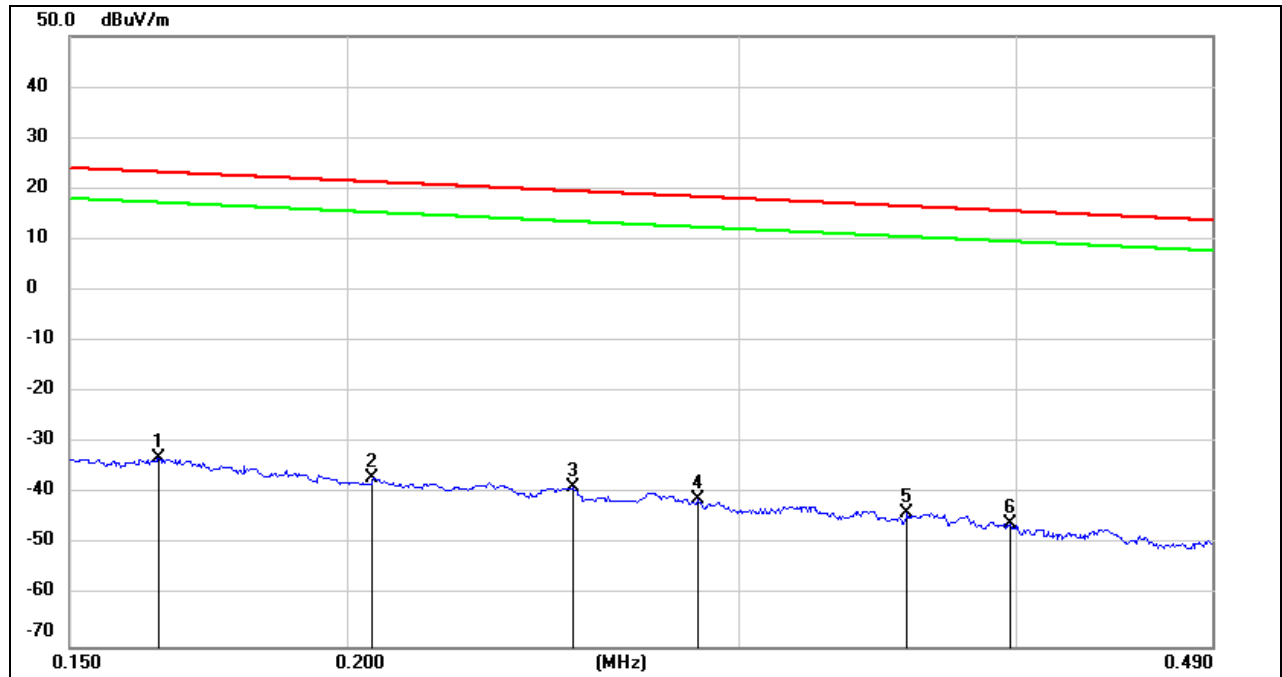
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV 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. $\text{dBuA/m} = \text{dBuV/m} - 20\log_{10}(120\pi) = \text{dBuV/m} - 51.5$.

150kHz ~ 490kHz



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	0.1645	68.75	-101.66	-32.91	23.28	-84.41	-28.22	-56.19	peak
2	0.2053	64.79	-101.73	-36.94	21.35	-88.44	-30.15	-58.29	peak
3	0.2530	63.09	-101.80	-38.71	19.54	-90.21	-31.96	-58.25	peak
4	0.2877	60.84	-101.85	-41.01	18.42	-92.51	-33.08	-59.43	peak
5	0.3573	58.08	-101.91	-43.83	16.54	-95.33	-34.96	-60.37	peak
6	0.3975	56.00	-101.96	-45.96	15.61	-97.46	-35.89	-61.57	peak

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

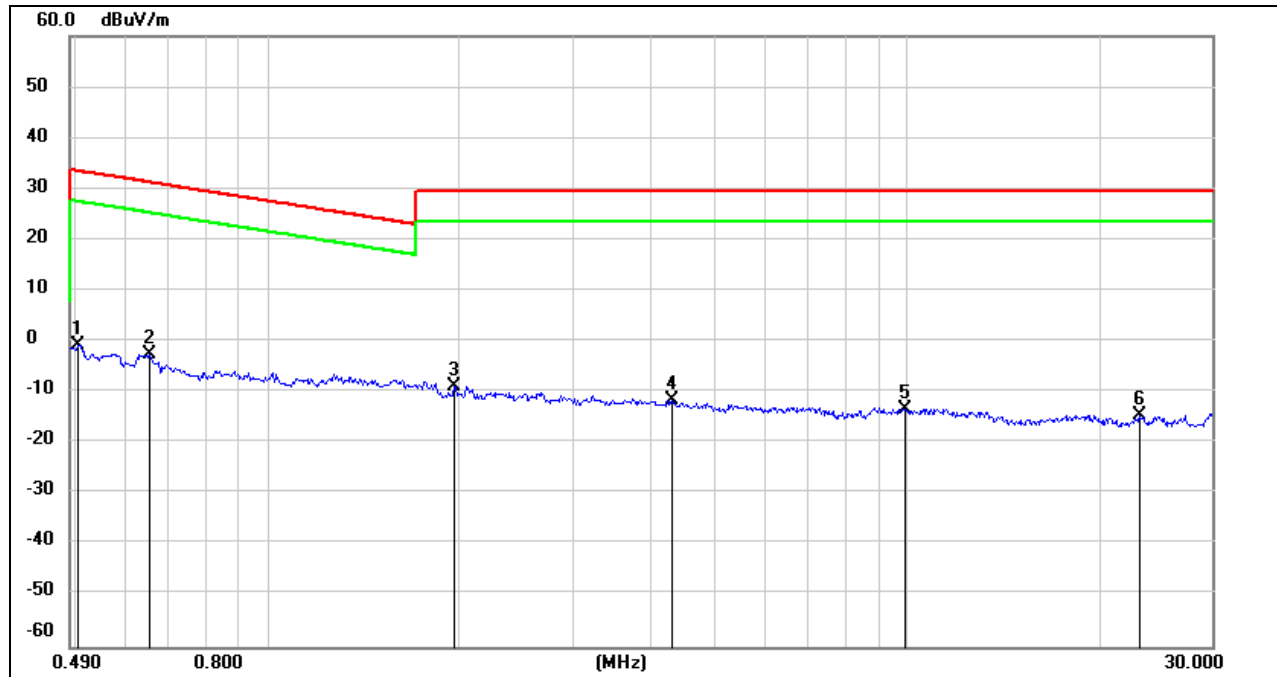
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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. $\text{dBuA/m} = \text{dBuV/m} - 20\log_{10}(120\pi) = \text{dBuV/m} - 51.5$.

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

490kHz ~ 30MHz



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	0.5039	61.44	-62.07	-0.63	33.56	-52.13	-17.94	-34.19	peak
2	0.6532	59.48	-62.10	-2.62	31.30	-54.12	-20.2	-33.92	peak
3	1.9516	53.11	-61.84	-8.73	29.54	-60.23	-21.96	-38.27	peak
4	4.2968	49.77	-61.38	-11.61	29.54	-63.11	-21.96	-41.15	peak
5	9.9329	47.49	-60.81	-13.32	29.54	-64.82	-21.96	-42.86	peak
6	23.1233	46.08	-60.59	-14.51	29.54	-66.01	-21.96	-44.05	peak

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

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV 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. $\text{dBuA/m} = \text{dBuV/m} - 20\log_{10}(120\pi) = \text{dBuV/m} - 51.5$.

Note: All the modes and buttons had been tested, only the worst data record in the report.



7. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

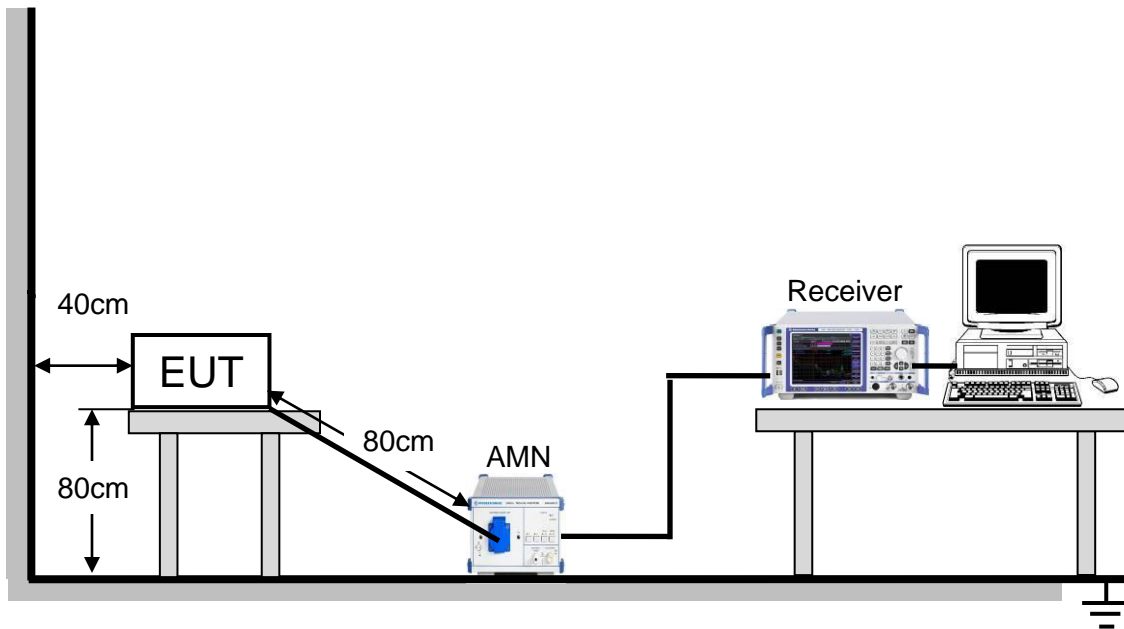
Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

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

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

TEST SETUP AND PROCEDURE



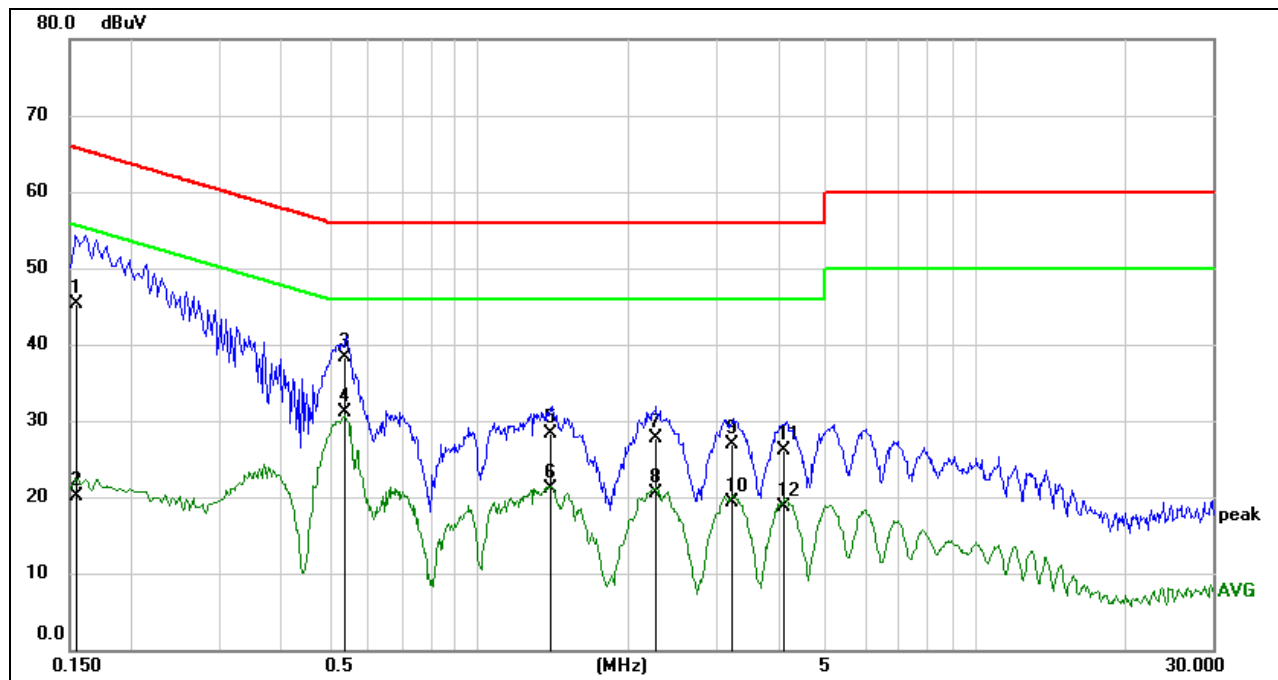
The following table is the setting of the receiver:

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was placed on the top of a rotating table 0.8 meters above the horizontal ground plane and being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
3. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
4. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
5. LISN at least 80 cm from nearest part of EUT chassis.
6. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.
7. 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	24°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

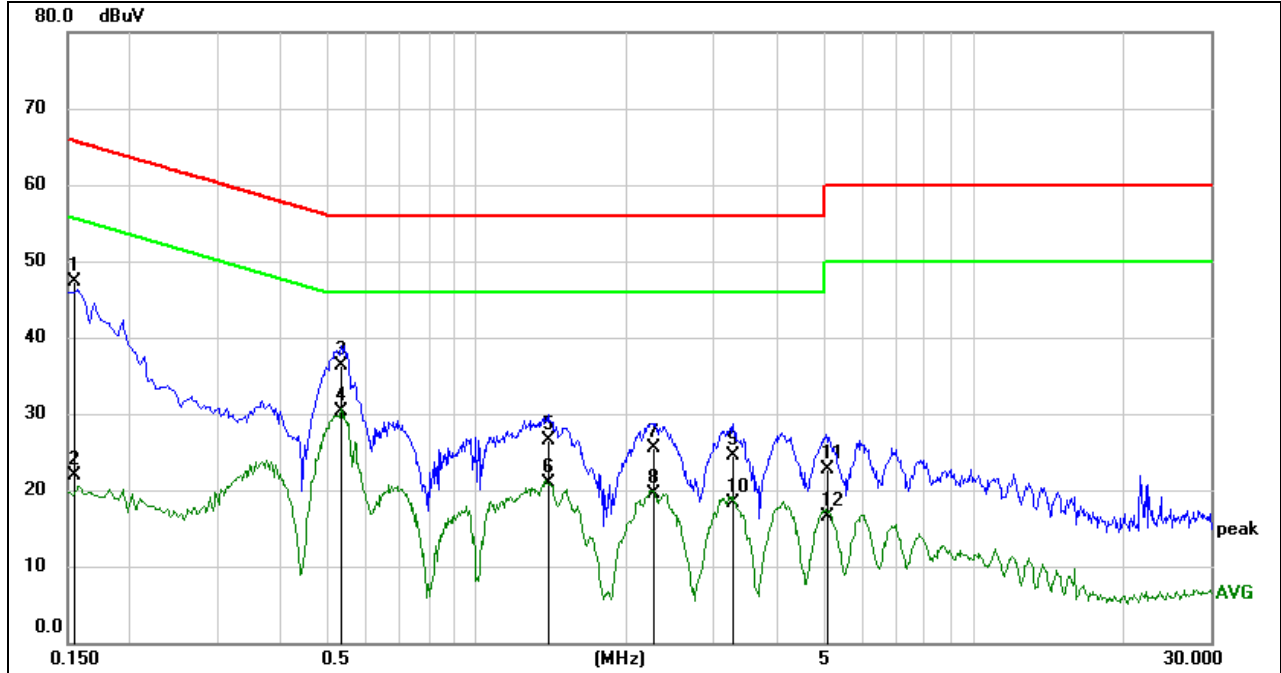
LINE N RESULTS

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1547	35.63	9.60	45.23	65.74	-20.51	QP
2	0.1547	10.60	9.60	20.20	55.74	-35.54	AVG
3	0.5360	28.65	9.60	38.25	56.00	-17.75	QP
4	0.5360	21.44	9.60	31.04	46.00	-14.96	AVG
5	1.3955	18.78	9.61	28.39	56.00	-27.61	QP
6	1.3955	11.54	9.61	21.15	46.00	-24.85	AVG
7	2.2691	18.10	9.63	27.73	56.00	-28.27	QP
8	2.2691	10.95	9.63	20.58	46.00	-25.42	AVG
9	3.2408	17.18	9.65	26.83	56.00	-29.17	QP
10	3.2408	9.71	9.65	19.36	46.00	-26.64	AVG
11	4.1385	16.37	9.66	26.03	56.00	-29.97	QP
12	4.1385	9.00	9.66	18.66	46.00	-27.34	AVG

Note: 1. Result = Reading +Correct Factor.

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

LINE L RESULTS



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1543	37.79	9.61	47.40	65.77	-18.37	QP
2	0.1543	12.24	9.61	21.85	55.77	-33.92	AVG
3	0.5349	26.72	9.60	36.32	56.00	-19.68	QP
4	0.5349	20.79	9.60	30.39	46.00	-15.61	AVG
5	1.3869	16.90	9.61	26.51	56.00	-29.49	QP
6	1.3869	11.23	9.61	20.84	46.00	-25.16	AVG
7	2.2610	15.82	9.63	25.45	56.00	-30.55	QP
8	2.2610	9.86	9.63	19.49	46.00	-26.51	AVG
9	3.2678	14.76	9.65	24.41	56.00	-31.59	QP
10	3.2678	8.61	9.65	18.26	46.00	-27.74	AVG
11	5.0663	13.03	9.67	22.70	60.00	-37.30	QP
12	5.0663	6.90	9.67	16.57	50.00	-33.43	AVG

Note: 1. Result = Reading +Correct Factor.

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

Note: All the modes and buttons had been tested, only the worst data record in the report.



8. 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

END OF REPORT