



## FCC 47 CFR PART 15 SUBPART C

### CERTIFICATION TEST REPORT

*For*

**Vivint Door and Window Sensor (Long Range)**

**MODEL NUMBER: DW03**

**FCC ID: 2AAAS-DW03**

**REPORT NUMBER: 4791771880-1-RF-1**

**ISSUE DATE: May 16, 2025**

*Prepared for*

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*Prepared by*

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	May 16, 2025	Initial Issue	

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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Vivint, Inc.  
Address: 3401 N. Ashton Blvd. Lehi Utah 84043 United States

### Manufacturer Information

Company Name: Vivint, Inc.  
Address: 3401 N. Ashton Blvd. Lehi Utah 84043 United States

### EUT Information

EUT Name: Vivint Door and Window Sensor (Long Range)  
Model: DW03  
Sample Received Date: April 30, 2025  
Sample Status: Normal  
Sample ID: 8431413  
Date of Tested: May 6, 2025~ May 16, 2025

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS

Prepared By:



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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b> 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><b>ISED (Company No.: 21320)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p>
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Note 1:

All tests measurement facilities use to collect the measurement data are located at Room 101, Building 2, No.4, Information Road, Songshan Lake, Dongguan, Guangdong, 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)

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	Vivint Door and Window Sensor (Long Range)
Model	DW03
Battery	DC 3 V*2
Protocol	ZWAVE
Transmit Frequency Range	902 MHz ~ 928 MHz
Modulation	GFSK

Note: There are two batteries in the EUT and they are connected in parallel. So the normal test Voltage is DC 3V.

### 5.2. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	908.4	2	908.42	3	916

### 5.3. MAXIMUM EMISSIONS FIELD STRENGTH

Operation Frequency (MHz)	Number of Transmit Chains (NTX)	Max. Emissions Field Strength (dB $\mu$ V/m)
902-928	1	92.72

### 5.4. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 908.4~916MHz				
Test Software		sscom5.12.1		
Modulation Type	Test Channel	Test Channel		
		908.4MHz	908.42MHz	916MHz
GFSK	1	18	18	18

## 5.5. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	45 ~ 65%	
Atmospheric Pressure:	101kPa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	DC 3 V
	VH	N/A

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature

## 5.6. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel Number	Test Channel
GFSK	CH 1/Low	908.4MHz
	CH 2/Mid	908.42MHz
	CH 3/High	916MHz

## 5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	902 - 928	Metal Antenna	1.44

Test Mode	Transmit and Receive Mode	Description
GFSK	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

Note: 1. The value of the antenna gain was declared by customer.

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	PC	Lenovo	E42-80	/
2	Dongle	/	/	/

### I/O CABLES

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

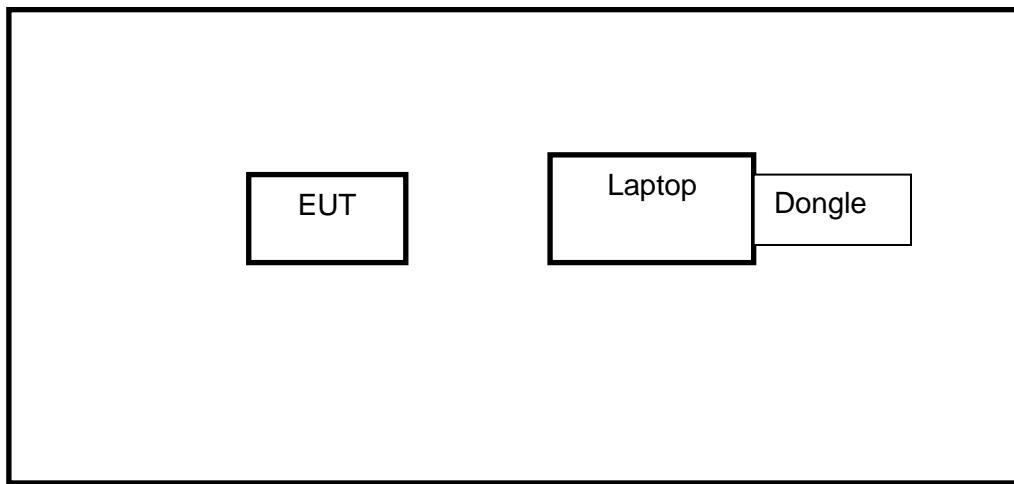
### ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
/	/		/	/

### TEST SETUP

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

### SETUP DIAGRAM FOR TESTS



## 5.9. MEASURING INSTRUMENT AND SOFTWARE USED

Radiated Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Sep.28, 2024	Sep.27, 2025
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	June 28, 2024	June.27 2027
Preamplifier	HP	8447D	2944A09099	Sep.28, 2024	Sep.27, 2025
EMI Measurement Receiver	R&S	ESR26	101377	Sep.28, 2024	Sep.27, 2025
Horn Antenna	TDK	HRN-0118	130940	Dec.10, 2024	Dec.11, 2027
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Sep.28, 2024	Sep.27, 2025
Horn Antenna	Schwarzbeck	BBHA9170	697	Jun 30, 2024	Jun 29, 2027
Preamplifier	TDK	PA-02-2	TRS-307-00003	Sep.28, 2024	Sep.27, 2025
Loop antenna	Schwarzbeck	1519B	00008	Dec.09, 2024	Dec.08, 2027
Software					
Description		Manufacturer		Name	Version
Test Software for Radiated Emissions		Farad		EZ-EMC	Ver. UL-3A1

Other instruments					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Keysight	N9030A	MY55410512	Sep.28, 2024	Sep.27, 2025
Signal Analyzer	R&S	FSV40	101118	Sep.28, 2024	Sep.27, 2025
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.8, 2024	Oct.7, 2025
Attenuator	Agilent	8495B	2814a12853	Sep.28, 2024	Sep.27, 2025

## 6. SUMMARY OF TEST RESULTS

Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	20dB Bandwidth	FCC Part 15.215(c)	Pass
2	TX Spurious Emission	FCC 15.249 (a)(d)(e) FCC 15.209 FCC 15.205	Pass
3	Antenna Requirement	FCC Part 15.203	Pass

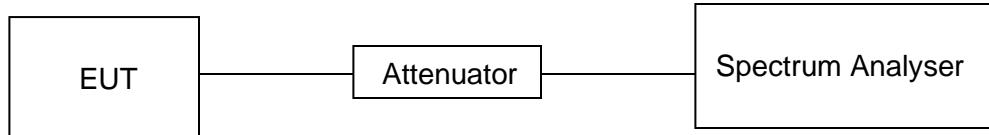
## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	24.1 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3 V

RESULTS

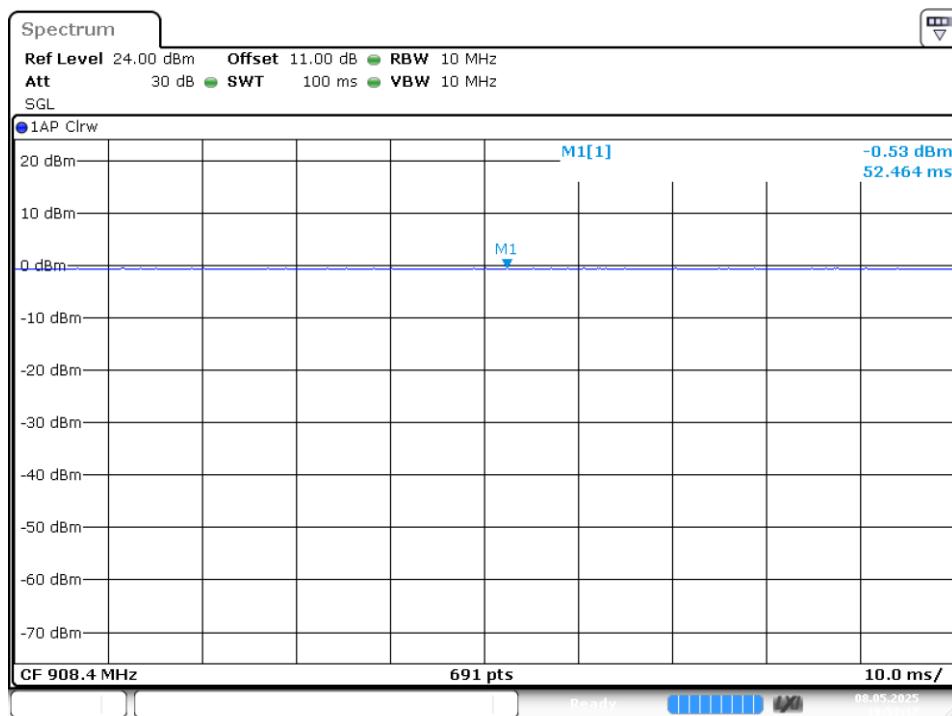
Test Channel	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	minimum VBW 1/T (KHz)
Low	100	100	1.00	100%	0	0.01

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

Where: x is Duty Cycle (Linear)

Where: T is On Time (transmit duration)

Duty cycle > 98%, so, VBW=10Hz has been used to test.

ON TIME AND DUTY CYCLE MID


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## 7.2. 20 dB BANDWIDTH

### LIMITS

FCC Part15 (15.249)			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.215(c)	20dB Bandwidth	for reporting purposes only	902-928 MHz

### TEST PROCEDURE

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

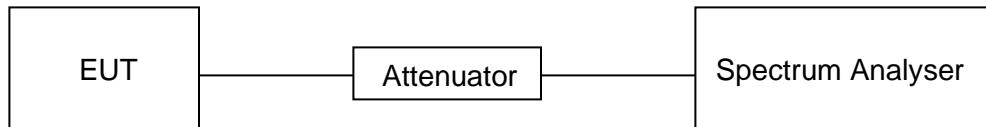
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	$\geq 3 \times \text{RBW}$
Span	Approximately 2 to 3 times the 20dB bandwidth
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

### TEST ENVIRONMENT

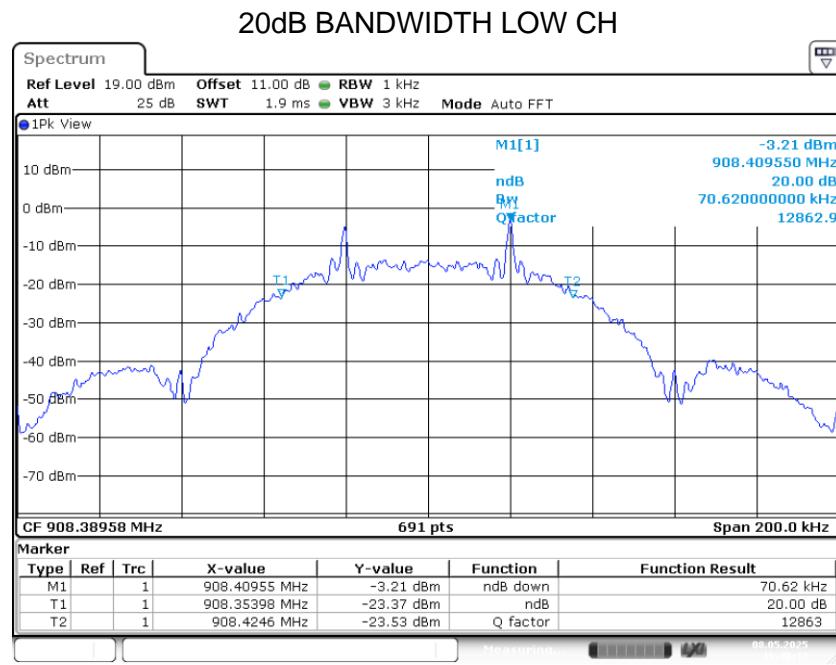
Temperature	24.1 °C	Relative Humidity	52 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3 V

### TEST SETUP

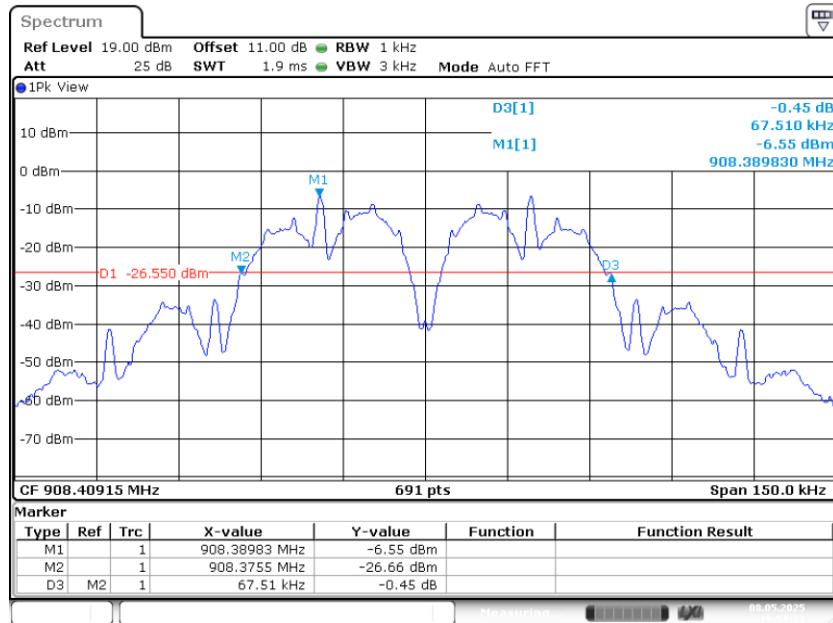


**RESULTS**

Channel	20dB bandwidth (KHz)	Result
Low	70.62	Pass
Mid	67.51	Pass
High	122	Pass

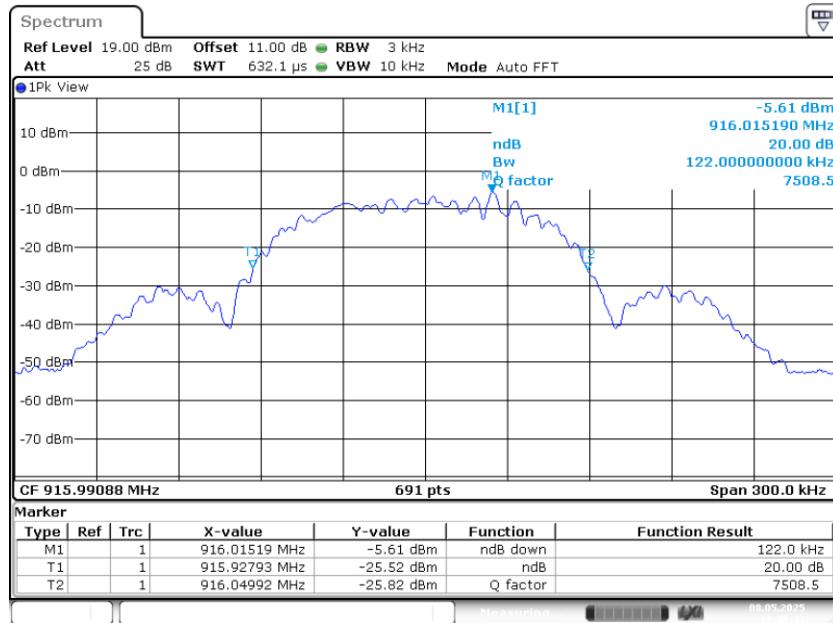


## 20dB BANDWIDTH MID CH



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## 20dB BANDWIDTH HIGH CH



Date: 8 MAY 2025 19:46:44

## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to FCC §15.249 (a)(d)(e)

The field strength of emissions from intentional radiators operated within these frequency bands			
Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3
2400 – 2483.5	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3
5725 – 5875	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3

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

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

Note:

(1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

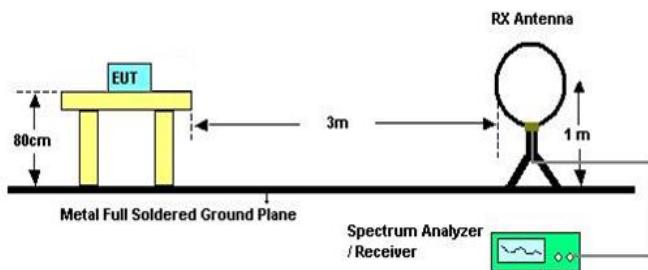
Radiation Disturbance Test Limit for FCC (Above 1GHz)

Frequency (MHz)	dB (uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

About Restricted bands of operation please refer to RSS-Gen section 8.10 and FCC §15.205 (a)

## **TEST SETUP AND PROCEDURE**

Below 30 MHz

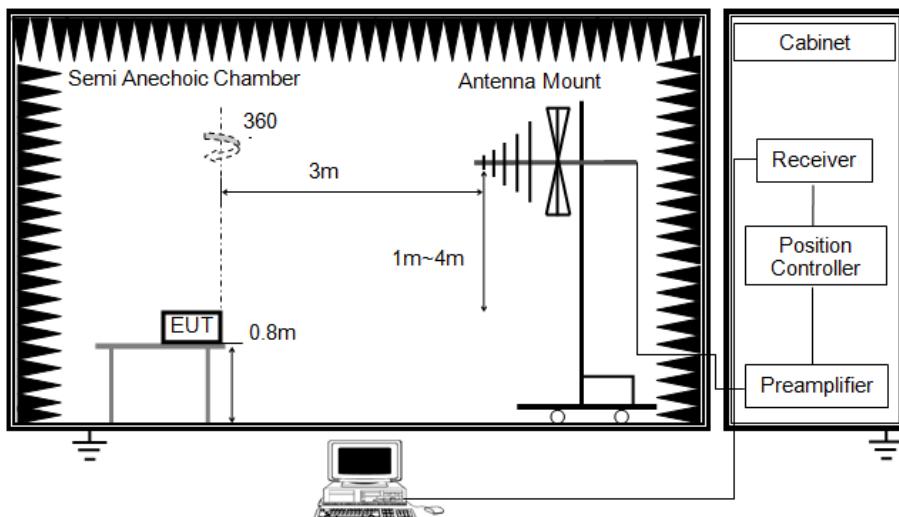


The setting of the spectrum analyser

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  $377\Omega$ . For example, the measurement frequency  $X$  KHz resulted in a level of  $Y$  dB $\mu$ V/m, which is equivalent to  $Y-51.5 = Z$  dB $\mu$ A/m, which has the same margin,  $W$  dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

BELOW 1G



The setting of the spectrum analyser. (For Bandedge and Field strength)

RBW	$\geq$ OBW (125 kHz)
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

The setting of the spectrum analyser. (For Spurious emissions)

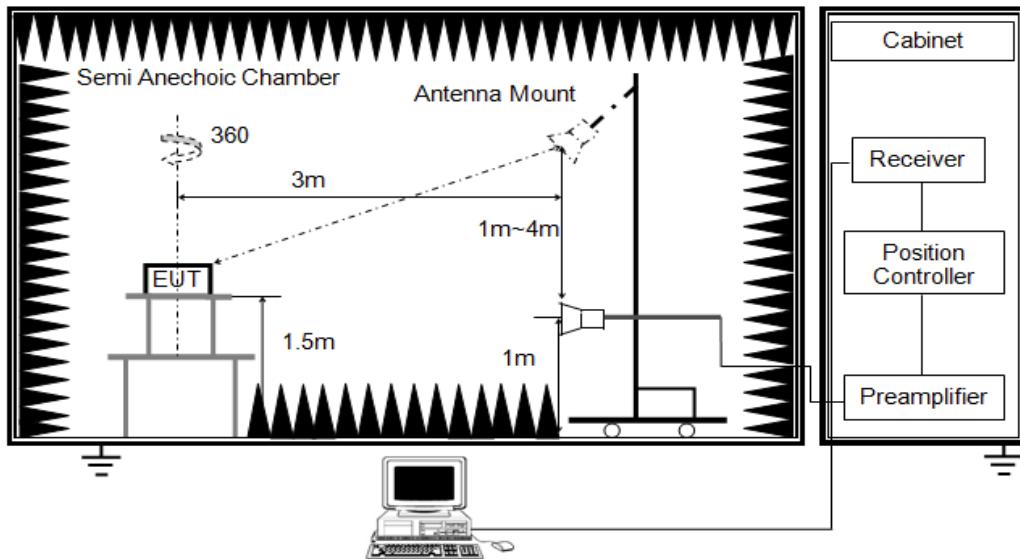
RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

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 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Measurement = Reading Level + Correct Factor
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

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

## ABOVE 1G

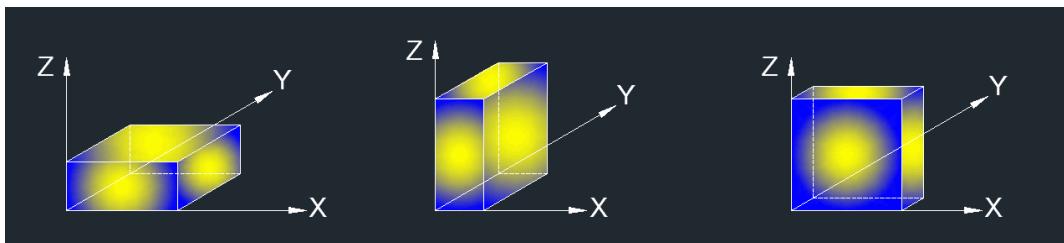


## The setting of the spectrum analyser

RBW	1M MHz
VBW	PEAK: 3MHz 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 1.5m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For average power measurement, set the detector to AVG, while maintaining all of the other instrument settings, if the duty cycle of the EUT is less than 98%, the Duty Cycle Correction Factor shall be added to the measured emission levels. For the Duty Cycle and Correction Factor please refer to clause 7.1.ON TIME AND DUTY CYCLE.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

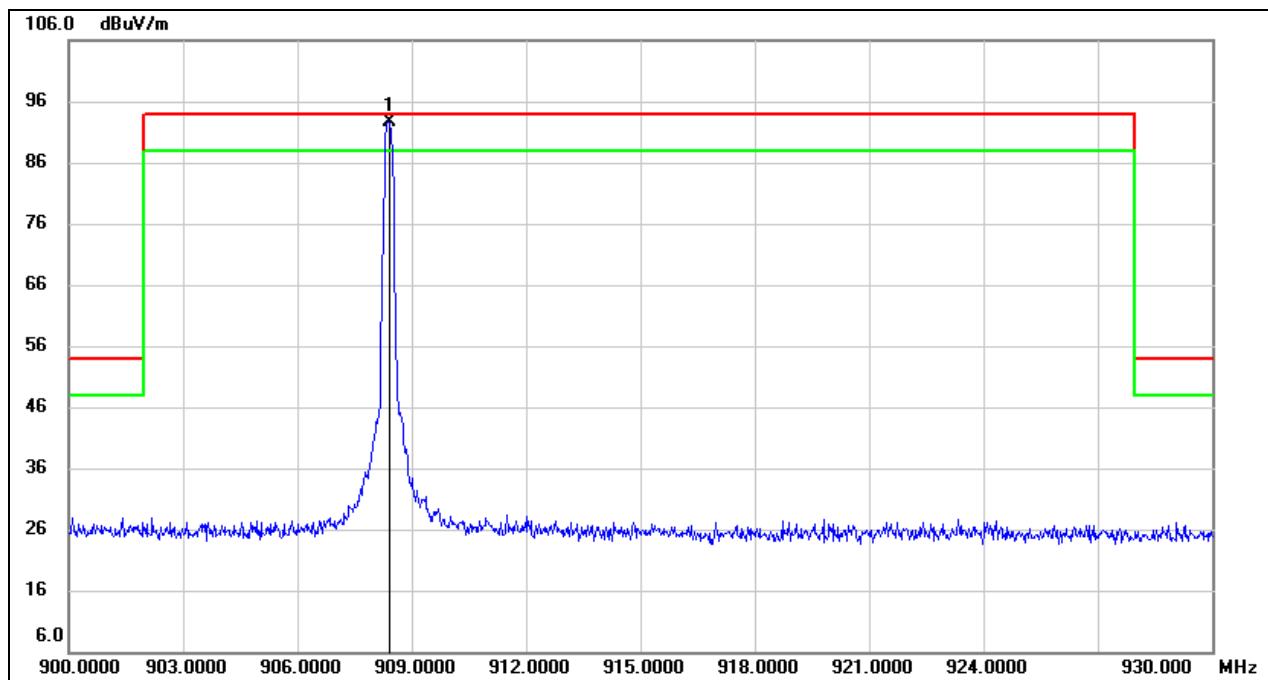
#### **TEST ENVIRONMENT**

Temperature	23.8 °C	Relative Humidity	65 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3 V

#### **RESULTS**

## 8.2. FIELD STRENGTH OF INTENTIONAL EMISSIONS

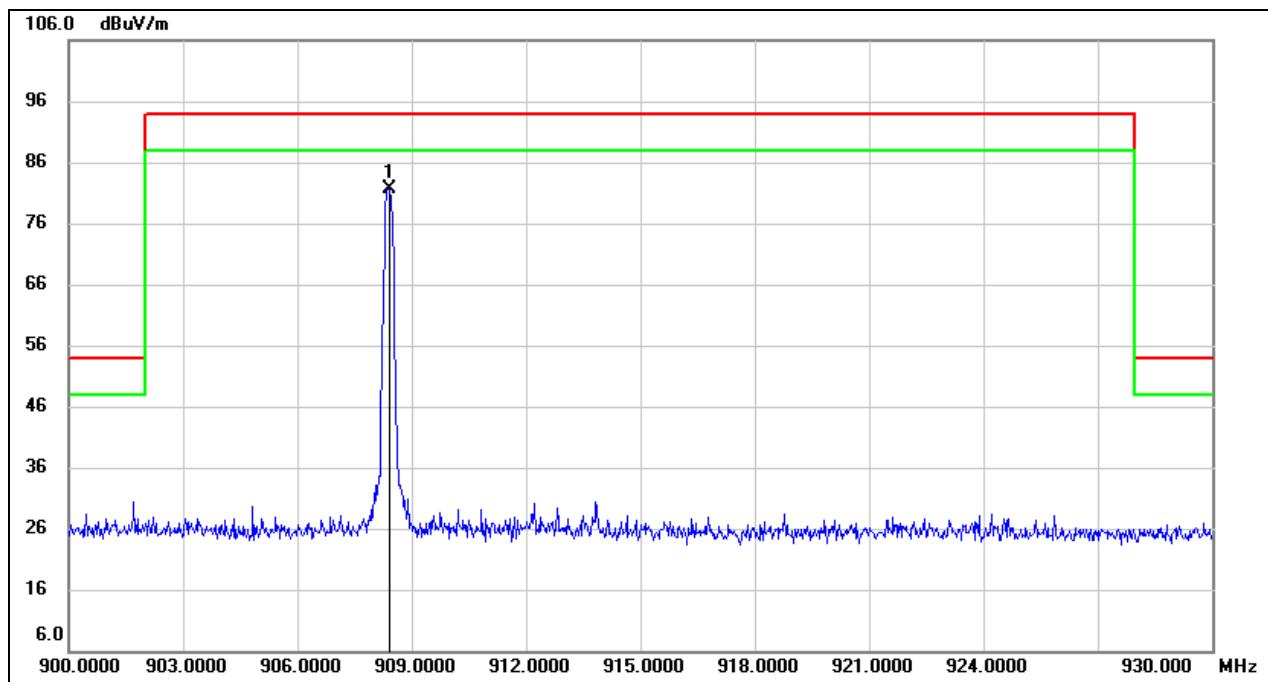
### FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	908.4000	93.12	-0.51	92.61	94.00	-1.39	peak

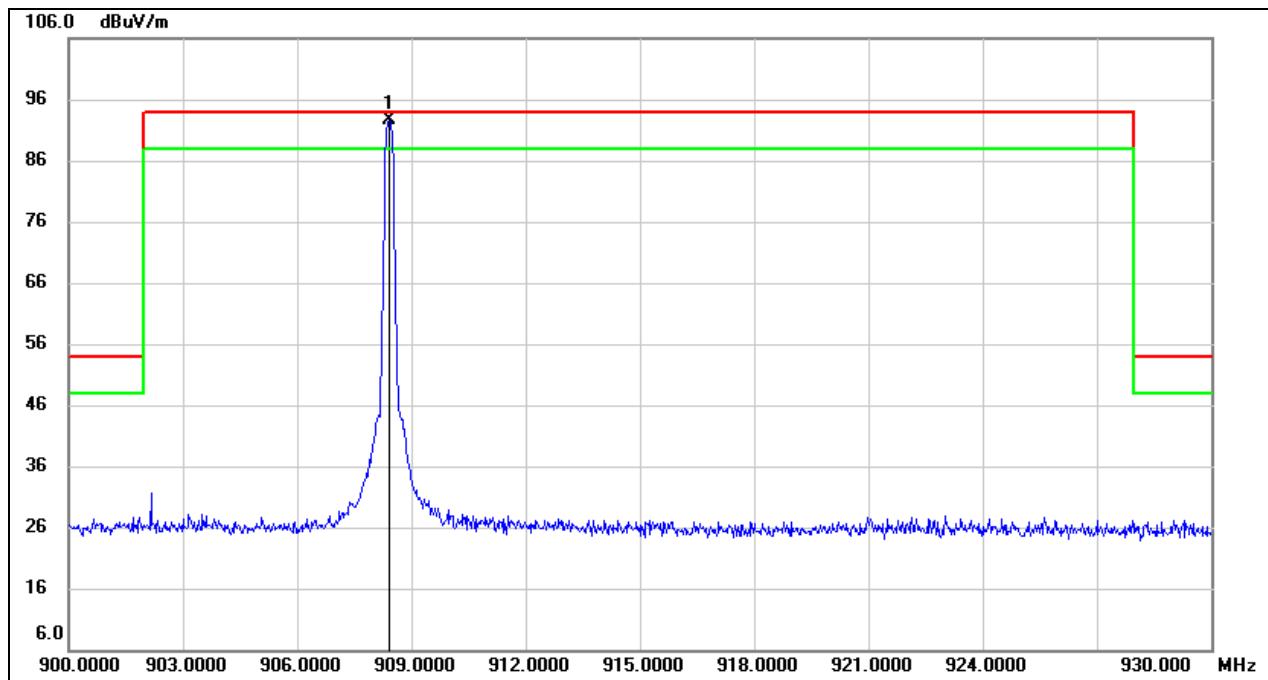
Note: 1. Measurement = Reading Level + Correct Factor.

2. Peak detector.

FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL, VERTICAL)


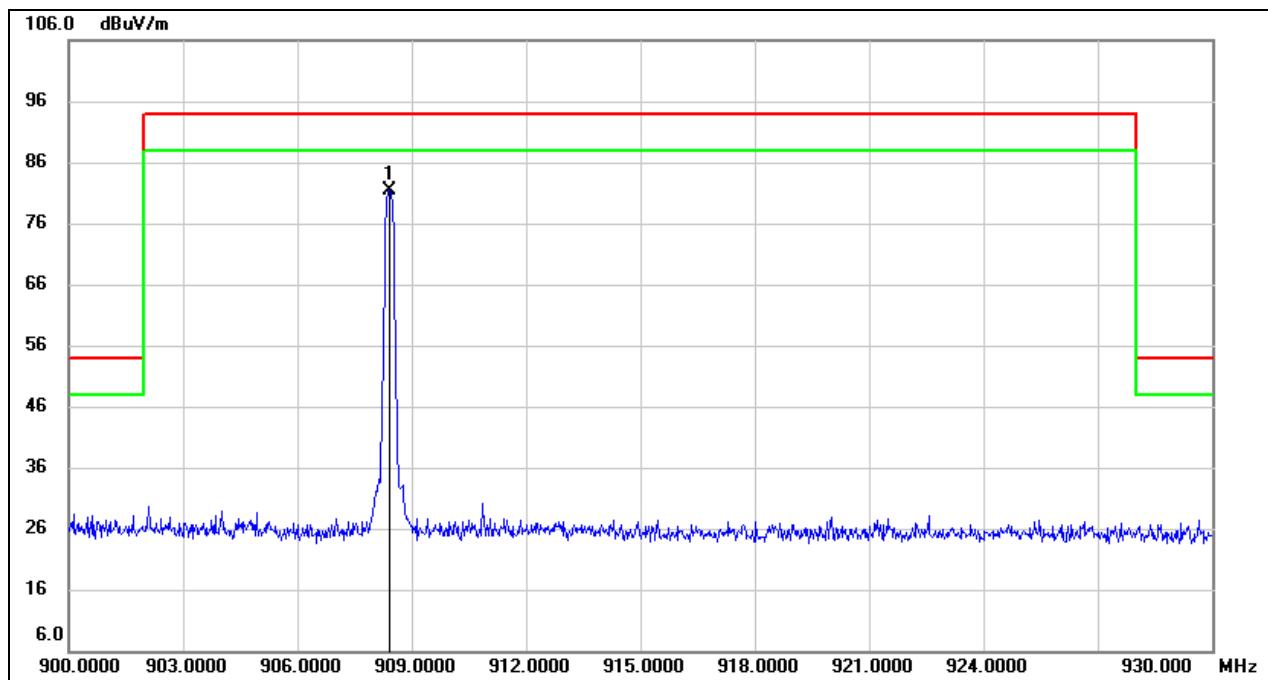
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	908.4000	82.04	-0.51	81.53	94.00	-12.47	peak

Note: 1. Measurement = Reading Level + Correct Factor.  
 2. Peak detector.

FIELD STRENGTH OF INTENTIONAL EMISSIONS (MID CHANNEL, HORIZONTAL)


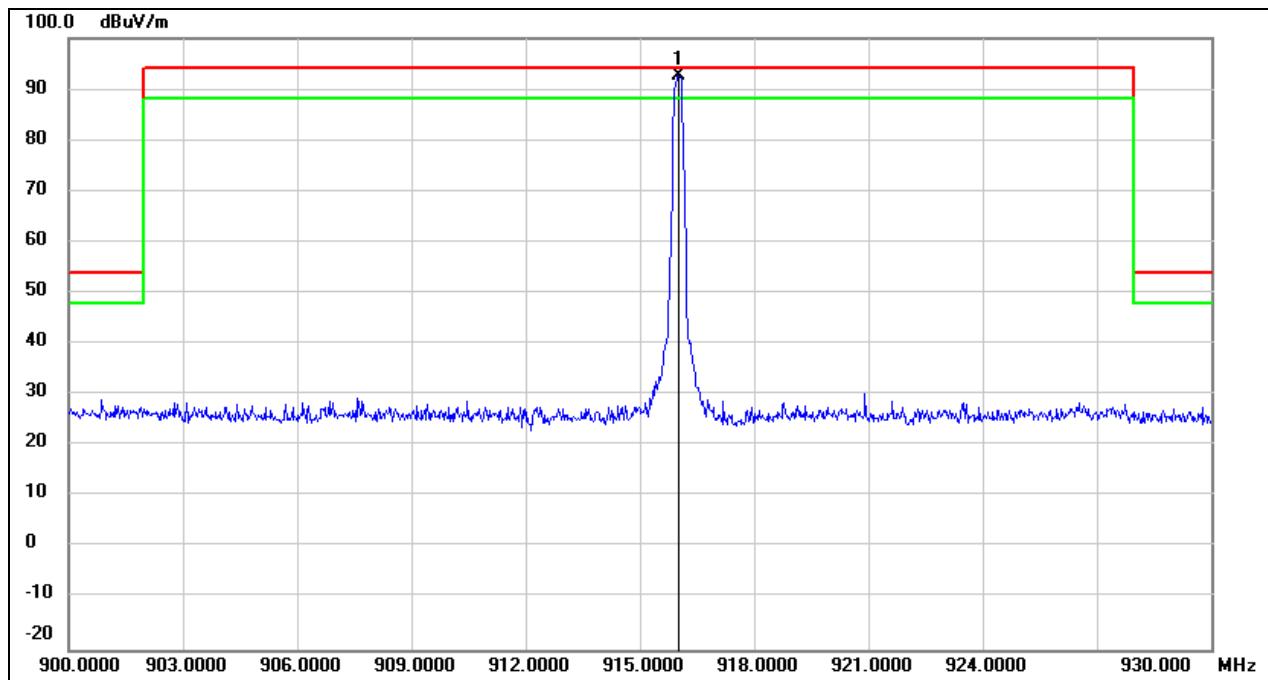
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	908.4300	93.07	-0.51	92.56	94.00	-1.44	peak

Note: 1. Measurement = Reading Level + Correct Factor.  
 2. Peak detector.

FIELD STRENGTH OF INTENTIONAL EMISSIONS (MID CHANNEL, VERTICAL)


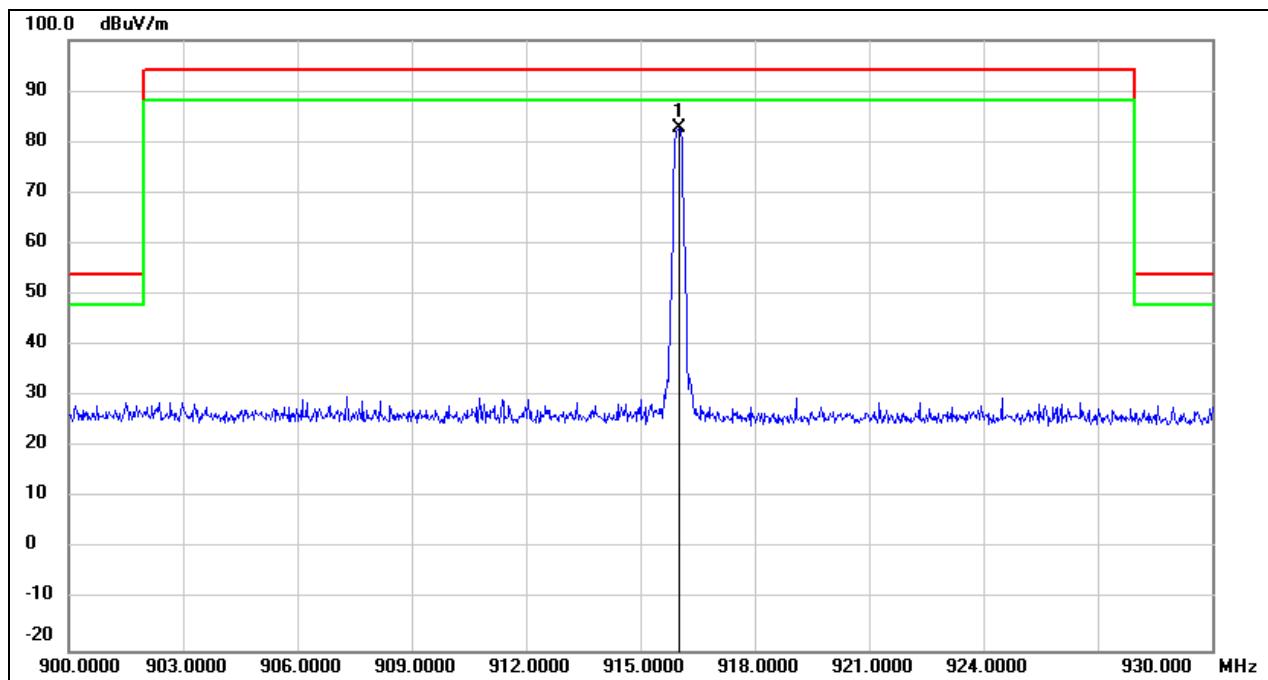
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	908.4000	81.99	-0.51	81.48	94.00	-12.52	peak

Note: 1. Measurement = Reading Level + Correct Factor.  
 2. Peak detector.

**FIELD STRENGTH OF INTENTIONAL EMISSIONS (HIGH CHANNEL, HORIZONTAL)**


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	916.0200	93.29	-0.57	92.72	94.00	-1.28	peak

Note: 1. Measurement = Reading Level + Correct Factor.  
 2. Peak detector.

**FIELD STRENGTH OF INTENTIONAL EMISSIONS (HIGH CHANNEL, VERTICAL)**


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	916.0200	83.19	-0.57	82.62	94.00	-11.38	peak

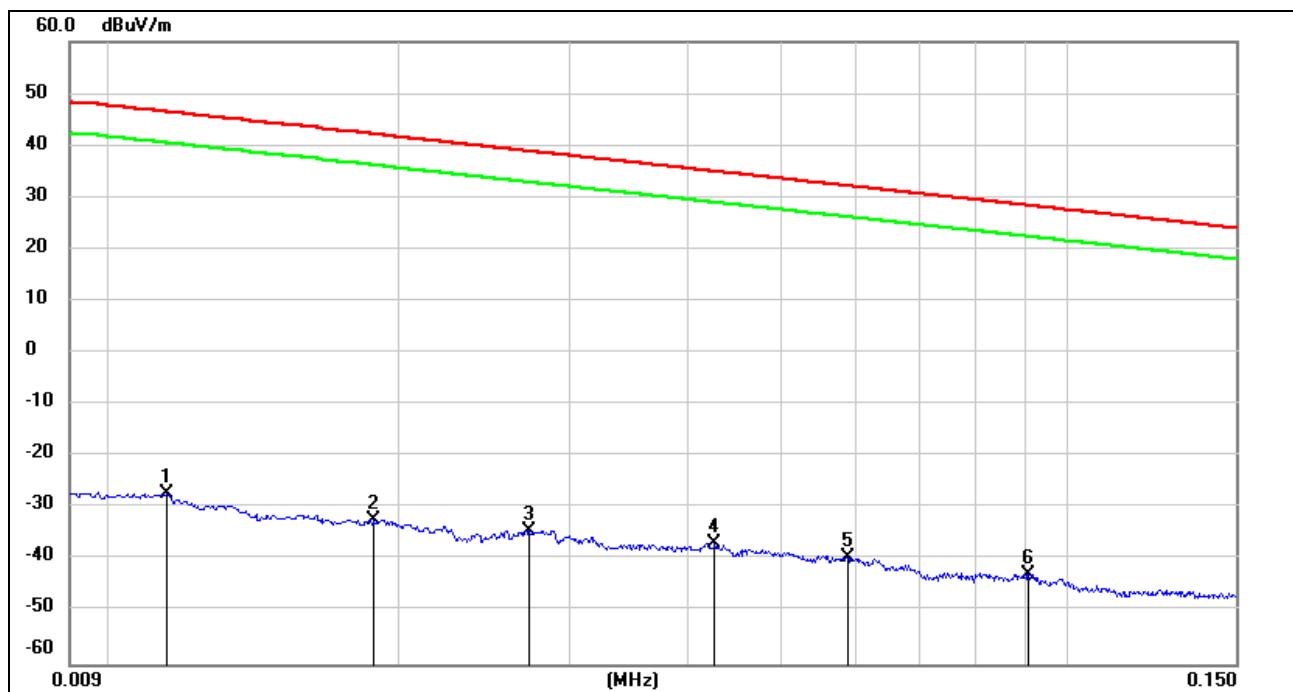
Note: 1. Measurement = Reading Level + Correct Factor.  
 2. Peak detector.

### 8.3. SPURIOUS EMISSIONS BELOW 30M

#### SPURIOUS EMISSIONS

(HIGH CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)

9kHz~ 150kHz

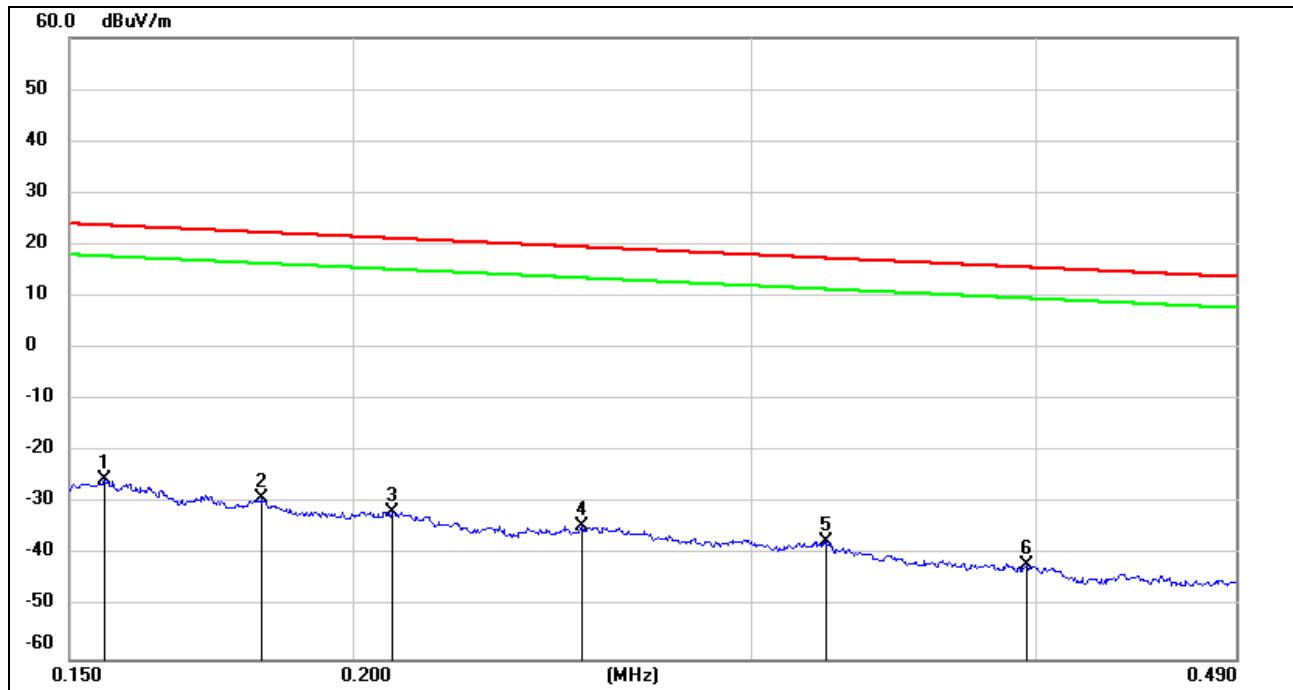


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0114	74.38	-101.40	-27.02	46.46	-73.48	peak
2	0.0188	69.14	-101.35	-32.21	42.12	-74.33	peak
3	0.0273	66.99	-101.38	-34.39	38.88	-73.27	peak
4	0.0427	64.64	-101.45	-36.81	34.99	-71.80	peak
5	0.0587	61.98	-101.52	-39.54	32.23	-71.77	peak
6	0.0911	59.11	-101.72	-42.61	28.41	-71.02	peak

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120π] = dBuV/m- 51.5).

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.

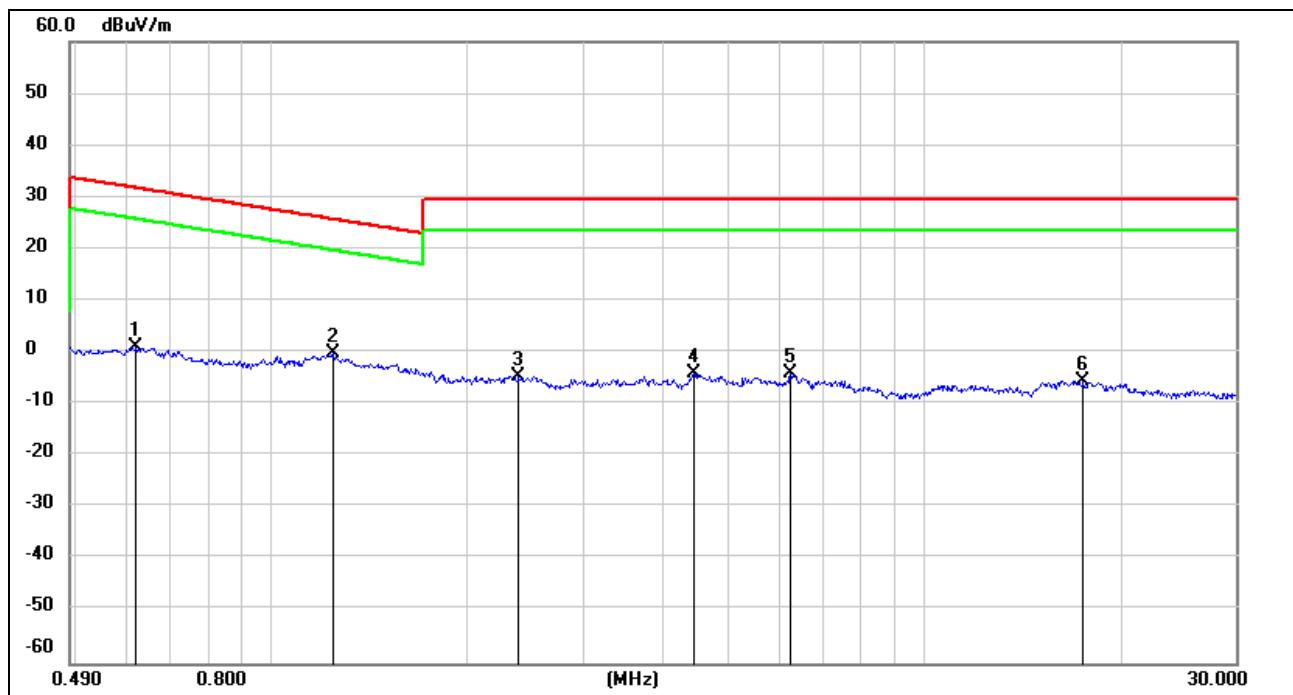
150kHz ~ 490kHz


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1554	76.27	-101.65	-25.38	23.77	-49.15	peak
2	0.1824	72.84	-101.68	-28.84	22.38	-51.22	peak
3	0.2081	70.12	-101.73	-31.61	21.23	-52.84	peak
4	0.2522	67.39	-101.80	-34.41	19.57	-53.98	peak
5	0.3234	64.48	-101.88	-37.40	17.41	-54.81	peak
6	0.3966	60.18	-101.96	-41.78	15.63	-57.41	peak

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m-  $20\log_{10}[120\pi]$  = dBuV/m- 51.5).

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.

490kHz ~ 30MHz


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.6195	63.08	-62.09	0.99	31.76	-30.77	peak
2	1.2418	62.01	-62.16	-0.15	25.72	-25.87	peak
3	2.3887	57.15	-61.72	-4.57	29.54	-34.11	peak
4	4.4443	57.29	-61.40	-4.11	29.54	-33.65	peak
5	6.2445	57.13	-61.32	-4.19	29.54	-33.73	peak
6	17.5167	55.40	-60.92	-5.52	29.54	-35.06	peak

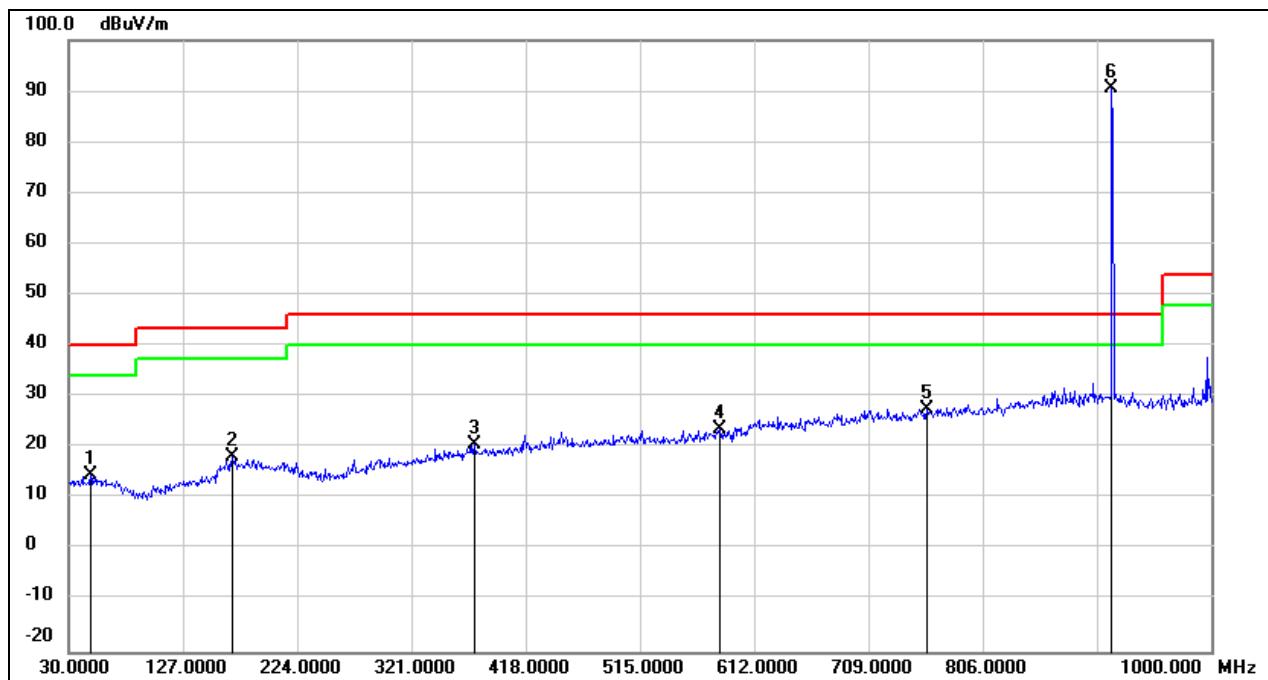
Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m-  $20\log_{10}[120\pi]$  = dBuV/m- 51.5).

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.

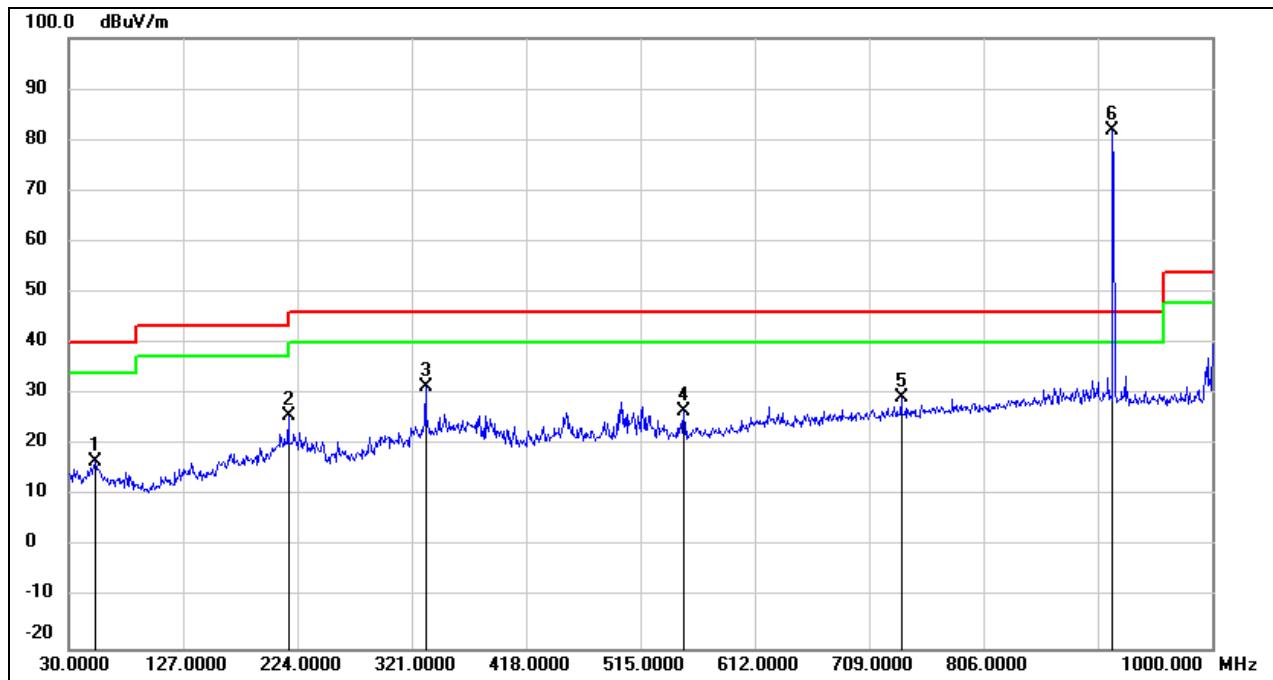
## 8.4. SPURIOUS EMISSIONS BELOW 1 GHz

### SPURIOUS EMISSIONS BELOW 1GHZ (WORST-CASE HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	48.4300	29.55	-15.04	14.51	40.00	-25.49	QP
2	168.7100	30.30	-12.18	18.12	43.50	-25.38	QP
3	374.3500	30.31	-9.56	20.75	46.00	-25.25	QP
4	582.9000	29.70	-6.18	23.52	46.00	-22.48	QP
5	758.4699	30.99	-3.38	27.61	46.00	-18.39	QP
6	916.0000	91.24	-0.56	90.68	/	/	fundamental

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.  
 4. About the Fundamental emission test result please refer to section 8.2.

SPURIOUS EMISSIONS BELOW 1GHz (WORST-CASE HIGH CHANNEL, VERTICAL)


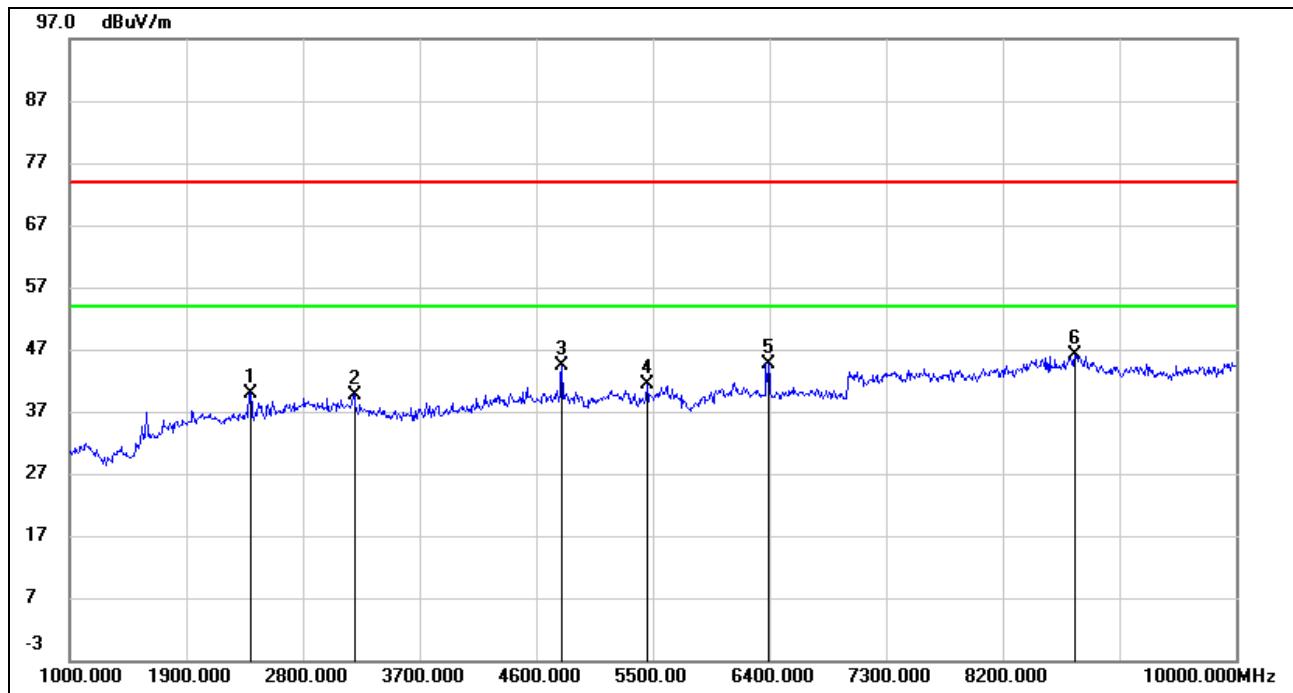
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	52.3100	31.67	-15.05	16.62	40.00	-23.38	QP
2	216.2400	38.60	-12.95	25.65	46.00	-20.35	QP
3	332.6400	41.76	-10.22	31.54	46.00	-14.46	QP
4	551.8600	33.52	-6.98	26.54	46.00	-19.46	QP
5	736.1599	33.03	-3.73	29.30	46.00	-16.70	QP
6	916.0000	82.52	-0.56	81.96	/	/	fundamental

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.  
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto  
 4. About the Fundamental emission test result please refer to section 8.2.

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

## 8.5. SPURIOUS EMISSIONS 1 ~ 10GHz

### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

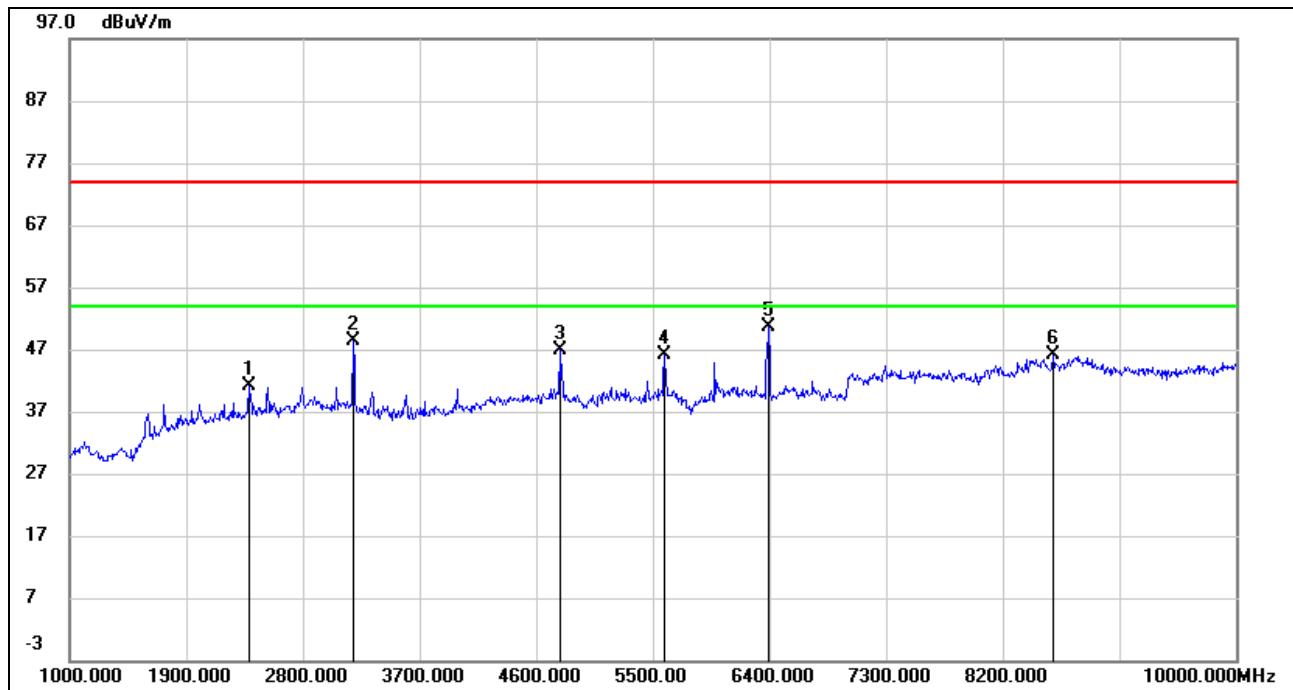


No.	Frequency	Reading	Correct	Result	Limit for Peak	Margin for Peak	Limit for AVG	Margin for AVG based on Peak result	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	
1	2395.000	58.44	-18.59	39.85	74.00	-34.15	54.00	-14.15	peak
2	3196.000	56.03	-16.33	39.70	74.00	-34.30	54.00	-14.30	peak
3	4798.000	58.70	-14.31	44.39	74.00	-29.61	54.00	-9.61	peak
4	5455.000	56.00	-14.59	41.41	74.00	-32.59	54.00	-12.59	peak
5	6391.000	58.37	-13.65	44.72	74.00	-29.28	54.00	-9.28	peak
6	8758.000	53.32	-7.26	46.06	74.00	-27.94	54.00	-7.94	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

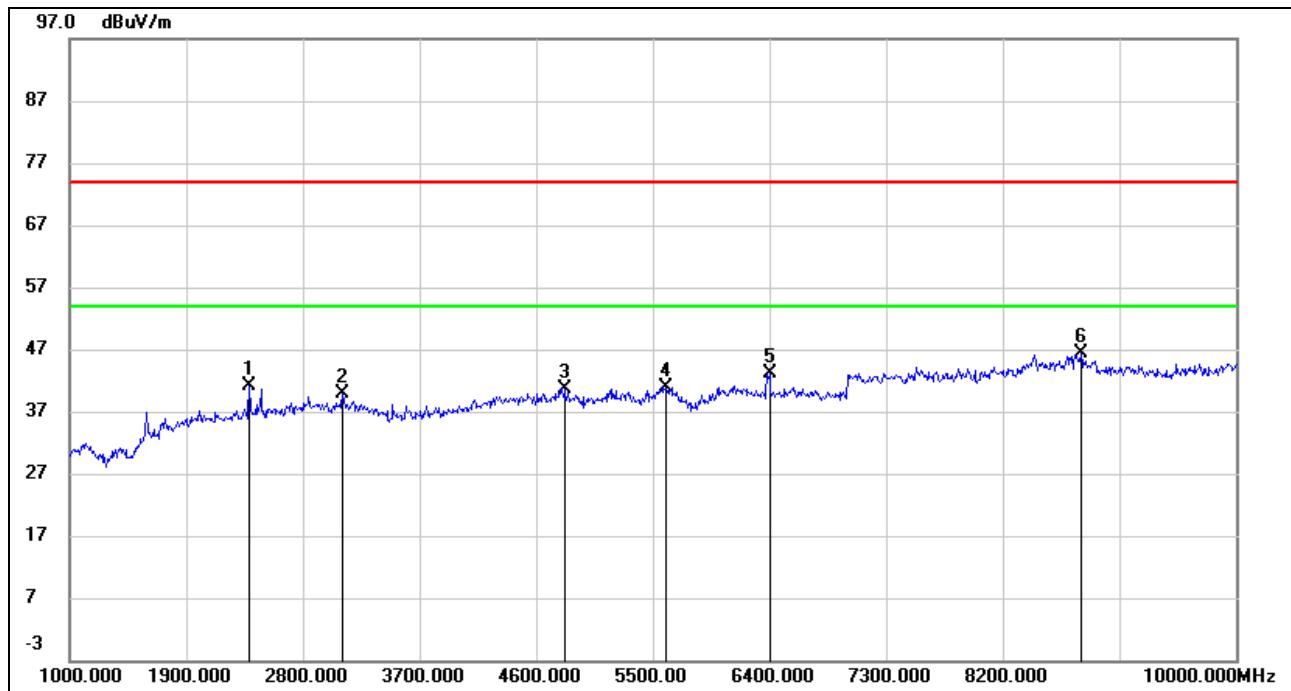
**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)**


No.	Frequency	Reading	Correct	Result	Limit for Peak	Margin for Peak	Limit for AVG	Margin for AVG based on Peak result	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	
1	2386.000	59.68	-18.61	41.07	74.00	-32.93	54.00	-12.93	peak
2	3187.000	64.67	-16.34	48.33	74.00	-25.67	54.00	-5.67	peak
3	4780.000	61.26	-14.34	46.92	74.00	-27.08	54.00	-7.08	peak
4	5590.000	59.37	-13.21	46.16	74.00	-27.84	54.00	-7.84	peak
5	6391.000	64.23	-13.65	50.58	74.00	-23.42	54.00	-3.42	peak
6	8587.000	54.07	-7.98	46.09	74.00	-27.91	54.00	-7.91	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

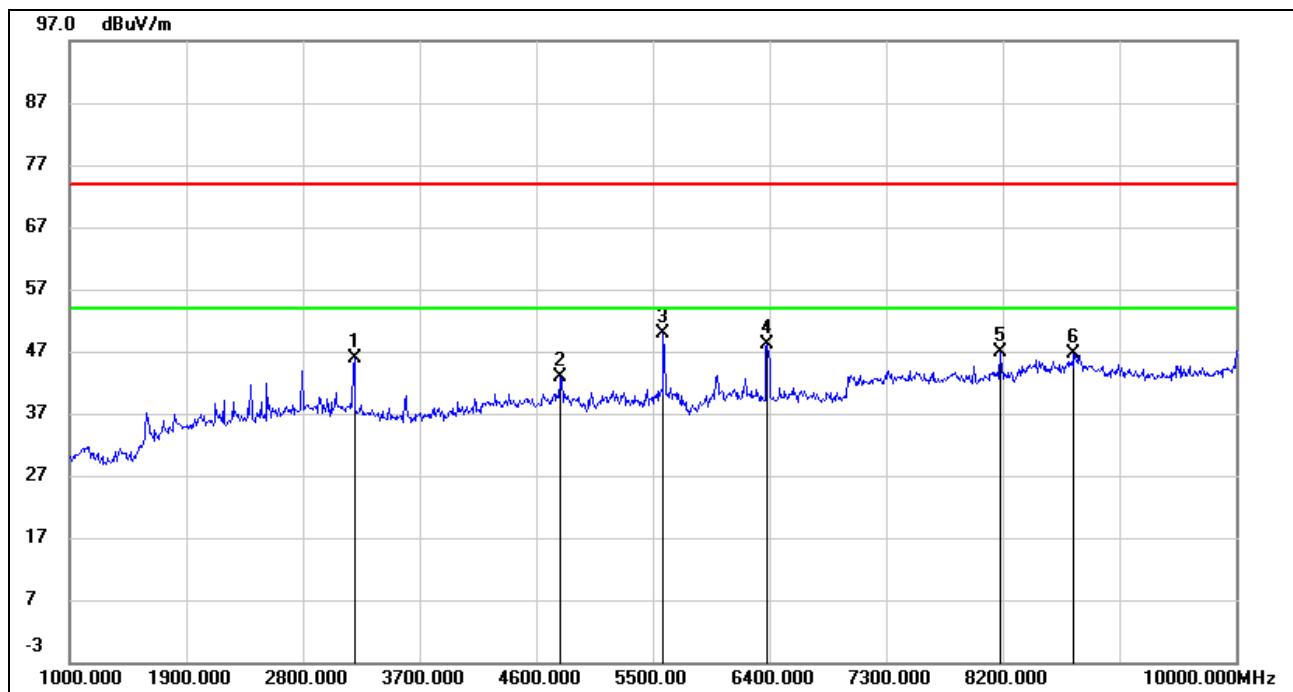
**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)**


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit for Peak (dBuV/m)	Margin for Peak (dB)	Limit for AVG (dBuV/m)	Margin for AVG based on Peak result (dB)	Remark
1	2386.000	59.83	-18.61	41.22	74.00	-32.78	54.00	-12.78	peak
2	3106.000	56.29	-16.37	39.92	74.00	-34.08	54.00	-14.08	peak
3	4816.000	55.19	-14.44	40.75	74.00	-33.25	54.00	-13.25	peak
4	5599.000	54.10	-13.12	40.98	74.00	-33.02	54.00	-13.02	peak
5	6400.000	56.83	-13.66	43.17	74.00	-30.83	54.00	-10.83	peak
6	8803.000	53.42	-7.12	46.30	74.00	-27.70	54.00	-7.70	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

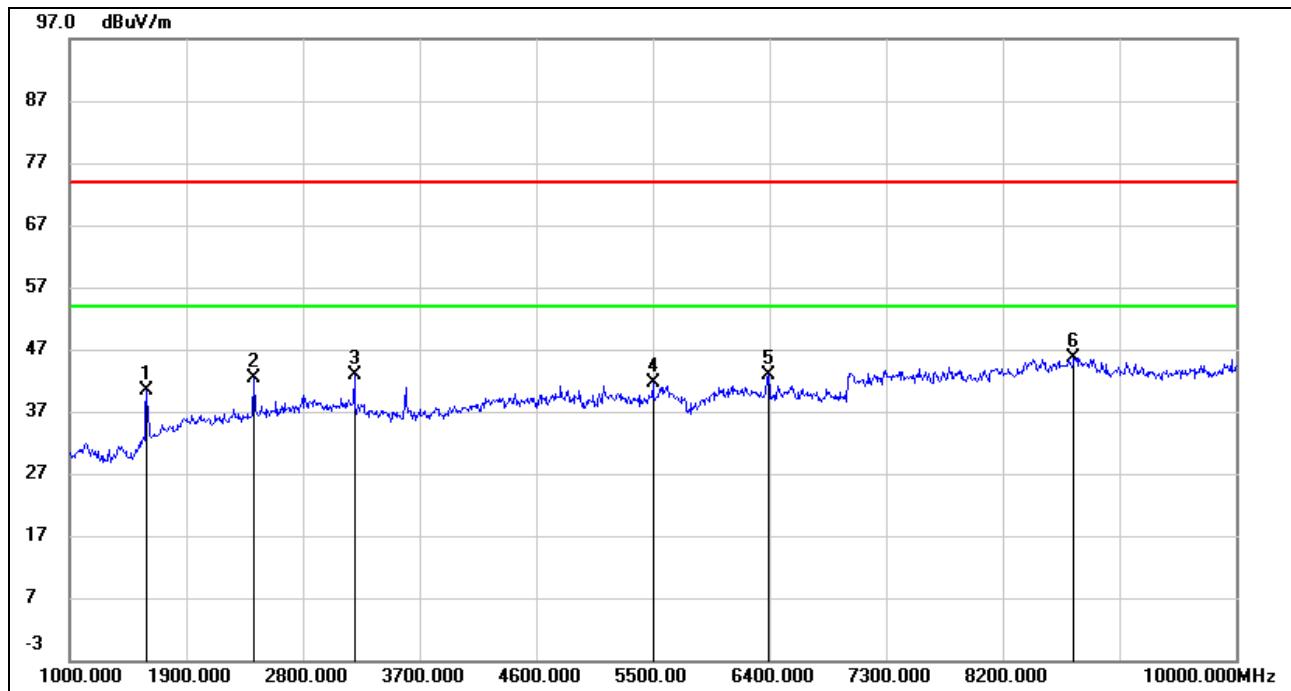
**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)**


No.	Frequency	Reading	Correct	Result	Limit for Peak	Margin for Peak	Limit for AVG	Margin for AVG based on Peak result	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	
1	3196.000	62.17	-16.33	45.84	74.00	-28.16	54.00	-8.16	peak
2	4789.000	57.13	-14.34	42.79	74.00	-31.21	54.00	-11.21	peak
3	5581.000	63.21	-13.31	49.90	74.00	-24.10	54.00	-4.10	peak
4	6382.000	61.80	-13.66	48.14	74.00	-25.86	54.00	-5.86	peak
5	8182.000	57.21	-10.27	46.94	74.00	-27.06	54.00	-7.06	peak
6	8749.000	53.97	-7.30	46.67	74.00	-27.33	54.00	-7.33	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

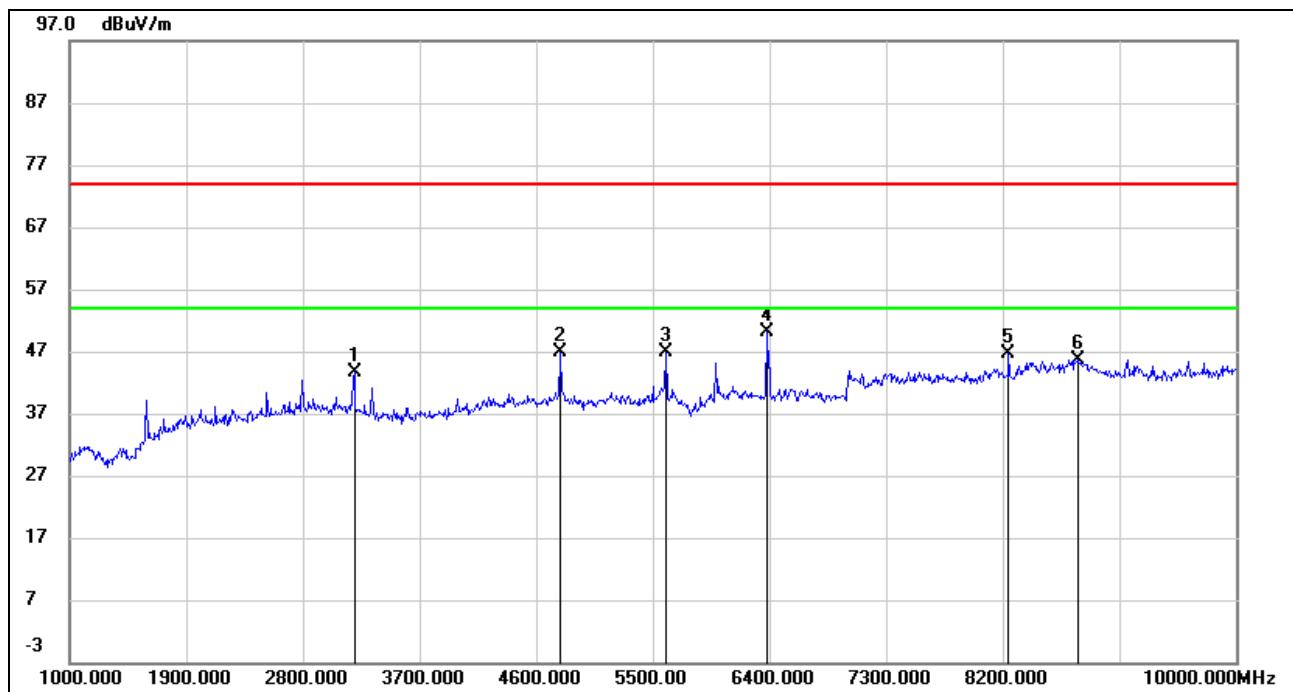
**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)**


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit for Peak (dBuV/m)	Margin for Peak (dB)	Limit for AVG (dBuV/m)	Margin for AVG based on Peak result (dB)	Remark
1	1594.000	63.25	-22.78	40.47	74.00	-33.53	54.00	-13.53	peak
2	2422.000	60.81	-18.40	42.41	74.00	-31.59	54.00	-11.59	peak
3	3196.000	59.32	-16.33	42.99	74.00	-31.01	54.00	-11.01	peak
4	5500.000	55.83	-14.15	41.68	74.00	-32.32	54.00	-12.32	peak
5	6391.000	56.50	-13.65	42.85	74.00	-31.15	54.00	-11.15	peak
6	8749.000	52.98	-7.30	45.68	74.00	-28.32	54.00	-8.32	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)**


No.	Frequency	Reading	Correct	Result	Limit for Peak	Margin for Peak	Limit for AVG	Margin for AVG based on Peak result	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	
1	3196.000	60.07	-16.33	43.74	74.00	-30.26	54.00	-10.26	peak
2	4789.000	61.26	-14.34	46.92	74.00	-27.08	54.00	-7.08	peak
3	5599.000	60.10	-13.12	46.98	74.00	-27.02	54.00	-7.02	peak
4	6382.000	63.77	-13.66	50.11	74.00	-23.89	54.00	-3.89	peak
5	8245.000	56.36	-9.85	46.51	74.00	-27.49	54.00	-7.49	peak
6	8785.000	52.79	-7.15	45.64	74.00	-28.36	54.00	-8.36	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit. The measured result complies with AV limit, which is 54 dBuV/m.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

## 9. ANTENNA REQUIREMENTS

### APPLICABLE REQUIREMENTS

Please refer to FCC §15.203

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

### RESULTS

Complies

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**END OF REPORT**