FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

UAV Remote Controller

MODEL NUMBER: DHI-UAV-R1S-RH

FCC ID: SVNUAV-R1

REPORT NUMBER: 4788322398-3-10

ISSUE DATE: July 19, 2018

Prepared for

Zhejiang Dahua Vision Technology Co., Ltd.
No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	7/19/2018	Initial Issue	

Summary of Test Results			
Clause	**Test Items**	**FCC Rules**	**Test Results**
1	20dB Bandwidth	15.247 (a) (i)	Pass
2	Peak Conducted Output Power	FCC 15.247 (b) (2)	Pass
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1)	Pass
4	Number of Hopping Frequency	15.247 (a) (i)	Pass
5	Time of Occupancy (Dwell Time)	15.247 (a) (i)	Pass
6	Conducted Bandedge	FCC 15.247 (d)	Pass
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205	Pass
8	Antenna Requirement	FCC 15.203	Pass

TABLE OF CONTENTS

1. ATTESTATION OF TESCT RESULTS

Applicant Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd.
Address: No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

Manufacturer Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd.
Address: No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

Factory Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd.
Address: No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

EUT Name: UAV Remote Controller
Brand: alhua
Model: DHI-UAV-R1S-RH
Serial Model: See chapter 5.1
Sample Received Date: July 10, 2018
Date of Tested: July 10, 2018 ~ July 31, 2018

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

Tested By:

Denny Huang
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 DA 00-705, KDB414788 D01 Radiated Test Site v01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been assessed and proved to be in compliance with A2LA. **IAS (Lab Code: TL-702)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has demonstrated compliance with ISO/IEC Standard 17025:2005, General requirements for the competence of testing and calibration laboratories **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 Delcaration of Conformity (DoC) and Certification rules **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. **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. 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

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.

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
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-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

Equipment	UAV Remote Controller	
Product Description	The EUT is a remote controller used for UAV.	
Model Name	DHI-UAV-R1S-RH	
Series Model	UAV-R1S-RH,DH-UAV-R1S-RH,OEM-UAV-R1S-RH,DHI-UAV-R1123,DHI-UAV-R1133,UAV-R1123,UAV-R1133,DH-UAV-R1123, DH-UAV-R1133, OEM-UAV-R1123, OEM-UAV-R1133, DH-UAV-R1S-11,DHI-UAV-R1S-23,DHI-UAV-R1S-33,OEM-UAV-R1S-11,UAV-R1S-23,UAV-R1S-33,DH-UAV-R1S-11-C,DHI-UAV-R1S-23-C,DHI-UAV-R1S-33-C,OEM-UAV-R1S-11-C,UAV-R1S-23-C,UAV-R1S-33-C,DH-UAV-R1S-11CH,OEM-UAV-R1S-11CH,DH-UAV-R1S-11CH-C,OEM-UAV-R1S-11CH-C,DH-UAV-R1S-S-11CH,OEM-UAV-R1S-S-11CH,DH-UAV-R1S-S-11CH-C,OEM-UAV-R1S-S-11CH-C,DHI-UAV-R1S-33CH,UAV-R1S-33CH,DHI-UAV-R1S-33CH-C,UAV-R1S-33CH-C,DHI-UAV-R1S-S-33CH,UAV-R1S-S-33CH,DHI-UAV-R1S-S-33CH-C,UAV-R1S-S-33CH-C,DHI-UAV-R1S-23CH,UAV-R1S-23CH,UAV-R1S-23CH-C,HI-UAV-R1S-23CH-C,DHI-UAV-R1S-S-23CH,UAV-R1S-S-23CH,DHI-UAV-R1S-S-23CH-C,UAV-R1S-S-23CH-C.	
Model Difference	All the same except for the appearance of the different color and graphic pattern.	
Product Description	Operation Frequency	907.15 MHz ~ 923.35 MHz
	Modulation Type	
	2GFSK	
Rated Power Input	100-240V~,50Hz/60Hz,1.5A max	
Battery	7.4V, 7800mAh	

5.2. MAXIMUM OUTPUT POWER

Mode	Frequency (MHz)	Channel Number	Max Output Power (dBm)
2GFSK	902~928	1-163[163]	18.233

5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	907.15	42	911.25	83	915.35	124	919.45
2	907.25	43	911.35	84	915.45	125	919.55
3	907.35	44	911.45	85	915.55	126	919.65
4	907.45	45	911.55	86	915.65	127	919.75
5	907.55	46	911.65	87	915.75	128	919.85
6	907.65	47	911.75	88	915.85	129	919.95
7	907.75	48	911.85	89	915.95	130	920.05
8	907.85	49	911.95	90	916.05	131	920.15
9	907.95	50	912.05	91	916.15	132	920.25
10	908.05	51	912.15	92	916.25	133	920.35
11	908.15	52	912.25	93	916.35	134	920.45
12	908.25	53	912.35	94	916.45	135	920.55
13	908.35	54	912.45	95	916.55	136	920.65
14	908.45	55	912.55	96	916.65	137	920.75
15	908.55	56	912.65	97	916.75	138	920.85
16	908.65	57	912.75	98	916.85	139	920.95
17	908.75	58	912.85	99	916.95	140	921.05
18	908.85	59	912.95	100	917.05	141	921.15
19	908.95	60	913.05	101	917.15	142	921.25
20	909.05	61	913.15	102	917.25	143	921.35
21	909.15	62	913.25	103	917.35	144	921.45
22	909.25	63	913.35	104	917.45	145	921.55
23	909.35	64	913.45	105	917.55	146	921.65
24	909.45	65	913.55	106	917.65	147	921.75
25	909.55	66	913.65	107	917.75	148	921.85
26	909.65	67	913.75	108	917.85	149	921.95
27	909.75	68	913.85	109	917.95	150	922.05
28	909.85	69	913.95	110	918.05	151	922.15
29	909.95	70	914.05	111	918.15	152	922.25
30	910.05	71	914.15	112	918.25	153	922.35
31	910.15	72	914.25	113	918.35	154	922.45
32	910.25	73	914.35	114	918.45	155	922.55
33	910.35	74	914.45	115	918.55	156	922.65
34	910.45	75	914.55	116	918.65	157	922.75
35	910.55	76	914.65	117	918.75	158	922.85
36	910.65	77	914.75	118	918.85	159	922.95
37	910.75	78	914.85	119	918.95	160	923.05
38	910.85	79	914.95	120	919.05	161	923.15
39	910.95	80	915.05	121	919.15	162	923.25
40	911.05	81	915.15	122	919.25	163	923.35
41	911.15	82	915.25	123	919.35		

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel Number	Test Channel
2GFSK	CH 1, CH 82, CH 163	Low, Middle, High

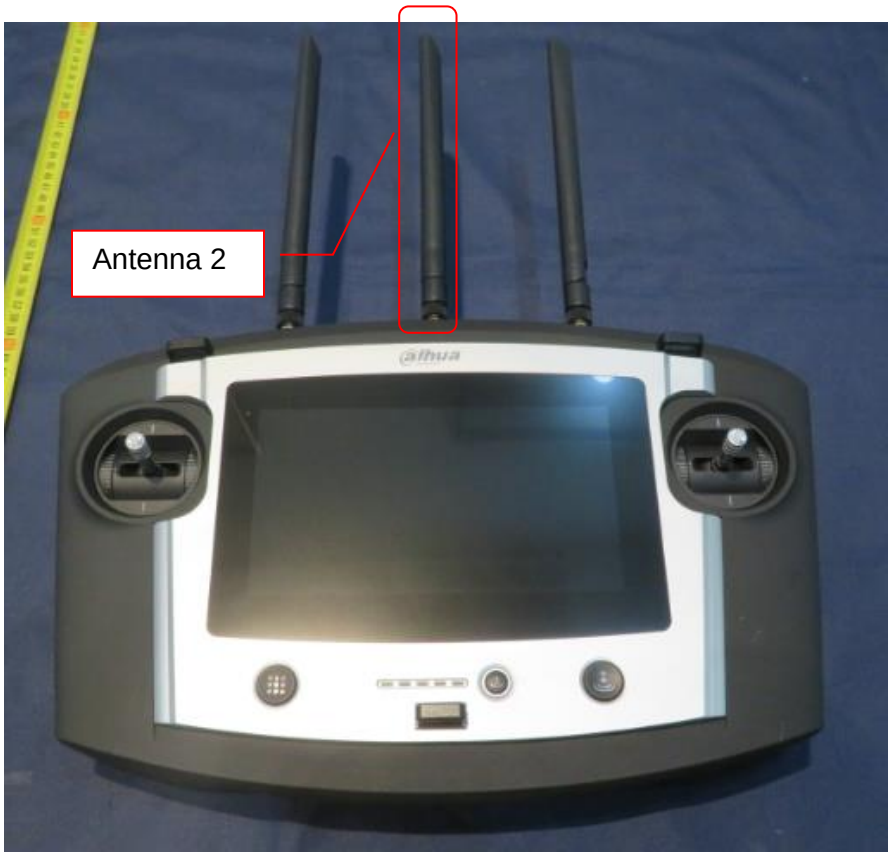
5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 902~928MHzMHz Band				
Test Software		/		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 1	CH 82	CH 163
2GFSK	1	Default	Default	Default

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
2	907.15MHz~923.35MHz	External Antenna	1.35

Test Mode	Transmit and Receive Mode	Description
2GFSK	☒ 1TX, 1RX	Chain 2 can be used as transmitting/receiving antenna.



5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	USB to Serial board	N/A	N/A	N/A

I/O CABLES

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

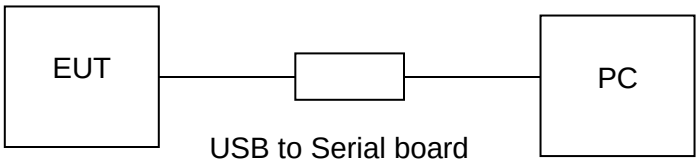
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	LiPo Charger for Drones	alhua	ADS-65HI-12N-1 12048E	AC Input: 100 ~ 240V, 1.5A DC Output: 12V, 4A

TEST SETUP

The EUT can work in an engineer mode with a software through a PC.

SETUP DIAGRAM FOR TESTS



5.8. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.12,2017	Dec.11,2018
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.12,2017	Dec.11,2018
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.12,2017	Dec.11,2018
Software						
Used	Description		Manufacturer	Name	Version	
☑	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.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.12,2017	Dec.11,2018
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Jan.09, 2019
☑	Preamplifier	HP	8447D	2944A09099	Dec.12,2017	Dec.11,2018
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12,2017	Dec.11,2018
☑	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Jan. 09, 2019
☑	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Jan.06, 2016	Jan.06, 2019
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12,2017	Dec.11,2018
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12,2017	Dec.11,2018
☑	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 25, 2019
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.12,2017	Dec.11,2018
☑	Power Meter	Keysight	N1911A	MY55416024	Dec.12,2017	Dec.11,2018
☑	Power Sensor	Keysight	N1921A	MY51100041	Dec.12,2017	Dec.11,2018

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

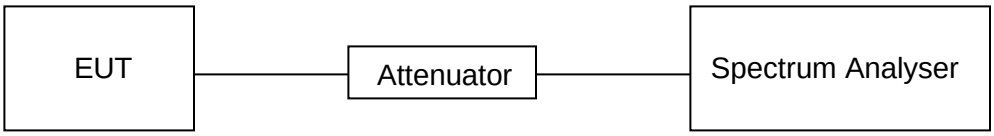
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

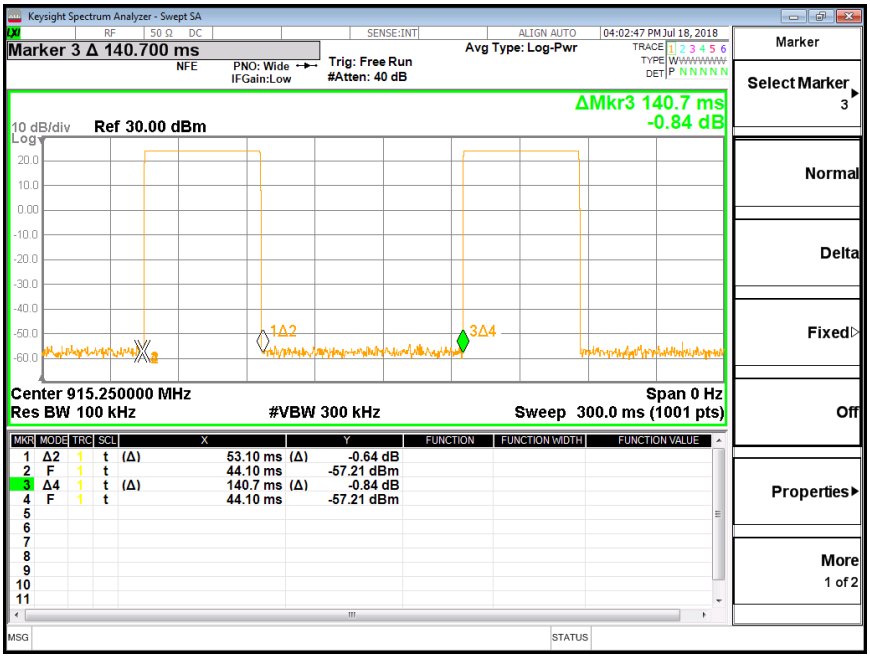
Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
2GFSK	53.1	140.7	0.377	37.7	4.23	0.02

Note: Duty Cycle Correction Factor=10log(1/x).
Where: x is Duty Cycle(Linear)
Where: T is On Time (transmit duration)

ON TIME AND DUTY CYCLE MID CH



6.2. 20 dB BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247 (a)(i)	20dB Bandwidth	250KHz	902~928

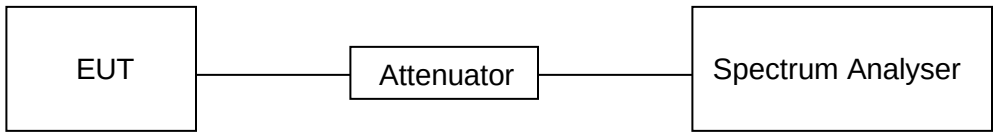
TEST PROCEDURE

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% of the 20 dB bandwidth
VBW	≥ RBW
Span	approximately 2 to 3 times the 20 dB 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 SETUP



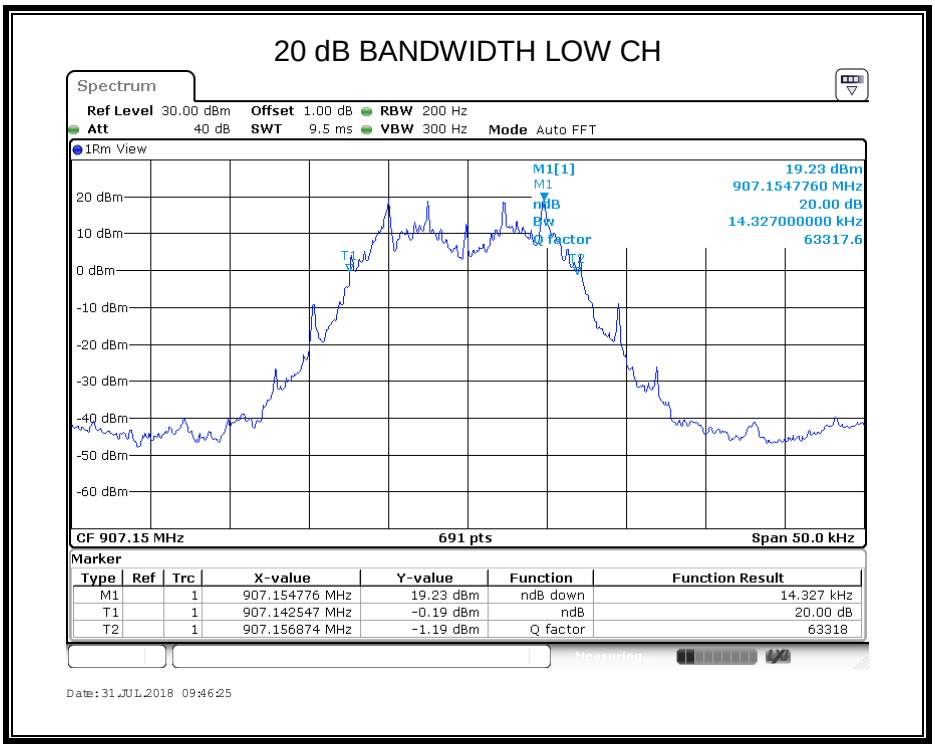
TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

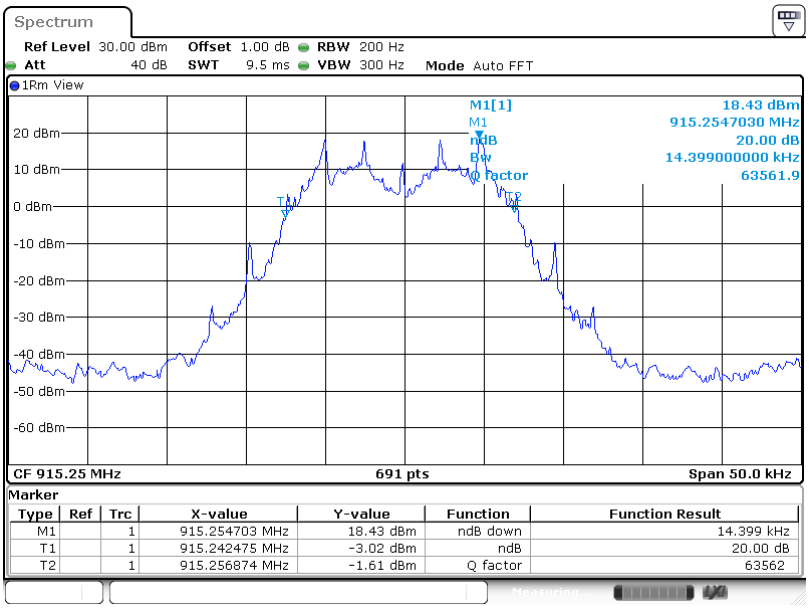
RESULTS

Channel	Frequency (MHz)	20dB bandwidth (KHz)	Result
Low	907.15	14.327	PASS
Middle	915.25	14.399	PASS
High	923.35	13.676	PASS

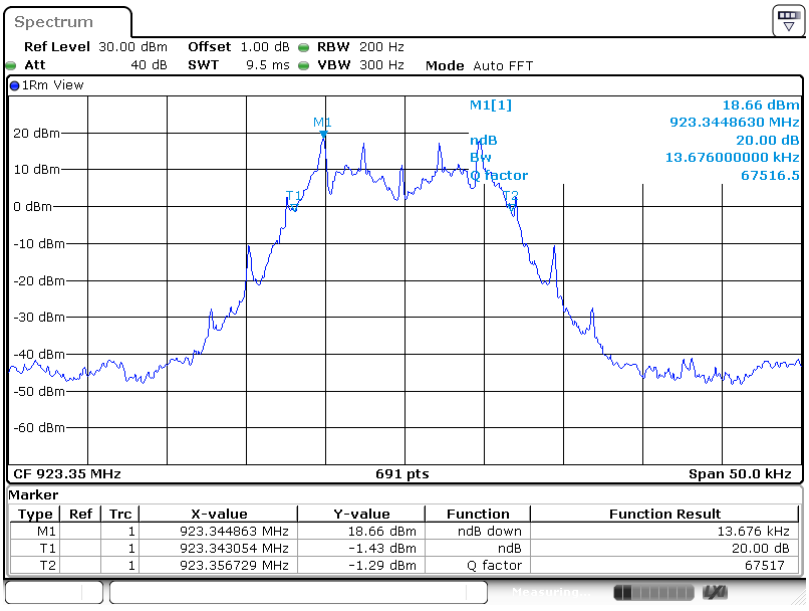
20 dB BANDWIDTH LOW CH



20 dB BANDWIDTH MID CH



20 dB BANDWIDTH HIGH CH



6.3. PEAK CONDUCTED OUTPUT POWER

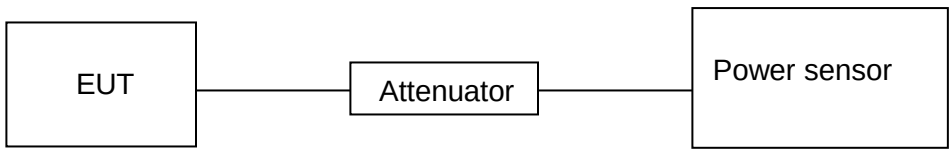
LIMITS

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (b) (2)	Peak Conducted Output Power	1 watt for systems employing at least 50 hopping channels	902~928

TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure peak power each channel.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

RESULTS

Channel	Frequency	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(AVG)	Result
	(MHz)	(dBm)		
Low	907.15	25.120	21.049	Pass
Middle	915.25	24.468	20.041	Pass
High	923.35	23.946	19.357	Pass

6.4. CARRIER HOPPING CHANNEL SEPARATION

LIMITS

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1)	Carrier Hopping Channel Separation	25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.	902~928

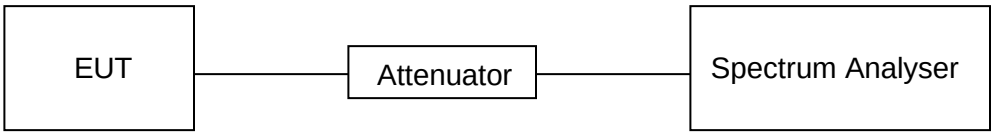
TEST PROCEDURE

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

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

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

TEST SETUP

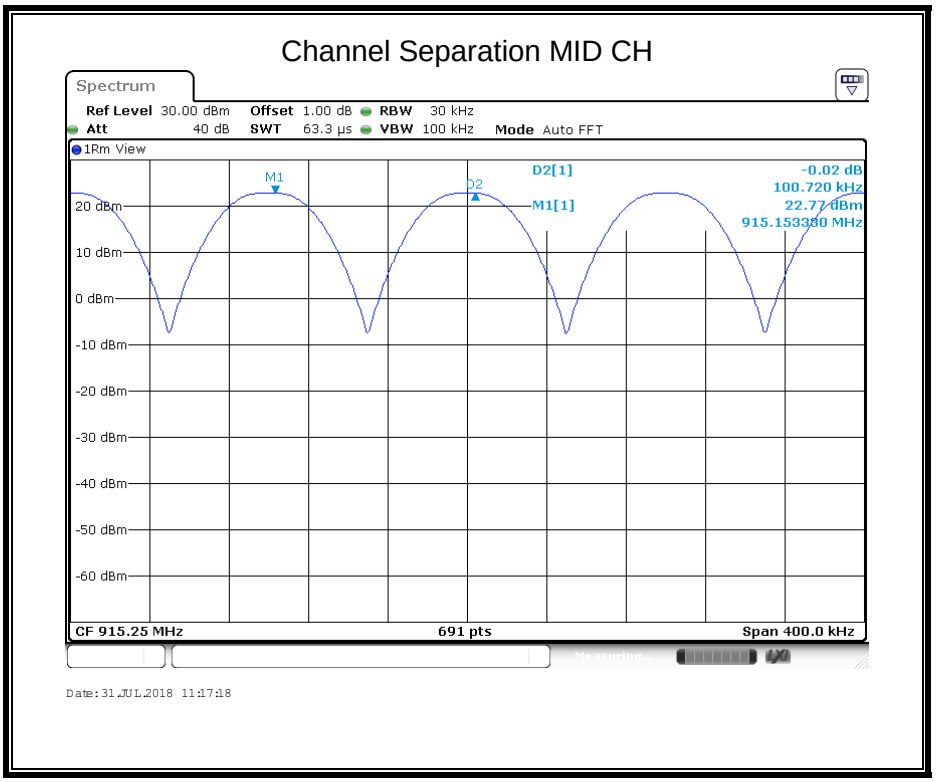


TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

RESULTS

Channel	Carrier Hopping Channel Separation (KHz)	Limit (KHz)	Result
Middle	100.0	≥ 25	PASS



Note: For 20 dB Bandwidth of The Hopping Channel, please refer to clause 6.2.

6.5. NUMBER OF HOPPING FREQUENCY

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247 (a)(i)	Number of Hopping Frequency	at least 50 hopping channels

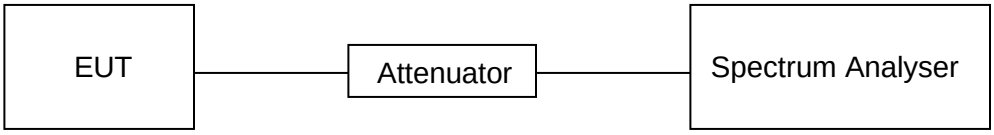
TEST PROCEDURE

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

Detector	Peak
RBW	100K
VBW	≥RBW
Span	The frequency band of operation
Trace	Max hold
Sweep time	Auto couple

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

TEST SETUP



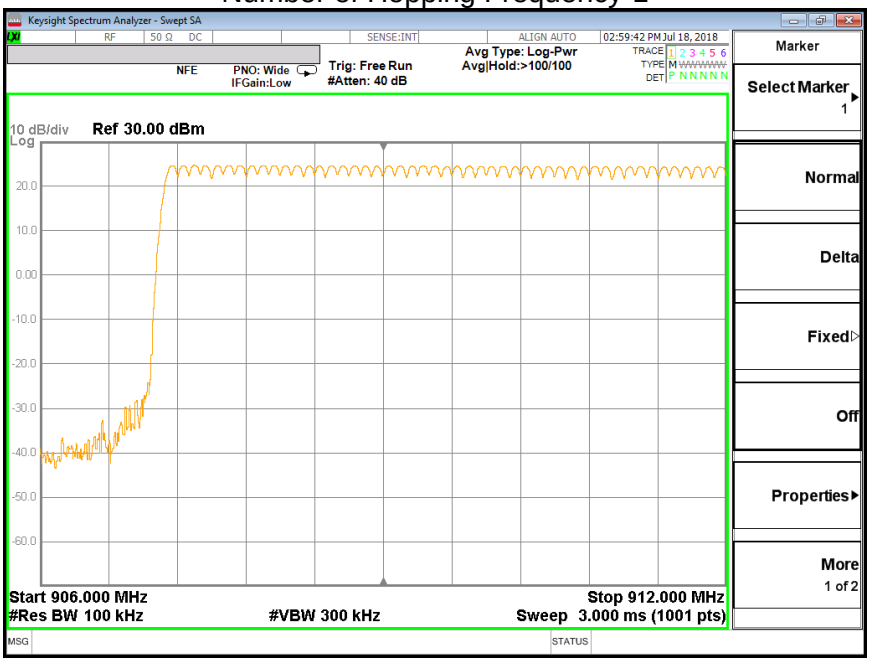
TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

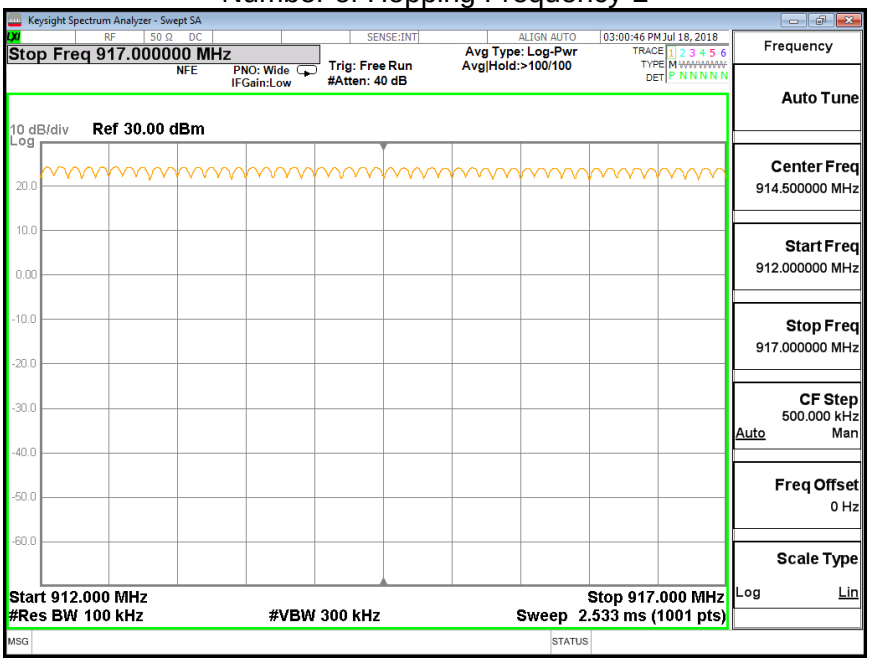
RESULTS

Hopping numbers	Limit	Results
163	>50	Pass

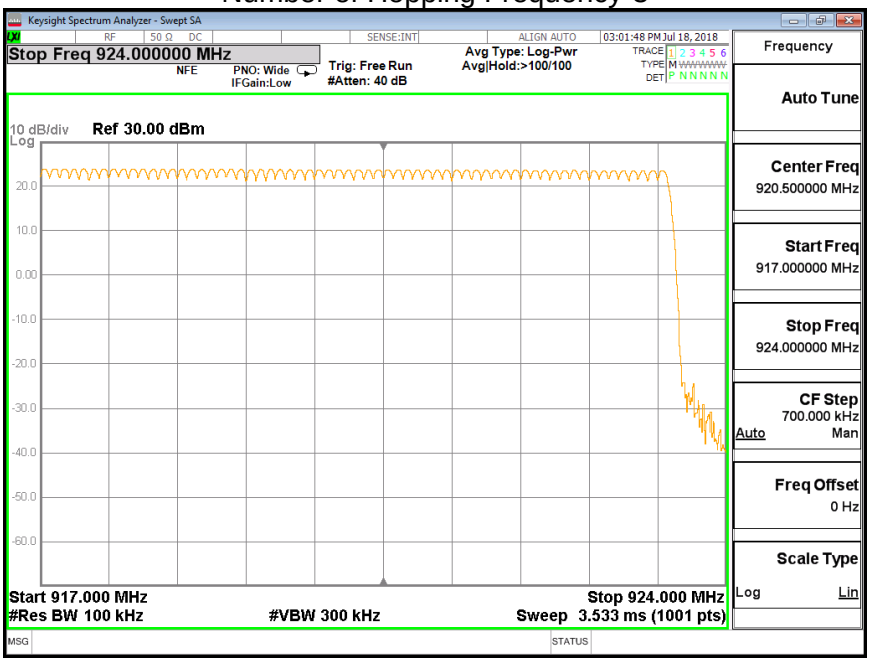
Number of Hopping Frequency-1



Number of Hopping Frequency-2



Number of Hopping Frequency-3



6.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247 (a)(i)	Time of Occupancy (Dwell Time)	The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period

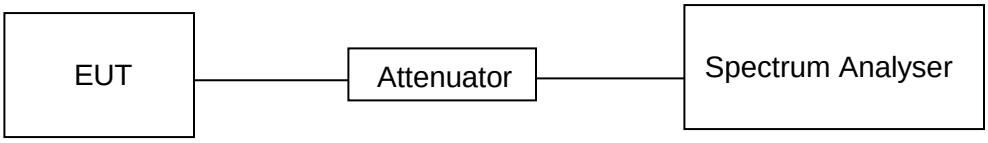
TEST PROCEDURE

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	100KHz
VBW	≥RBW
Span	zero span
Trace	Max hold
Sweep time	As necessary to capture the entire dwell time per hopping channel

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Measure the maximum time duration of one single pulse.
A Period Time = (channel number)*0.4

TEST SETUP



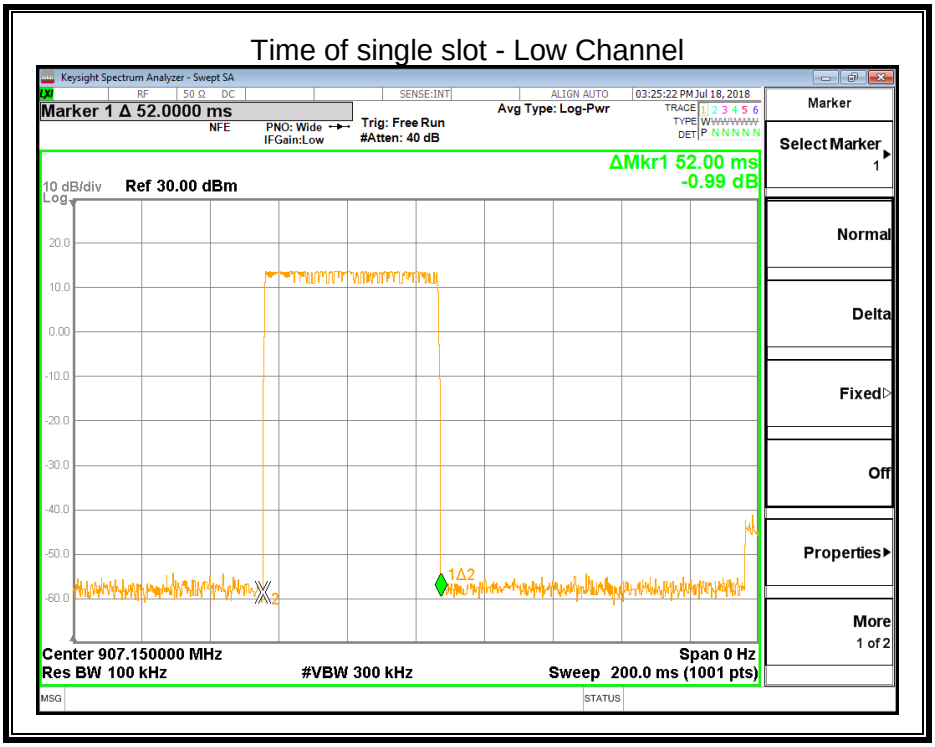
TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

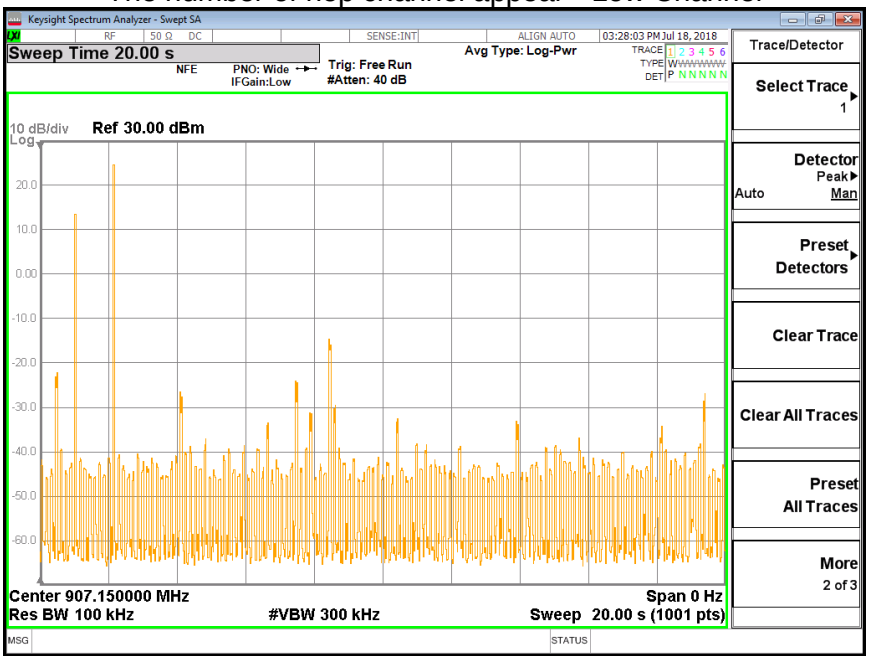
RESULTS

Channel	Burst Width [ms/hop/ch]	Dwell Time [s]	Limit [s]	Results
Low	52.00	0.104	0.4	PASS
Middle	52.20	0.157	0.4	PASS
High	52.00	0.104	0.4	PASS

Time of single slot - Low Channel

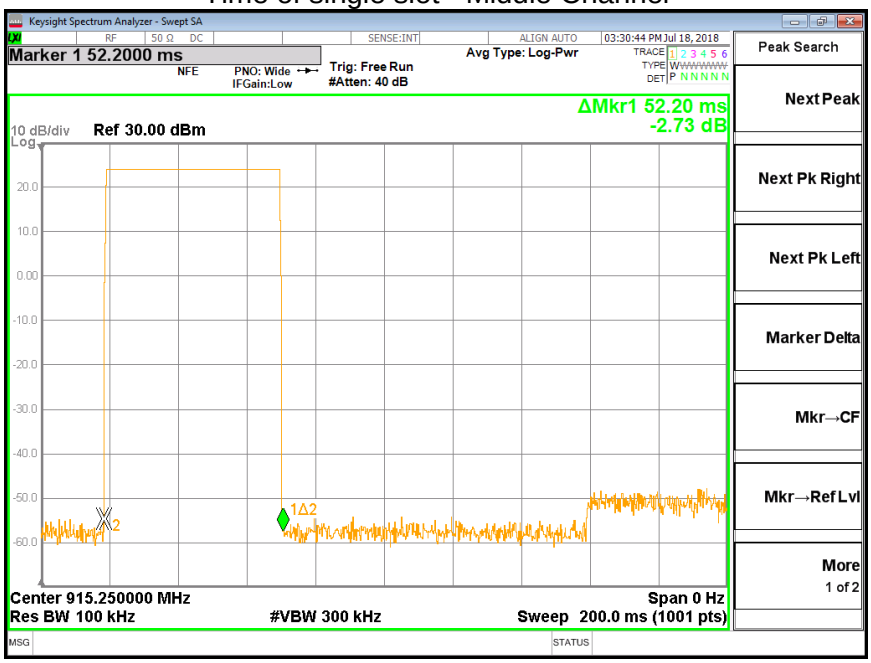


The number of hop channel appear - Low Channel

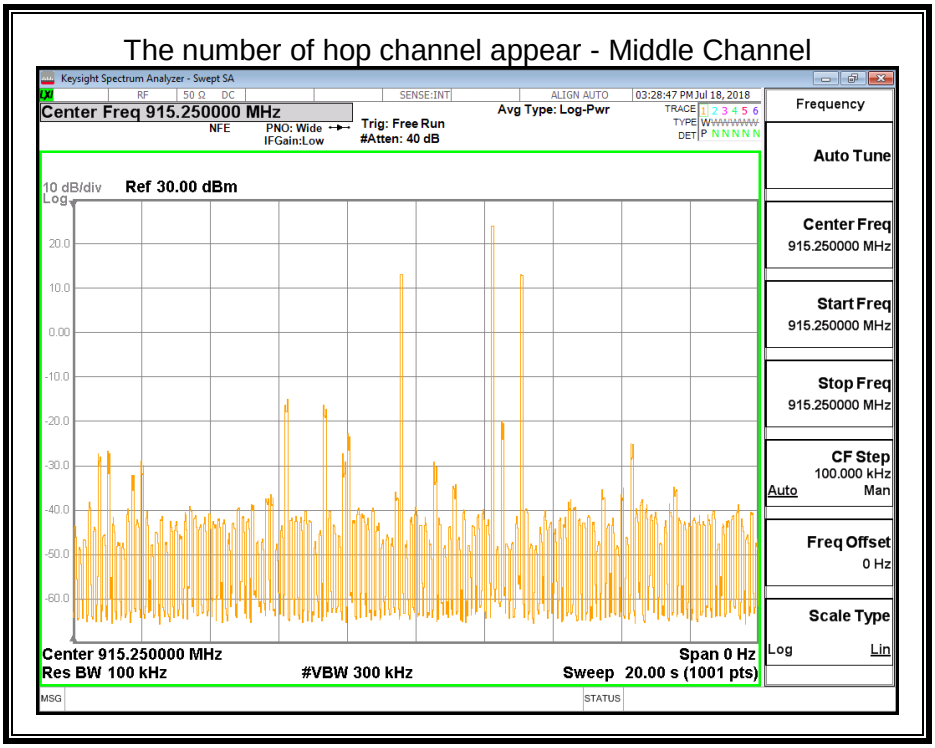


Note: The dwell time = Time of single slot * The number of hop channel appear within 20s

Time of single slot - Middle Channel

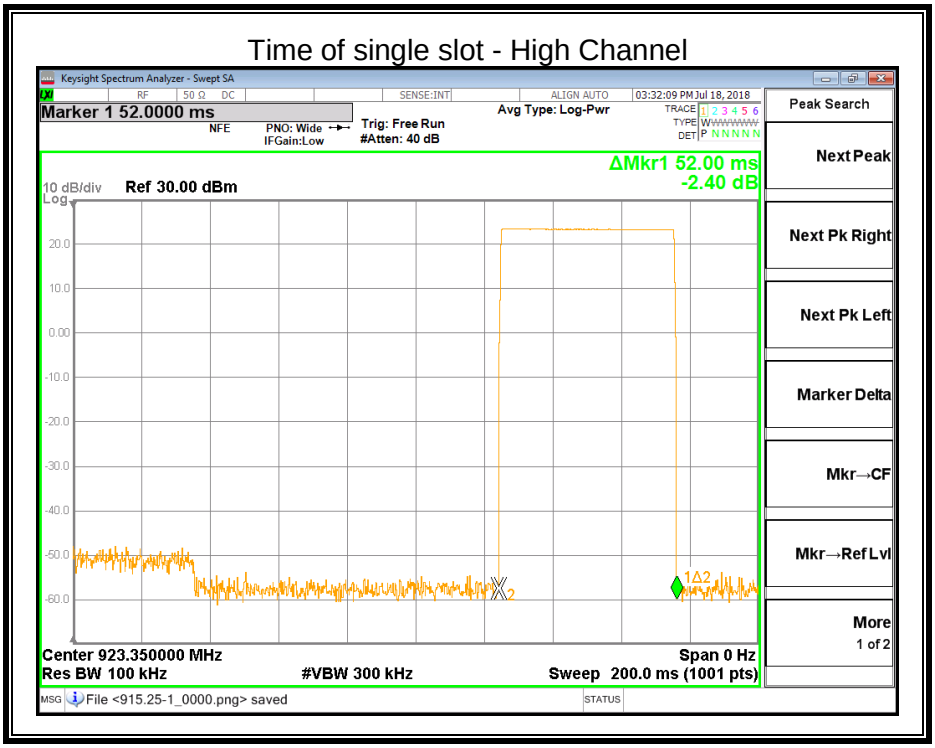


The number of hop channel appear - Middle Channel

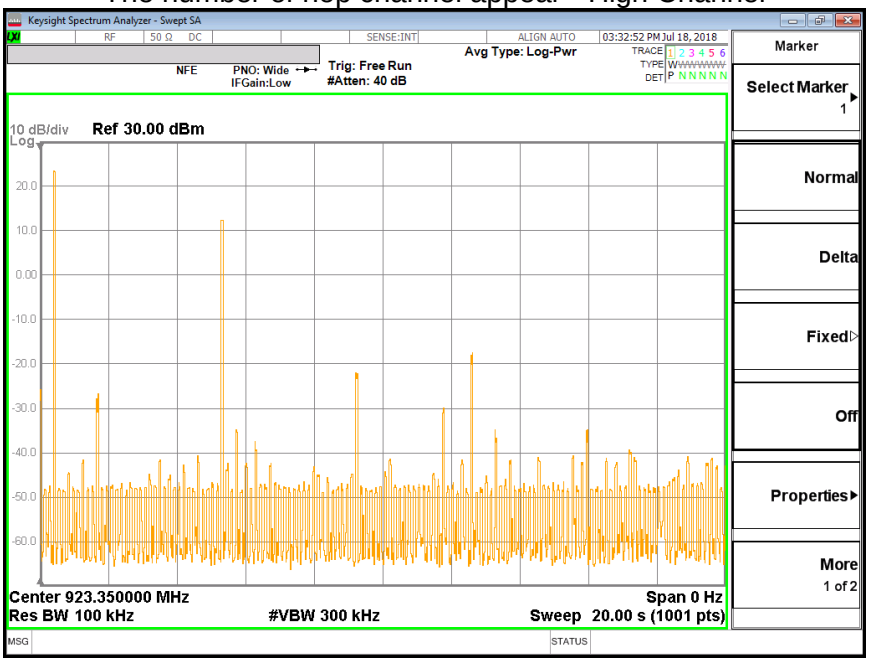


Note: The dwell time = Time of single slot * The number of hop channel appear within 20s

Time of single slot - High Channel



The number of hop channel appear - High Channel



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

6.7. CONDUCTED SPURIOUS EMISSION

LIMITS

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
FCC §15.247 (d)	Conducted Spurious Emission	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

For Bandedge use the following settings:

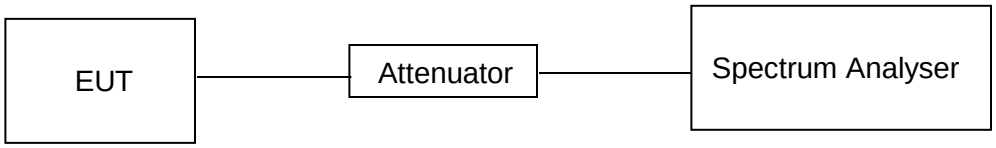
Detector	Peak
RBW	100K
VBW	≥RBW
Span	wide enough to fully capture the emission being measured
Trace	Max hold
Sweep time	Auto couple.

For Spurious Emission use the following settings:

Detector	Peak
RBW	100K
VBW	≥ RBW
Span	wide enough to fully capture the emission being measured
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP



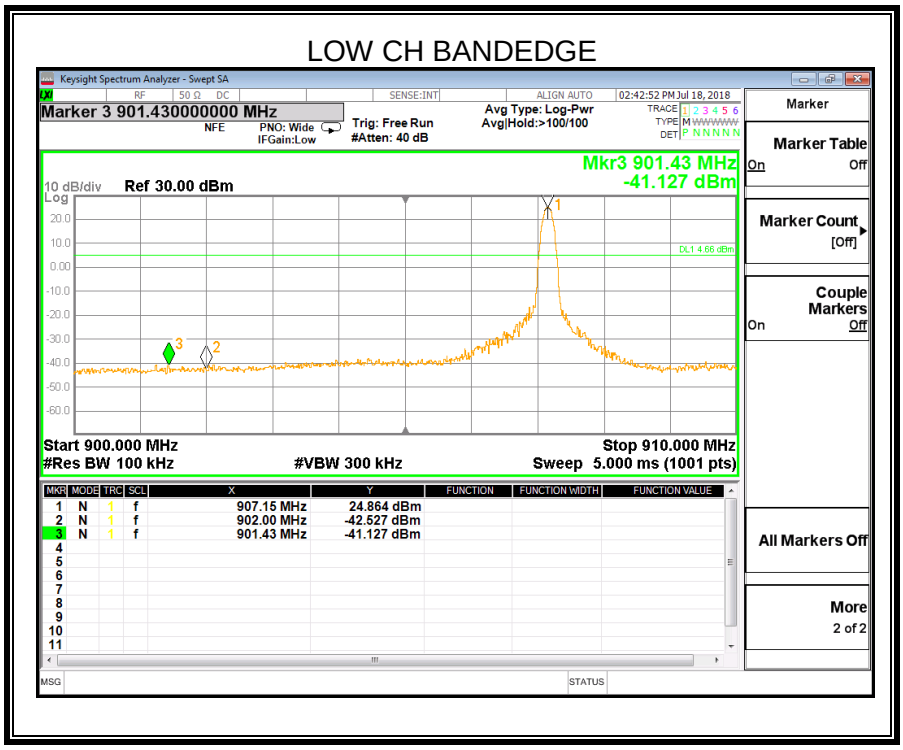
TEST ENVIRONMENT

Temperature	23.5°C	Relative Humidity	67%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

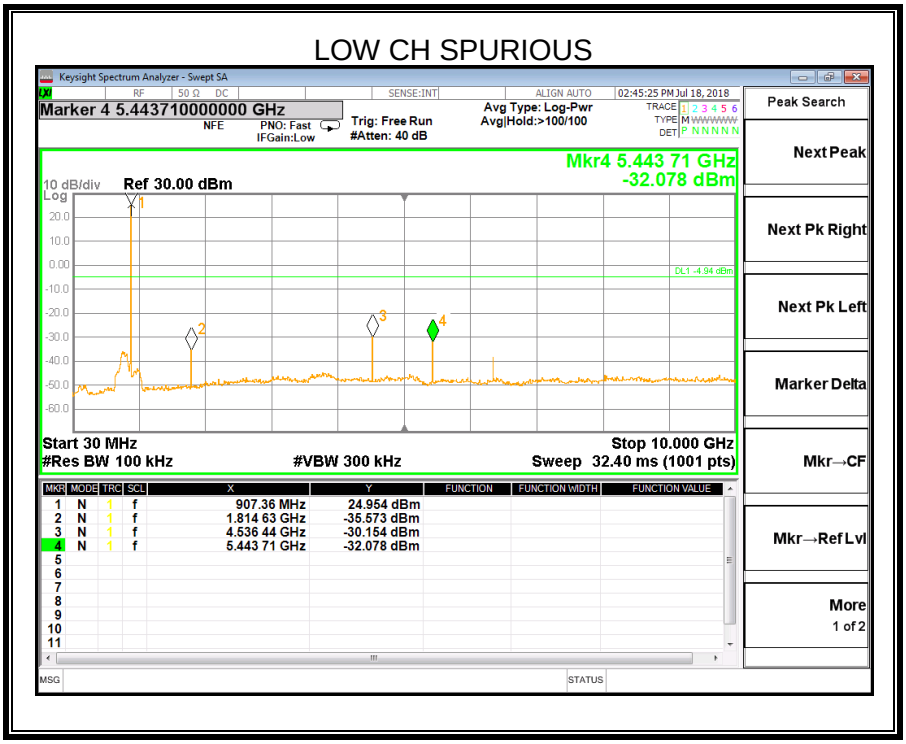
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CH BANDEDGE

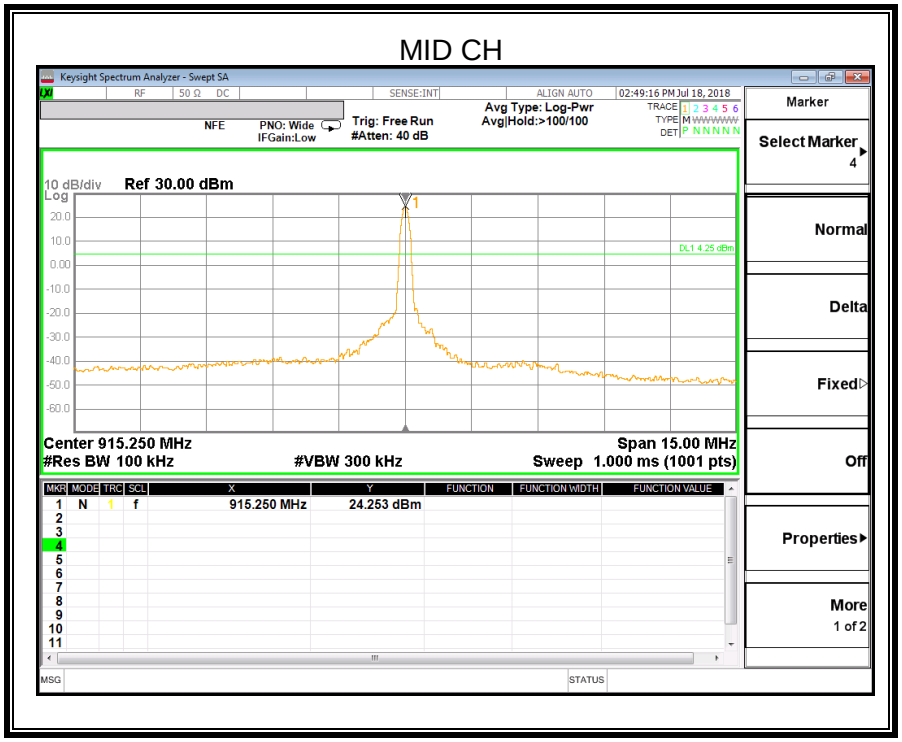


LOW CH SPURIOUS

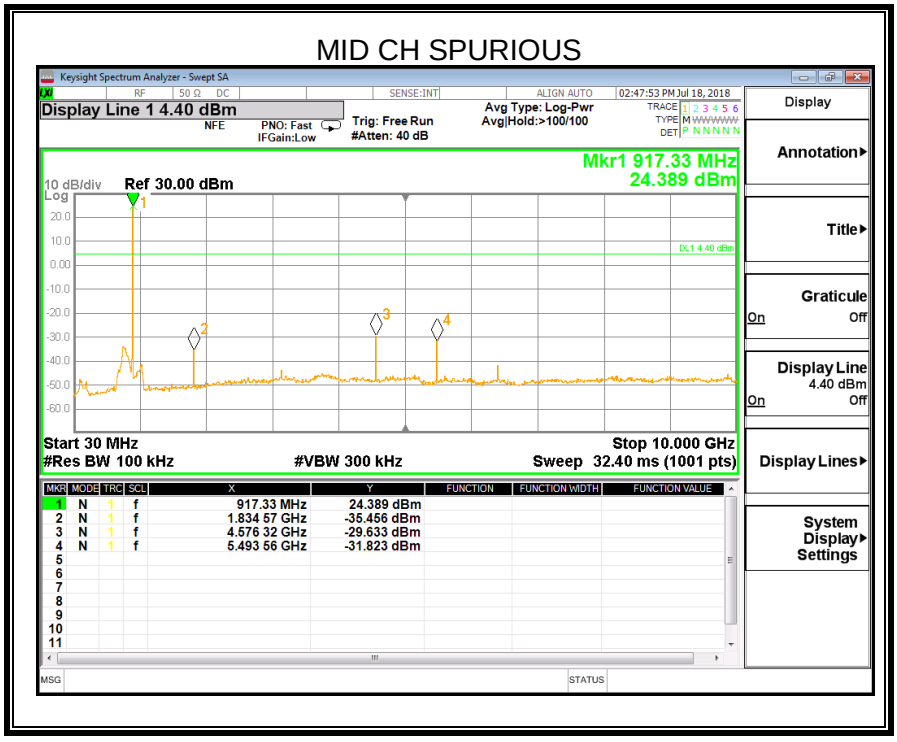


SPURIOUS EMISSIONS, MID CHANNEL

MID CH

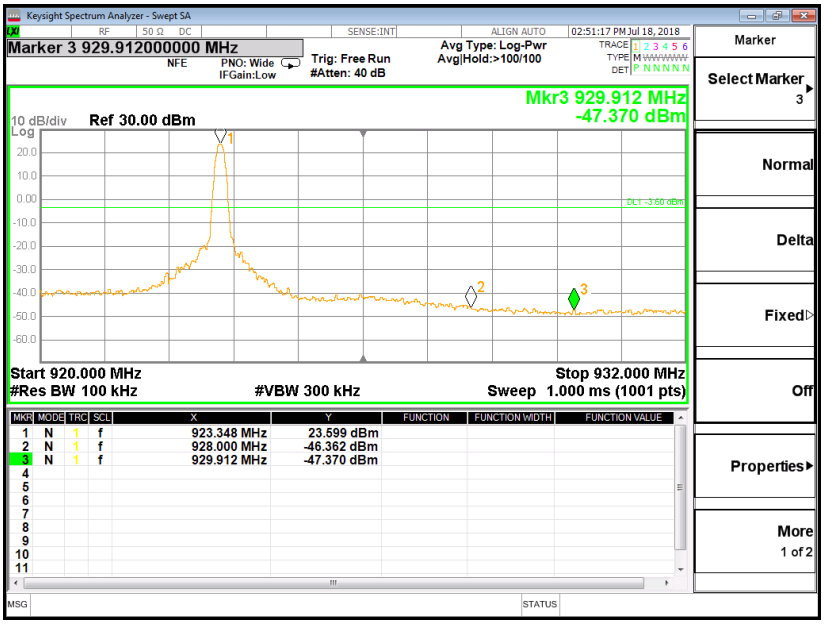


MID CH SPURIOUS

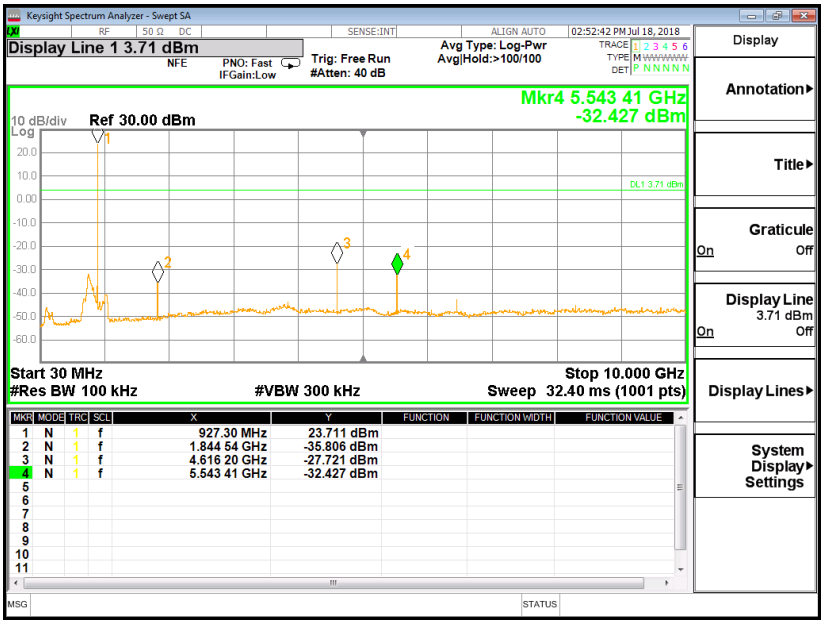


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CH BANDEDGE

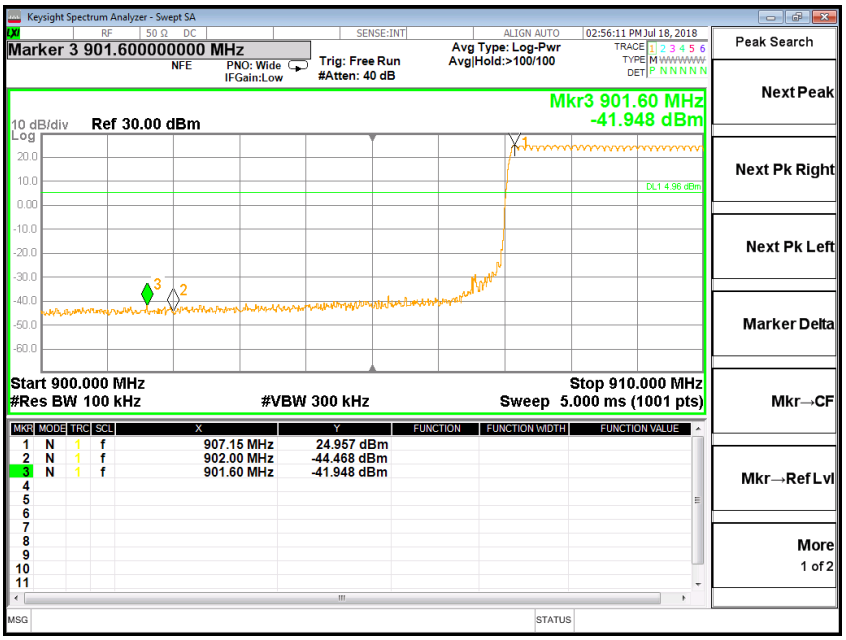


HIGH CH SPURIOUS

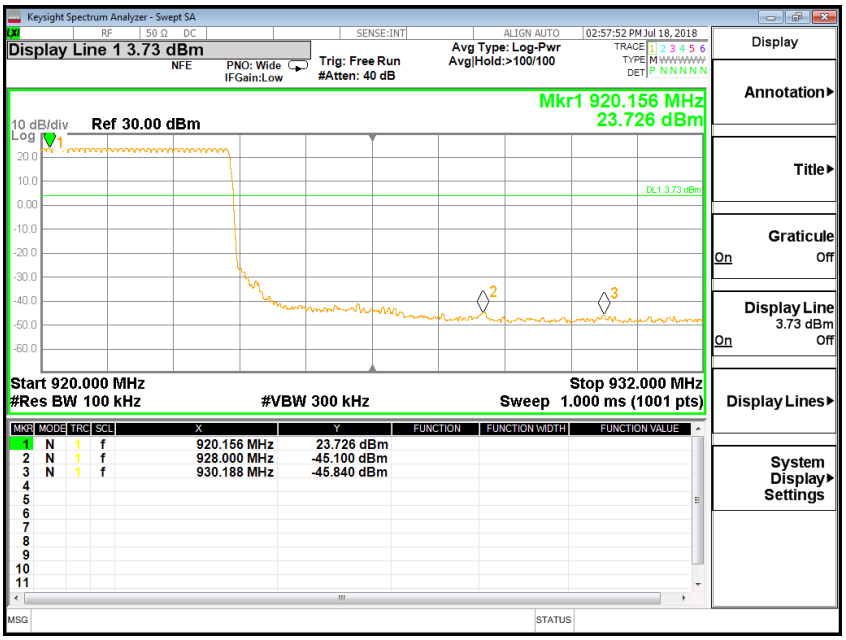


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW CH BANDEDGE WITH HOPPING ON



HIGH CH SPURIOUS WITH HOPPING ON



7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to RSS-GEN Clause 8.9 and Clause 8.10

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).

(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 1G)

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

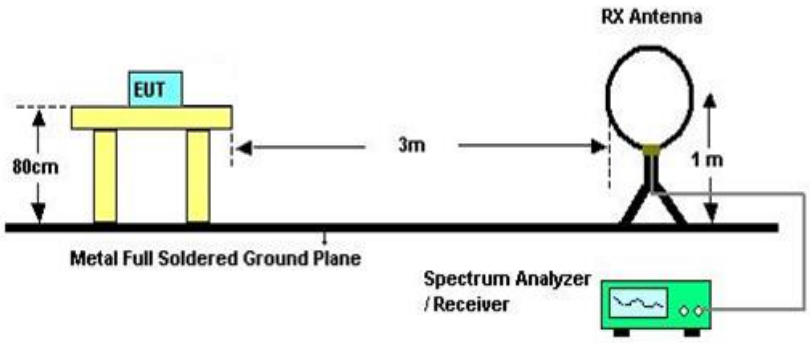
Restricted bands of operation

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

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
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 and 414788 D01 Radiated Test Site v01.

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 and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80cm meter above ground.

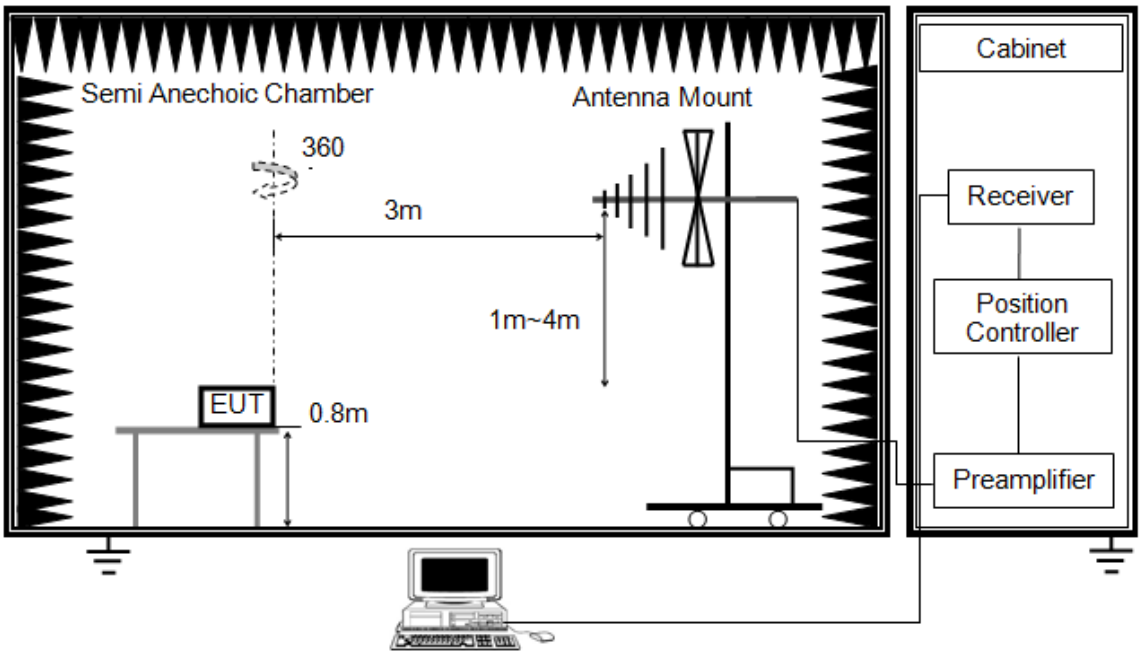
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

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 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.

7. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open are test 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 based on KDB 414788. Anechoic chamber is shown to be equivalent to or worst case from the open field site.

Below 1G and above 30MHz



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

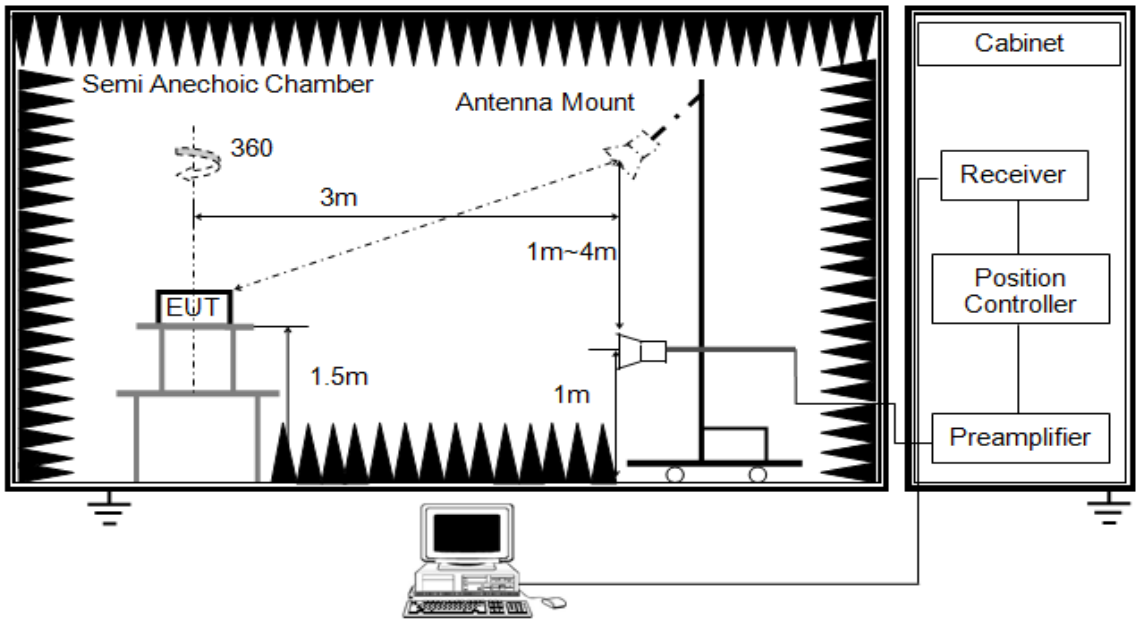
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations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

3. The EUT was placed on a turntable with 80cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 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.

Above 1G



RBW	1M
VBW	3M
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 (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.

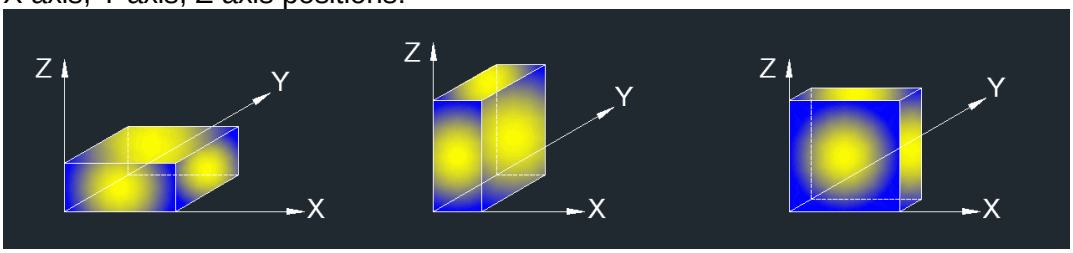
3. The EUT was placed on a turntable with 1.5m above ground.

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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector. For the Duty Cycle 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) data recorded in the report.

Note 2: All the EUT's emissions had been evaluated for simultaneous transmission with the other 2.4GHz (2.4G SRD and 2.4G WiFi) and 5GHz transmitter and there were no any additional or worse emissions found.

Note 3: For all radiated measurements, EUT was worked in stand-alone mode but it can simulated the communication between PC and the accessories through software.

TEST ENVIRONMENT

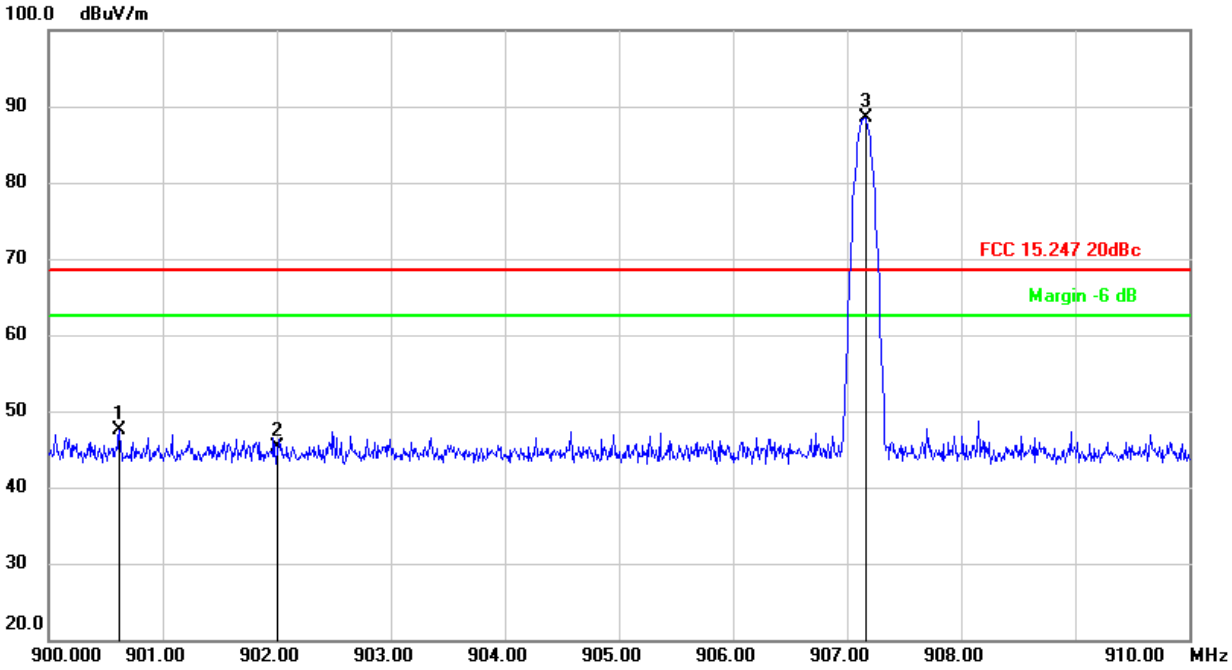
Temperature	22.7°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

RESULTS

7.2. RADIATED BANDEDGE

Note: Owing to the Restricted bands of frequencies 614MHz and 960MHz are far away from the 907.15 MHz ~ 923.35 MHz, So lab add a confirmed radiated test for conducted spurious emission.

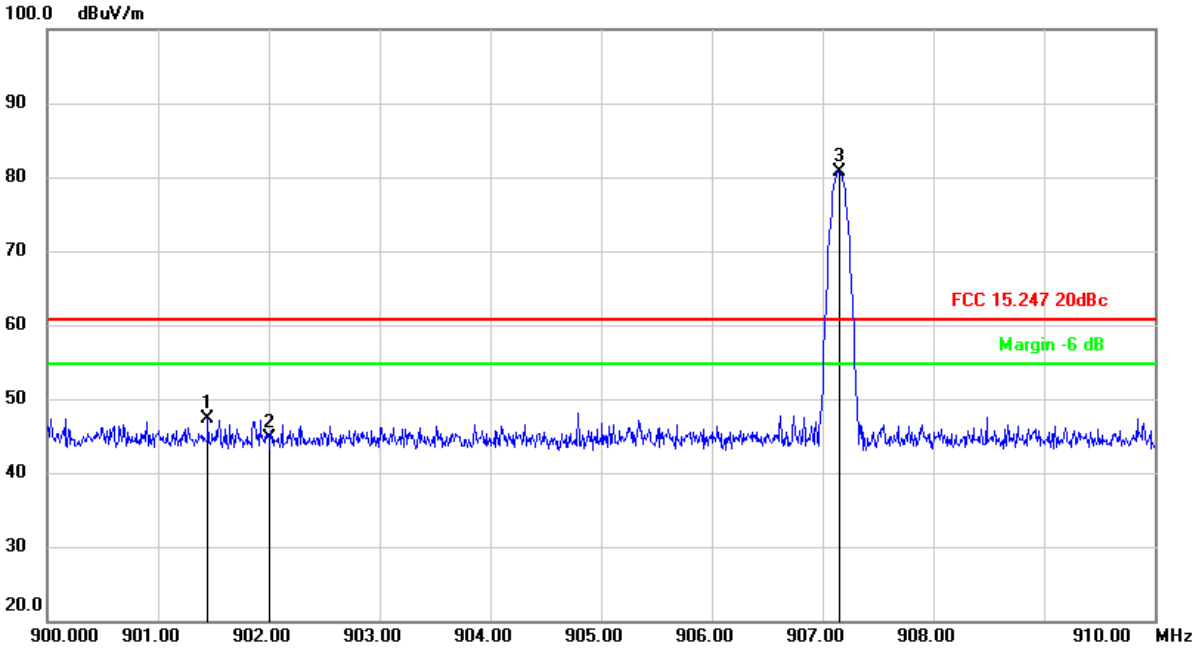
RADIATED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	900.6200	22.34	25.10	47.44	68.44	-21.00	peak
2	902.0000	20.16	25.12	45.28	68.44	-23.16	peak
3	907.1600	63.29	25.15	88.44	/	/	peak

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

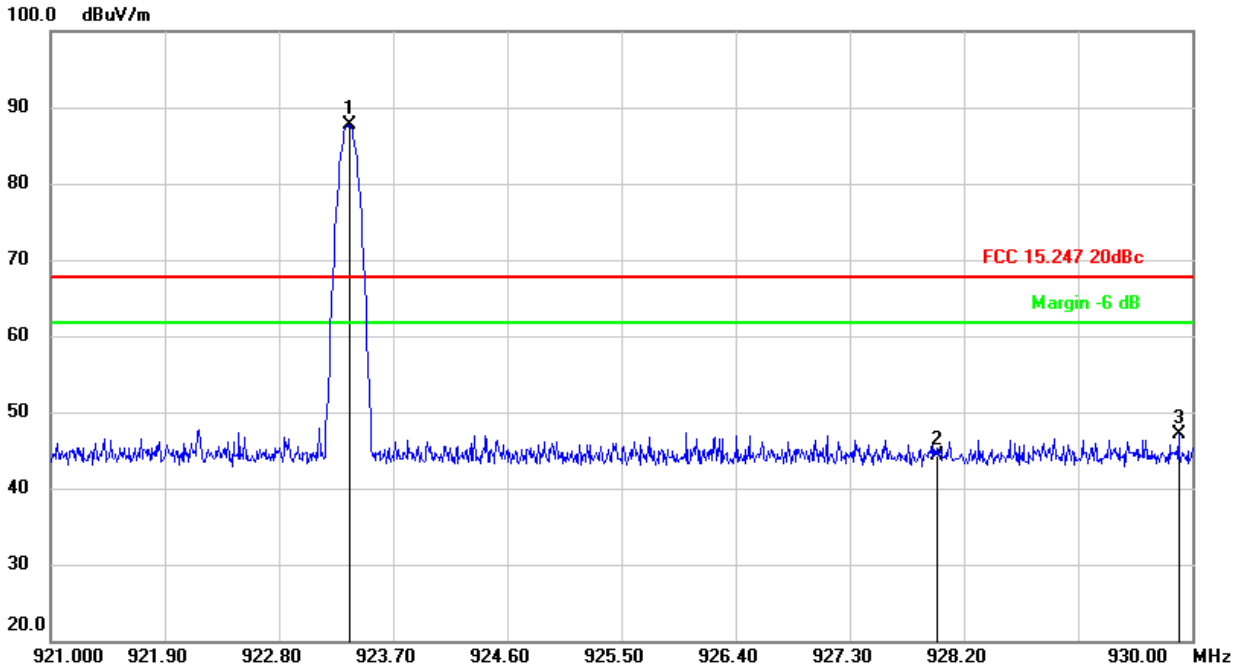
RADIATED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	901.4500	22.17	25.11	47.28	60.80	-13.52	peak
2	902.0000	19.61	25.12	44.73	60.80	-16.07	peak
3	907.1500	55.65	25.15	80.80	/	/	peak

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

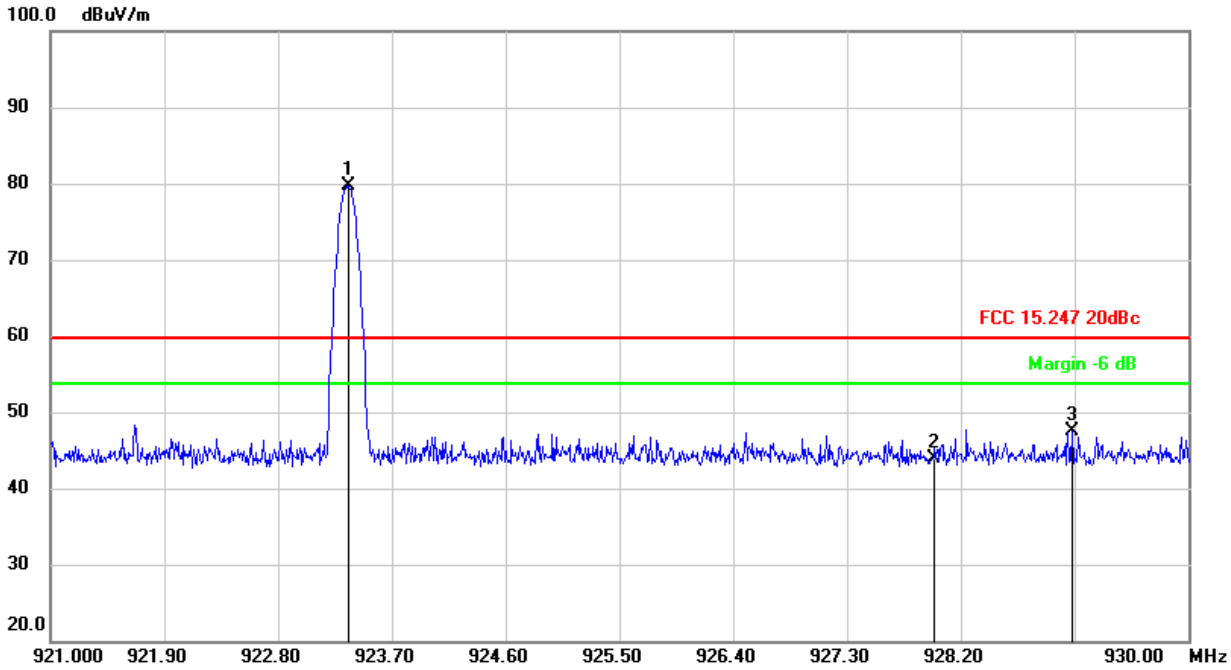
RADIATED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	923.3580	62.55	25.15	87.70	/	/	peak
2	928.0000	19.15	25.21	44.36	67.70	-23.34	peak
3	929.8920	21.93	25.23	47.16	67.70	-20.54	peak

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

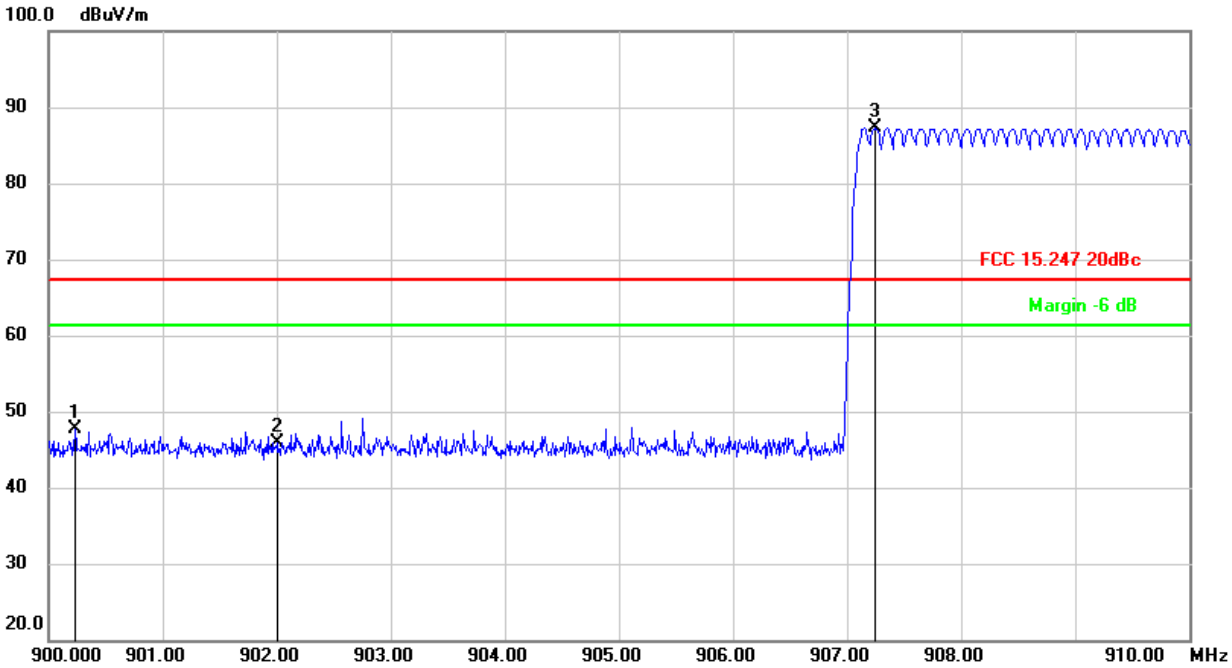
RADIATED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	923.3580	54.60	25.15	79.75	/	/	peak
2	928.0000	18.70	25.21	43.91	59.75	-15.84	peak
3	929.0820	22.20	25.22	47.42	59.75	-12.33	peak

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

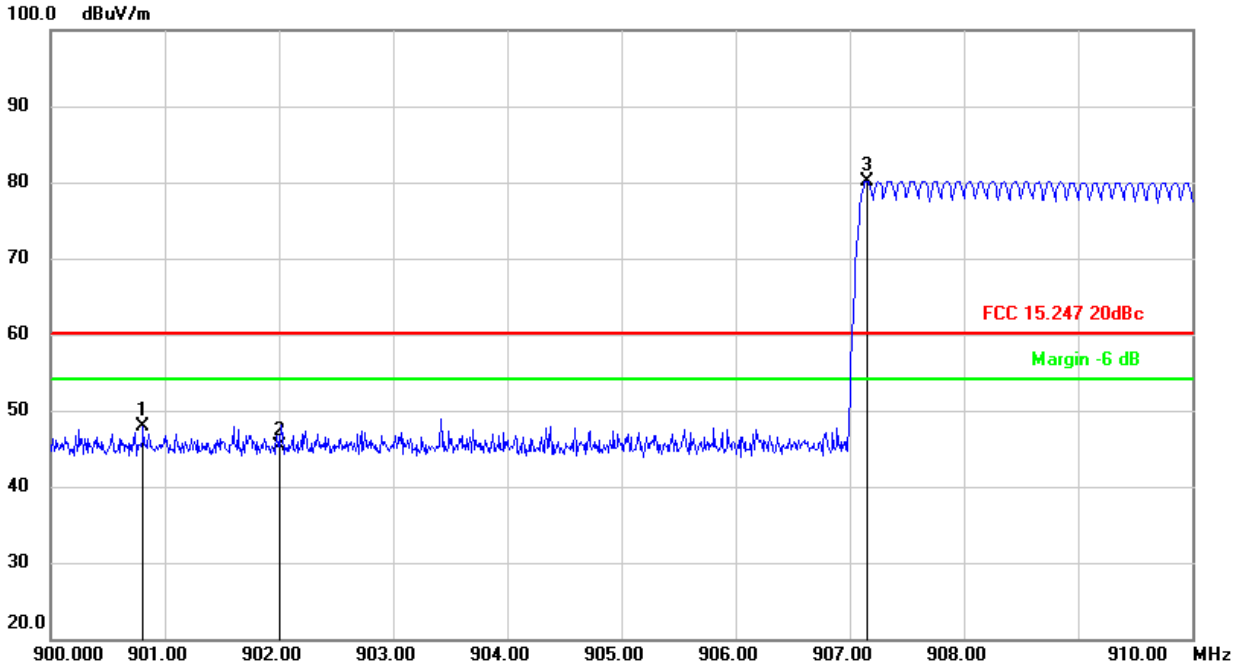
RADIATED BANDEDGE (LOW HOP CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	900.2300	22.51	25.10	47.61	67.21	-19.60	peak
2	902.0000	20.70	25.12	45.82	67.21	-21.39	peak
3	907.2500	62.06	25.15	87.21	/	/	peak

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

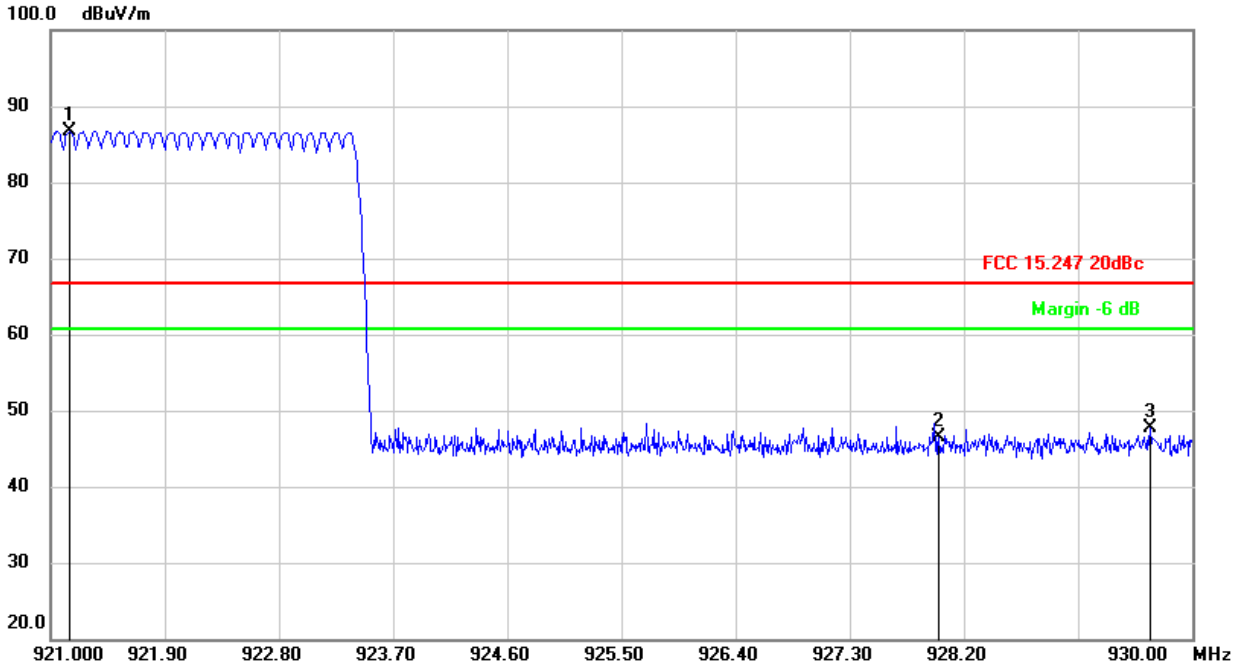
RADIATED BANDEDGE (LOW HOP CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	900.8100	22.89	25.10	47.99	60.19	-12.20	peak
2	902.0000	20.13	25.12	45.25	60.19	-14.94	peak
3	907.1500	55.04	25.15	80.19	/	/	peak

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

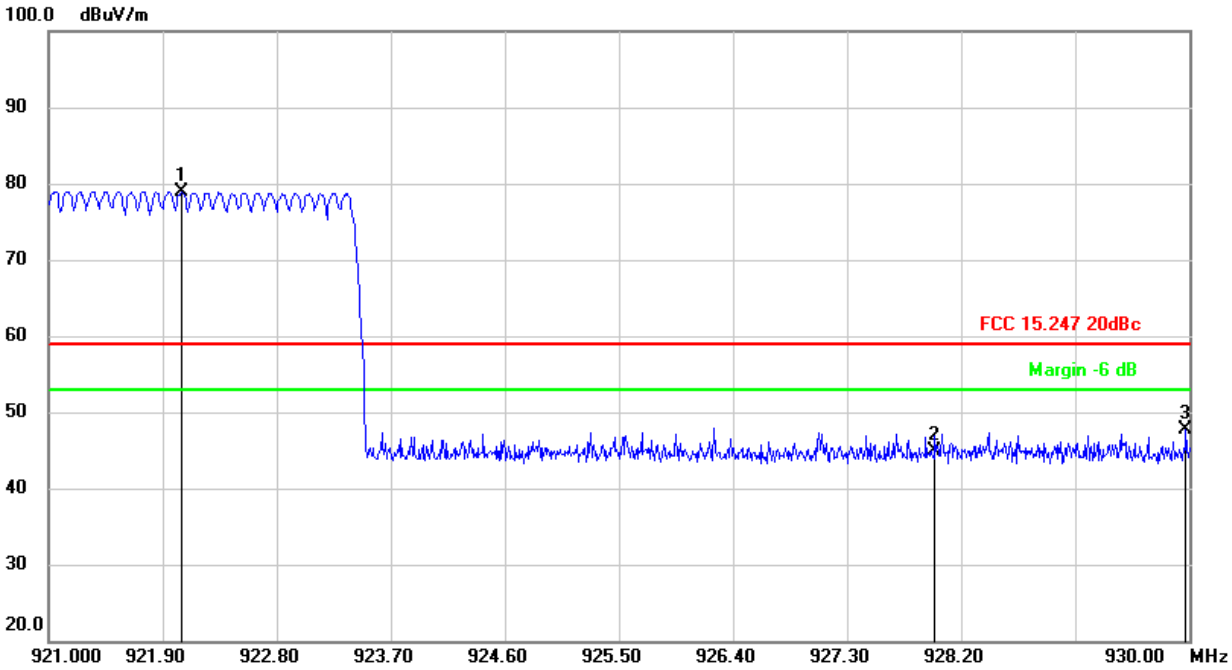
RADIATED BANDEDGE (HIGH HOP CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	921.1440	61.51	25.13	86.64	/	/	peak
2	928.0000	21.34	25.21	46.55	66.64	-20.09	peak
3	929.6670	22.43	25.23	47.66	66.64	-18.98	peak

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

RADIATED BANDEDGE (HIGH HOP CHANNEL, VERTICAL)



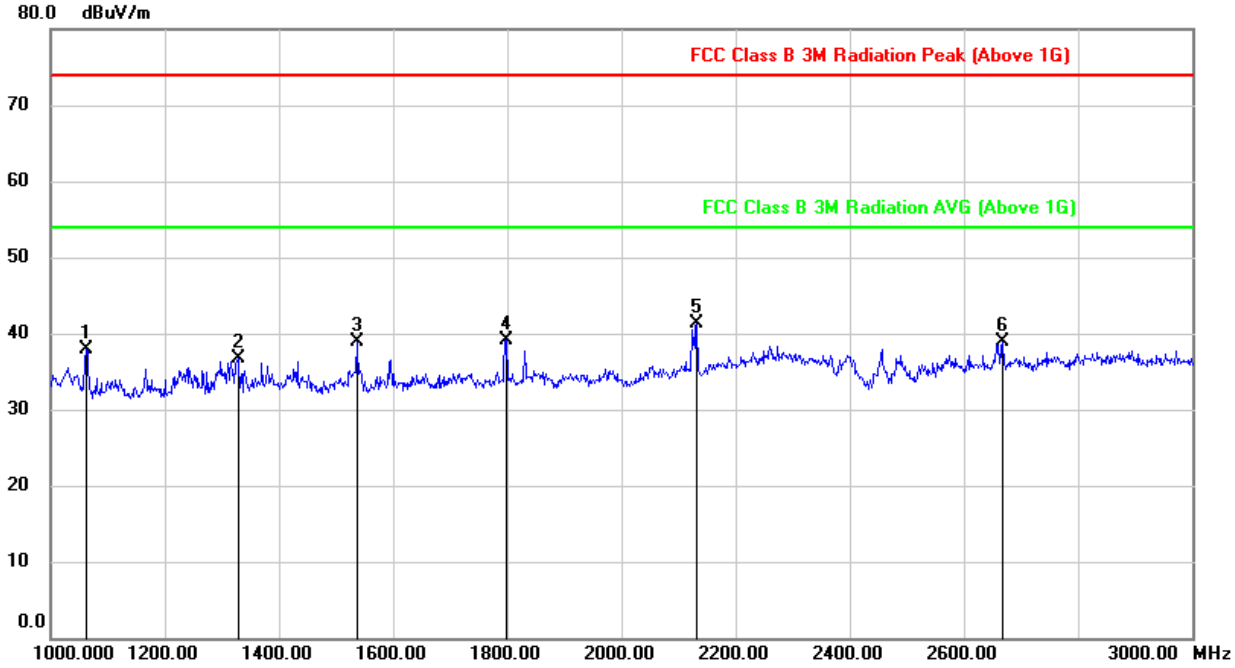
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	922.0530	53.80	25.14	78.94	/	/	peak
2	928.0000	19.68	25.21	44.89	58.94	-14.05	peak
3	929.9730	22.43	25.23	47.66	58.94	-11.28	peak

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

7.3. SPURIOUS EMISSIONS (1~10GHz)

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

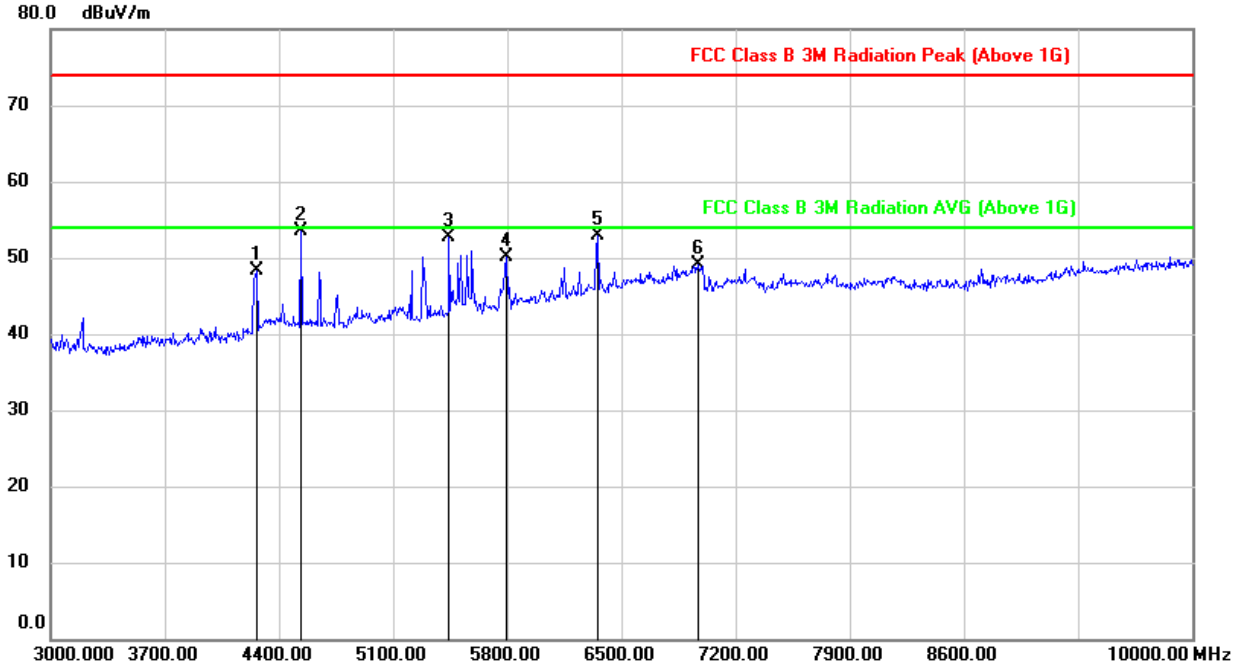
1GHz ~ 3GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1062.000	51.46	-13.62	37.84	74.00	-36.16	peak
2	1328.000	49.09	-12.38	36.71	74.00	-37.29	peak
3	1536.000	51.17	-12.32	38.85	74.00	-35.15	peak
4	1798.000	50.24	-11.13	39.11	74.00	-34.89	peak
5	2132.000	50.40	-9.16	41.24	74.00	-32.76	peak
6	2668.000	46.58	-7.77	38.81	74.00	-35.19	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

3GHz ~ 10GHz

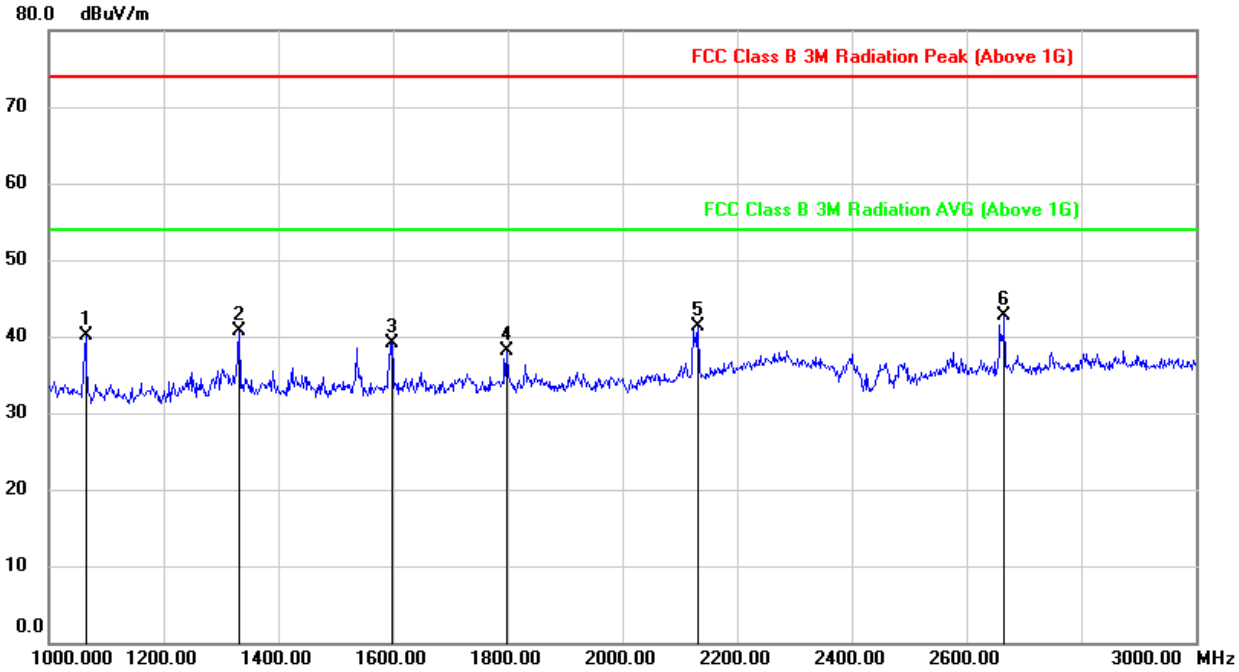


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4267.000	50.11	-1.84	48.27	74.00	-25.73	peak
2	4533.000	54.27	-0.80	53.47	74.00	-20.53	peak
3	5443.000	50.80	1.95	52.75	74.00	-21.25	peak
4	5793.000	47.52	2.64	50.16	74.00	-23.84	peak
5	6353.000	48.26	4.63	52.89	74.00	-21.11	peak
6	6969.000	42.27	6.84	49.11	74.00	-24.89	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

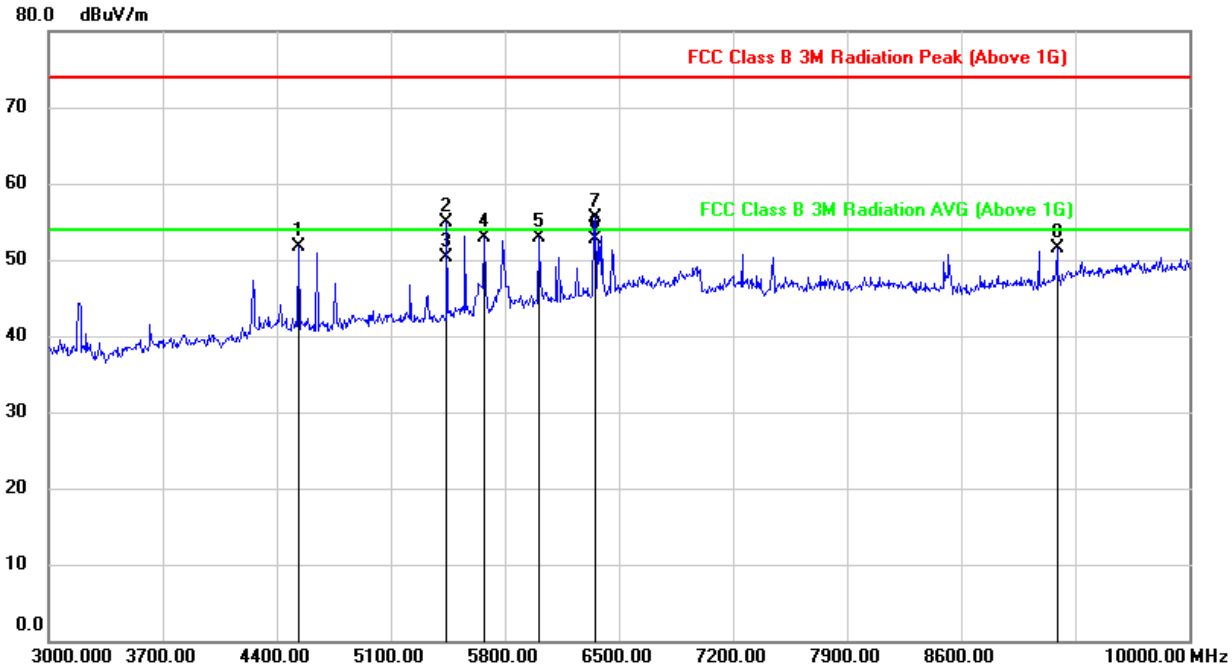
1GHz ~ 3GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1064.000	53.94	-13.92	40.02	74.00	-33.98	peak
2	1332.000	53.12	-12.48	40.64	74.00	-33.36	peak
3	1598.000	51.21	-12.06	39.15	74.00	-34.85	peak
4	1798.000	49.15	-11.13	38.02	74.00	-35.98	peak
5	2132.000	50.48	-9.26	41.22	74.00	-32.78	peak
6	2666.000	50.50	-7.84	42.66	74.00	-31.34	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton=0.02K, where: Ton is transmit duration.
5. For transmit duration, please refer to clause 6.1 .

3GHz ~ 10GHz

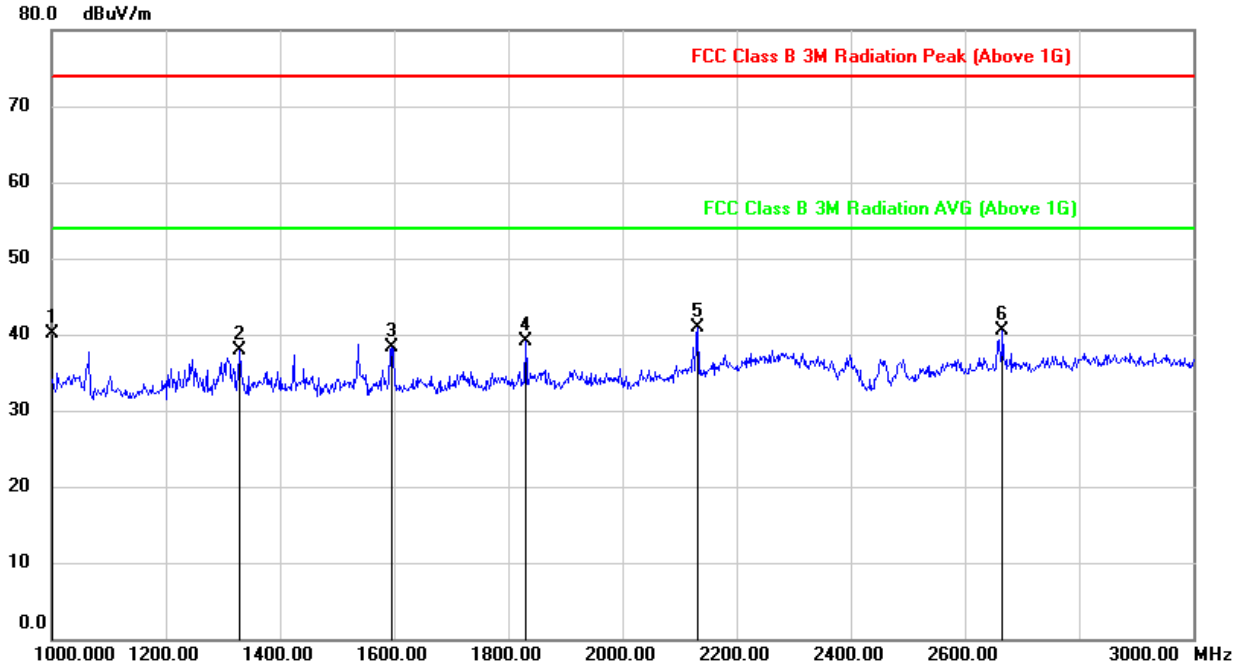


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4533.000	52.49	-0.70	51.79	74.00	-22.21	peak
2	5443.000	52.99	1.95	54.94	74.00	-19.06	peak
3	5443.000	48.35	1.95	50.30	54.00	-3.70	AVG
4	5674.000	50.62	2.30	52.92	74.00	-21.08	peak
5	6010.000	49.61	3.34	52.95	74.00	-21.05	peak
6	6349.983	48.02	4.63	52.65	54.00	-1.35	AVG
7	6353.000	50.96	4.64	55.60	74.00	-18.40	peak
8	9188.000	41.36	10.16	51.52	74.00	-22.48	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton=0.02K, where: Ton is transmit duration.
5. For transmit duration, please refer to clause 6.1 .

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

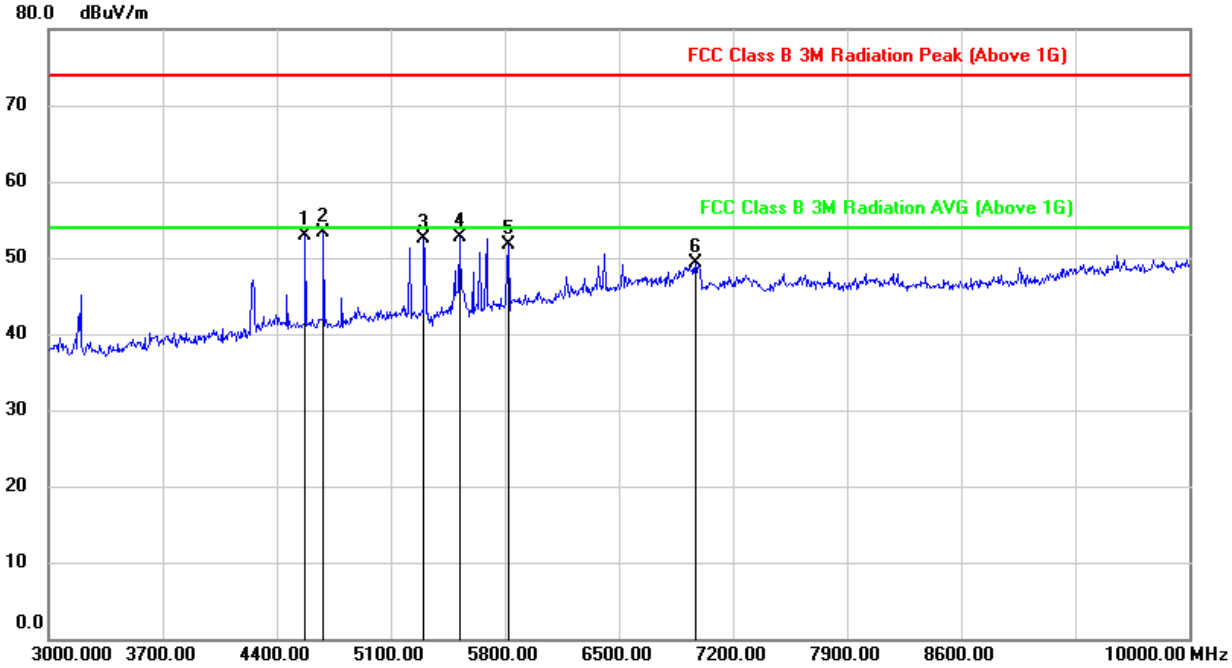
1GHz ~ 3GHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1000.0000	54.25	-14.21	40.04	74.00	-33.96	peak
2	1330.000	50.30	-12.38	37.92	74.00	-36.08	peak
3	1596.000	50.46	-12.09	38.37	74.00	-35.63	peak
4	1830.000	50.16	-10.98	39.18	74.00	-34.82	peak
5	2132.000	50.01	-9.16	40.85	74.00	-33.15	peak
6	2666.000	48.29	-7.78	40.51	74.00	-33.49	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

3GHz ~ 10GHz

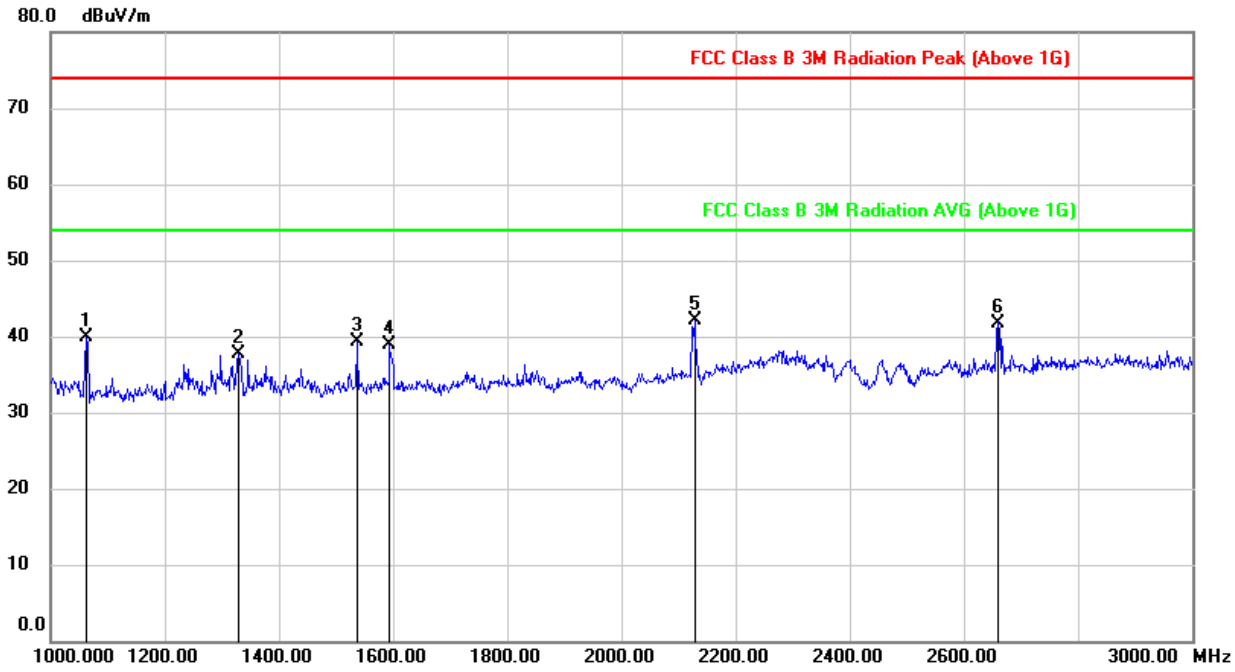


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4575.000	53.74	-0.79	52.95	74.00	-21.05	peak
2	4687.000	54.01	-0.63	53.38	74.00	-20.62	peak
3	5303.000	51.48	1.06	52.54	74.00	-21.46	peak
4	5520.000	50.43	2.32	52.75	74.00	-21.25	peak
5	5821.000	48.94	2.76	51.70	74.00	-22.30	peak
6	6969.000	42.42	6.84	49.26	74.00	-24.74	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

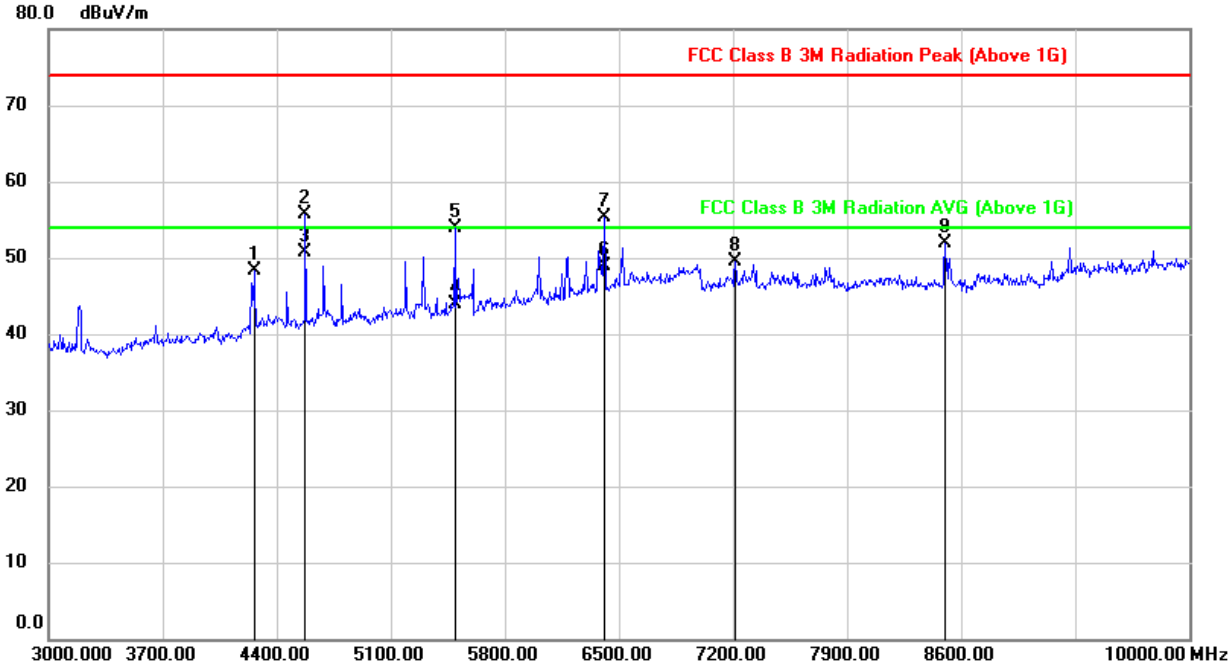
1GHz ~ 3GHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1062.000	53.74	-13.92	39.82	74.00	-34.18	peak
2	1328.000	50.18	-12.51	37.67	74.00	-36.33	peak
3	1536.000	51.62	-12.27	39.35	74.00	-34.65	peak
4	1594.000	50.95	-12.08	38.87	74.00	-35.13	peak
5	2128.000	51.50	-9.31	42.19	74.00	-31.81	peak
6	2660.000	49.68	-7.88	41.80	74.00	-32.20	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

3GHz ~ 10GHz

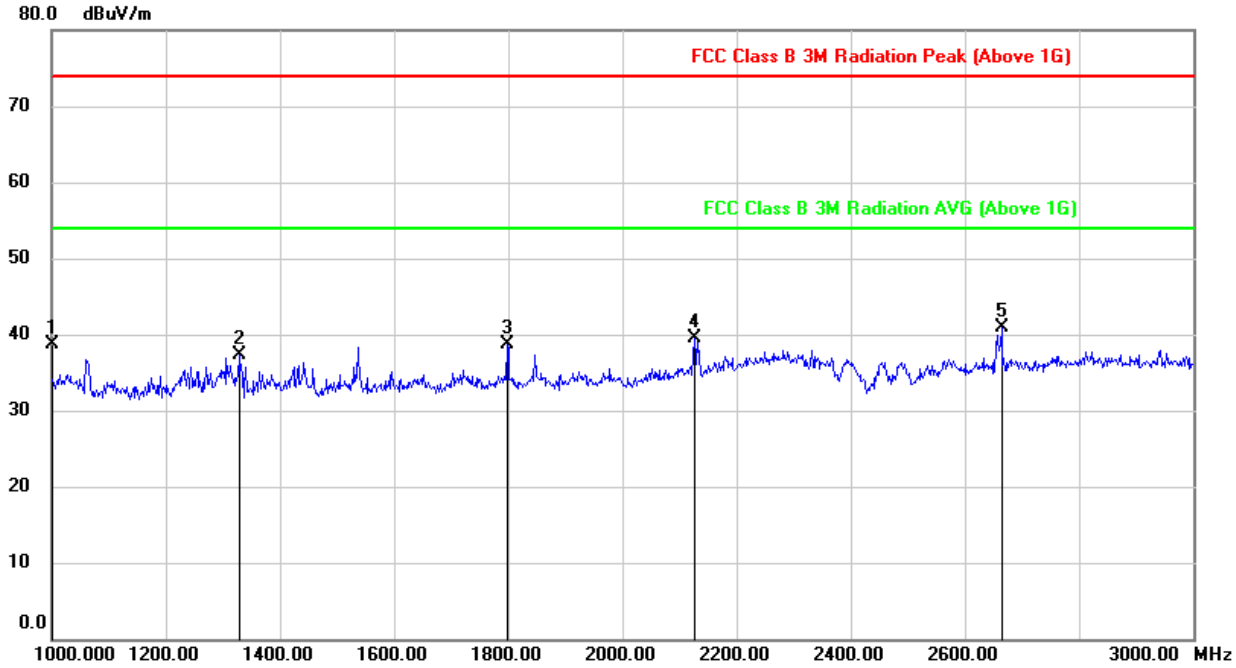


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4260.000	50.09	-1.80	48.29	74.00	-25.71	peak
2	4576.250	56.25	-0.63	55.62	74.00	-18.38	peak
3	4576.259	51.35	-0.63	50.72	54.00	-3.28	AVG
4	5491.480	41.68	2.30	43.98	54.00	-10.02	AVG
5	5491.500	51.62	2.30	53.92	74.00	-20.08	peak
6	6406.722	44.24	4.76	49.00	54.00	-5.00	AVG
7	6406.750	50.46	4.76	55.22	74.00	-18.78	peak
8	7214.000	41.67	7.82	49.49	74.00	-24.51	peak
9	8502.000	43.39	8.49	51.88	74.00	-22.12	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton=0.02K, where: Ton is transmit duration.
5. For transmit duration, please refer to clause 6.1 .

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

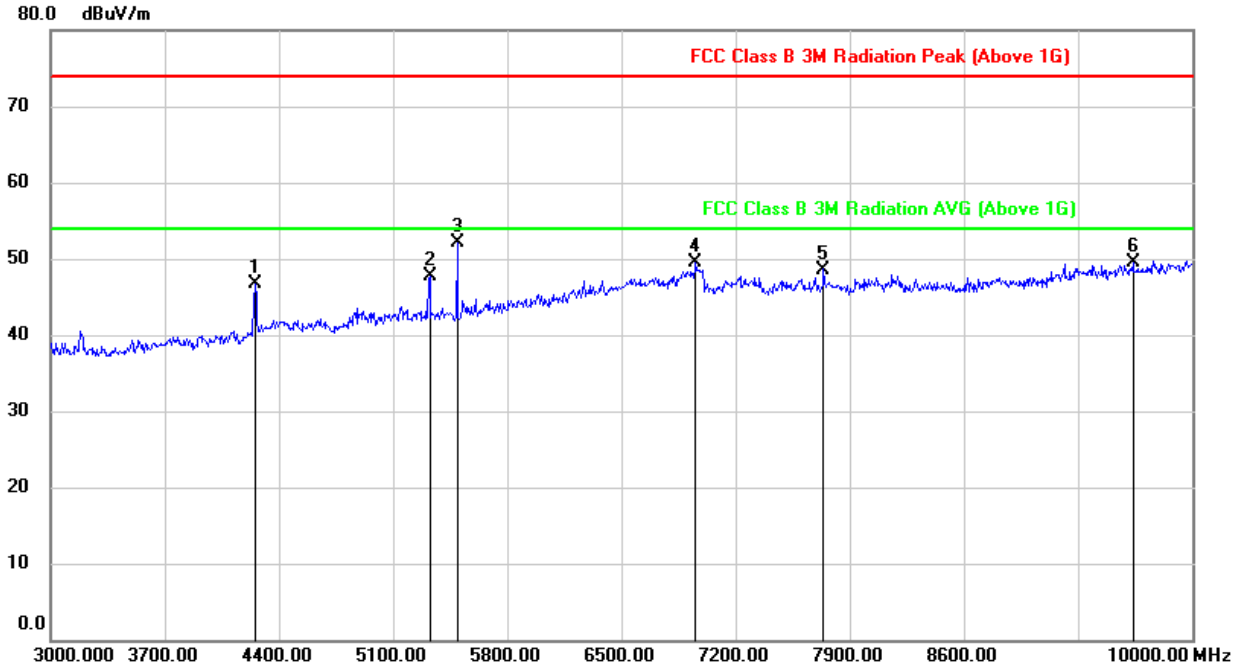
1GHz ~ 3GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1000.0000	52.85	-14.21	38.64	74.00	-35.36	peak
2	1328.000	49.67	-12.38	37.29	74.00	-36.71	peak
3	1798.000	49.79	-11.13	38.66	74.00	-35.34	peak
4	2126.000	48.74	-9.24	39.50	74.00	-34.50	peak
5	2664.000	48.66	-7.78	40.88	74.00	-33.12	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

3GHz ~ 10GHz

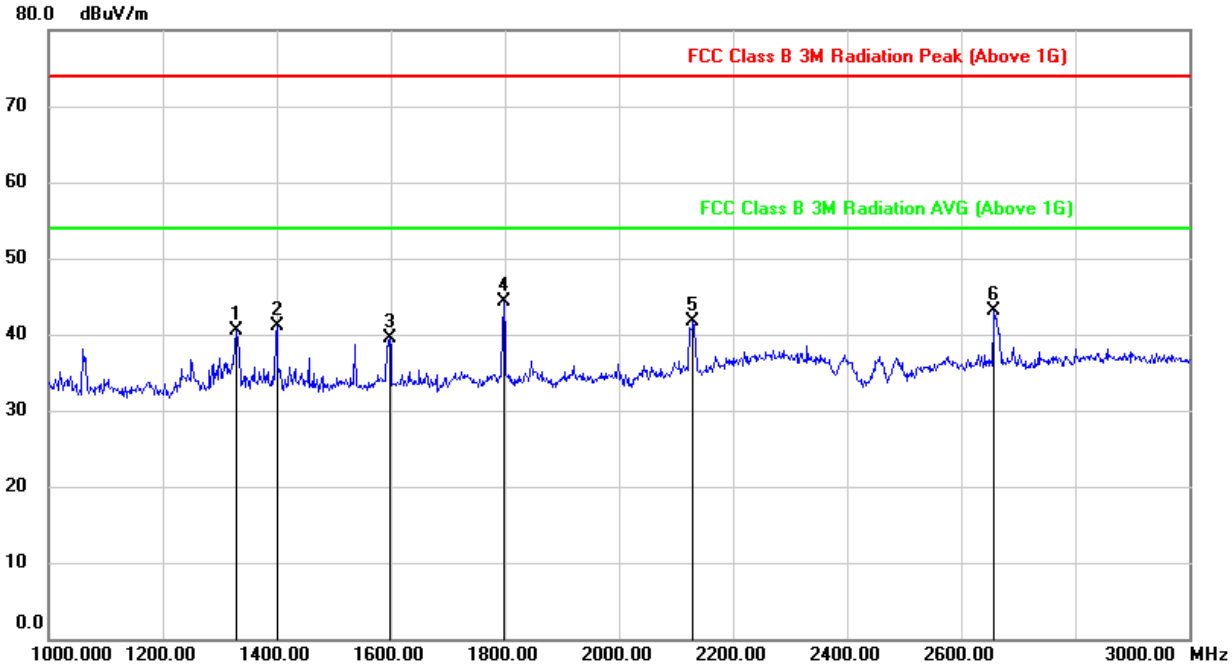


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4253.000	48.76	-1.97	46.79	74.00	-27.21	peak
2	5324.000	46.57	1.15	47.72	74.00	-26.28	peak
3	5492.000	49.75	2.30	52.05	74.00	-21.95	peak
4	6955.000	42.70	6.78	49.48	74.00	-24.52	peak
5	7739.000	40.49	8.11	48.60	74.00	-25.40	peak
6	9636.000	38.27	11.22	49.49	74.00	-24.51	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

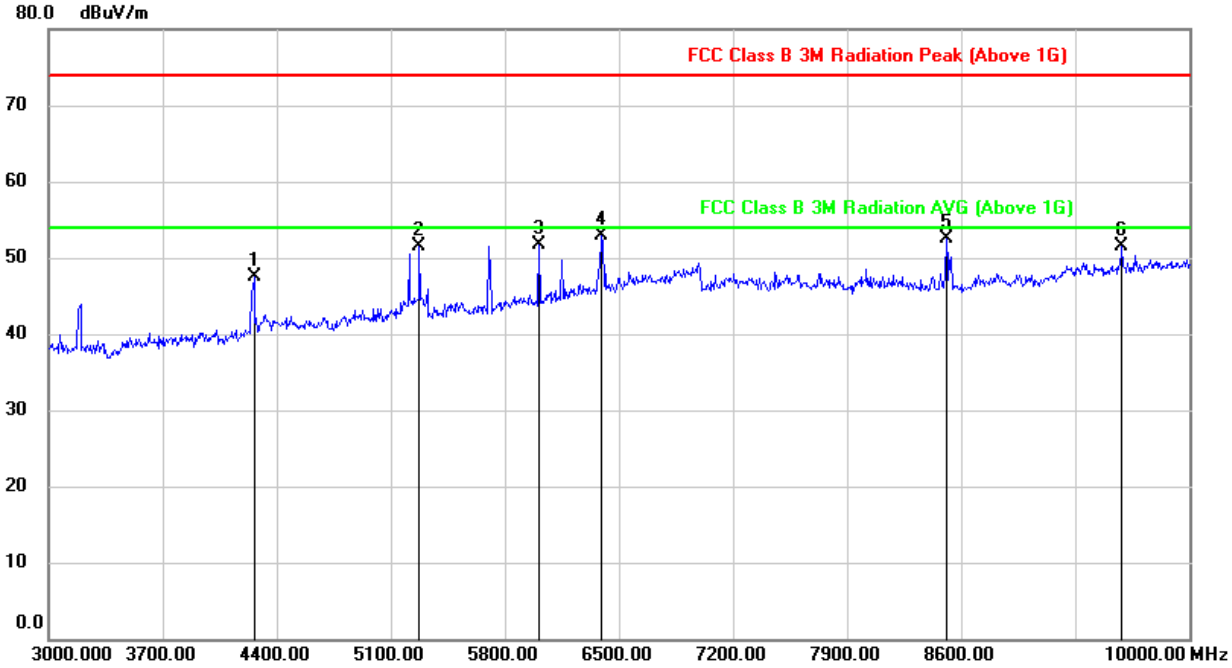
1GHz ~ 3GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1328.000	52.97	-12.51	40.46	74.00	-33.54	peak
2	1400.000	53.61	-12.46	41.15	74.00	-32.85	peak
3	1598.000	51.62	-12.06	39.56	74.00	-34.44	peak
4	1798.000	55.51	-11.13	44.38	74.00	-29.62	peak
5	2130.000	50.93	-9.28	41.65	74.00	-32.35	peak
6	2658.000	51.01	-7.90	43.11	74.00	-30.89	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

3GHz ~ 10GHz

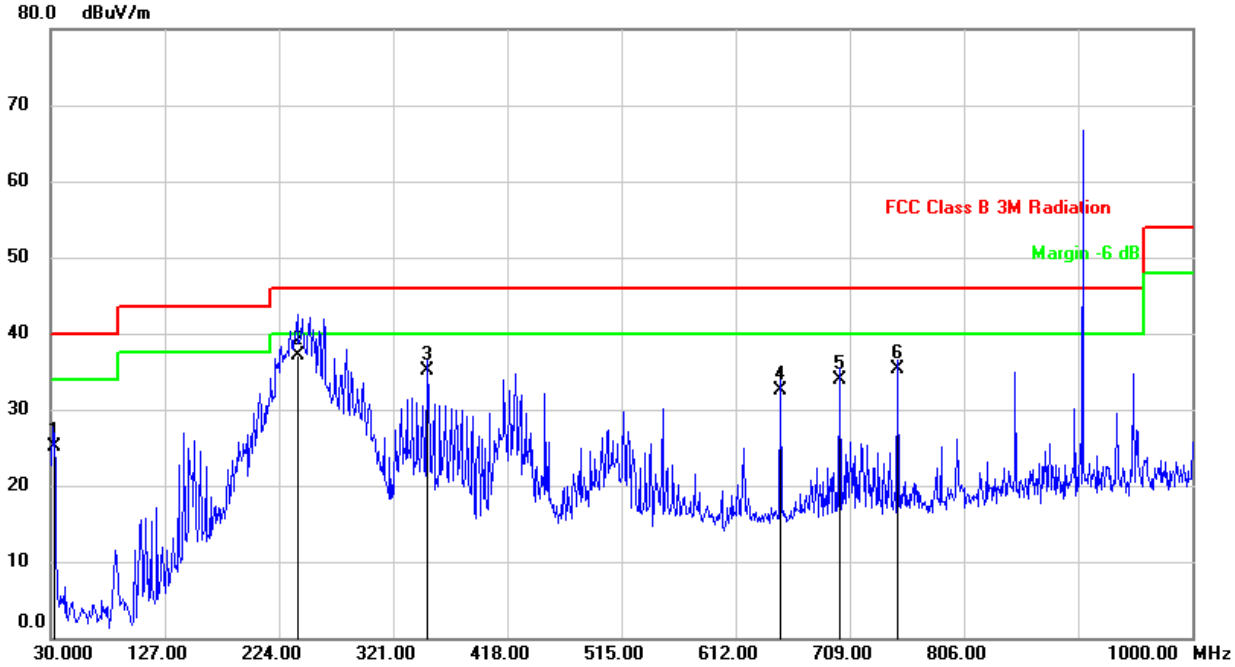


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4260.000	49.36	-1.80	47.56	74.00	-26.44	peak
2	5275.000	50.50	1.07	51.57	74.00	-22.43	peak
3	6010.000	48.33	3.34	51.67	74.00	-22.33	peak
4	6388.000	48.16	4.74	52.90	74.00	-21.10	peak
5	8509.000	43.92	8.51	52.43	74.00	-21.57	peak
6	9587.000	40.14	11.31	51.45	74.00	-22.55	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

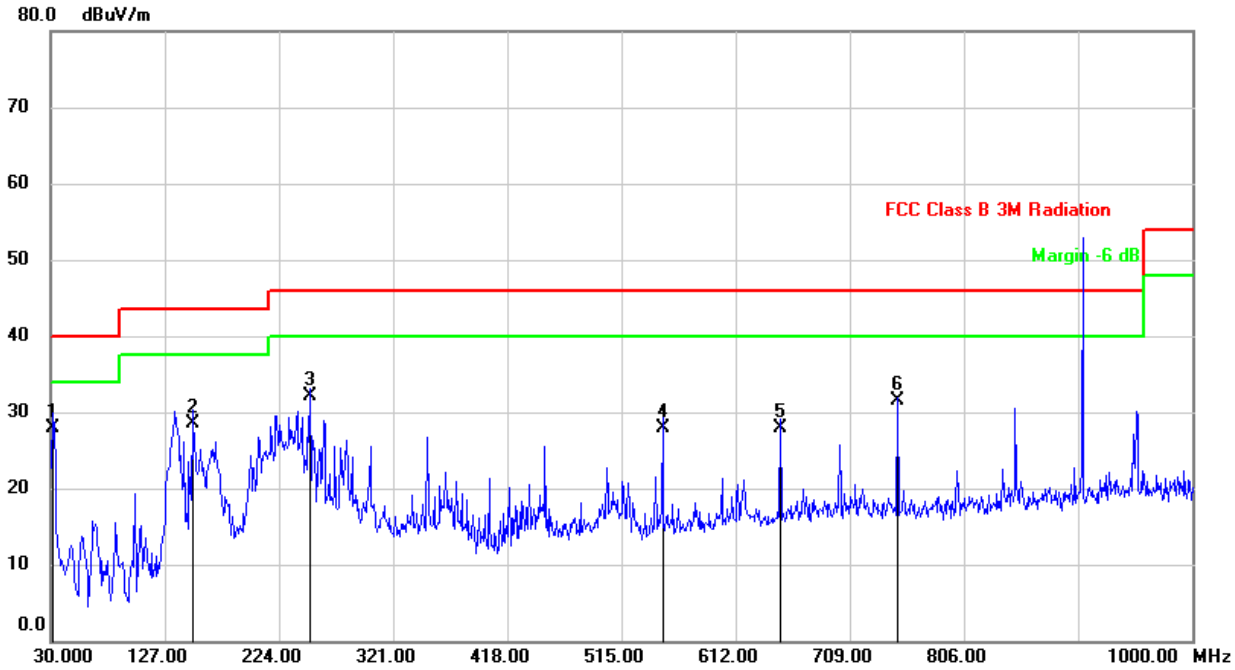
SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	32.9100	44.38	-19.21	25.17	40.00	-14.83	QP
2	239.5200	55.07	-18.00	37.07	46.00	-8.93	QP
3	350.1000	49.03	-13.83	35.20	46.00	-10.80	QP
4	649.8300	41.06	-8.60	32.46	46.00	-13.54	QP
5	700.2700	41.69	-7.82	33.87	46.00	-12.13	QP
6	749.7400	42.74	-7.52	35.22	46.00	-10.78	QP

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.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.9400	47.00	-19.15	27.85	40.00	-12.15	QP
2	150.2800	45.81	-17.35	28.46	43.50	-15.04	QP
3	250.1900	49.80	-17.70	32.10	46.00	-13.90	QP
4	549.9200	38.05	-10.10	27.95	46.00	-18.05	QP
5	649.8300	36.46	-8.60	27.86	46.00	-18.14	QP
6	749.7400	39.05	-7.52	31.53	46.00	-14.47	QP

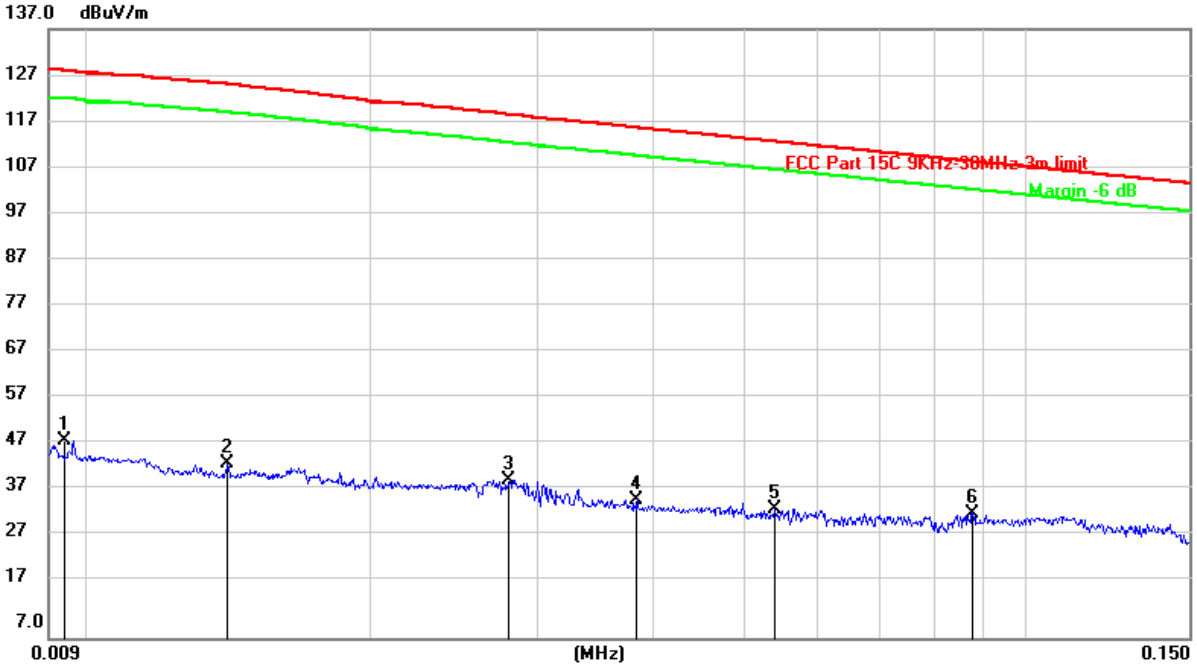
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

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

7.5. SPURIOUS EMISSIONS BELOW 30M

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

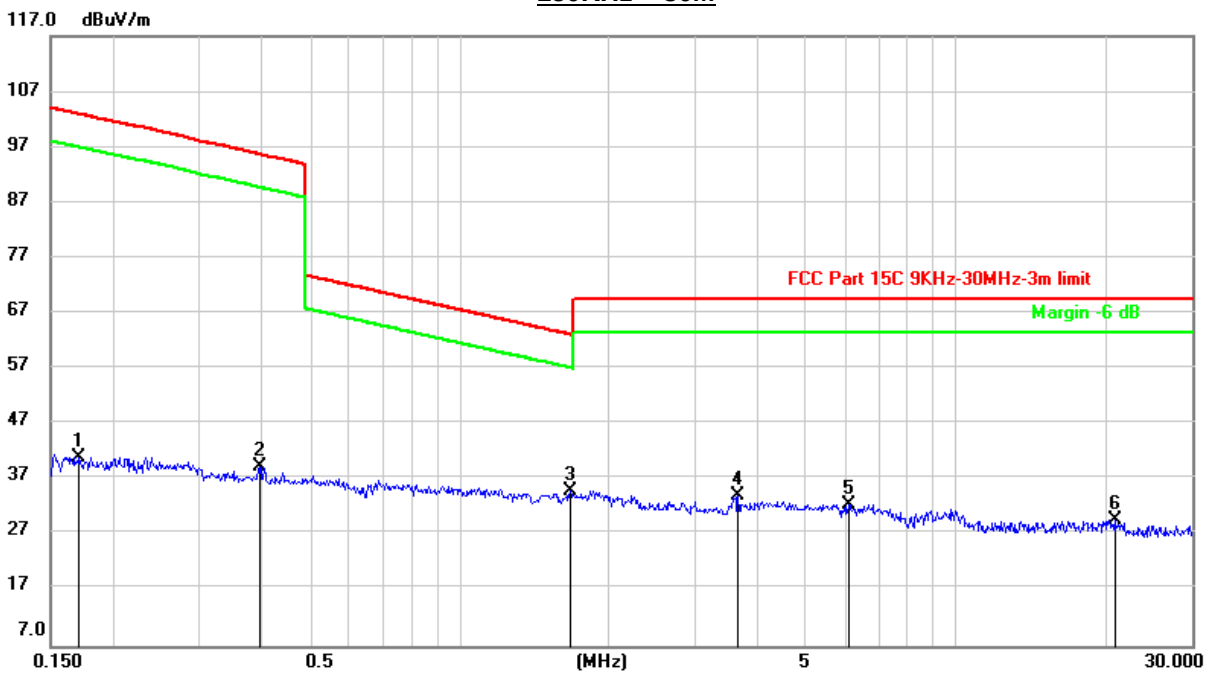
9KHz~ 150KHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(KHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0094	28.99	20.26	49.25	128.06	-78.81	peak
2	0.0140	23.97	20.25	44.22	125.19	-80.97	peak
3	0.0280	20.28	20.31	40.59	118.76	-78.17	peak
4	0.0383	16.25	20.31	36.56	115.98	-79.42	peak
5	0.0539	14.13	20.31	34.44	113.00	-78.56	peak
6	0.0879	13.39	20.26	33.65	108.73	-75.08	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

150KHz ~ 30M

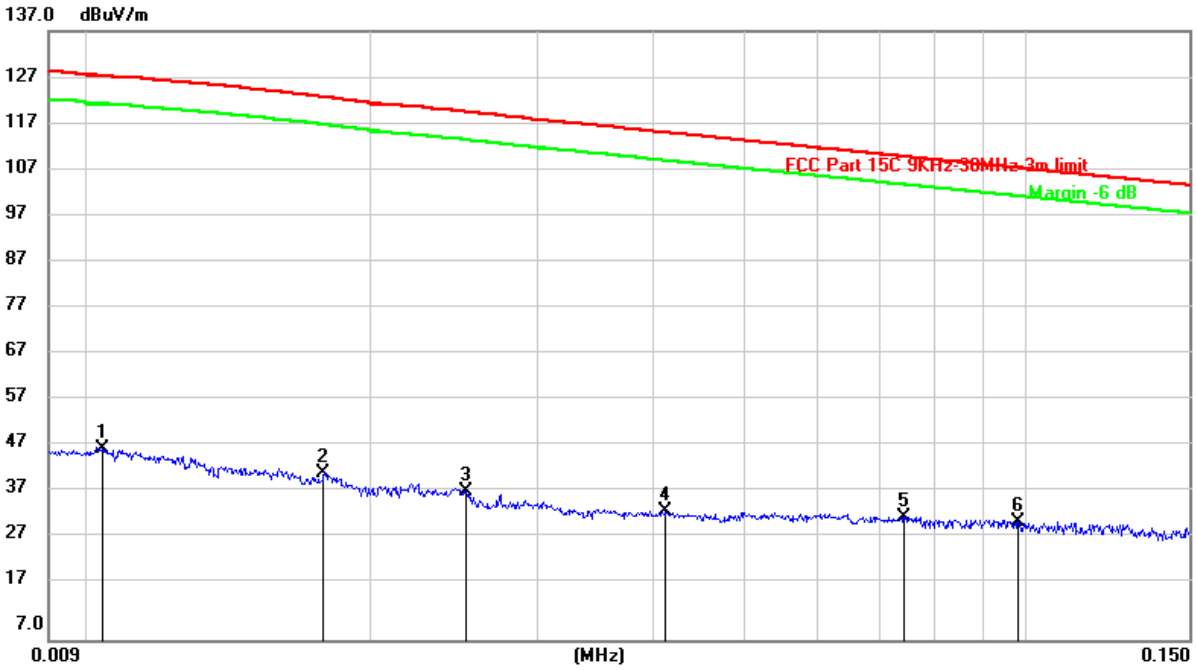


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.1711	20.58	20.40	40.98	102.95	-61.97	peak
2	0.3955	18.99	20.27	39.26	95.67	-56.41	peak
3	1.6713	14.38	20.61	34.99	63.15	-28.16	peak
4	3.6417	12.99	21.00	33.99	69.54	-35.55	peak
5	6.0884	11.64	20.87	32.51	69.54	-37.03	peak
6	20.9237	8.56	21.13	29.69	69.54	-39.85	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

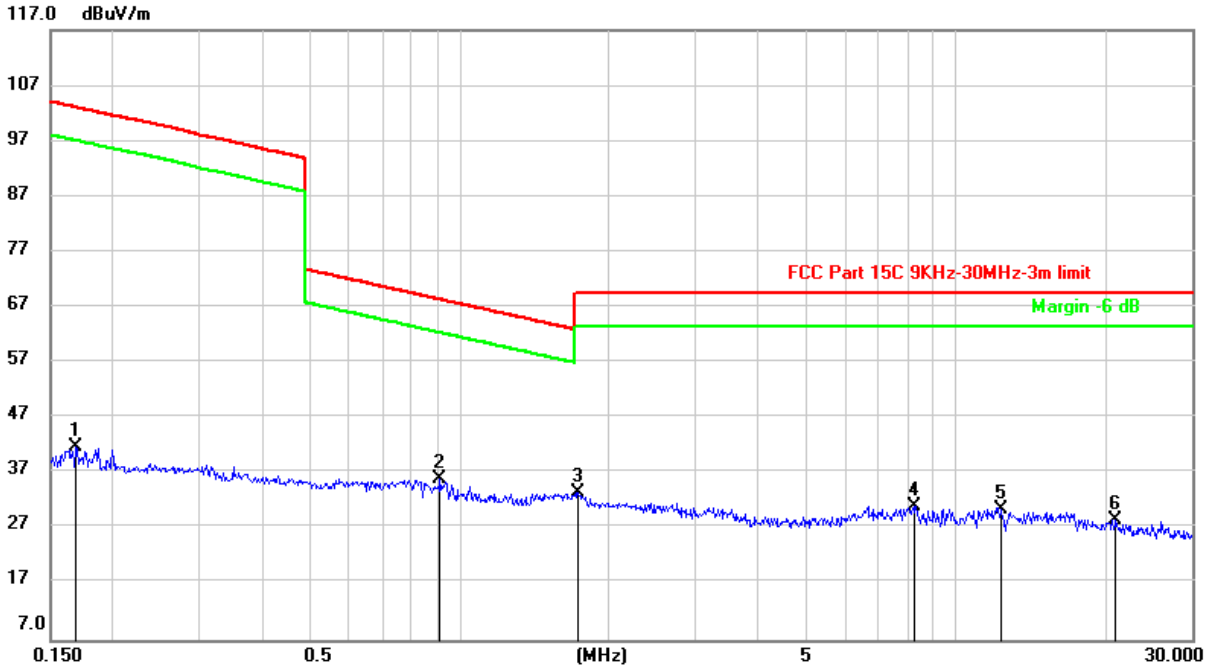
9KHz~ 150KHz



No.	Frequency (KHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0103	27.57	20.21	47.78	127.42	-79.64	peak
2	0.0177	22.46	20.29	42.75	122.96	-80.21	peak
3	0.0252	18.29	20.31	38.60	119.75	-81.15	peak
4	0.0412	14.00	20.31	34.31	115.33	-81.02	peak
5	0.0742	12.99	20.31	33.30	110.21	-76.91	peak
6	0.0984	11.89	20.23	32.12	107.75	-75.63	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

150KHz ~ 30M



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.1685	21.43	20.40	41.83	103.08	-61.25	peak
2	0.9133	15.59	20.37	35.96	68.40	-32.44	peak
3	1.7338	12.97	20.64	33.61	69.54	-35.93	peak
4	8.2347	10.19	20.97	31.16	69.54	-38.38	peak
5	12.3178	9.63	21.00	30.63	69.54	-38.91	peak
6	21.0350	7.37	21.15	28.52	69.54	-41.02	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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

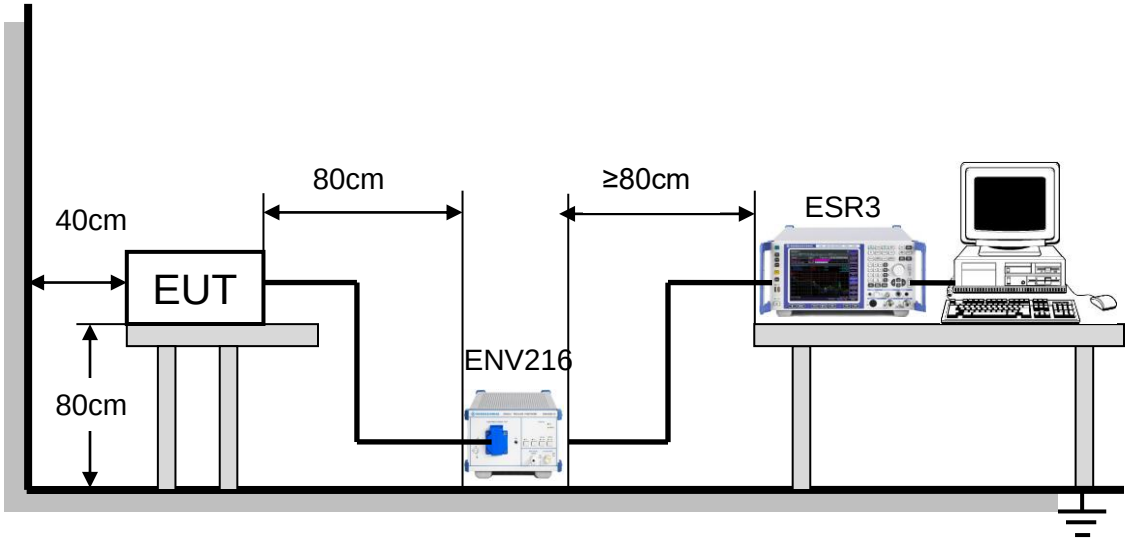
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8.

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE



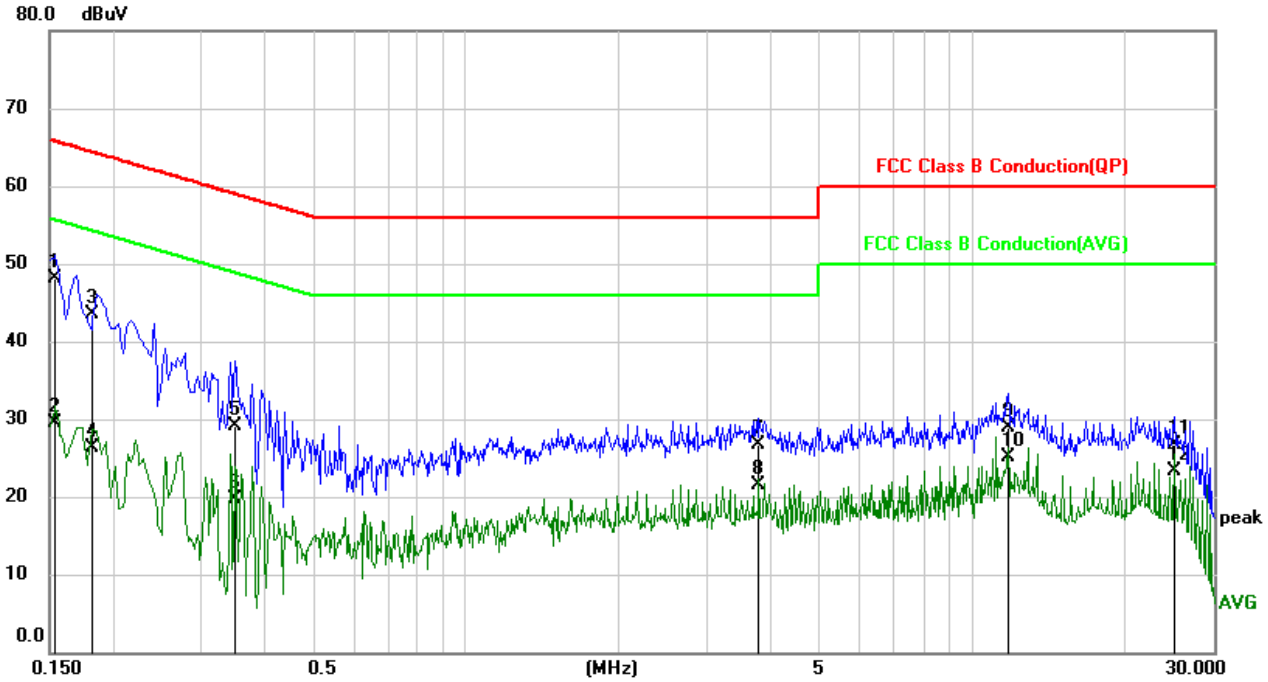
The EUT is put on a table of non-conducting material that is 0.8m high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). An EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST ENVIRONMENT

Temperature	22.8°C	Relative Humidity	65%
Atmosphere Pressure	101kPa	Test Voltage	DC 7.4V

RESULTS(LOW CHANNEL, WORST-CASE CONFIGURATION)

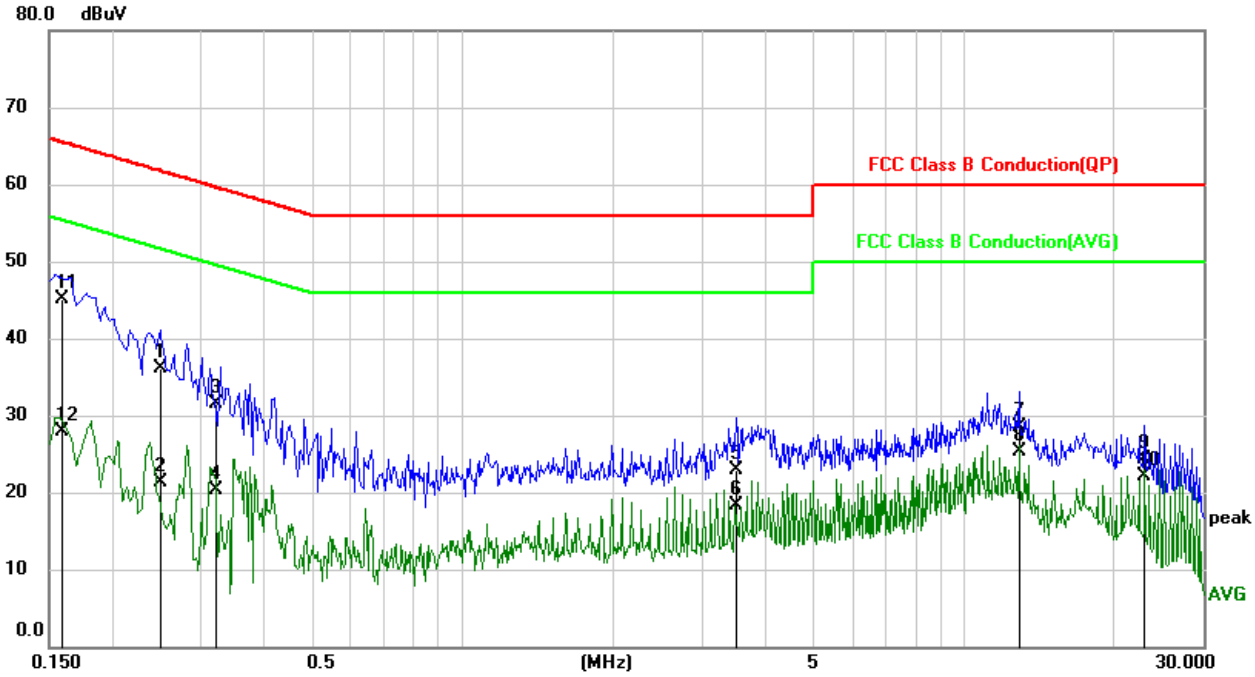
LINE N RESULTS



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1525	38.44	9.62	48.06	65.86	-17.80	QP
2	0.1525	19.81	9.62	29.43	55.86	-26.43	AVG
3	0.1824	33.94	9.62	43.56	64.38	-20.82	QP
4	0.1824	16.78	9.62	26.40	54.38	-27.98	AVG
5	0.3465	19.53	9.63	29.16	59.05	-29.89	QP
6	0.3465	10.14	9.63	19.77	49.05	-29.28	AVG
7	3.7902	16.95	9.69	26.64	56.00	-29.36	QP
8	3.7902	11.80	9.69	21.49	46.00	-24.51	AVG
9	11.7471	18.93	10.02	28.95	60.00	-31.05	QP
10	11.7471	15.15	10.02	25.17	50.00	-24.83	AVG
11	25.1699	16.69	9.97	26.66	60.00	-33.34	QP
12	25.1699	13.29	9.97	23.26	50.00	-26.74	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.
5. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.

LINE L RESULTS



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.2502	26.44	9.63	36.07	61.75	-25.68	QP
2	0.2502	11.61	9.63	21.24	51.75	-30.51	AVG
3	0.3250	21.82	9.63	31.45	59.58	-28.13	QP
4	0.3250	10.72	9.63	20.35	49.58	-29.23	AVG
5	3.5060	13.30	9.69	22.99	56.00	-33.01	QP
6	3.5060	8.71	9.69	18.40	46.00	-27.60	AVG
7	12.8662	18.54	9.94	28.48	60.00	-31.52	QP
8	12.8662	15.38	9.94	25.32	50.00	-24.68	AVG
9	22.9332	14.48	9.89	24.37	60.00	-35.63	QP
10	22.9332	12.15	9.89	22.04	50.00	-27.96	AVG
11	0.1596	35.54	9.64	45.18	65.48	-20.30	QP
12	0.1596	18.17	9.64	27.81	55.48	-27.67	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.
5. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.

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

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.

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.

ANTENNA CONNECTOR

EUT has a external antenna with an antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT