FCC/ISED RF TEST REPORT

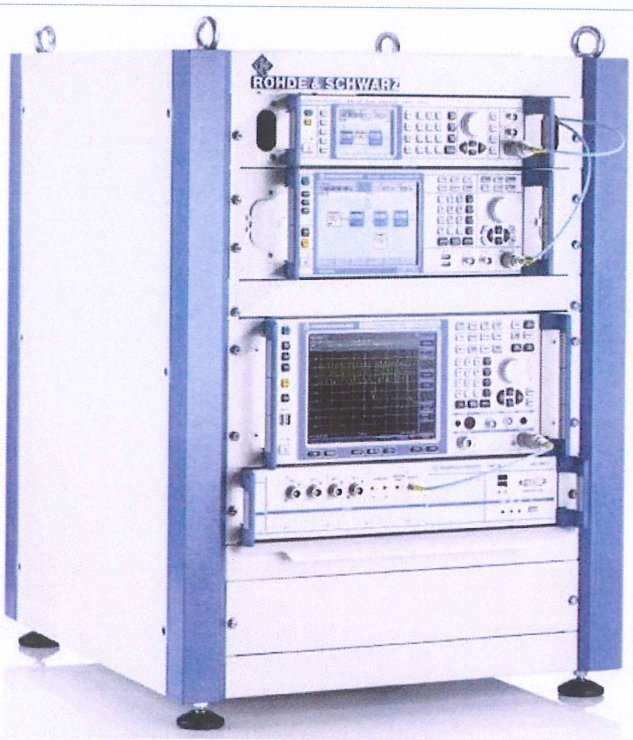
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

RF 5G Wireless Module (Pin type)

ISSUED TO
SYNCOMM TECHNOLOGY CORP.

10F., No.101, Sec.2 Gongdao 5th Rd., Hsinchu City, Taiwan 300, R.O.C



Report No.:	BL-HK1930562-601
EUT Name:	RF 5G Wireless Module (Pin type)
Model Name:	IA9QH5 S83D-F
Brand Name:	Syncomm
Test Standard:	47 CFR Part 15 Subpart E
	RSS-Gen (Issue 5, April 2018)
	RSS-247 (Issue 2, February 2017)
FCC ID:	PJH-IA9QH5S83D-F
ISED Number:	24253-IA9QH5S83DF
Test Conclusion:	Pass
Test Date:	Mar. 28, 2019 ~ Apr. 27, 2019
Date of Issue:	May 30, 2019

Prepared by: _____
Heng Aiping
(Engineer)
Date May 30, 2019

Approved by: _____
Wei Yanquan
(Chief Engineer)
Date May 30, 2019

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	May 16, 2019	Initial Issue
Rev. 02	May 30, 2019	Update the description of note 1 on page 8

TABLE OF CONTENTS

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20℃ to 25℃
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

(1) The test report reference to the report template version v4.3.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	SYNCOMM TECHNOLOGY CORP.
Address	10F., No.101, Sec.2 Gongdao 5th Rd., Hsinchu City, Taiwan 300, R.O.C

2.2 Manufacturer

Manufacturer	SYNCOMM TECHNOLOGY CORP.
Address	10F., No.101, Sec.2 Gongdao 5th Rd., Hsinchu City, Taiwan 300, R.O.C

2.3 Factory

Factory	SYNCOMM TECHNOLOGY CORP.
Address	10F., No.101, Sec.2 Gongdao 5th Rd., Hsinchu City, Taiwan 300, R.O.C

2.4 General Description for Equipment under Test (EUT)

EUT Name	RF 5G Wireless Module (Pin type)
Model Name Under Test	IA9QH5 S83D-F
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V1.1
Software Version	V1.00E1
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	5.2G and 5.8G ISM Band(GFSK modulation)

The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	Band I: 5160 MHz to 5240 MHz, Band IV: 5735 MHz to 5840 MHz
Product Type	☒ Mobile ☐ Portable ☐ Fix Location
Modulation Type	GFSK
Transfer Rate (Mbps) (Single RF path)	2 Mbps
Number of channel	6 (See note 1)
Maximum Output Power	Band I: 11.64 dBm Band IV: 14.23 dBm
Tested Channel	Band I: Low Channel (5160 MHz), Middle Channel(5200 MHz), High Channel (5240 MHz) Band IV: Low Channel (5735 MHz), Middle Channel(5785 MHz), High Channel (5840 MHz)
Antenna Type	PCB Antenna
Antenna Gain	2.5 dBi
About the Product	The equipment is RF 5G Wireless Module (Pin type), intended for used with information technology equipment.

Channel List

Band I		Band IV	
Number	Frequency (MHz)	Number	Frequency (MHz)
1	5160(Low)	4	5735(Low)
2	5200(Middle)	5	5785(Middle)
3	5240(High)	6	5840(High)

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.6 Additional Instructions

EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

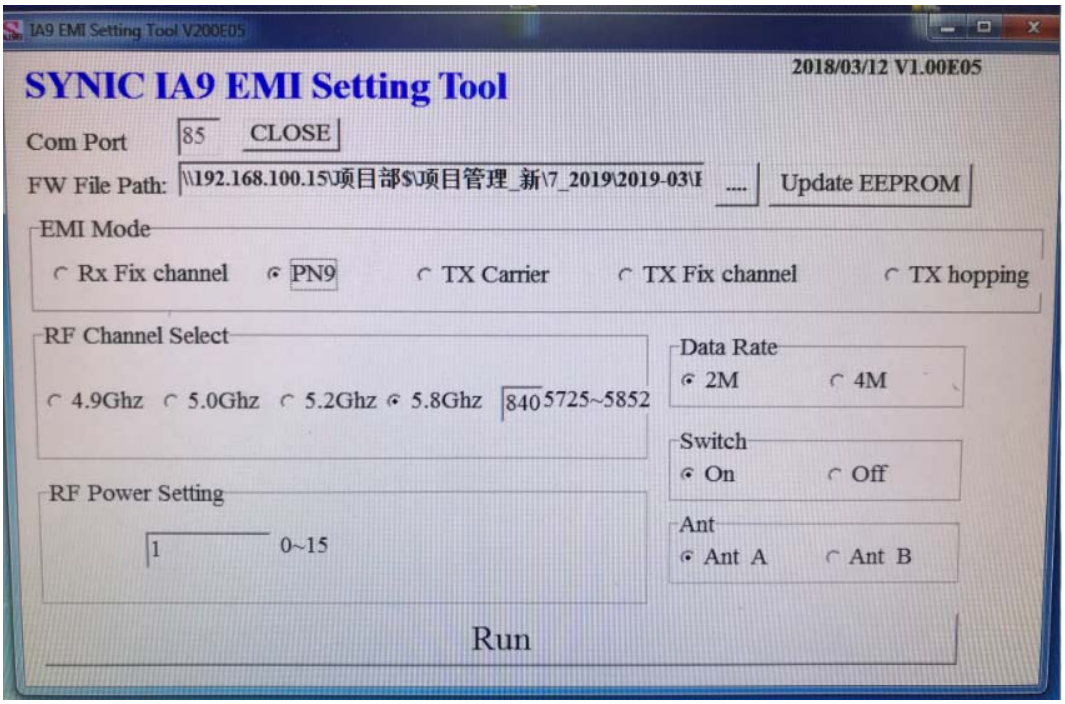
During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software Version	IA9 EMI Setting Tool V200E05		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220

Band I (5160 - 5240 MHz) Power level setup in software		
Channel	Frequency (MHz)	Soft Set
Low	5160	1
Middle	5200	
High	5240	

Band IV (5735 - 5840 MHz) Power level setup in software		
Channel	Frequency (MHz)	Soft Set
Low	5735	0
Middle	5785	
High	5840	

Run Software



3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart E	Unlicensed National Information Infrastructure Devices
2	KDB Publication 789033 D02v01r04	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
3	RSS-Gen (Issue 5, Apr. 2018)	General Requirements for Compliance of Radio Apparatus
4	RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exemp Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	RSS Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	RSS-247, 6.2	--	Pass[Note1]
2	RF Output Power	15.407(a)	RSS-247, 6.2	ANNEX A.1	Pass
3	Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	RSS-247, 6.2	ANNEX A.2	Pass
4	6 dB bandwidth	15.407(e)	RSS-247, 6.2	ANNEX A.3	Pass
5	Power Spectral Density	15.407(a)	RSS-247, 6.2	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	N/A[Note3]
7	Conducted Spurious Emission and Band Edge (Authorized-band)	15.407(b) 15.209	RSS-247, 6.2	ANNEX A.6	Pass
8	Radiated Spurious Emissions and Band Edge (Restricted-band)	15.407(b)	RSS-247, 6.2	ANNEX A.7	Pass
9	Frequency Stability	15.407(g)	--	ANNEX A.8	Pass
10	Receiver Spurious Emissions	--	RSS-Gen, 7.1.2	--	N/A[Note2]

Note [1]: The EUT has Two permanently PCB antenna, which complies with the requirement FCC 15.203.

Note [2]: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.

Note [3]: Because EUT is a module, so the Conducted Emission test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% to 55%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22℃ to +25℃
	LT (Low Temperature)	0℃
	HT (High Temperature)	+55℃
Working Voltage of the EUT	NV (Normal Voltage)	3.3 V
	LV (Low Voltage)	3.0 V
	HV (High Voltage)	3.6 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2018.06.15	2019.06.14
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2018.06.15	2019.06.14
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2018.11.07	2019.11.06
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2018.06.13	2019.06.12
LISN	SCHWARZBECK	NSLK 8127	8127-687	2018.06.13	2019.06.12
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2018.06.15	2019.06.14
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2018.06.15	2019.06.14
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2018.06.14	2019.06.13
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2018.06.26	2019.06.25
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.11.09	2019.11.08
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2017.07.22	2019.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2018.06.21	2019.06.20
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2019.01.05	2021.01.04
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2020.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2017.08.08	2019.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2018.06.15	2019.06.14
Power Amplifier	OPHIR RF	5225F	1037	2019.02.28	2020.02.27

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Power Amplifier	OPHIR RF	5273F	1016	2019.02.28	2020.02.27
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A
Feld Strength Meter	Narda	EP601	511WX51129	2018.05.21	2019.05.20
Mouth Simulator	B&K	4227	2423931	2018.11.15	2019.11.14
Sound Calibrator	B&K	4231	2430337	2018.11.15	2019.11.14
Sound Level Meter	B&K	NL-20	00844023	2018.11.15	2019.11.14
Ear Simulator	B&K	4185	2409449	2018.11.15	2019.11.14
Ear Simulator	B&K	4195	2418189	2018.11.15	2019.11.14
Audio analyzer	B&K	UPL 16	100129	2018.11.15	2019.11.14

4.3 Measurement Uncertainty

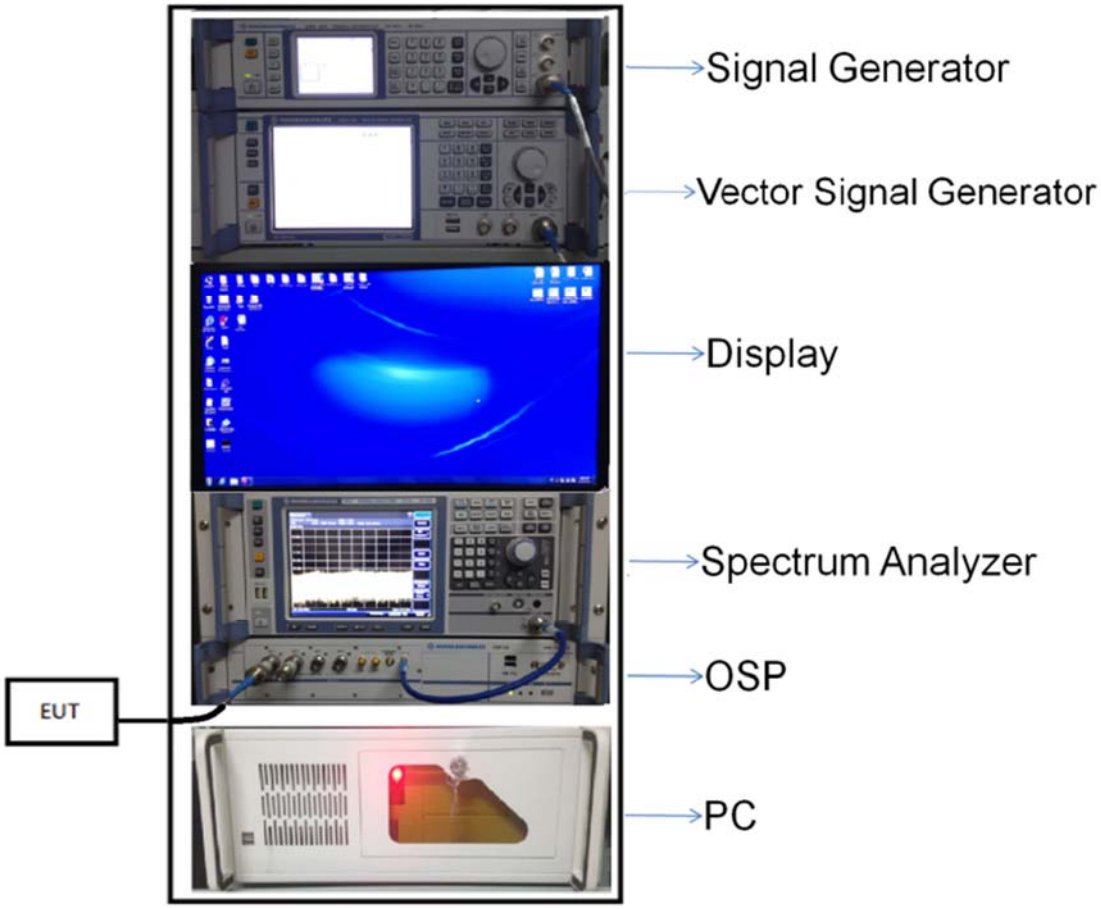
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.4 dB
Power Spectral Density, conducted	±2.5 dB
Unwanted Emissions, conducted	±2.8 dB
All emissions, radiated	±5.4 dB
Temperature	±1°C
Humidity	±4%

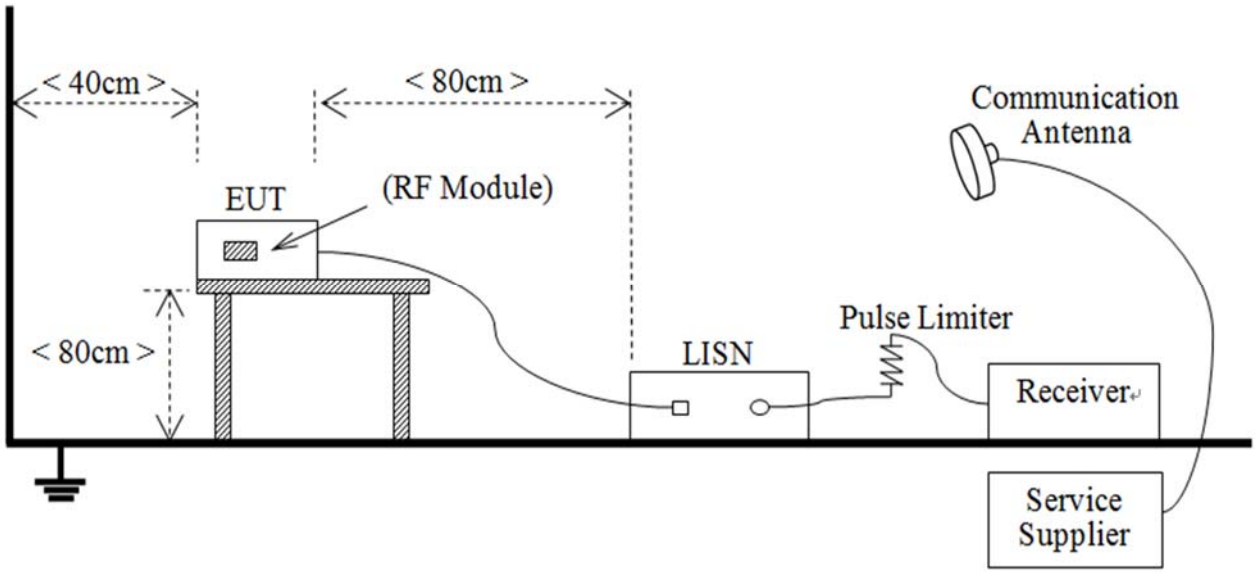
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



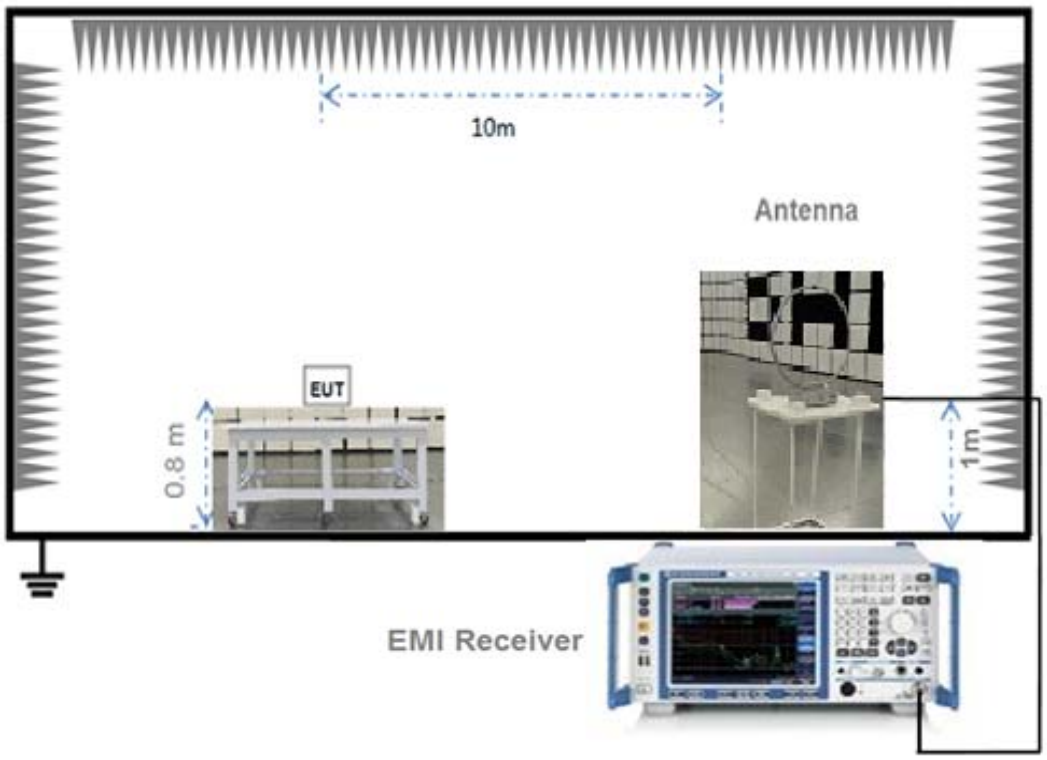
(Diagram 1)

4.4.2 For AC Power Supply Port Test



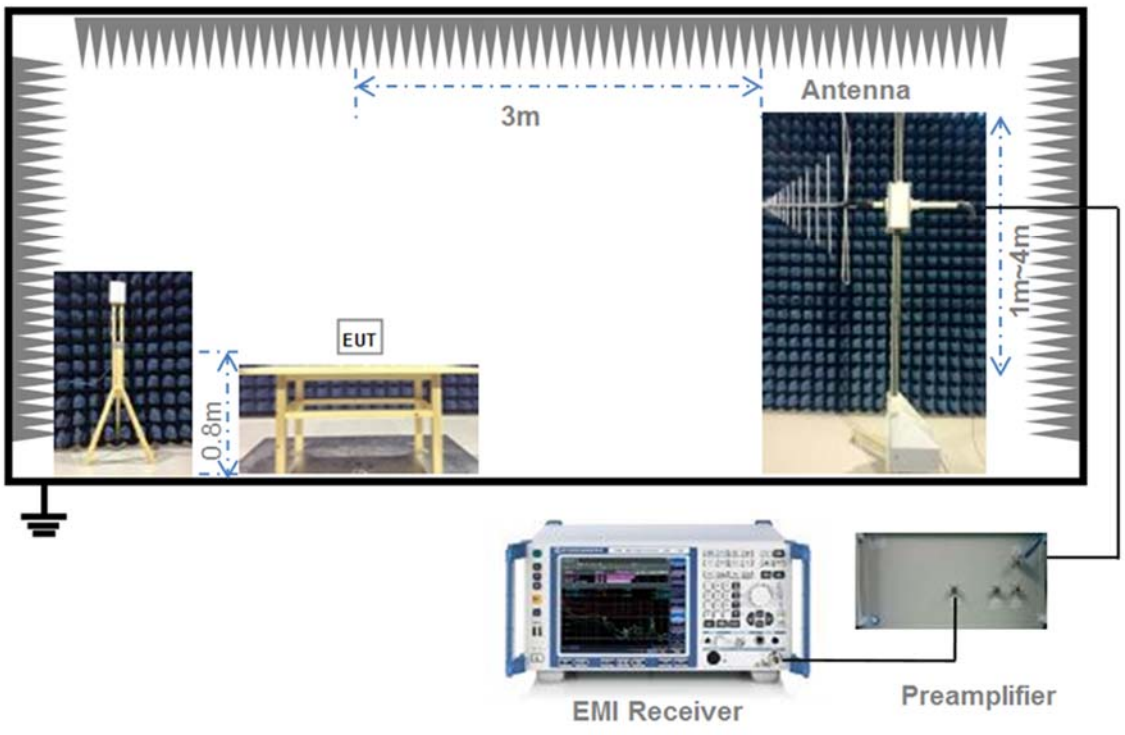
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



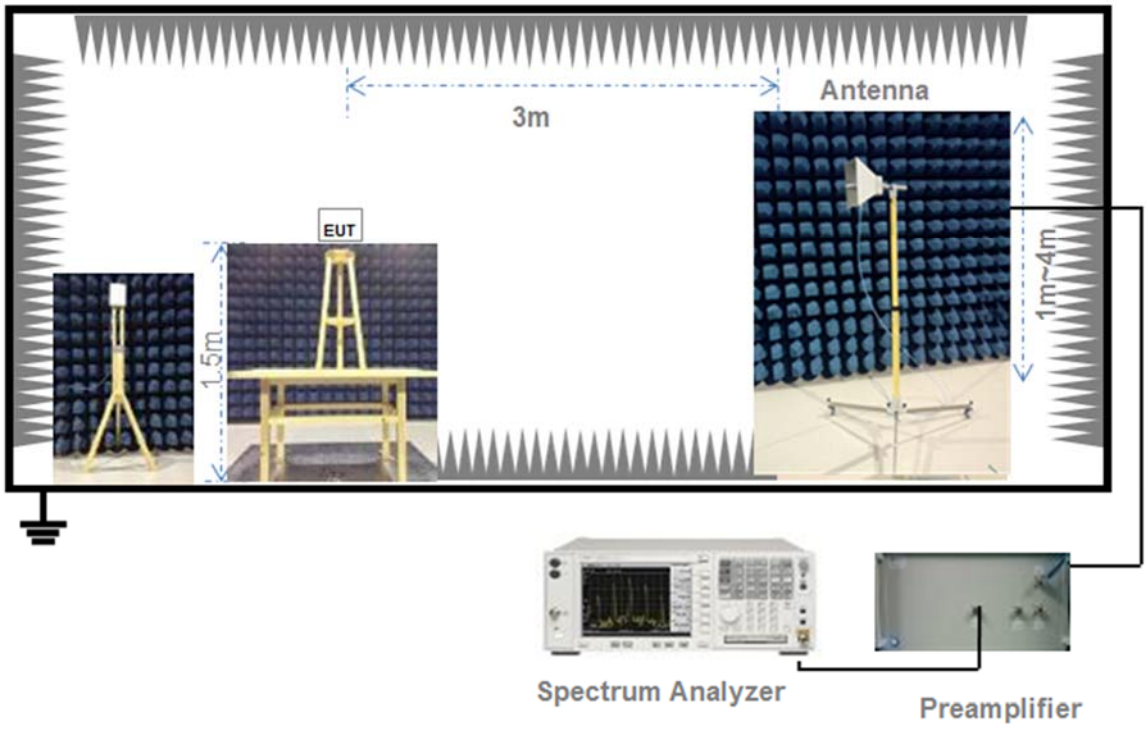
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



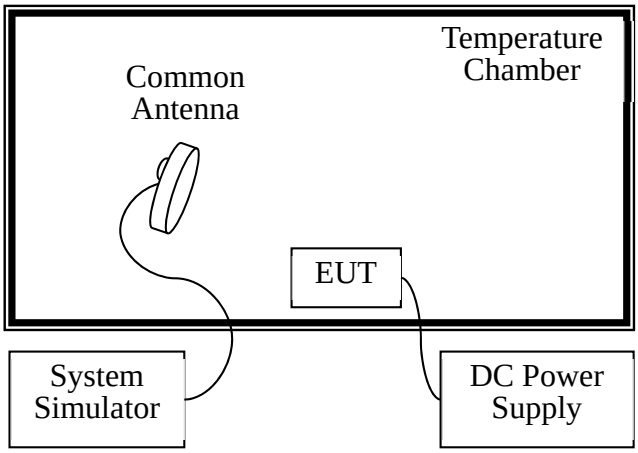
(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.4.6 For Frequency Stability Test



(Diagram 6)

5 TEST ITEMS

5.1 RF Output Power

5.1.1 Test Limit

FCC §15.407(a)

The maximum conducted output power should not exceed:

Frequency Band (MHz)	Limit
5160-5240	250 mW
5735-5840	1 W
Note: Where “B” is the 26 dB emissions bandwidth in MHz.	

RSS-247, 6.2

The maximum conducted output power shall not exceed:

Frequency Band (MHz)	Limit
5160-5240	N/A
5735-5840	1 W
Note: Where “B” is the 99% emissions bandwidth in MHz.	

The maximum e.i.r.p. shall not exceed:

Frequency Band (MHz)	Limit
5160-5240	200 mW or 10 dBm + 10log B, whichever is less.
5735-5840	N/A
Note: Where “B” is the 99% emissions bandwidth in MHz.	

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

The maximum peak conducted output power may be measured using a broadband Average RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.

The E.I.R.P used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Emission Bandwidth and 6 dB Bandwidth

5.2.1 Limit

FCC §15.407(a), RSS-247, 6.2

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.2.2 Test Setup

The test setup photo please refer to 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Emission bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.

2. Set VBW ≥ 3*RBW,

3. Detector = Peak.

4. Trace mode = Max hold.

5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

Occupied Bandwidth

1. Set Span = 1.5 times to 5.0 times the OBW

2. Set RBW = 1% to 5% of the OBW.

3. Set VBW ≥ 3*RBW, Detector = Peak.

4. Trace mode = Max hold.

5. Use the 99% power bandwidth function of the instrument.

6 dB bandwidth

1. Set RBW = 100 kHz, VBW = 300 kHz.

2. Detector = Peak.Trace mode = Max hold.

3. Allow the trace to stabilize.

4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.2.4 Test Result

Please refer to ANNEX A.2 and ANNEX A.3.

5.3 Power Spectral density (PSD)

5.3.1 Limit

FCC §15.407(a)

The maximum power spectral density should not exceed:

Frequency Band (MHz)	Limit
5160-5240	11 dBm/MHz
5735-5840	30 dBm/500kHz

RSS-247, 6.2

The maximum power spectral density should not exceed:

Frequency Band (MHz)	Limit
5160-5240	N/A
5735-5840	30 dBm/500kHz

The e.i.r.p. spectral density should not exceed:

Frequency Band (MHz)	Limit
5160-5240	10 dBm/MHz
5735-5840	N/A

5.3.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.

1. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS.
2. Allow the sweeps to continue until the trace stabilizes.
3. Use the peak marker function to determine the maximum amplitude level.
4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.

5.3.4 Test Result

Please refer to ANNEX A.4.

5.4 Conducted Emission

5.4.1 Limit

FCC §15.207, RSS-GEN, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.4.2 Test Setup

The section 4.4.2 (Diagram 2) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

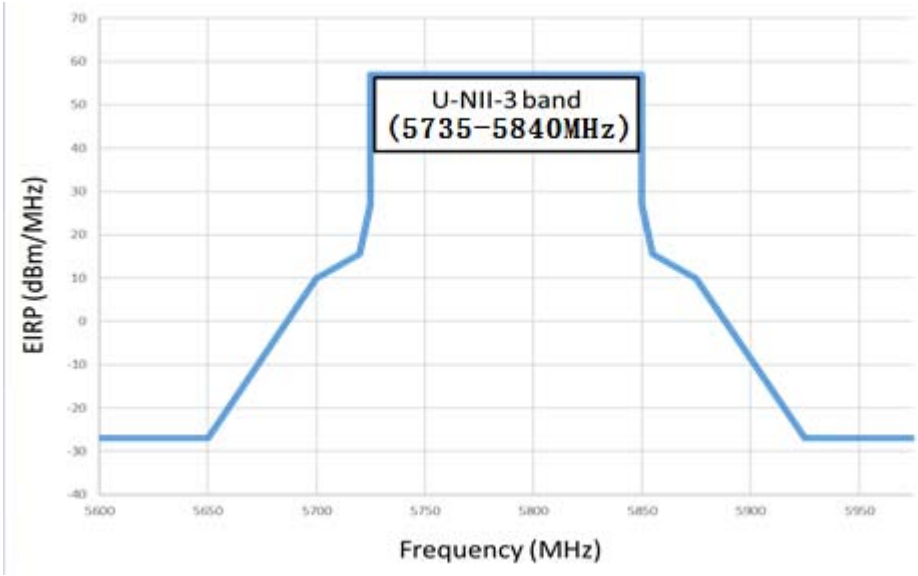
5.4.4 Test Result

Please refer to ANNEX A.5.

5.5 Conducted Spurious Emission and Band Edge (Authorized-band)

5.5.1 Limit

FCC §15.407(b)

Un-restricted band emissions	
Frequency Band (MHz)	Limit
5160-5240	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5735-5840	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. 

5.5.2 Test Setup

See section 4.4.2 (Diagram 2) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

5.5.4 Test Result

Please refer to ANNEX A.6.

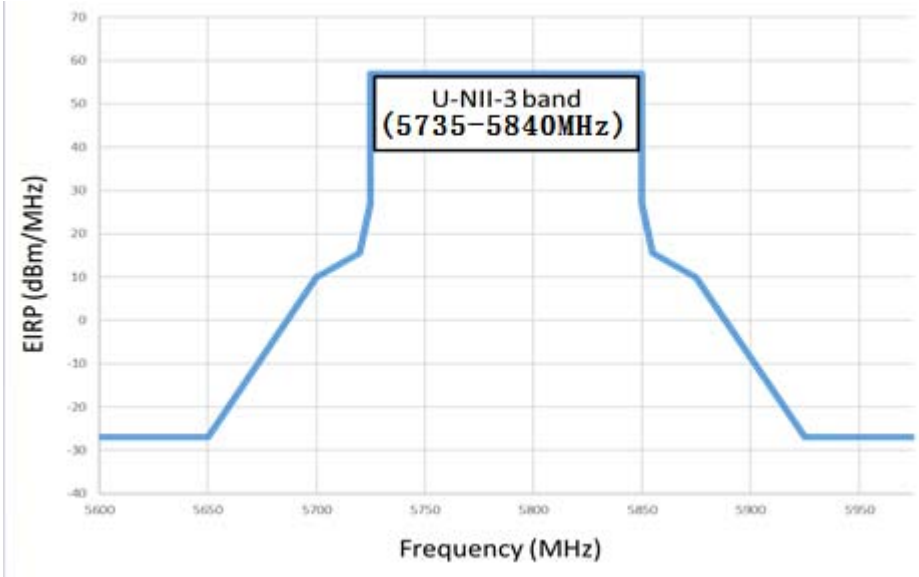
5.6 Radiated Spurious Emissions and Band Edge (Restricted-band)

5.6.1 Limit

FCC §15.209 & 15.407(b), RSS-247, 6.2

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note [1]: The Limit for radiated test was performed according to FCC Part 15C
Note [2]: The tighter limit applies at the band edge.

Un-restricted band emissions	
Out Operating Band (MHz）	Limit
5160-5240	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5735 - 5840	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. 

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength.

5.6.2 Test Setup

The section 4.4.3-4.4.5 (Diagram 3 - Diagram 5) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)

c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$E = EIRP – 20\log D + 104.8$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

f) Compare the resultant electric field strength level to the applicable limit.

g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

a) RBW = as specified in Table 1.

b) VBW ≥ 3 x RBW.

c) Detector = Peak.

d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.

c) RBW = 1 MHz (unless otherwise specified).

d) VBW ≥ 3 x RBW.

e) Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is 20 log(1/x), where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.6.4 Test Result

Please refer to ANNEX A.7 and Please refer to ANNEX A.9

5.7 Frequency Stability

5.7.1 Limit

FCC §15.407(g)

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

5.7.2 Test Setup

The section 4.4.6 (Diagram 6) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

The EUT is installed in an environment test chamber with external power source.
Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.
A sufficient stabilization period at each temperatures is used prior to each frequency measurement.
When temperature is stabled, measure the frequency stability.
The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage.
Change setting of chamber and external power source to complete all conditions.

5.7.4 Test Result

Please refer to ANNEX A.8.

ANNEX A TEST RESULT

A.1 RF Output Power

Note [1]: For FCC standard, if transmitting antennas of directional gain greater than 6 dBi are used, all band maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Date

Peak Power Test Data

Band I (5160 - 5240 MHz)						
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (mW)	FCC Limit (mW)	Verdict
GFSK	Low	5160	11.29	13.46	250	Pass
	Middle	5200	10.89	12.27	250	Pass
	High	5240	11.64	14.59	250	Pass

Band IV (5735 - 5840 MHz)						
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (mW)	FCC/IC Limit (W)	Verdict
GFSK	Low	5735	14.23	26.49	1.00	Pass
	Middle	5785	11.99	15.81	1.00	Pass
	High	5840	13.55	22.65	1.00	Pass

EIRP:

Band I (5160 - 5240 MHz)						
Mode	Channel	Frequency (MHz)	EIRP Power (dBm)	EIRP Power (mW)	IC Limit (dBm)	Verdict
GFSK	Low	5160	13.79	23.93	14.85	Pass
	Middle	5200	13.39	21.83	14.93	Pass
	High	5240	14.14	25.94	14.79	Pass

A.2 Emission Bandwidth & 99% Bandwidth

Test Data

Band I (5160 - 5240 MHz)		
Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2.62	3.05
Middle	2.61	3.11
High	2.62	3.01

Band IV (5735 - 5840 MHz)		
Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2.62	2.58
Middle	2.62	3.08
High	2.62	3.08

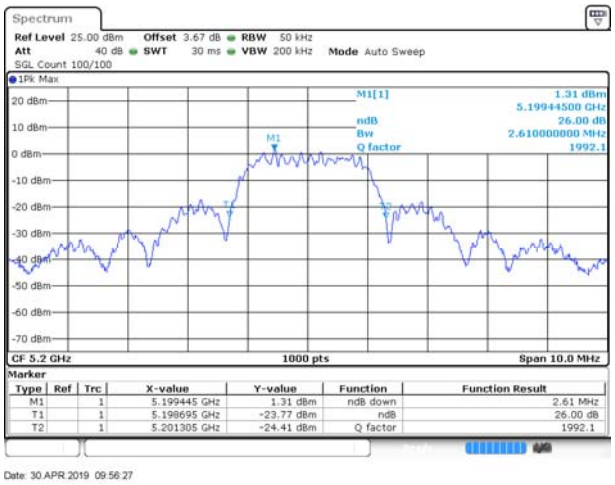
Test plots

26 dB Bandwidth

Band I

LOW CHANNEL

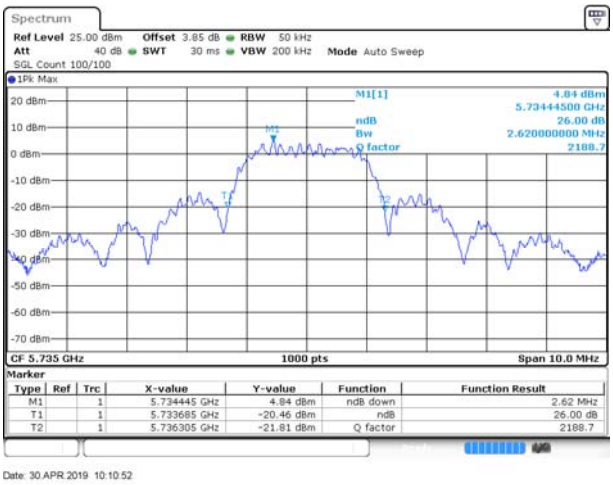
MIDDLE CHANNEL



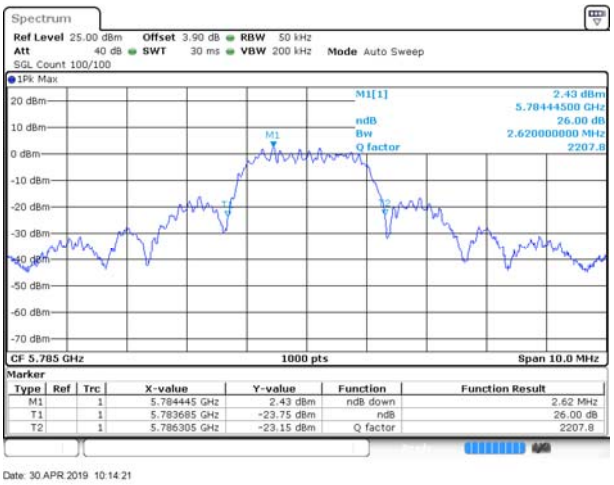
HIGH CHANNEL

Band IV

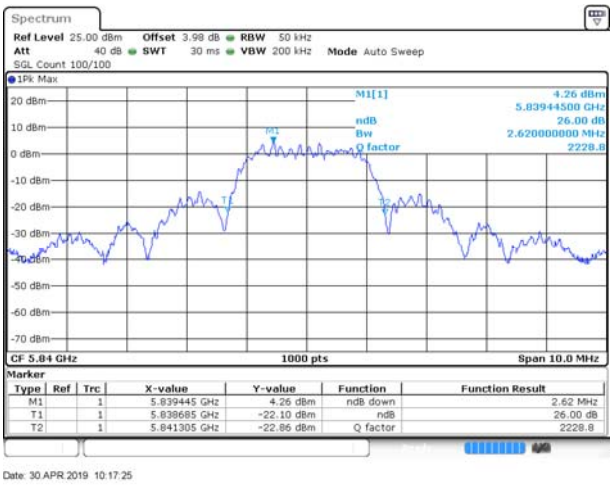
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



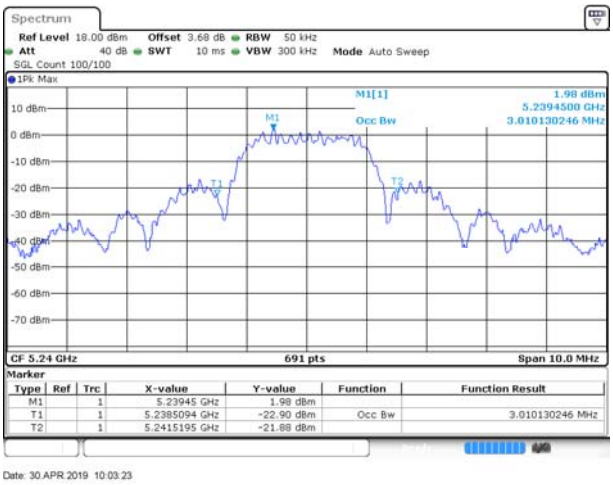
99% Bandwidth

Band I

LOW CHANNEL

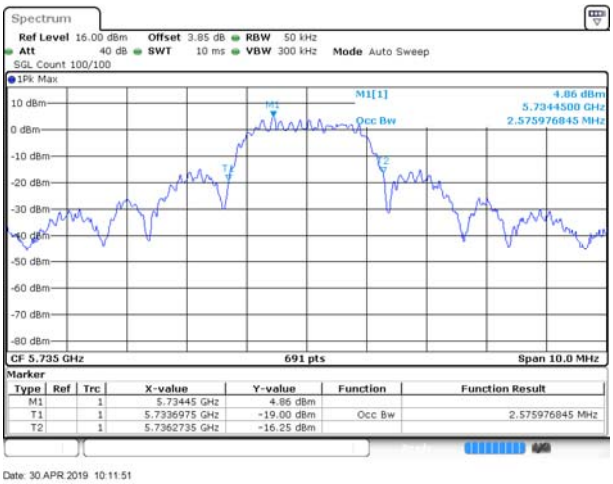
MIDDLE CHANNEL

HIGH CHANNEL



Band IV

LOW CHANNEL



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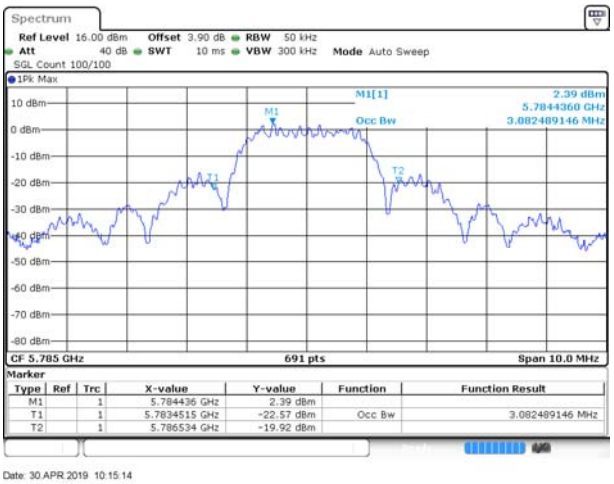
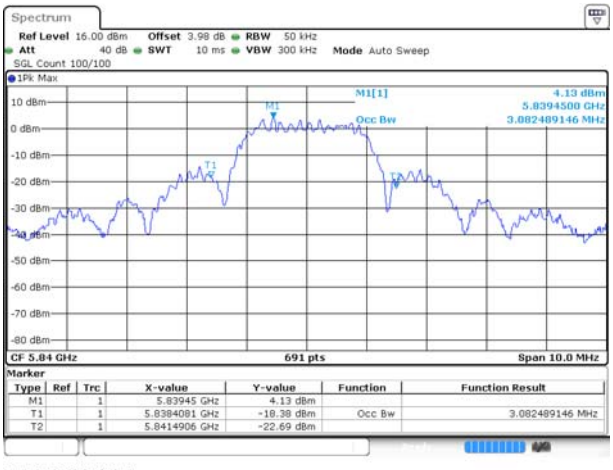


HIGH CHANNEL



A.3 6 dB Bandwidth

Test Data

Band I (5160- 5240 MHz)			
Channel	6 dB Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)	Verdict
Low	1.92	⩾500	Pass
Middle	1.95	⩾500	Pass
High	1.90	⩾500	Pass

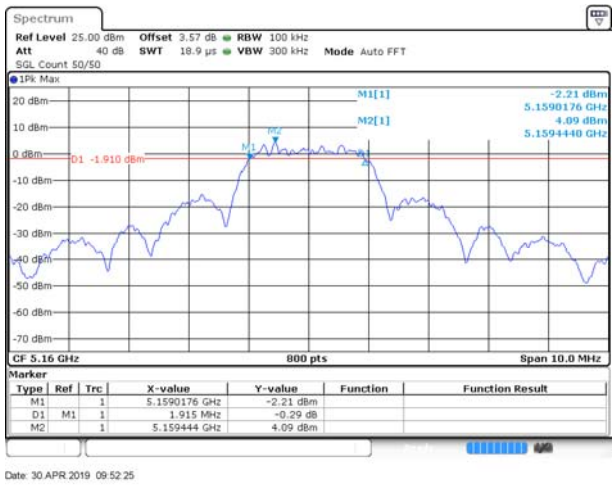
Band IV (5735 - 5840 MHz)			
Channel	6 dB Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)	Verdict
Low	1.81	⩾500	Pass
Middle	1.99	⩾500	Pass
High	2.00	⩾500	Pass

Test plots

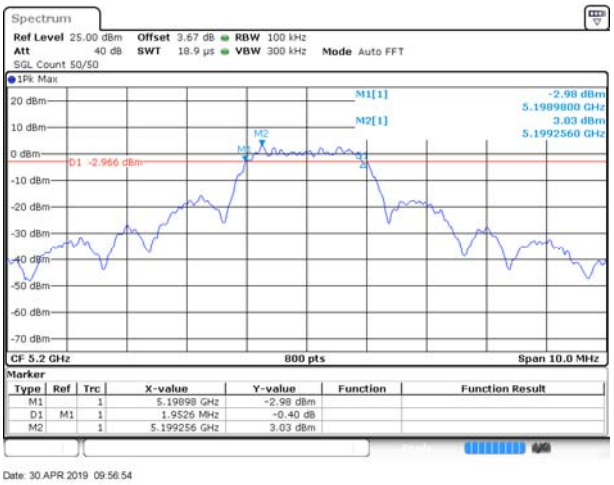
6 dB Bandwidth

Band I

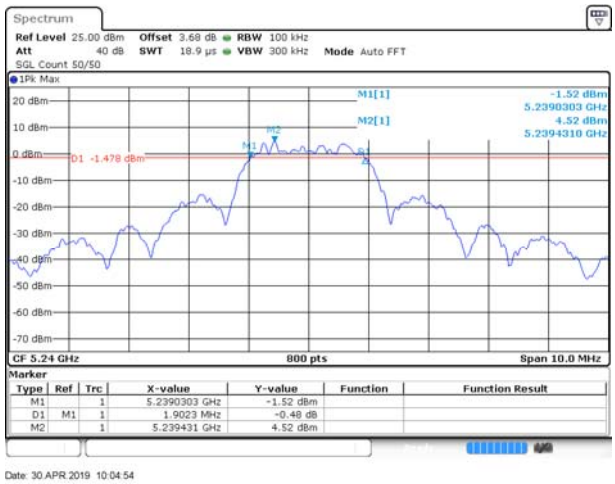
LOW CHANNEL



MIDDLE CHANNEL

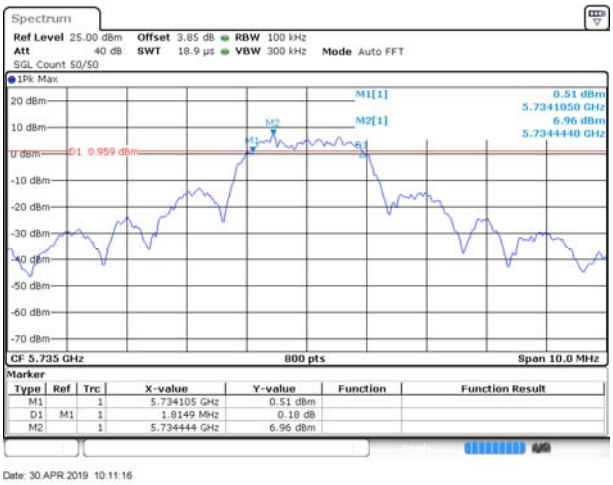


HIGH CHANNEL

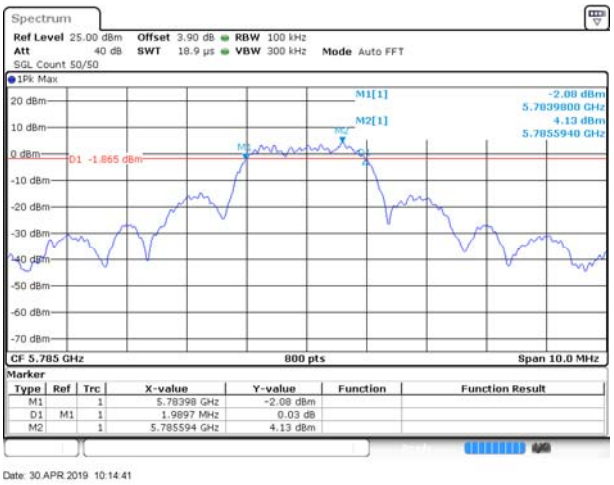


Band IV

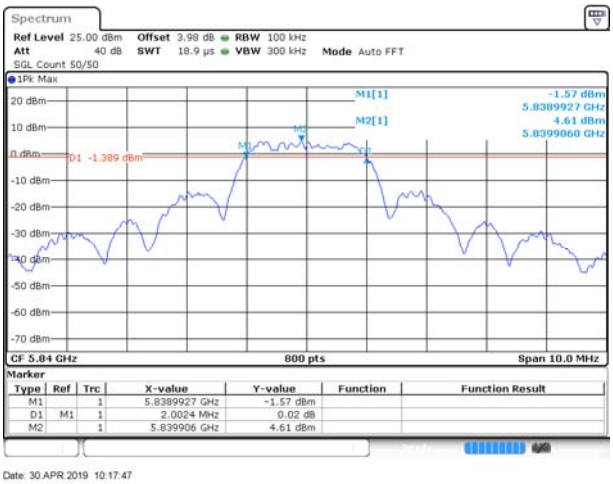
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.4 Power Spectral Density

Test Data

Conducted PSD:

Band I (5160 - 5240 MHz)			
Channel	PSD (dBm/MHz)	FCC Limit (dBm/MHz)	Verdict
Low	5.06	11	Pass
Middle	4.61	11	Pass
High	5.37	11	Pass

Band IV (5735 - 5840 MHz)			
Channel	PSD (dBm/MHz)	FCC/IC Limit (30dBm/500 kHz)	Verdict
Low	5.19	30	Pass
Middle	2.64	30	Pass
High	4.16	30	Pass

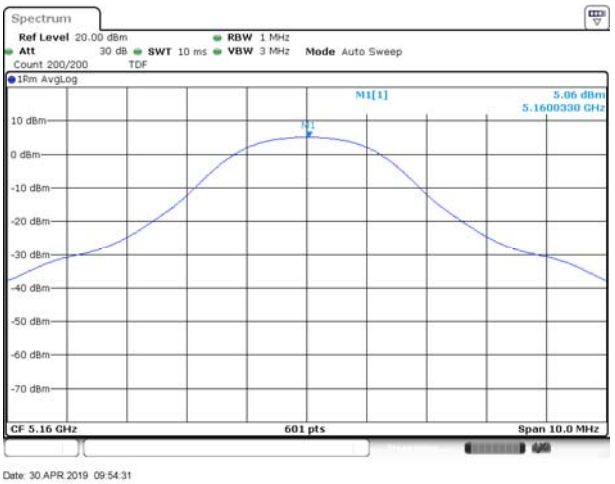
E.I.R.P PSD:

Band I (5160 - 5240 MHz)			
Channel	PSD (dBm/MHz)	IC Limit (dBm/MHz)	Verdict
Low	7.56	10	Pass
Middle	7.11	10	Pass
High	7.87	10	Pass

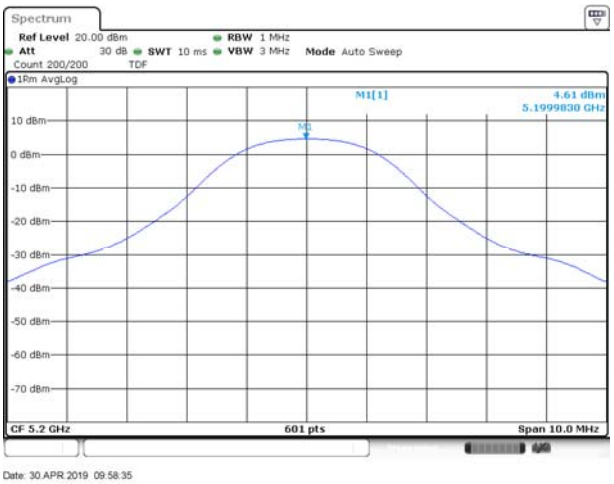
Test plots

Band I

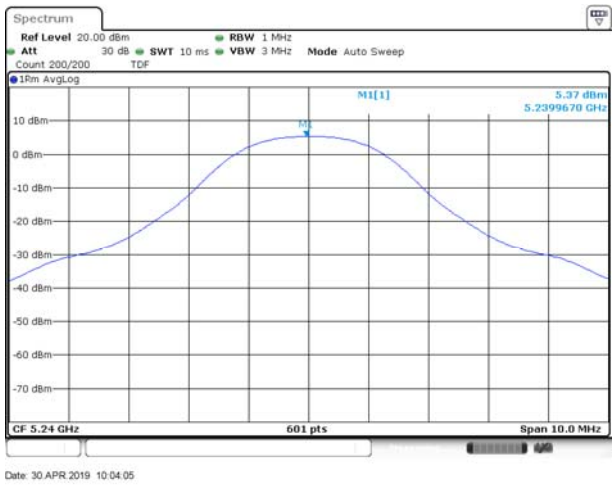
LOW CHANNEL



MIDDLE CHANNEL

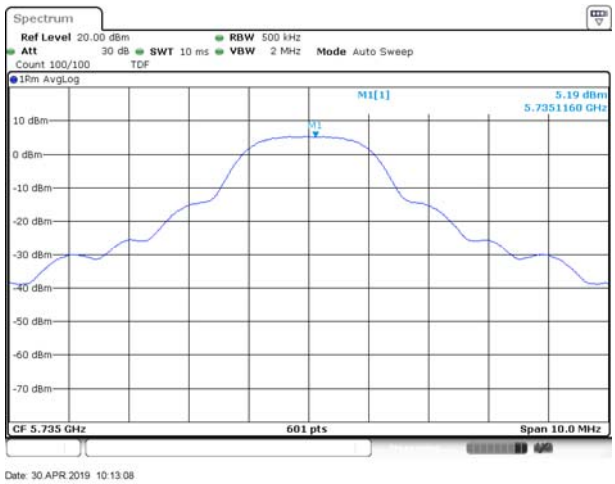


HIGH CHANNEL

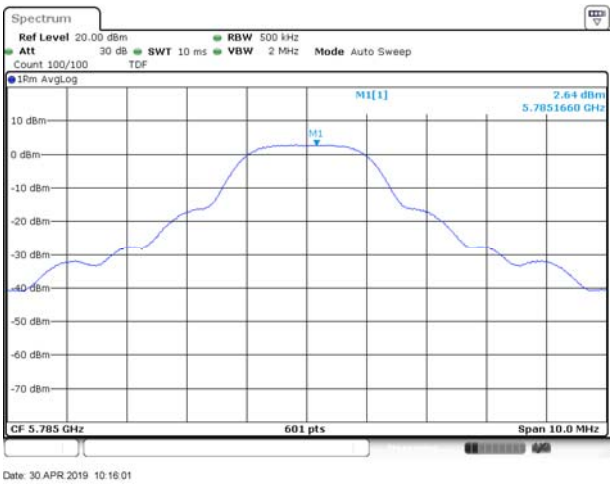


Band IV

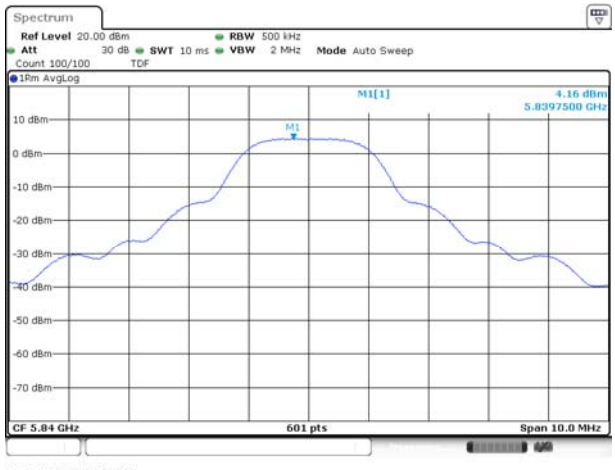
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.5 Conducted Emissions

Note: Not applicable.

A.6 Conducted Spurious Emission and Band Edge (Authorized-band)

Test data

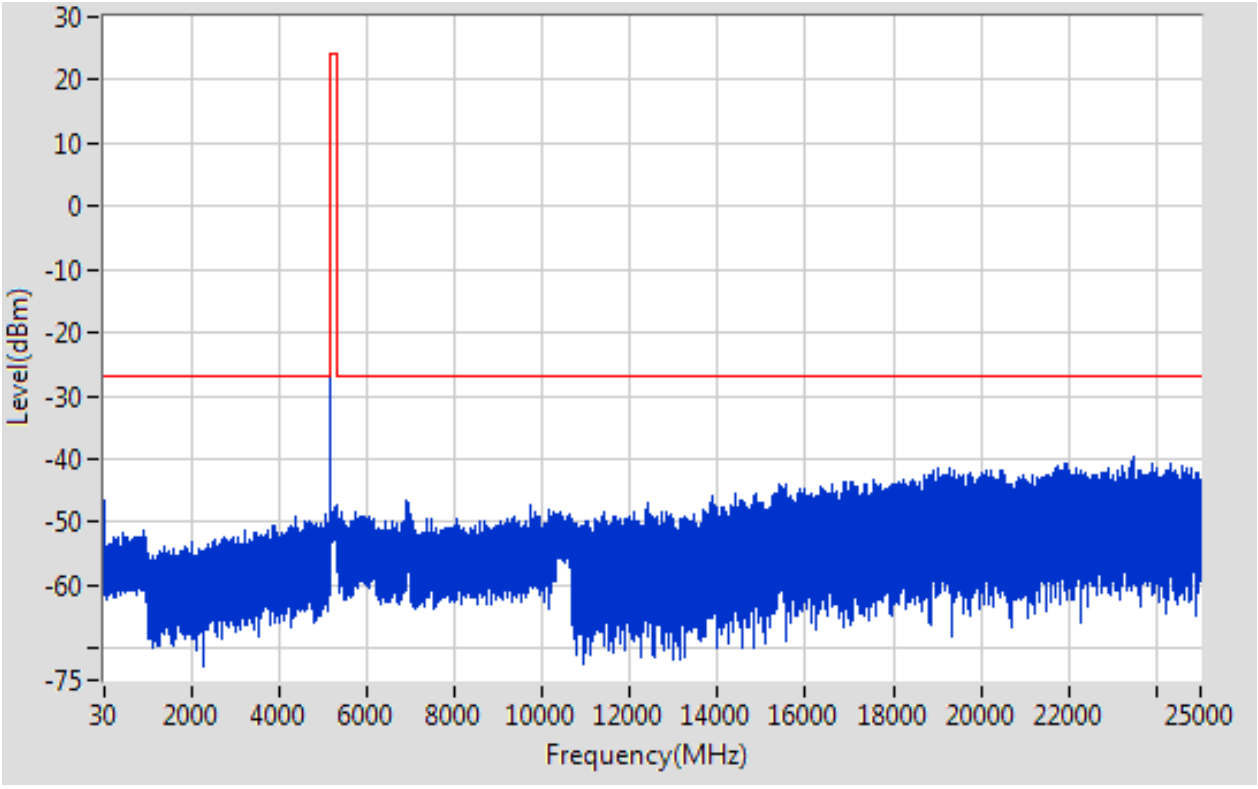
Test Band	Channel	Verdict
Band I (5160 - 5240 MHz)	Low	Pass
	Middle	Pass
	High	Pass
Band IV (5735 - 5840 MHz)	Low	Pass
	Middle	Pass
	High	Pass

Test plots

Band I

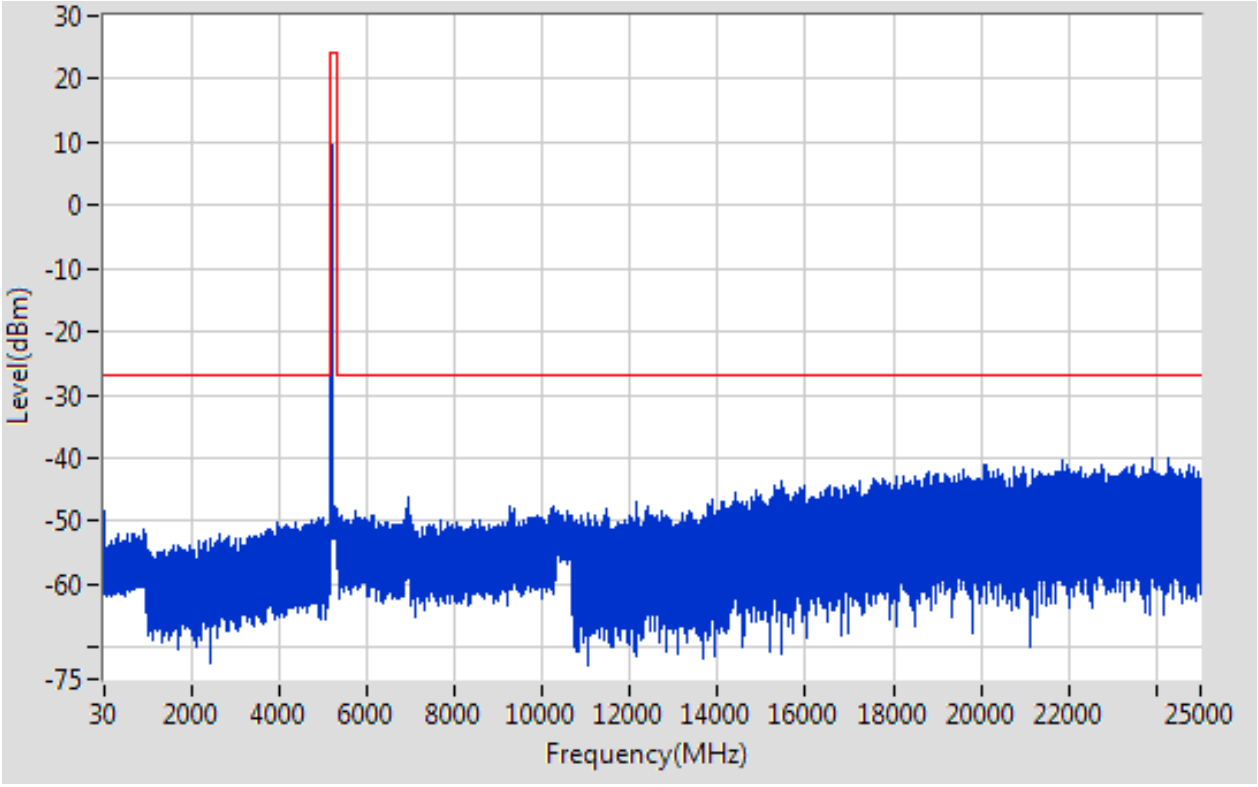
LOW CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-46.54	-27	Pass	9700
1000	5150	0.1	Peak	5086.487	-48.68	-27	Pass	41499
5150	5350	0.1	Peak	5159.405	9.72	24	Pass	2000
5350	10300	0.1	Peak	6909.749	-46.57	-27	Pass	49499
10300	10700	0.1	Peak	10393.523	-48.29	-27	Pass	4000
10700	25000	0.1	Peak	23455.399	-39.7	-27	Pass	142999



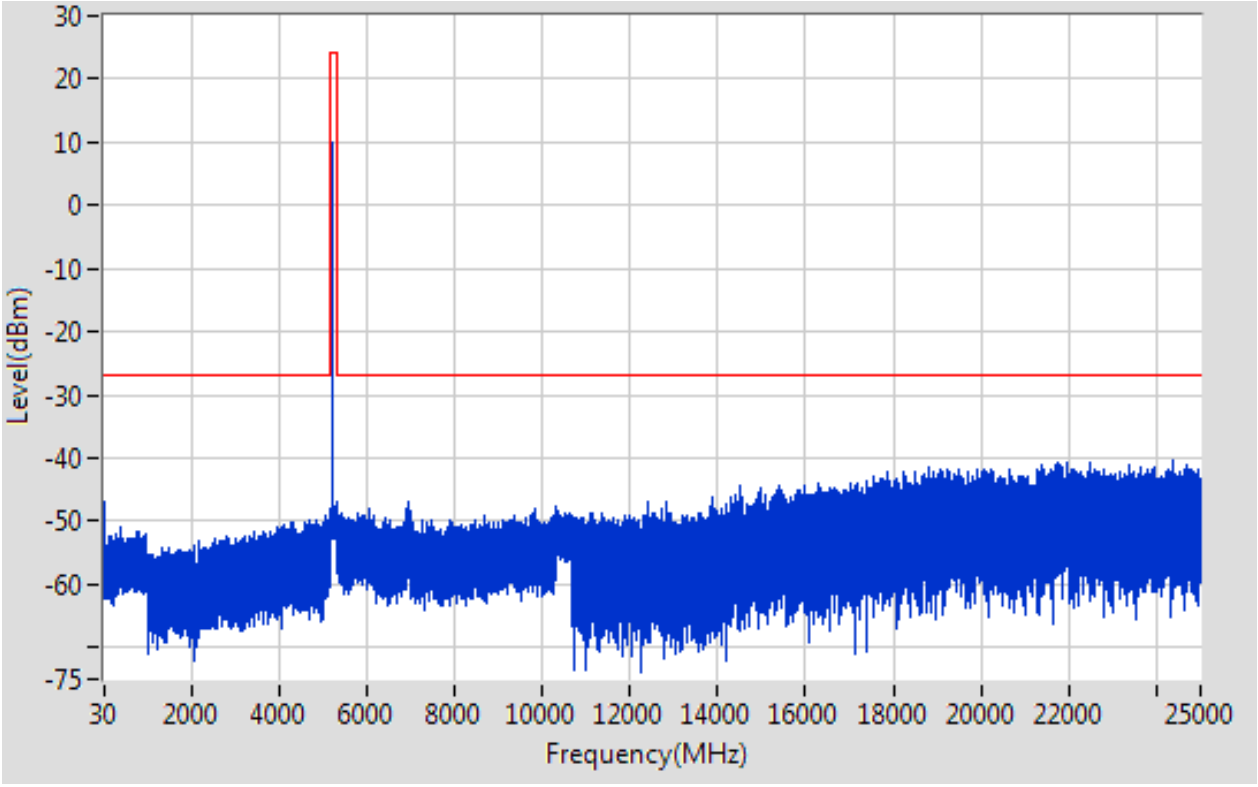
MIDDLE CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-48.26	-27	Pass	9700
1000	5150	0.1	Peak	5001.469	-49.63	-27	Pass	41499
5150	5350	0.1	Peak	5199.425	9.45	24	Pass	2000
5350	10300	0.1	Peak	6956.75	-46.38	-27	Pass	49499
10300	10700	0.1	Peak	10554.664	-48.48	-27	Pass	4000
10700	25000	0.1	Peak	24288.305	-40	-27	Pass	142999



HIGH CHANNEL

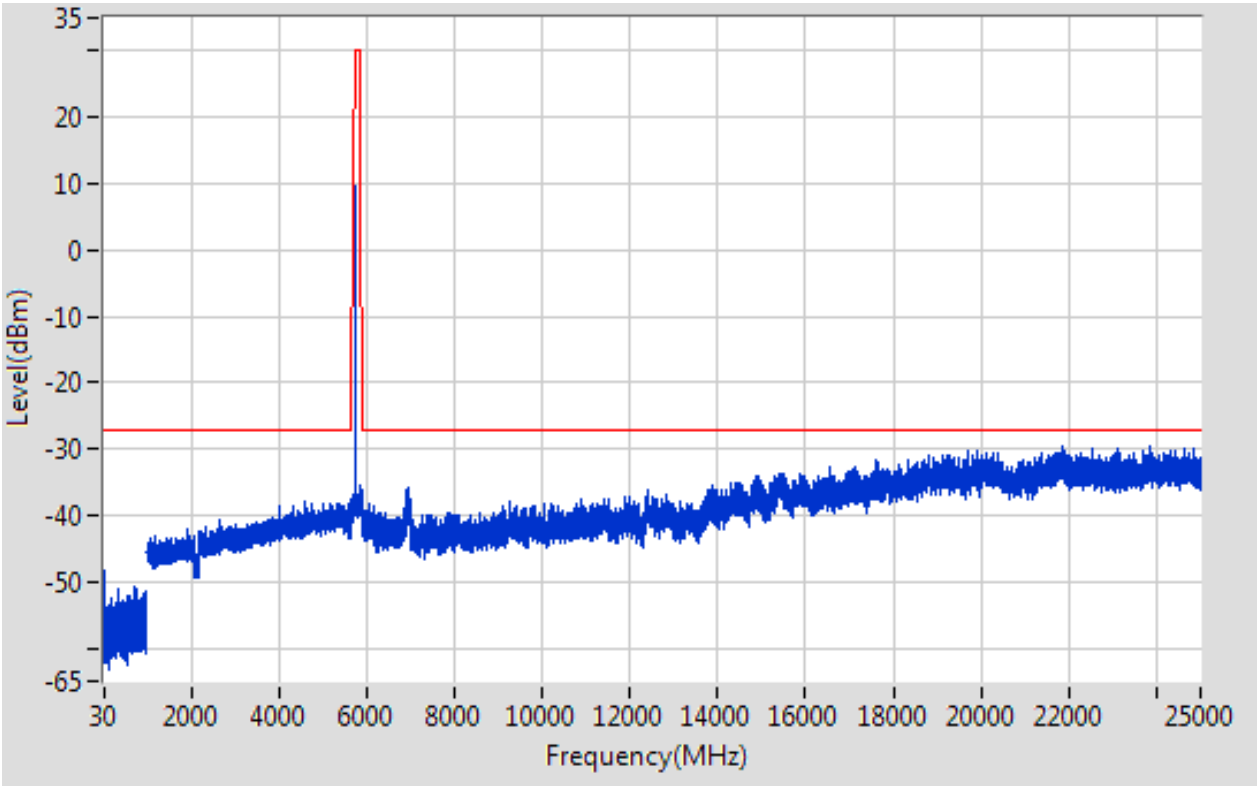
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-46.93	-27	Pass	9700
1000	5150	0.1	Peak	5050.179	-49.27	-27	Pass	41499
5150	5350	0.1	Peak	5239.445	10.01	24	Pass	2000
5350	10300	0.1	Peak	6953.15	-46.87	-27	Pass	49499
10300	10700	0.1	Peak	10314.104	-47.8	-27	Pass	4000
10700	25000	0.1	Peak	24358.814	-40.27	-27	Pass	142999



Band IV

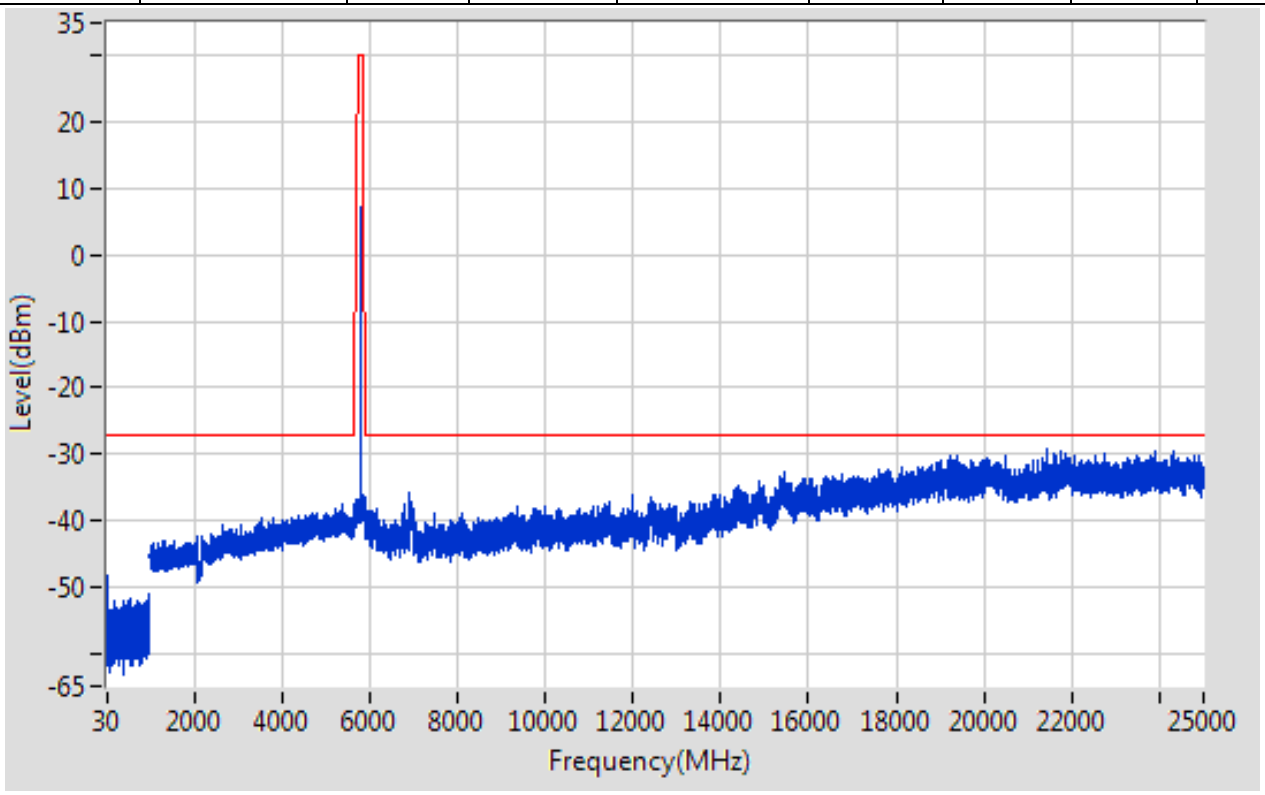
LOW CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-48.16	-27	Pass	9700
1000	5650	1	Peak	4588.772	-38.01	-27	Pass	4650
5650	5700	1	Peak	5650.145	-38.68	-26.89	Pass	691
5700	5720	1	Peak	5700.725	-38.37	10.2	Pass	691
5720	5725	1	Peak	5720.022	-38.02	15.65	Pass	691
5725	5850	1	Peak	5735.507	9.58	30	Pass	691
5850	5855	1	Peak	5854.993	-37.61	15.62	Pass	691
5855	5875	1	Peak	5874.043	-37.05	10.27	Pass	691
5875	5925	1	Peak	5924.783	-38.18	-26.84	Pass	691
5925	25000	1	Peak	21828.834	-29.48	-27	Pass	19075



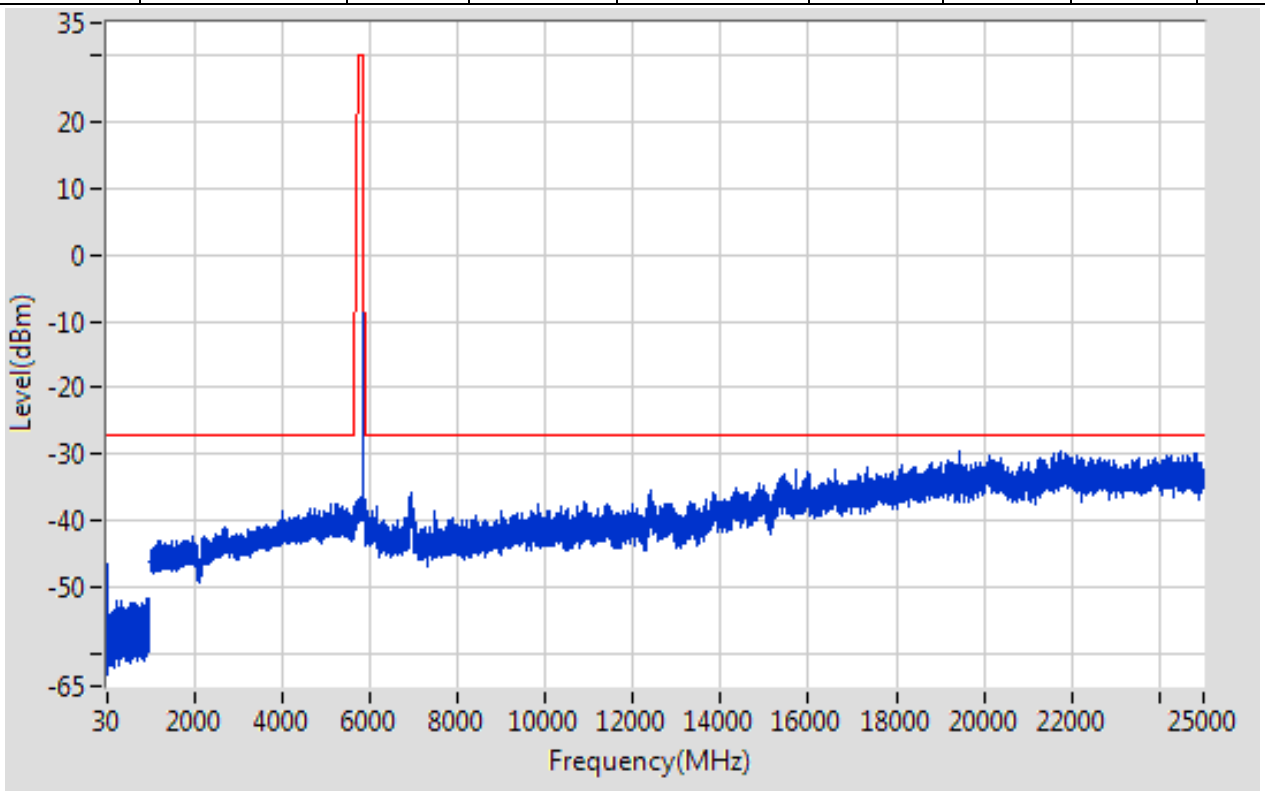
MIDDLE CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-48.24	-27	Pass	9700
1000	5650	1	Peak	5399.946	-37.64	-27	Pass	4650
5650	5700	1	Peak	5650.072	-38.3	-26.95	Pass	691
5700	5720	1	Peak	5700.174	-37.86	10.05	Pass	691
5720	5725	1	Peak	5720.13	-37.64	15.9	Pass	691
5725	5850	1	Peak	5785.688	7.16	30	Pass	691
5850	5855	1	Peak	5854.616	-36.09	16.48	Pass	691
5855	5875	1	Peak	5874.71	-36.96	10.08	Pass	691
5875	5925	1	Peak	5923.913	-38.14	-26.2	Pass	691
5925	25000	1	Peak	21411.812	-29.32	-27	Pass	19075



HIGH CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	30	-46.63	-27	Pass	9700
1000	5650	1	Peak	5118.886	-37.51	-27	Pass	4650
5650	5700	1	Peak	5650.072	-38.8	-26.95	Pass	691
5700	5720	1	Peak	5703.362	-37.13	10.94	Pass	691
5720	5725	1	Peak	5720.022	-38.35	15.65	Pass	691
5725	5850	1	Peak	5839.493	8.82	30	Pass	691
5850	5855	1	Peak	5854.964	-36.65	15.68	Pass	691
5855	5875	1	Peak	5874.681	-37.53	10.09	Pass	691
5875	5925	1	Peak	5924.928	-38.44	-26.95	Pass	691
5925	25000	1	Peak	19436.708	-29.71	-27	Pass	19075



A.7 Radiated Spurious Emissions and Band Edge (Restricted-band)

A.7.1 Radiated Spurious Emissions

Test Data

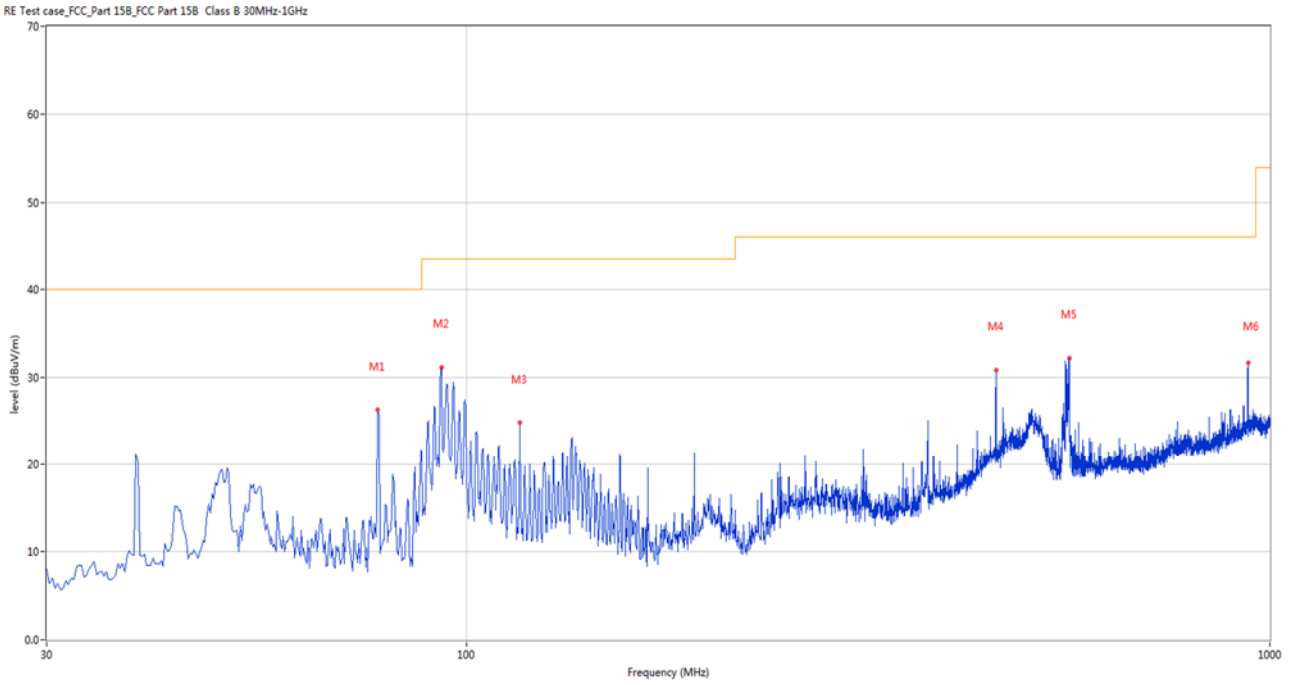
Note [1]: The symbol of "--" in the table which means not application.

Note [2]: For the test data above 1 GHz，According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note [3]: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

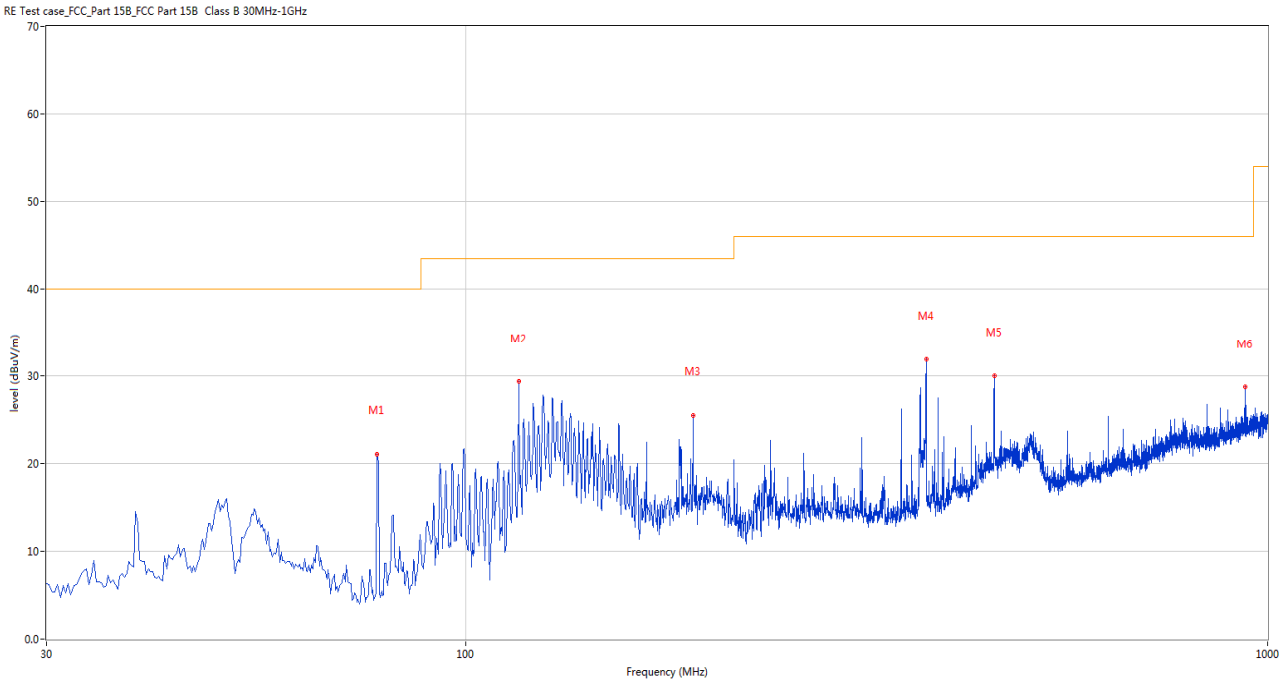
Note [4]: The EUT is working in the Normal link mode below 1 GHz.

30 MHz to 1 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	77.530	26.29	-28.94	40.0	-13.71	Peak	91.40	100	Vertical	Pass
2	93.050	31.13	-25.97	43.5	-12.37	Peak	358.90	100	Vertical	Pass
3	116.330	24.80	-25.83	43.5	-18.70	Peak	358.10	100	Vertical	Pass
4	456.073	30.84	-18.02	46.0	-15.16	Peak	203.80	100	Vertical	Pass
5	562.773	32.19	-15.78	46.0	-13.81	Peak	84.50	100	Vertical	Pass
6	939.617	31.64	-10.26	46.0	-14.36	Peak	135.90	200	Vertical	Pass

30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	77.530	21.08	-28.94	40.0	-18.92	Peak	38.30	200	Horizontal	Pass
2	116.330	29.36	-25.83	43.5	-14.14	Peak	190.90	200	Horizontal	Pass
3	191.990	25.50	-25.04	43.5	-18.00	Peak	38.30	200	Horizontal	Pass
4	375.078	31.91	-19.96	46.0	-14.09	Peak	110.40	100	Horizontal	Pass
5	456.073	30.01	-18.02	46.0	-15.99	Peak	83.30	200	Horizontal	Pass
6	938.162	28.72	-9.99	46.0	-17.28	Peak	154.50	100	Horizontal	Pass

Note 1: The marked spikes near 5.2 GHz or 5.8 GHz with circle should be ignored because they are carrier frequency.

Note 2: The test result of 18~40 GHz is less than 20dB, so it only shown 1 GHz to 18 GHz in this report.

Band I

1 GHz to 18 GHz, ANT V, Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2230.000	29.54	-11.09	54.0	-24.46	AV	322.00	100	Vertical	Pass
1	2230.000	39.85	-11.09	68.2	-28.35	Peak	322.00	100	Vertical	Pass
2**	4127.000	34.90	-4.33	54.0	-19.10	AV	110.00	100	Vertical	Pass
2	4127.000	45.36	-4.33	68.2	-22.84	Peak	110.00	100	Vertical	Pass
3**	5160.000	82.11	-0.96	--	82.11	AV	109.00	100	Vertical	N/A
3	5160.000	94.67	-0.96	--	85.67	Peak	109.00	100	Vertical	N/A
4**	6441.000	39.75	2.63	--	39.75	AV	128.00	100	Vertical	Pass
4	6441.000	51.11	2.63	68.2	-17.09	Peak	128.00	100	Vertical	Pass
5**	9094.438	37.60	18.81	54.0	-16.40	AV	22.00	100	Vertical	Pass
5	9094.438	48.52	18.81	68.2	-19.68	Peak	22.00	100	Vertical	Pass
6**	12028.375	39.83	20.31	54.0	-14.17	AV	218.00	100	Vertical	Pass
6	12028.375	50.77	20.31	68.2	-17.43	Peak	218.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H, Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2262.500	29.60	-10.40	54.0	-24.40	AV	132.00	100	Horizontal	Pass
1	2262.500	40.24	-10.40	68.2	-27.96	Peak	132.00	100	Horizontal	Pass
2**	4035.000	34.86	-4.71	54.0	-19.14	AV	152.00	100	Horizontal	Pass
2	4035.000	45.91	-4.71	68.2	-22.29	Peak	152.00	100	Horizontal	Pass
3**	5160.000	90.29	-0.96	--	90.29	AV	106.00	100	Horizontal	N/A
3	5160.000	103.58	-0.96	--	97.58	Peak	106.00	100	Horizontal	N/A
4**	7333.500	36.81	17.05	54.0	-17.19	AV	4.00	100	Horizontal	Pass
4	7333.500	47.84	17.05	68.2	-20.36	Peak	4.00	100	Horizontal	Pass
5**	11999.625	39.52	20.32	54.0	-14.48	AV	98.00	100	Horizontal	Pass
5	11999.625	49.73	20.32	68.2	-18.47	Peak	98.00	100	Horizontal	Pass
6**	16184.813	46.19	27.55	54.0	-7.81	AV	192.00	100	Horizontal	Pass
6	16184.813	56.05	27.55	68.2	-12.15	Peak	192.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V, High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2338.500	29.19	-10.55	54.0	-24.81	AV	115.00	100	Vertical	Pass
1	2338.500	40.30	-10.55	68.2	-27.90	Peak	115.00	100	Vertical	Pass
2**	3678.000	33.44	-5.16	54.0	-20.56	AV	312.00	100	Vertical	Pass
2	3678.000	44.77	-5.16	68.2	-23.43	Peak	312.00	100	Vertical	Pass
3**	5240.000	81.75	-1.12	--	81.75	AV	200.00	100	Vertical	N/A
3	5240.000	94.50	-1.12	--	92.50	Peak	200.00	100	Vertical	N/A
4**	7474.375	37.10	17.06	54.0	-16.90	AV	108.00	100	Vertical	Pass
4	7474.375	46.67	17.06	68.2	-21.53	Peak	108.00	100	Vertical	Pass
5**	9400.625	38.06	18.50	54.0	-15.94	AV	12.00	100	Vertical	Pass
5	9400.625	48.28	18.50	68.2	-19.92	Peak	12.00	100	Vertical	Pass
6**	15670.313	43.87	26.18	54.0	-10.13	AV	217.00	100	Vertical	Pass
6	15670.313	54.69	26.18	68.2	-13.51	Peak	217.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H, High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2271.000	29.46	-10.57	54.0	-24.54	AV	180.00	100	Horizontal	Pass
1	2271.000	40.37	-10.57	68.2	-27.83	Peak	180.00	100	Horizontal	Pass
2**	4067.000	34.95	-4.67	54.0	-19.05	AV	321.00	100	Horizontal	Pass
2	4067.000	45.64	-4.67	68.2	-22.56	Peak	321.00	100	Horizontal	Pass
3**	5240.000	90.10	-1.12	--	90.10	AV	152.00	100	Horizontal	N/A
3	5240.000	102.14	-1.12	--	87.14	Peak	152.00	100	Horizontal	N/A
4**	6964.000	40.71	4.18	--	40.71	AV	1.00	100	Horizontal	Pass
4	6964.000	51.35	4.18	68.2	-16.85	Peak	1.00	100	Horizontal	Pass
5**	9141.875	37.93	18.65	54.0	-16.07	AV	58.00	100	Horizontal	Pass
5	9141.875	48.83	18.65	68.2	-19.37	Peak	58.00	100	Horizontal	Pass
6**	16171.688	44.81	27.25	54.0	-9.19	AV	154.00	100	Horizontal	Pass
6	16171.688	55.83	27.25	68.2	-12.37	Peak	154.00	100	Horizontal	Pass

Band IV

1 GHz to 18 GHz, ANT V, Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2745.000	30.26	-9.35	54.0	-23.74	AV	326.00	100	Vertical	Pass
1	2745.000	41.42	-9.35	68.2	-26.78	Peak	326.00	100	Vertical	Pass
2**	4583.000	36.30	-2.54	54.0	-17.70	AV	12.00	100	Vertical	Pass
2	4583.000	47.71	-2.54	68.2	-20.49	Peak	12.00	100	Vertical	Pass
3**	5735.000	88.86	-0.13	--	88.86	AV	2.00	100	Vertical	N/A
3	5735.000	96.61	-0.13	--	87.61	Peak	2.00	100	Vertical	N/A
4**	7622.437	36.83	17.27	54.0	-17.17	AV	115.00	100	Vertical	Pass
4	7622.437	46.93	17.27	68.2	-21.27	Peak	115.00	100	Vertical	Pass
5**	11638.813	39.91	20.37	54.0	-14.09	AV	314.00	100	Vertical	Pass
5	11638.813	49.86	20.37	68.2	-18.34	Peak	314.00	100	Vertical	Pass
6**	15578.438	42.70	27.31	54.0	-11.30	AV	29.00	100	Vertical	Pass
6	15578.438	54.86	27.31	68.2	-13.34	Peak	29.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H, Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2848.000	30.52	-8.60	54.0	-23.48	AV	108.00	100	Horizontal	Pass
1	2848.000	41.56	-8.60	68.2	-26.64	Peak	108.00	100	Horizontal	Pass
2**	3863.000	34.41	-5.61	54.0	-19.59	AV	119.00	100	Horizontal	Pass
2	3863.000	44.39	-5.61	68.2	-23.81	Peak	119.00	100	Horizontal	Pass
3**	5735.000	90.54	-0.16	--	90.54	AV	357.00	100	Horizontal	N/A
3	5735.000	97.60	-0.16	--	90.60	Peak	357.00	100	Horizontal	N/A
4**	7623.875	37.06	17.24	54.0	-16.94	AV	8.00	100	Horizontal	Pass
4	7623.875	47.20	17.24	68.2	-21.00	Peak	8.00	100	Horizontal	Pass
5**	11594.250	39.22	20.00	54.0	-14.78	AV	55.00	100	Horizontal	Pass
5	11594.250	50.01	20.00	68.2	-18.19	Peak	55.00	100	Horizontal	Pass
6**	15658.500	43.37	26.71	54.0	-10.63	AV	175.00	100	Horizontal	Pass
6	15658.500	53.58	26.71	68.2	-14.62	Peak	175.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V, High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2771.500	29.90	-9.00	54.0	-24.10	AV	148.00	100	Vertical	Pass
1	2771.500	40.91	-9.00	68.2	-27.29	Peak	148.00	100	Vertical	Pass
2**	4903.000	37.40	-1.22	54.0	-16.60	AV	252.00	100	Vertical	Pass
2	4903.000	47.60	-1.22	68.2	-20.60	Peak	252.00	100	Vertical	Pass
3**	5840 .000	89.36	0.52	--	89.36	AV	1.00	100	Vertical	N/A
3	5840.000	96.86	0.52	--	95.86	Peak	1.00	100	Vertical	N/A
4**	7639.688	36.13	16.58	54.0	-17.87	AV	135.00	100	Vertical	Pass
4	7639.688	48.08	16.58	68.2	-20.12	Peak	135.00	100	Vertical	Pass
5**	9357.500	36.94	17.49	54.0	-17.06	AV	185.00	100	Vertical	Pass
5	9357.500	48.22	17.49	68.2	-19.98	Peak	185.00	100	Vertical	Pass
6**	12061.438	40.14	20.50	54.0	-13.86	AV	6.00	100	Vertical	Pass
6	12061.438	50.15	20.50	68.2	-18.05	Peak	6.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H, High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2290.500	29.02	-10.51	54.0	-24.98	AV	95.00	100	Horizontal	Pass
1	2290.500	40.29	-10.51	68.2	-27.91	Peak	95.00	100	Horizontal	Pass
2**	4116.000	35.11	-4.73	54.0	-18.89	AV	116.00	100	Horizontal	Pass
2	4116.000	45.98	-4.73	68.2	-22.22	Peak	116.00	100	Horizontal	Pass
3**	5840.000	88.45	0.25	--	88.45	AV	8.00	100	Horizontal	N/A
3	5840.000	95.37	0.25	--	82.37	Peak	8.00	100	Horizontal	N/A
4**	7319.125	36.66	17.21	54.0	-17.34	AV	171.00	100	Horizontal	Pass
4	7319.125	47.66	17.21	68.2	-20.54	Peak	171.00	100	Horizontal	Pass
5**	9091.562	38.27	18.78	54.0	-15.73	AV	131.00	100	Horizontal	Pass
5	9091.562	48.33	18.78	68.2	-19.87	Peak	131.00	100	Horizontal	Pass
6**	12104.563	39.82	20.76	54.0	-14.18	AV	10.00	100	Horizontal	Pass
6	12104.563	50.48	20.76	68.2	-17.72	Peak	10.00	100	Horizontal	Pass

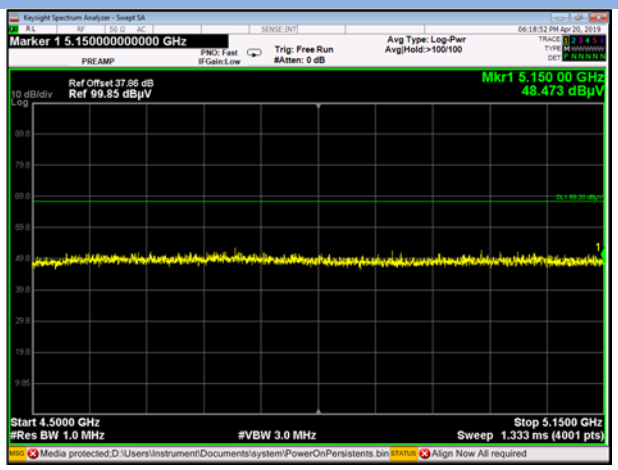
A.7.2 Band Edge (Restricted-band)

Test Band	Channel	Verdict
Band I (5160 - 5240 MHz)	Low	Pass
	High	Pass
Band IV (5735 - 5840 MHz)	Low	Pass
	High	Pass

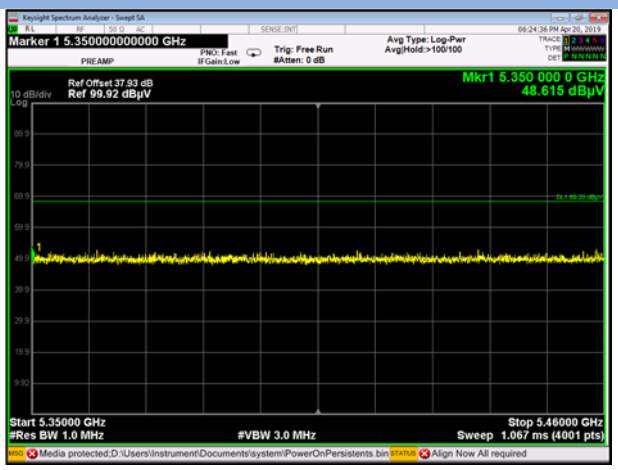
Test Plots

Band I

LOW CHANNEL

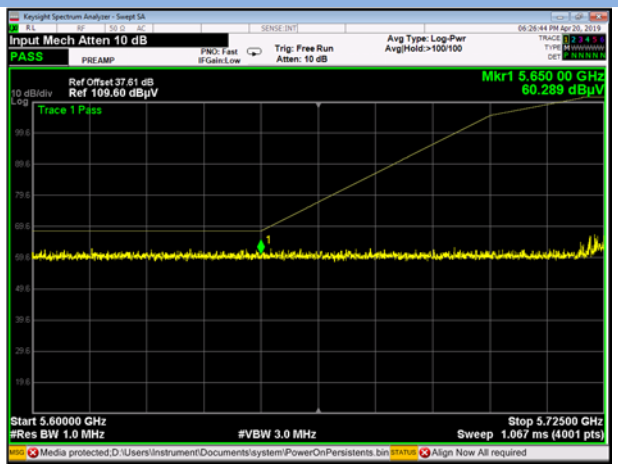


HIGH CHANNEL

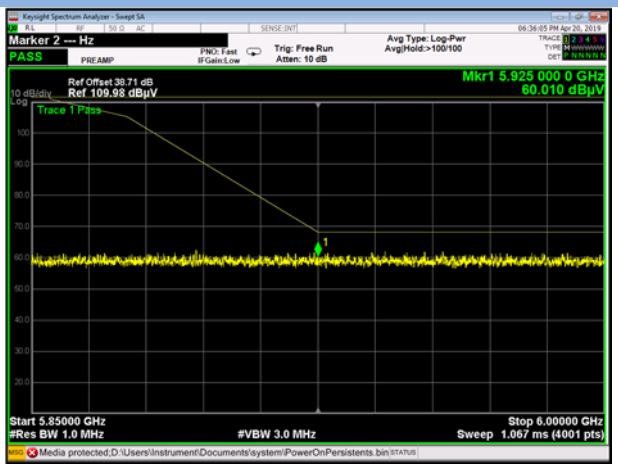


Band IV

LOW CHANNEL



HIGH CHANNEL



A.8 Frequency Stability

Voltage vs. Frequency Stability

Band I (5160 - 5240 MHz)		
Channel	Frequency Error(MHz)	ppm
Low	5159.9975	0.4797
Middle	5199.9967	0.6442
High	5239.9964	0.6918

Band IV (5735 - 5840 MHz)		
Channel	Frequency Error(MHz)	ppm
Low	5734.9958	0.7365
Middle	5784.9956	0.7647
High	5839.9955	0.7661

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-HK1930562-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-HK1930562-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-HK1930562-AI.PDF”.

--END OF REPORT--