FCC/ISED RF TEST REPORT

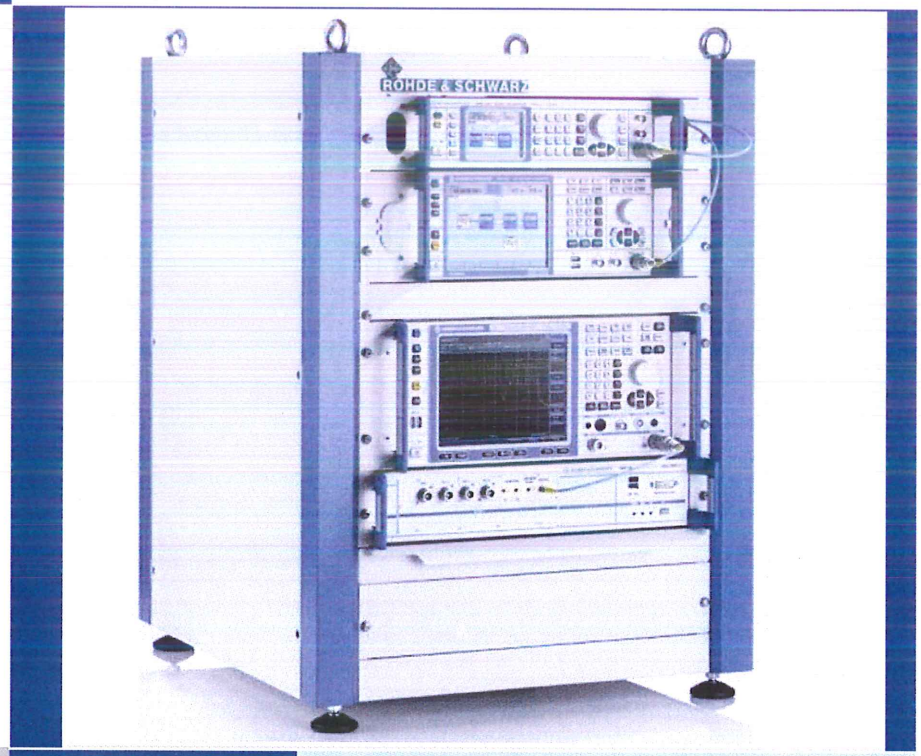
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

WIRELESS ADAPTER

ISSUED TO
DEI Sales, Inc., dba Polk Audio

5541 Fermi Court, Carlsbad, California 92008, USA



Report No.:	BL-SZ2050656-601
EUT Name:	WIRELESS ADAPTER
Model Name:	DBWA
Brand Name:	Polk Audio
Test Standard:	47 CFR Part 15 Subpart E
	RSS-Gen (Issue 5, March 2019)
	RSS-247 (Issue 2, February 2017)
FCC ID:	WLQDBWA
ISED Number:	7956A-DBWA
Test Conclusion:	Pass
Test Date:	Jun. 04, 2020 ~ Jun. 24, 2020
Date of Issue:	Sep. 04, 2020

Prepared by: Ye Hongji
Date Sep. 04, 2020

Approved by: Wei Yanquan
(Chief Engineer)
Date Sep. 04, 2020

Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: qc@baluntek.com
www.baluntek.com

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Sep. 04, 2020	Initial Issue

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 v4.4.

(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.

(7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	DEI Sales, Inc., dba Polk Audio
Address	5541 Fermi Court, Carlsbad, California 92008, USA

2.2 Manufacturer

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

2.3 Factory

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	WIRELESS ADAPTER
Model Name Under Test	DBWA
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	N/A
Hardware Version	v2.1
Software Version	v101E
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
Product Type	Indoor for IC standard Mobile for FCC standard
Transfer Rate (Mbps) (Single RF path)	2 Mbps
Number of channel	6 (See note)
Maximum Output Power	Band I: 11.75 dBm Band IV: 13.75 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	Band I: 5160 MHz to 5240 MHz: 1 dBi Band IV: 5735 MHz to 5840 MHz: 2.5 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)
About the Product	The equipment is WIRELESS ADAPTER, 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.

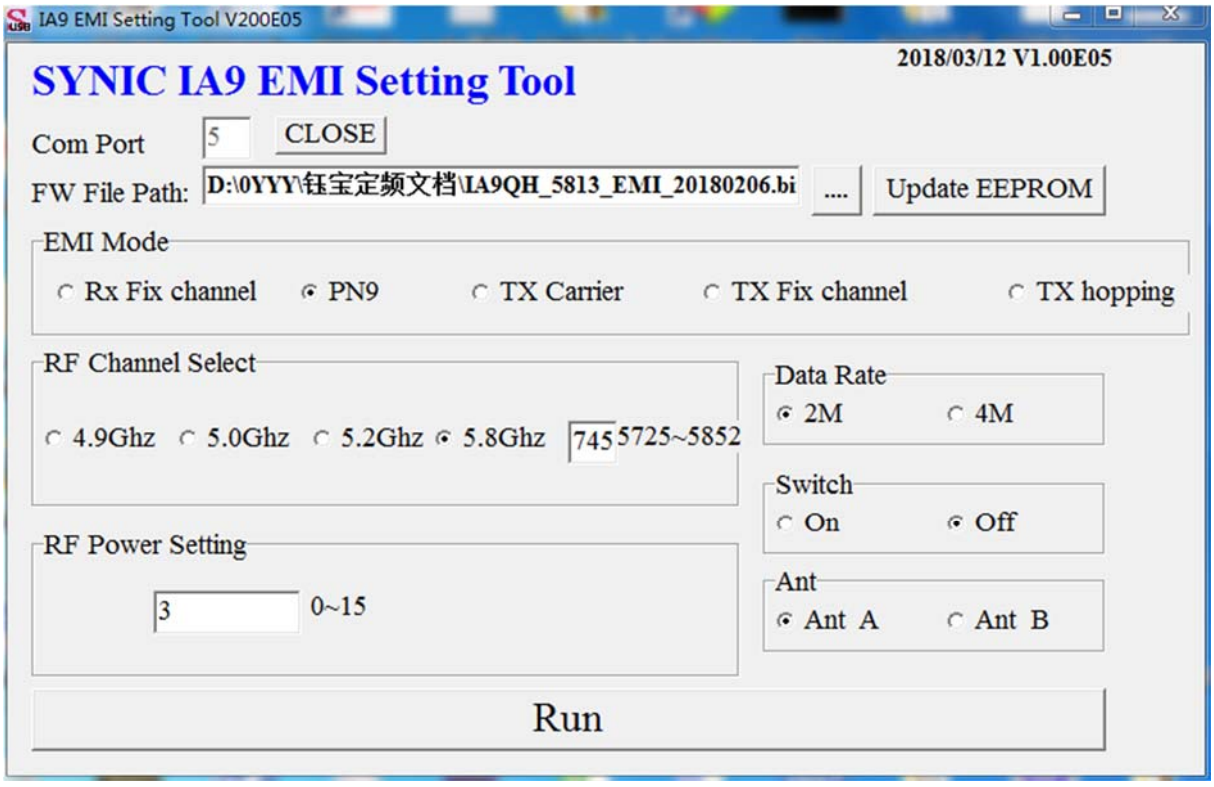
During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Test Software Version	IA9 EMI Setting Tool V200E05		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Dell	N/A

Band I (5160 - 5240 MHz) Power level setup in software		
Channel	Frequency (MHz)	Soft Set
Low	5160	2
Middle	5200	
High	5240	

Band IV (5735 - 5840 MHz) Power level setup in software		
Channel	Frequency (MHz)	Soft Set
Low	5735	3
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 (10-1-16 Edition)	Unlicensed National Information Infrastructure Devices
2	KDB Publication 789033 D02v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
3	RSS-Gen (Issue 5, Mar. 2019)	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	Pass
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 a permanently and irreplaceable attached 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

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)	5.0 V
	LV (Low Voltage)	4.5 V
	HV (High Voltage)	5.5 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2019.06.13	2020.06.12
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2019.06.13	2020.06.12
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2019.10.29	2020.10.28
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2019.06.13	2020.06.12
LISN	SCHWARZBECK	NSLK 8127	8127-687	2019.06.13	2020.06.12
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2019.06.15	2020.06.14
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2019.06.18	2020.06.17
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2019.06.15	2020.06.14
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
Temperature Chamber	AHK	SP20	1412	2019.06.24	2020.06.23
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.11.09	2020.11.08
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2018.08.22	2020.08.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10
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	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2018.08.08	2021.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2019.08.23	2020.08.22
Power Amplifier	OPHIR RF	5225F	1037	2020.02.19	2021.02.18
Power Amplifier	OPHIR RF	5273F	1016	2020.02.19	2021.02.18
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Sound Level Meter	B&K	NL-20	00844023	2019.11.12	2020.11.11
Ear Simulator	B&K	4185	2409449	2019.11.12	2020.11.11
Ear Simulator	B&K	4195	2418189	2019.11.12	2020.11.11
Audio analyzer	B&K	UPL 16	100129	2019.11.12	2020.11.11

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2020.06.08	2021.06.07
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2020.06.08	2021.06.07
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2020.06.09	2021.06.08
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2020.06.09	2021.06.08
LISN	SCHWARZBECK	NSLK 8127	8127-687	2020.06.09	2021.06.08
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2020.06.08	2021.06.07
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2020.06.08	2021.06.07
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2020.06.08	2021.06.07
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
Temperature Chamber	AHK	SP20	1412	2020.06.10	2021.06.09
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.11.09	2020.11.08
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2018.08.22	2020.08.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2019.07.22	2021.07.21
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2019.01.06	2021.01.05
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2018.08.08	2021.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2020.06.08	2021.06.07
Power Amplifier	OPHIR RF	5225F	1037	2020.02.19	2021.02.18
Power Amplifier	OPHIR RF	5273F	1016	2020.02.19	2021.02.18
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A
Sound Level Meter	B&K	NL-20	00844023	2019.11.12	2020.11.11
Ear Simulator	B&K	4185	2409449	2019.11.12	2020.11.11
Ear Simulator	B&K	4195	2418189	2019.11.12	2020.11.11
Audio analyzer	B&K	UPL 16	100129	2019.11.12	2020.11.11

4.3 Measurement Uncertainty

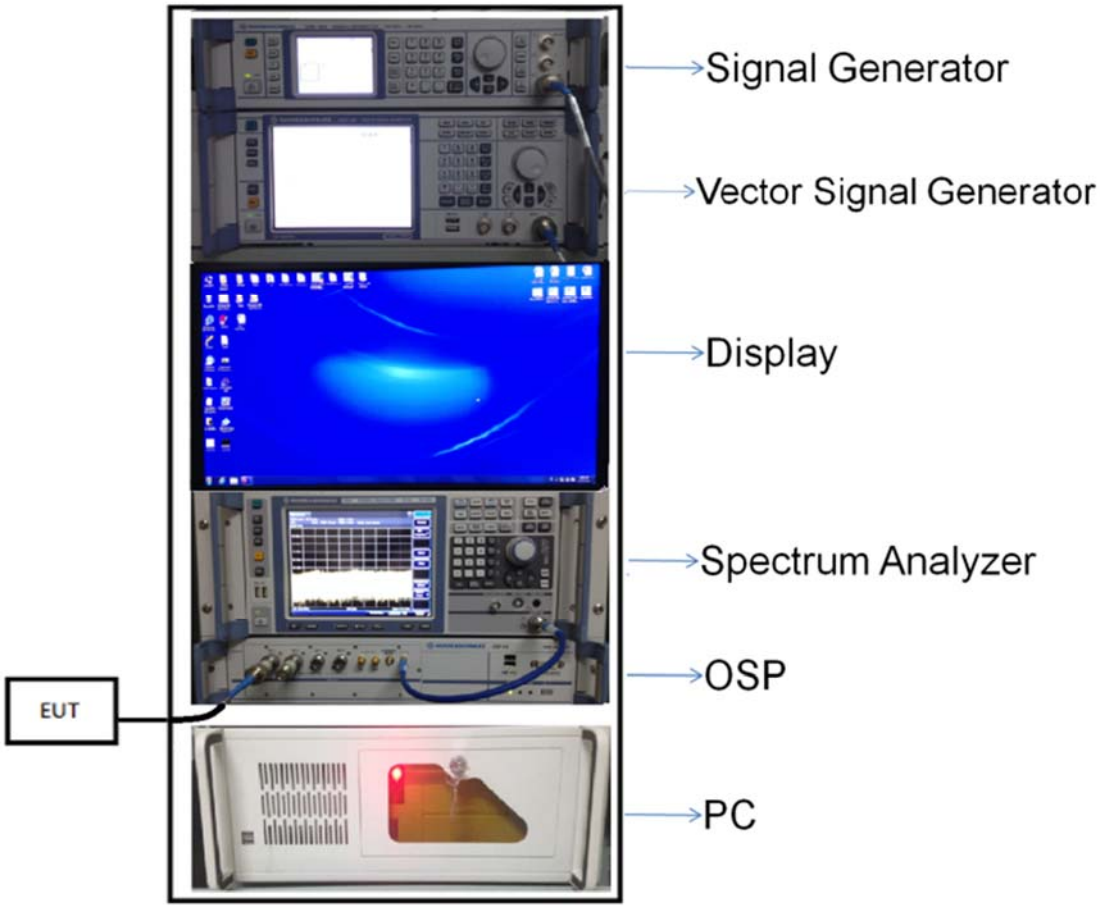
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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%

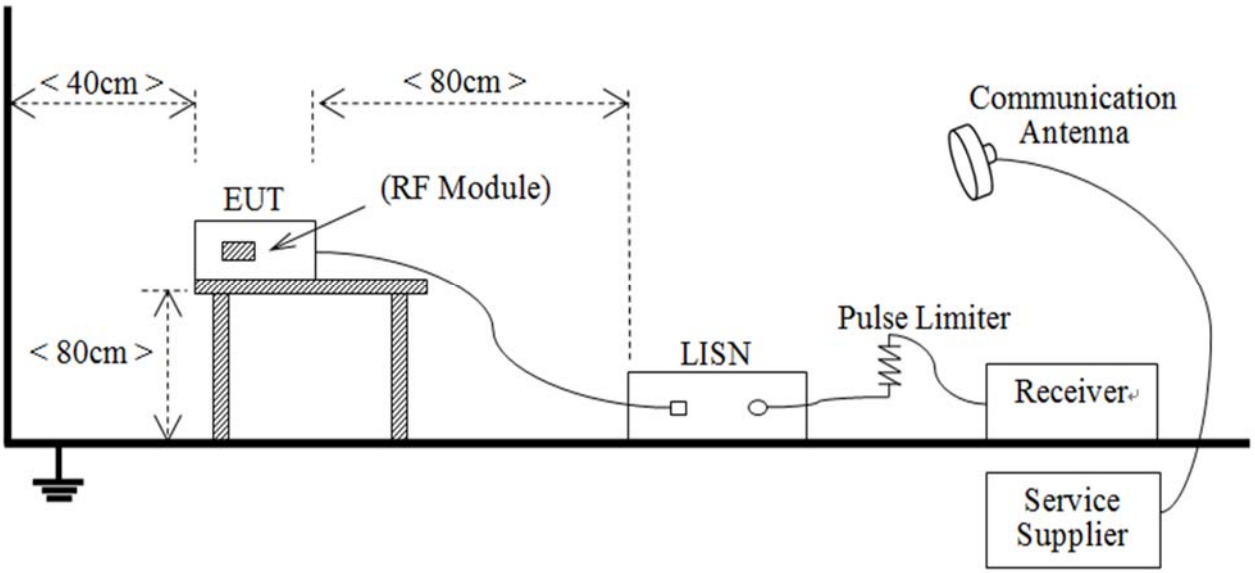
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



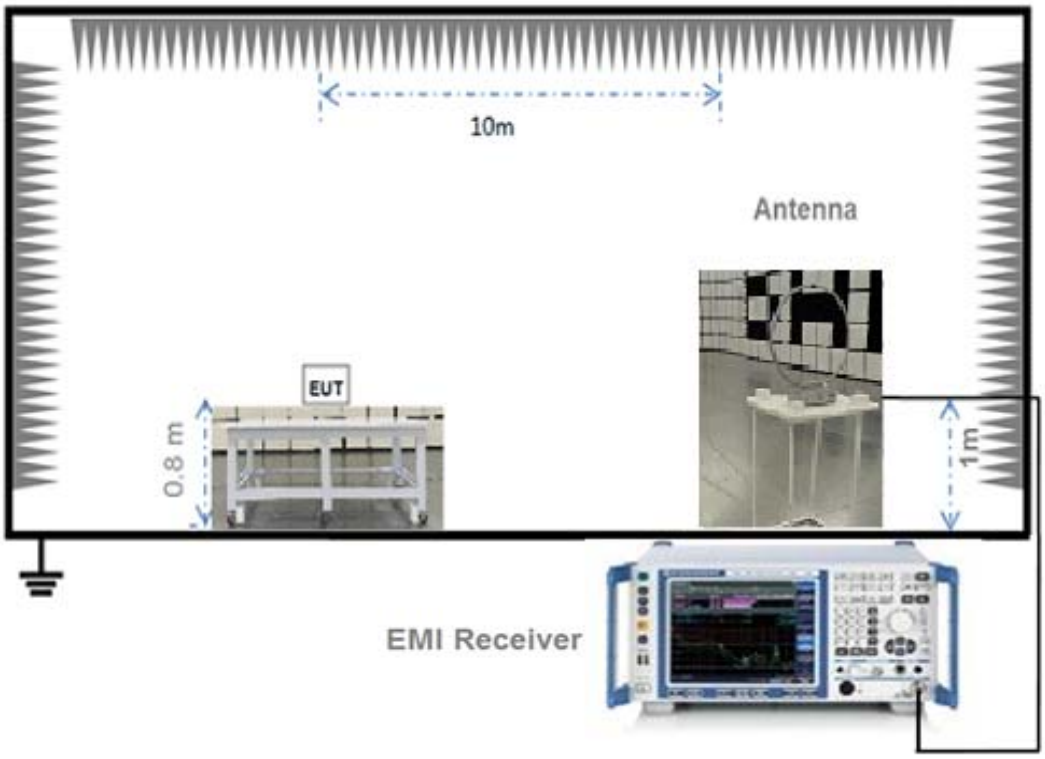
(Diagram 1)

4.4.2 For AC Power Supply Port Test



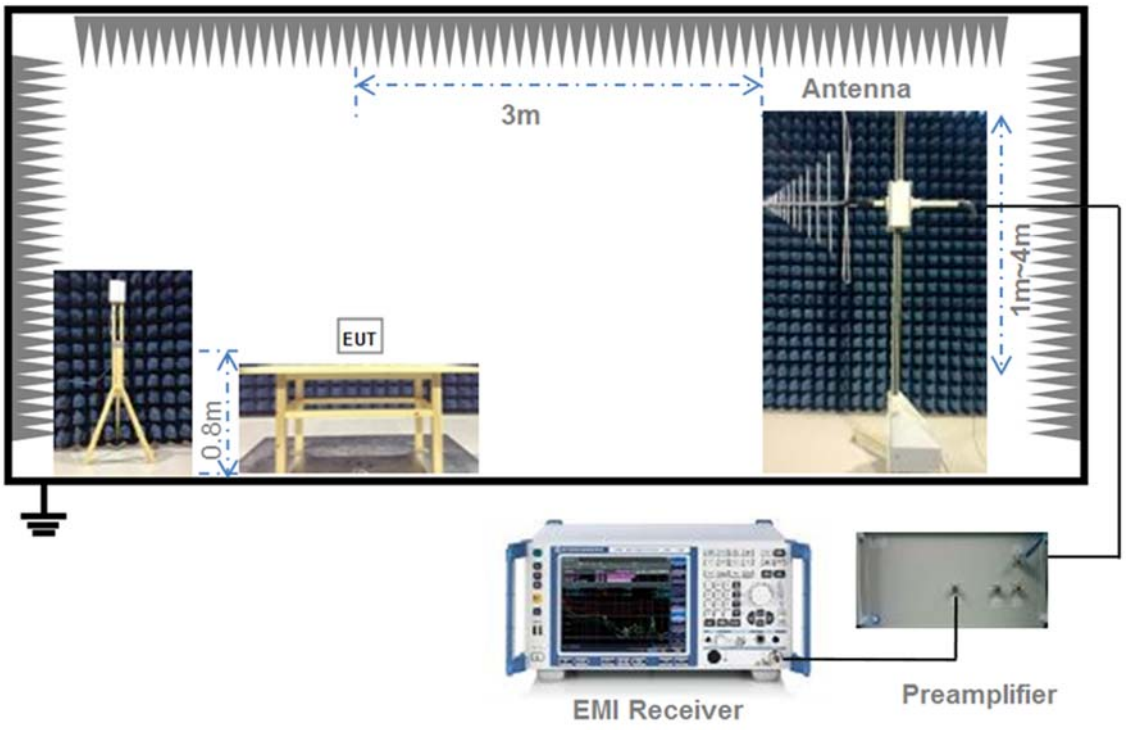
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



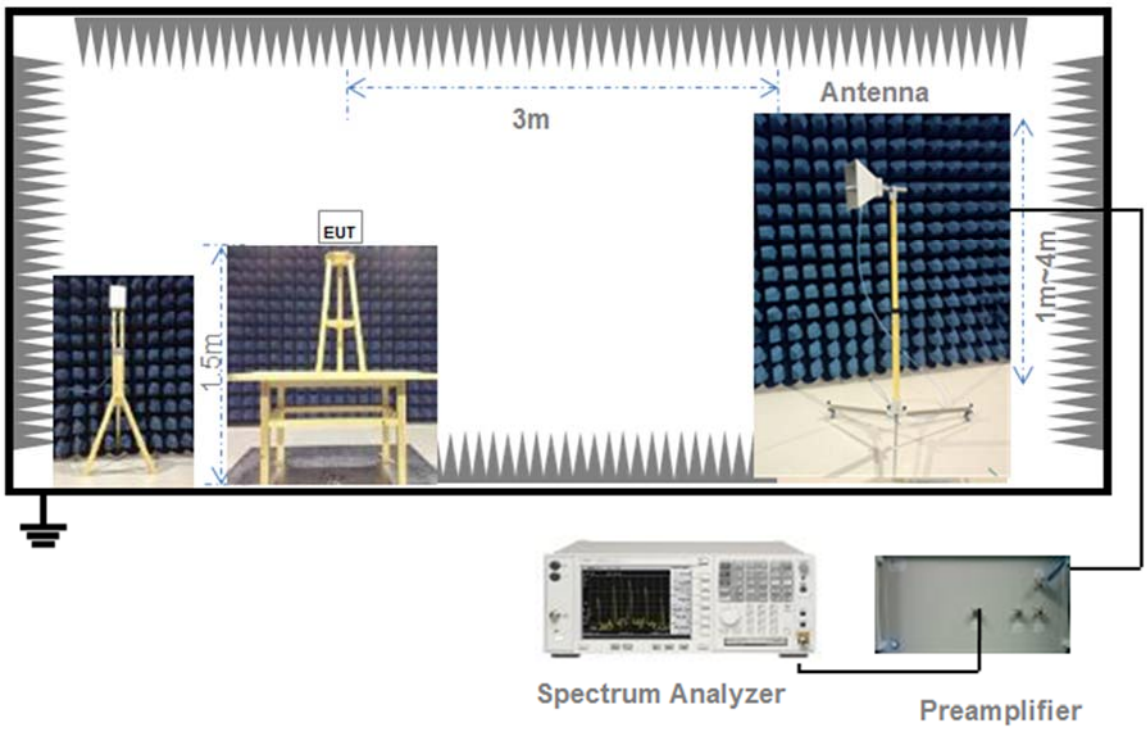
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

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.

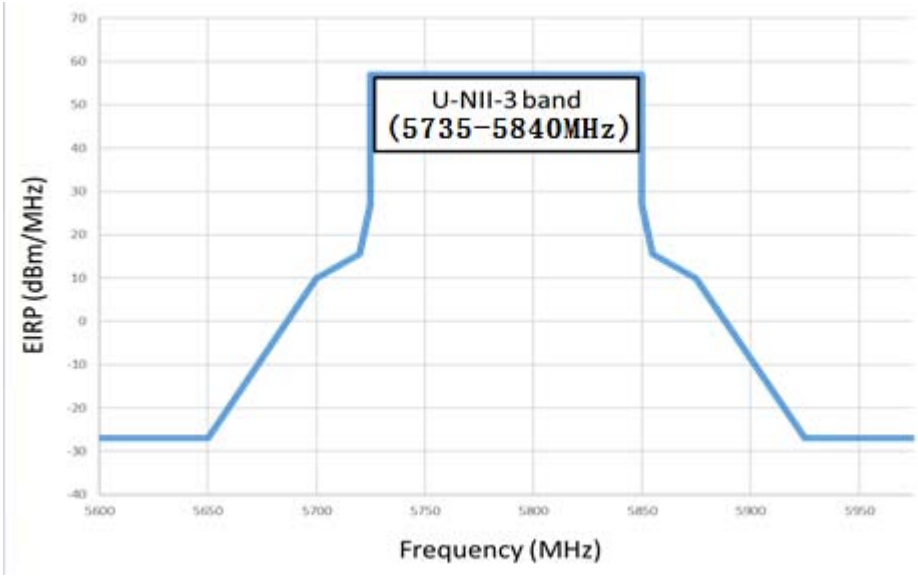
5.4.4 Test Result

Please refer to ANNEX A.5.

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

5.5.1 Limit

FCC §15.407(b)

<table>
<tr><th colspan="2">Un-restricted band emissions</th></tr>
<tr><th>Frequency Band (MHz)</th><th>Limit</th></tr>
<tr><td>5160-5240</td><td>Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm</td></tr>
<tr><td>5735-5840</td><td>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.
 
</td></tr>
</table>

5.5.2 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.

5.5.3 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.

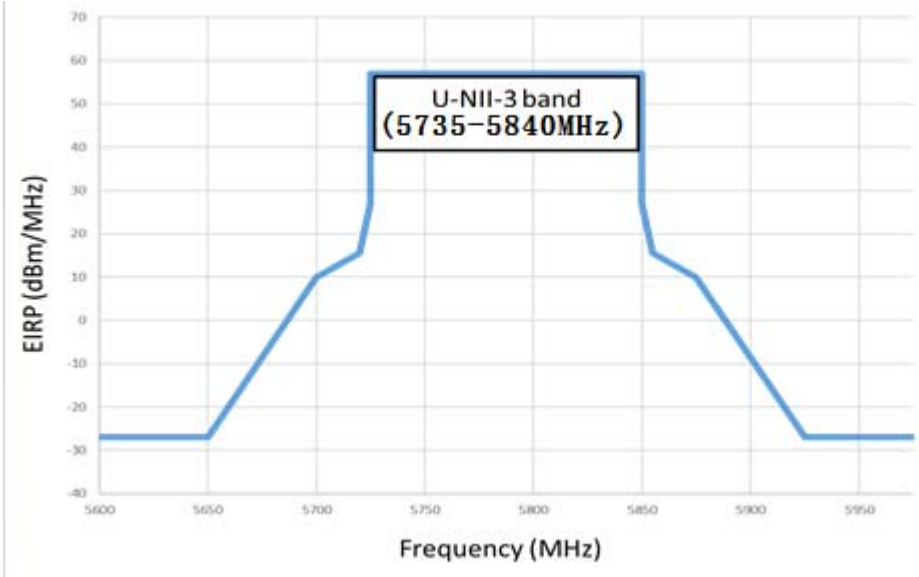
5.6 Radiated Spurious Emissions and Band Edge (Restricted-band)

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.

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 Data

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	11.75	14.96	250	Pass
	Middle	5200	11.21	13.21	250	Pass
	High	5240	11.51	14.16	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	13.75	23.71	1.00	Pass
	Middle	5785	12.40	17.38	1.00	Pass
	High	5840	13.41	21.93	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	12.75	18.84	14.74	Pass
	Middle	5200	12.21	16.63	14.74	Pass
	High	5240	12.51	17.82	14.66	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	2.98
Middle	2.62	2.98
High	2.62	2.92

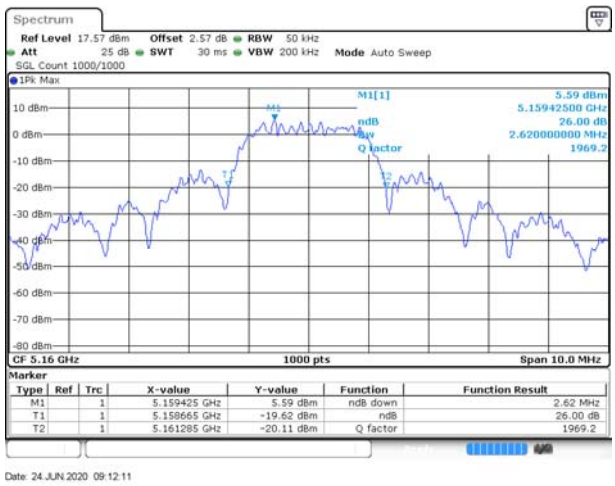
Band IV (5735 - 5840 MHz)		
Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2.62	2.98
Middle	2.62	3.05
High	2.63	3.15

Test plots

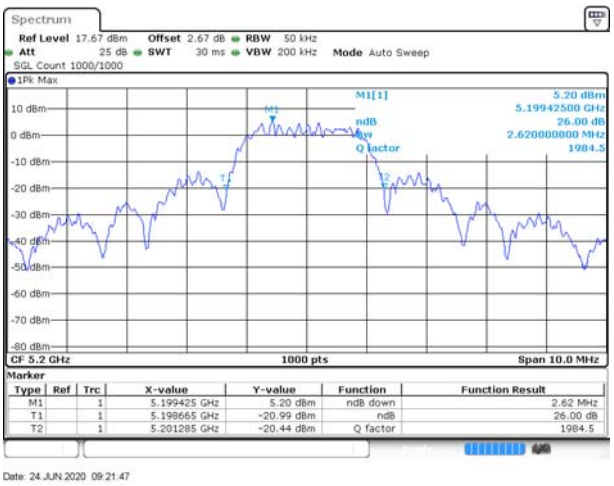
26 dB Bandwidth

Band I

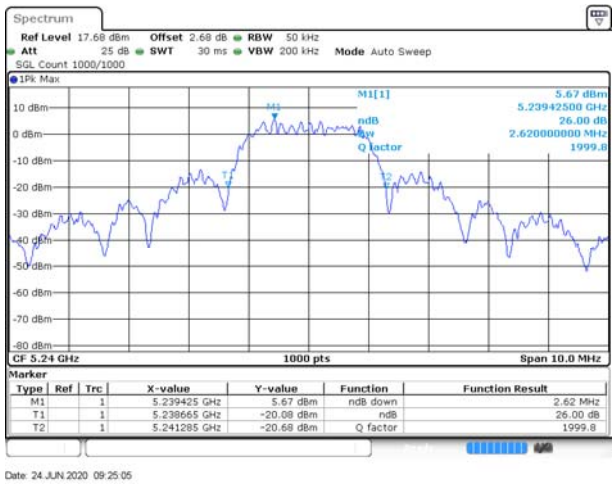
LOW CHANNEL



MIDDLE CHANNEL

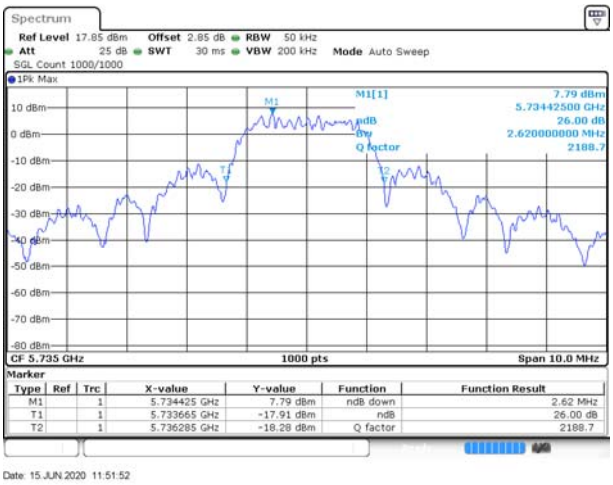


HIGH CHANNEL

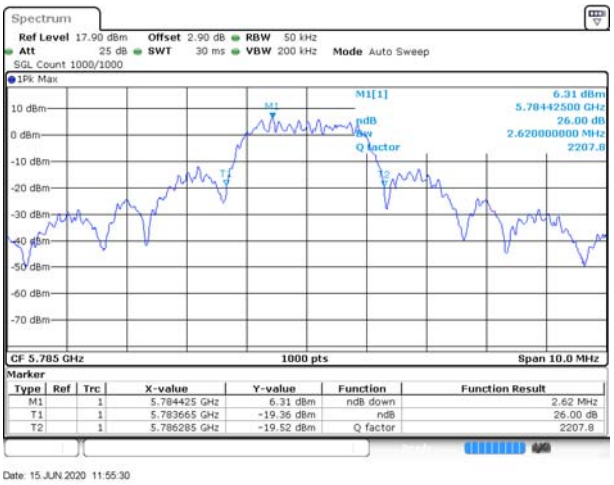


Band IV

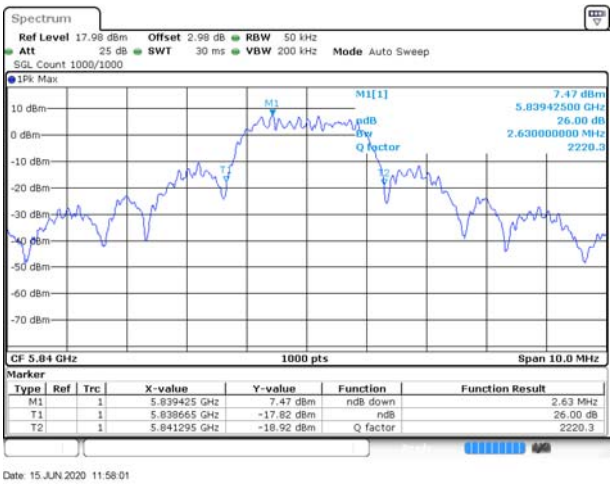
LOW CHANNEL



MIDDLE CHANNEL



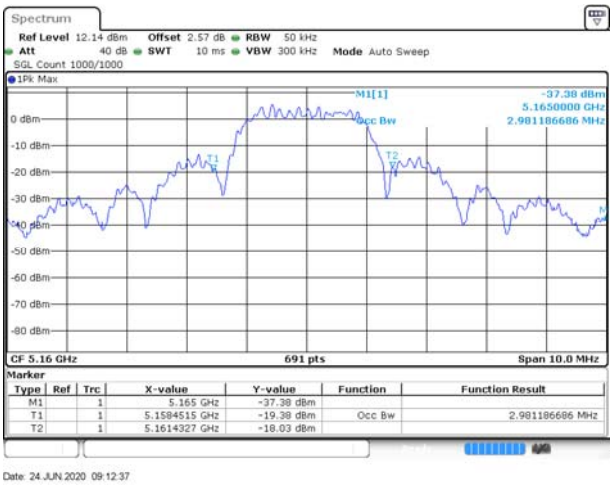
HIGH CHANNEL



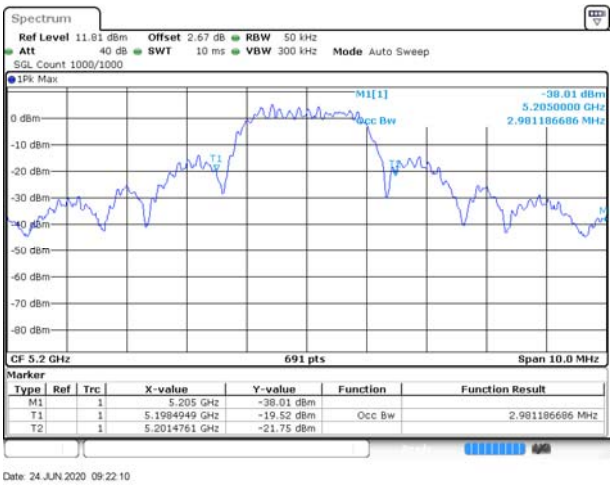
99% Bandwidth

Band I

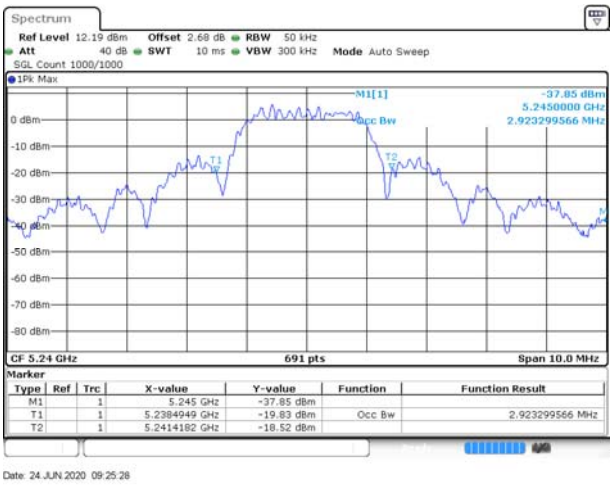
LOW CHANNEL



MIDDLE CHANNEL

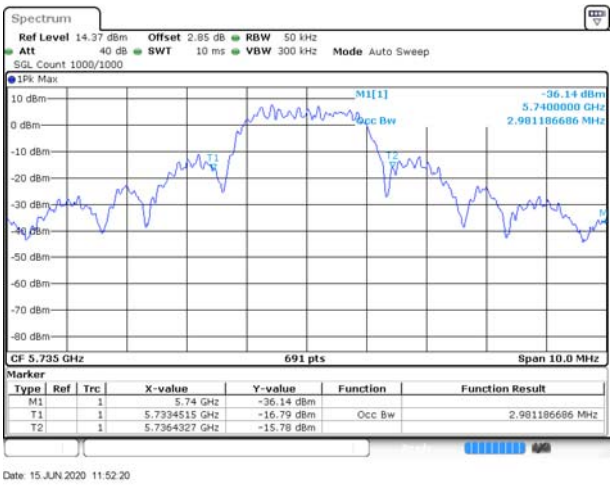


HIGH CHANNEL

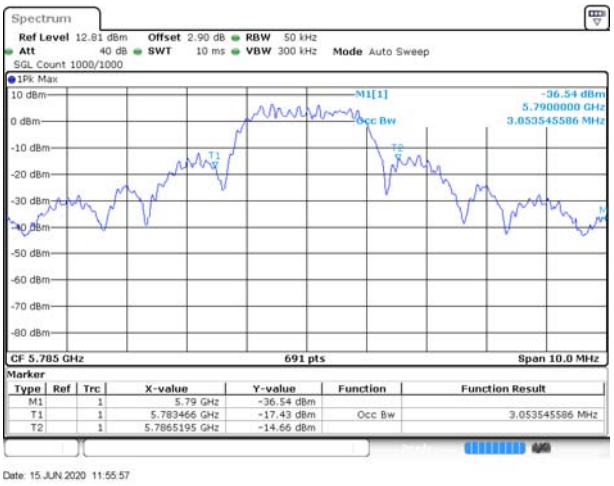


Band IV

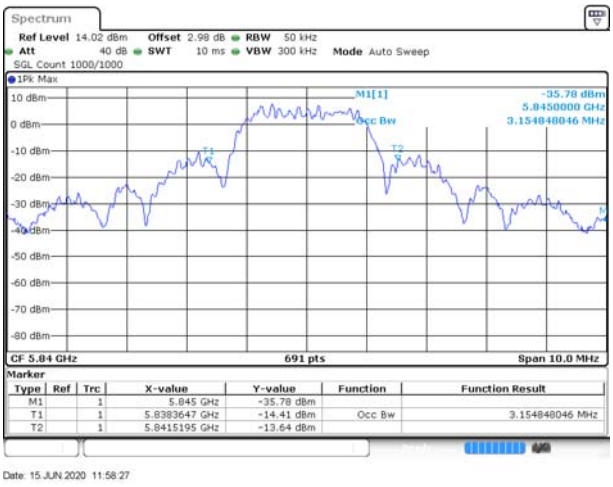
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.3 6 dB Bandwidth

Test Data

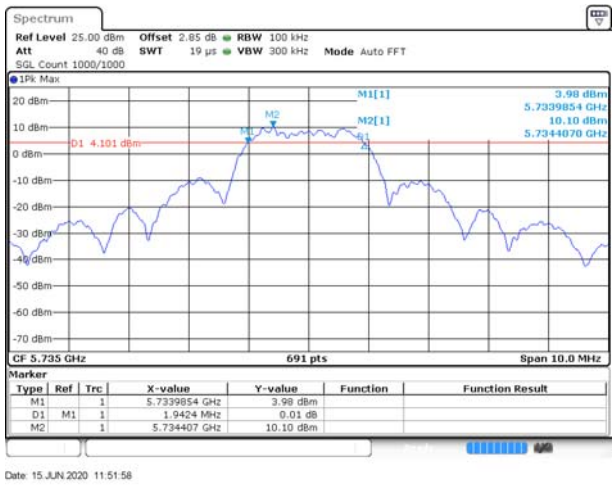
Band IV (5735 - 5840 MHz)			
Channel	6 dB Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)	Verdict
Low	1.94	⩾500	Pass
Middle	1.96	⩾500	Pass
High	1.99	⩾500	Pass

Test plots

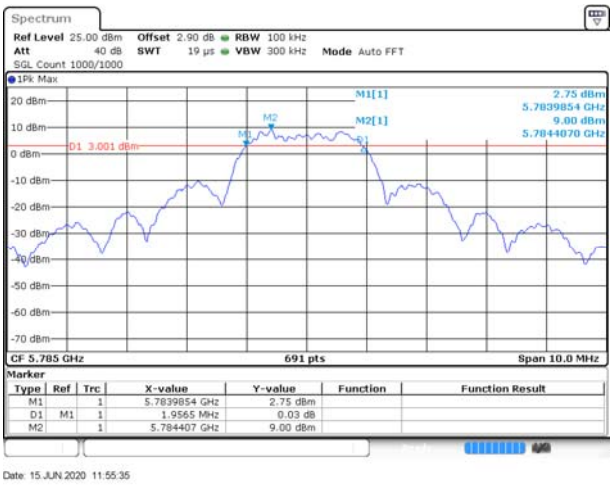
6 dB Bandwidth

Band IV

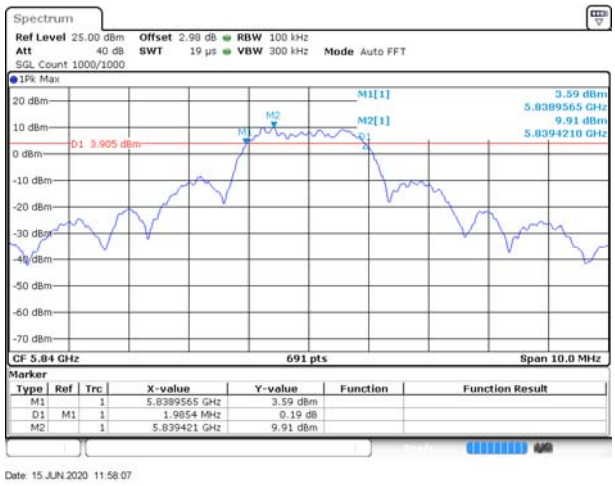
LOW CHANNEL



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	8.25	11	Pass
Middle	7.86	11	Pass
High	8.24	11	Pass

Band IV (5735 - 5840 MHz)			
Channel	PSD (dBm/MHz)	FCC/IC Limit (30dBm/500 kHz)	Verdict
Low	8.06	30	Pass
Middle	6.87	30	Pass
High	7.71	30	Pass

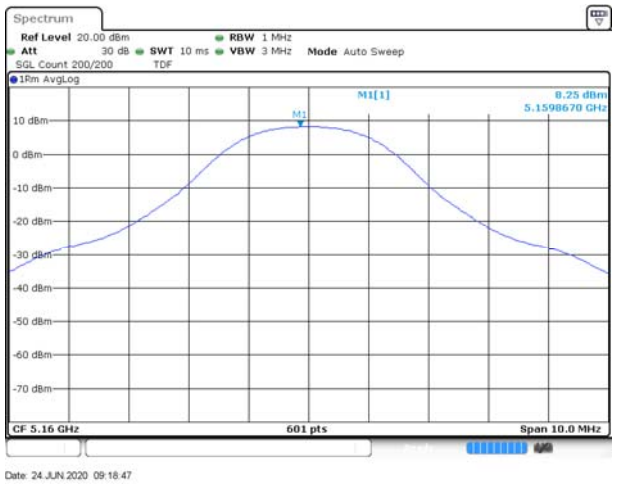
EIRP

Band I (5160 - 5240 MHz)			
Channel	PSD (dBm/MHz)	IC Limit (dBm/MHz)	Verdict
Low	9.25	10	Pass
Middle	8.86	10	Pass
High	9.24	10	Pass

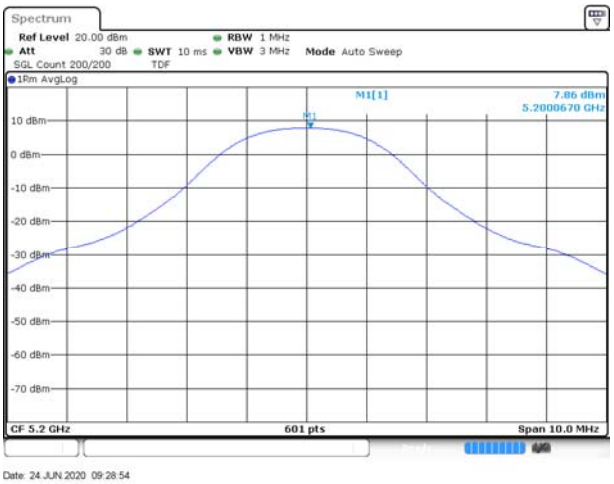
Test plots

Band I

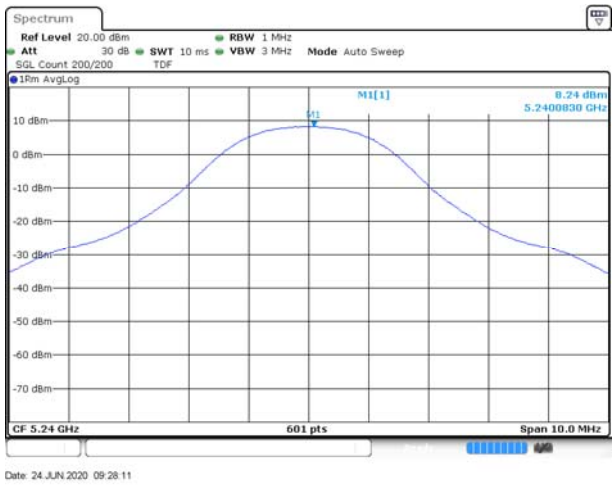
LOW CHANNEL



MIDDLE CHANNEL

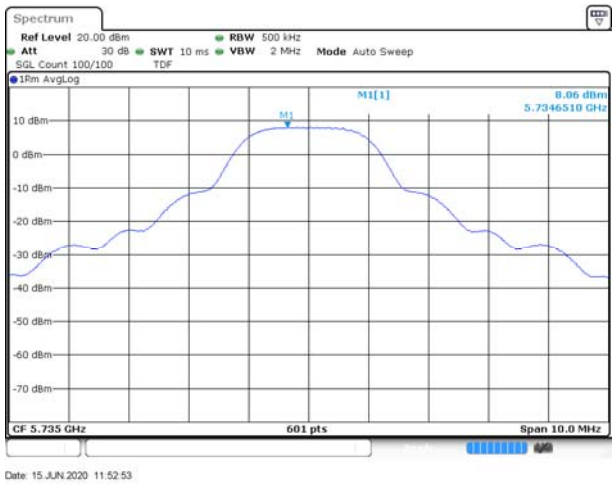


HIGH CHANNEL

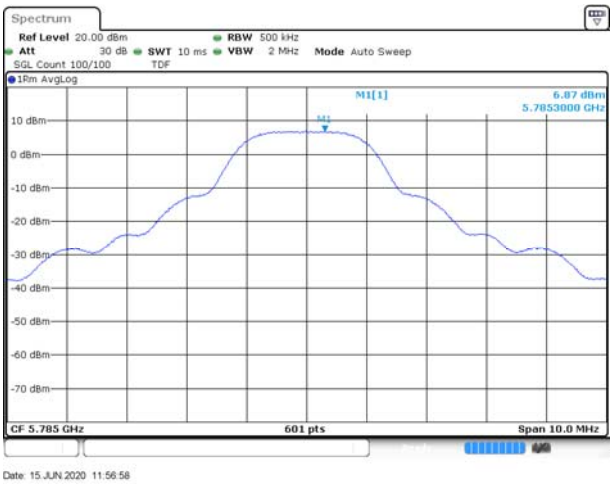


Band IV

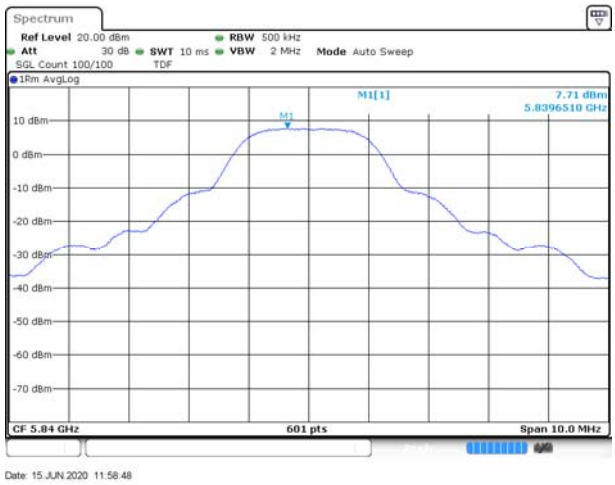
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL

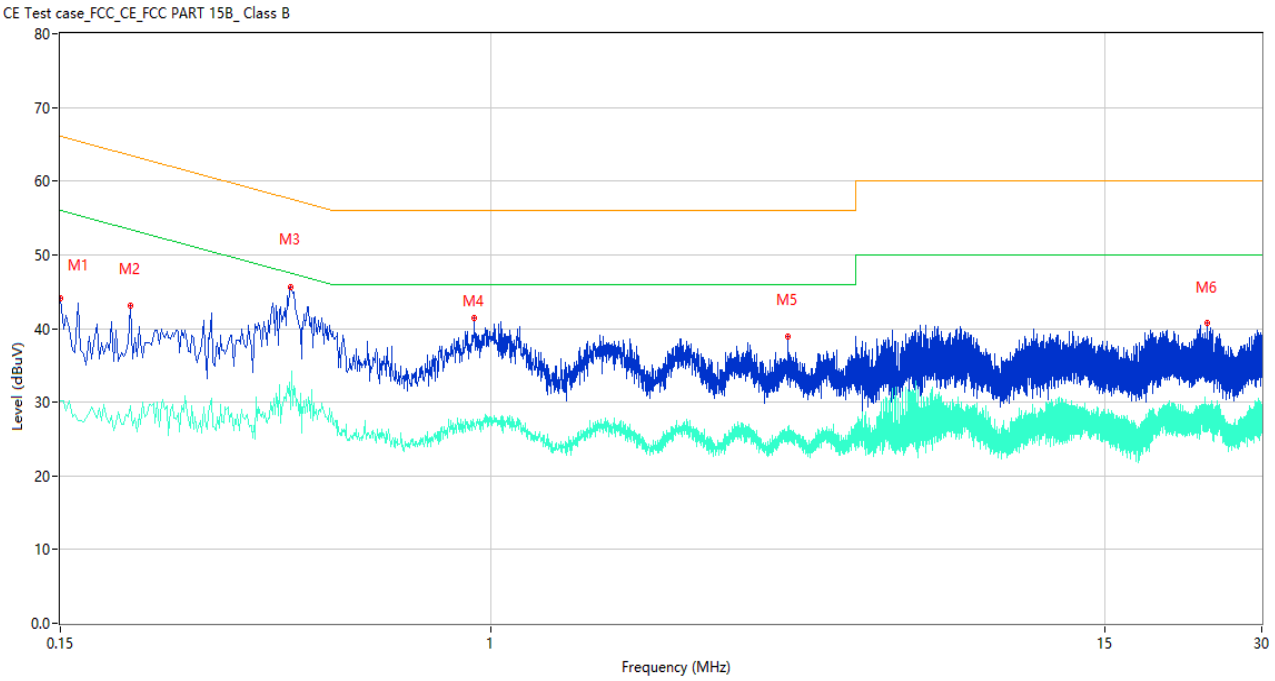


A.5 Conducted Emissions

Note [1]: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

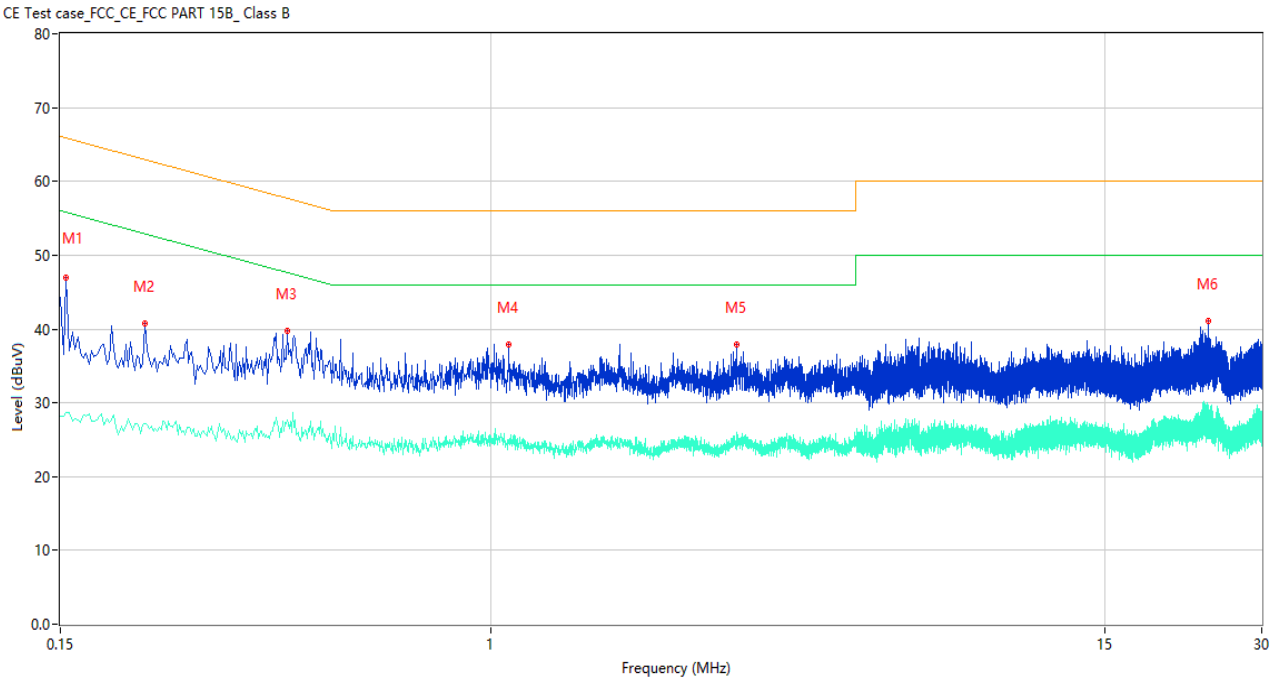
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	44.05	10.41	66.00	-21.95	Peak	L	Pass
1**	0.150	30.25	10.41	56.00	-25.75	AV	L	Pass
2	0.204	43.18	10.38	63.45	-20.27	Peak	L	Pass
2**	0.204	29.50	10.38	53.45	-23.95	AV	L	Pass
3	0.414	45.61	10.31	57.57	-11.96	Peak	L	Pass
3**	0.414	29.09	10.31	47.57	-18.48	AV	L	Pass
4	0.932	41.36	10.24	56.00	-14.64	Peak	L	Pass
4**	0.932	26.90	10.24	46.00	-19.10	AV	L	Pass
5	3.710	38.89	10.29	56.00	-17.11	Peak	L	Pass
5**	3.710	24.38	10.29	46.00	-21.62	AV	L	Pass
6	23.550	40.77	10.62	60.00	-19.23	Peak	L	Pass
6**	23.550	28.94	10.62	50.00	-21.06	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	44.34	10.41	66.00	-21.66	Peak	N	Pass
1**	0.150	28.22	10.41	56.00	-27.78	AV	N	Pass
2	0.218	40.71	10.37	62.89	-22.18	Peak	N	Pass
2**	0.218	27.14	10.37	52.89	-25.75	AV	N	Pass
3	0.408	39.73	10.31	57.69	-17.96	Peak	N	Pass
3**	0.408	27.73	10.31	47.69	-19.96	AV	N	Pass
4	1.084	37.91	10.23	56.00	-18.09	Peak	N	Pass
4**	1.084	25.00	10.23	46.00	-21.00	AV	N	Pass
5	2.958	37.98	10.28	56.00	-18.02	Peak	N	Pass
5**	2.958	25.57	10.28	46.00	-20.43	AV	N	Pass
6	23.658	41.04	10.63	60.00	-18.96	Peak	N	Pass
6**	23.658	28.23	10.63	50.00	-21.77	AV	N	Pass

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

Test data

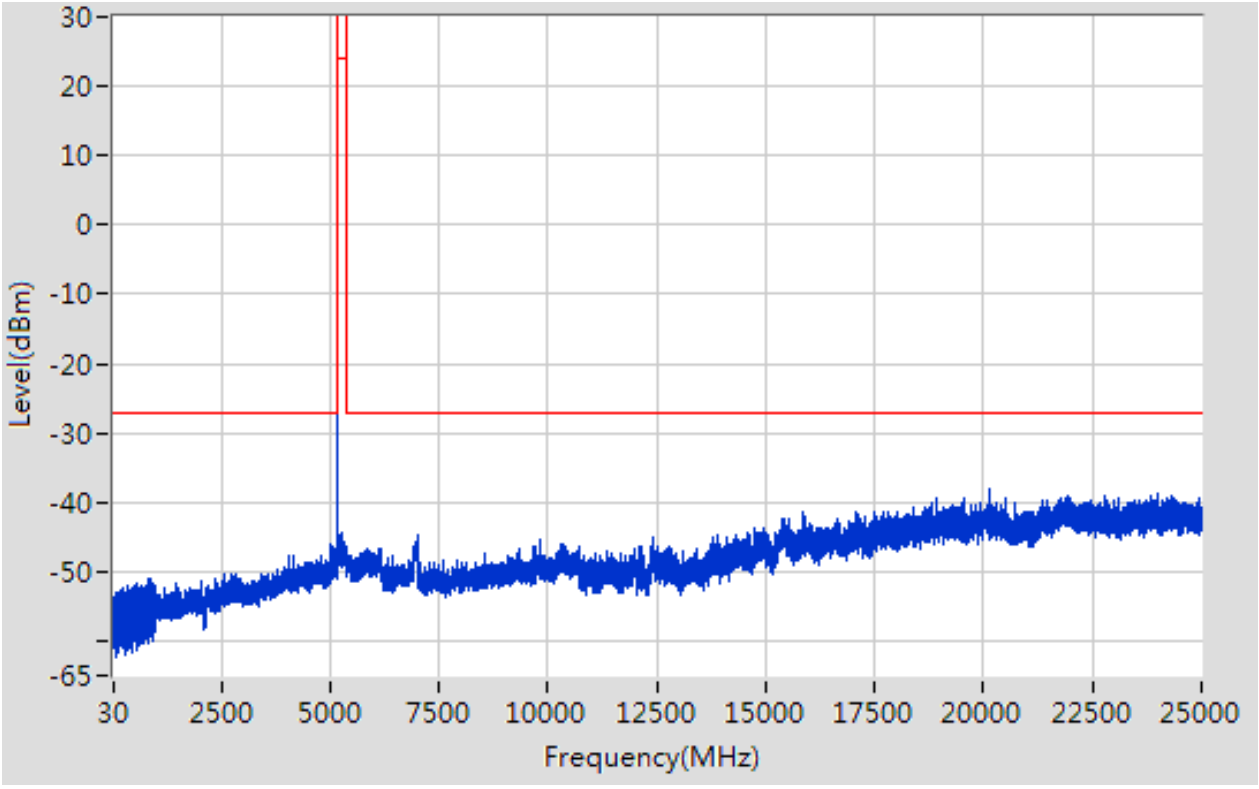
Test Band	Channel	Verdict
Band I (5160 - 5240 MHz)	Low	Pass
	Middle	Pass
	High	Pass
Band IV (5735 - 5840 MHz)	Low	Pass
	Middle	Pass
	High	Pass

Test plots

Band I

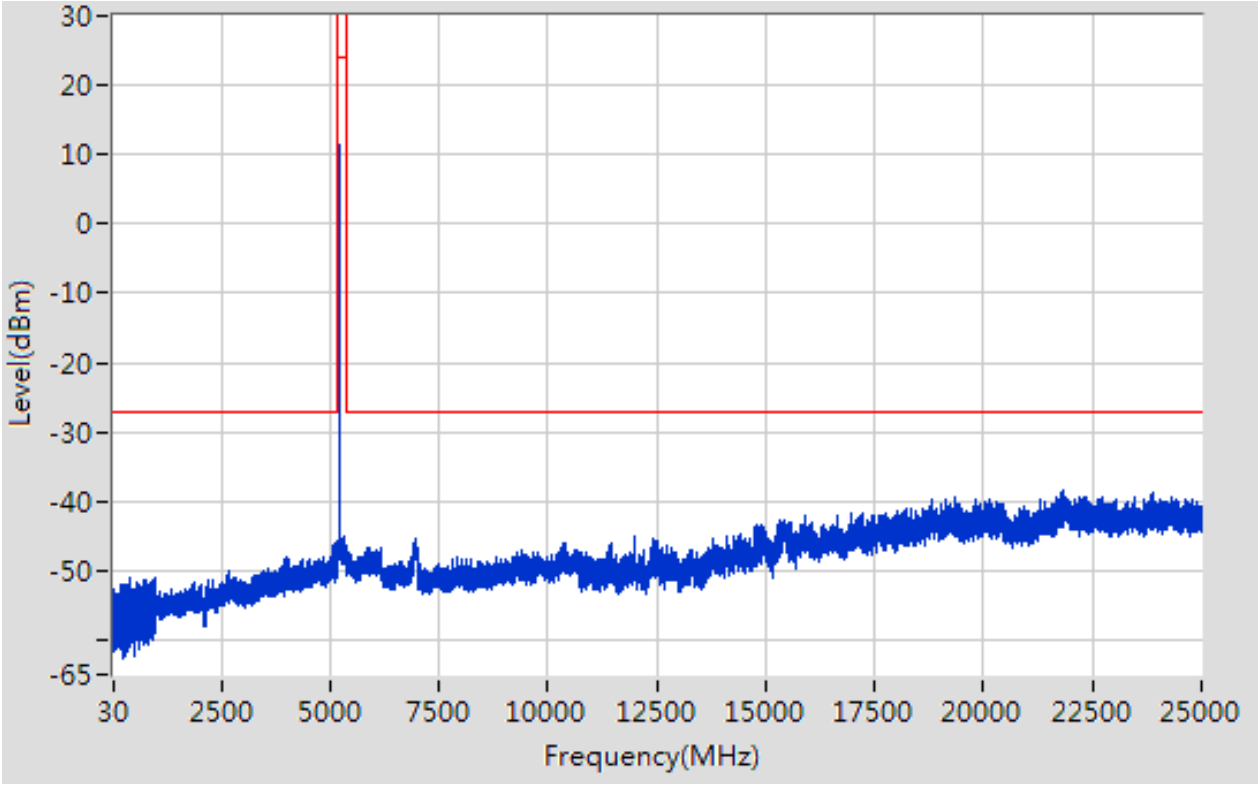
LOW CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	880.988	-51.03	-27	Pass	9700
1000	5149.5	1	Peak	4999.446	-45.9	-27	Pass	4149
5150.5	5349.5	1	Peak	5159.152	11.64	24	Pass	691
5350.5	10300	1	Peak	6989.997	-44.86	-27	Pass	4949
10300	10700	1	Peak	10320.29	-45.91	-27	Pass	691
10700	25000	1	Peak	20122.659	-38.08	-27	Pass	14300



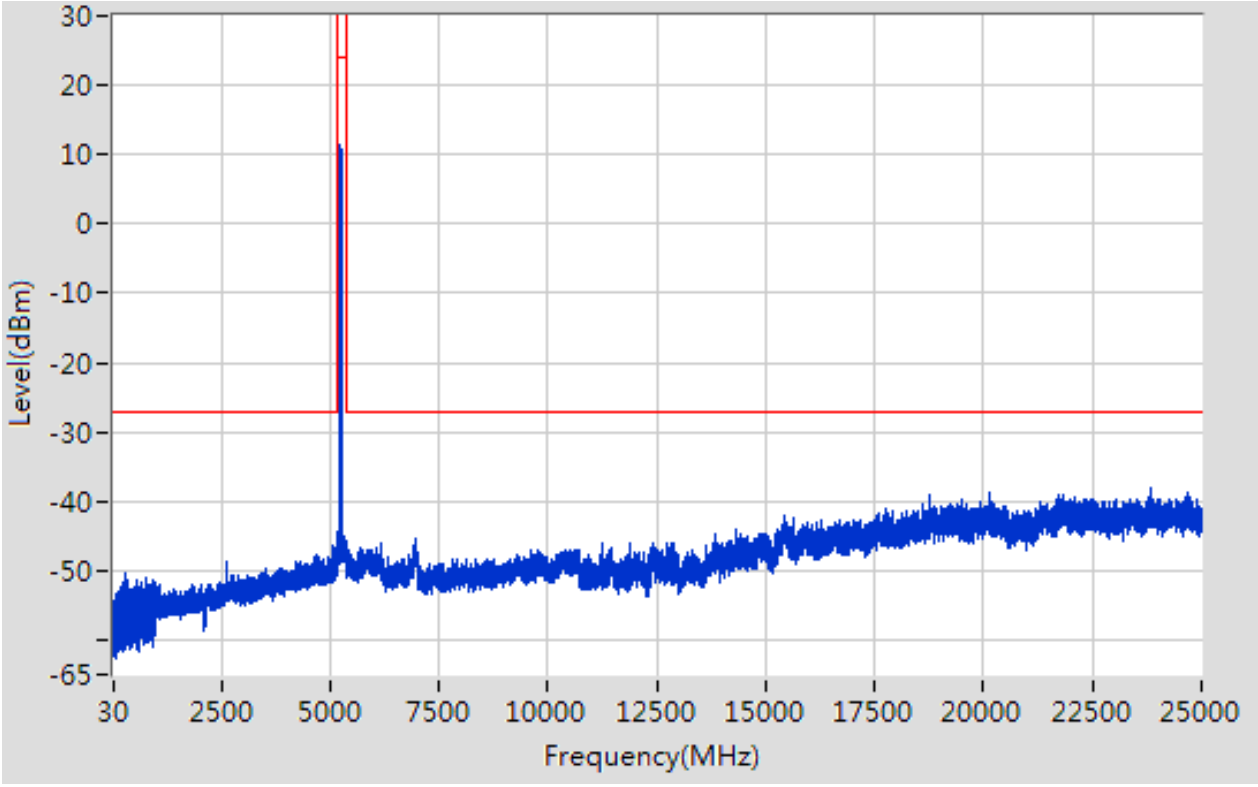
MIDDLE CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	391.537	-50.91	-27	Pass	9700
1000	5149.5	1	Peak	5103.483	-46.05	-27	Pass	4149
5150.5	5349.5	1	Peak	5200.683	11.28	24	Pass	691
5350.5	10300	1	Peak	6952.986	-45.52	-27	Pass	4949
10300	10700	1	Peak	10325.507	-45.95	-27	Pass	691
10700	25000	1	Peak	21848.78	-38.44	-27	Pass	14300



HIGH CHANNEL

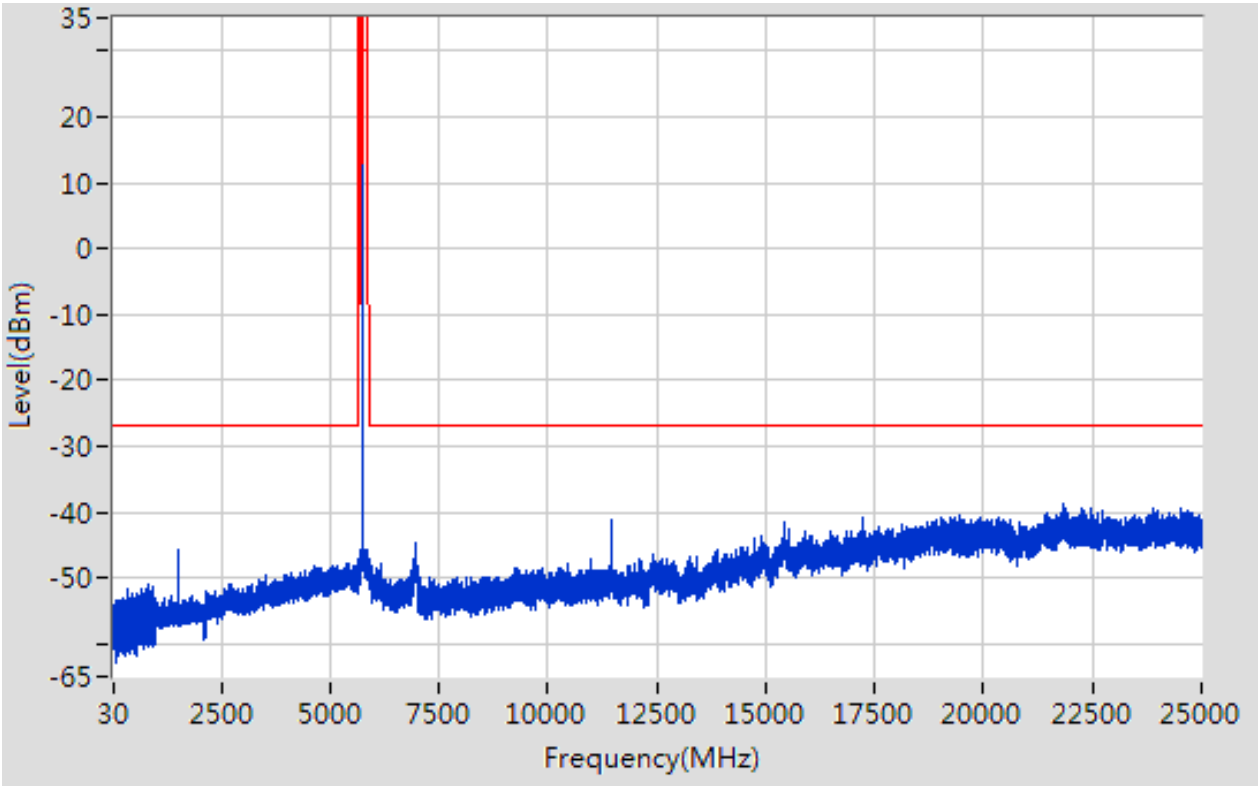
Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	310.929	-50.5	-27	Pass	9700
1000	5149.5	1	Peak	5144.498	-44.43	-27	Pass	4149
5150.5	5349.5	1	Peak	5239.329	11.51	24	Pass	691
5350.5	10300	1	Peak	6949.985	-45.33	-27	Pass	4949
10300	10700	1	Peak	10478.551	-46.92	-27	Pass	691
10700	25000	1	Peak	23837.919	-38.05	-27	Pass	14300



Band IV

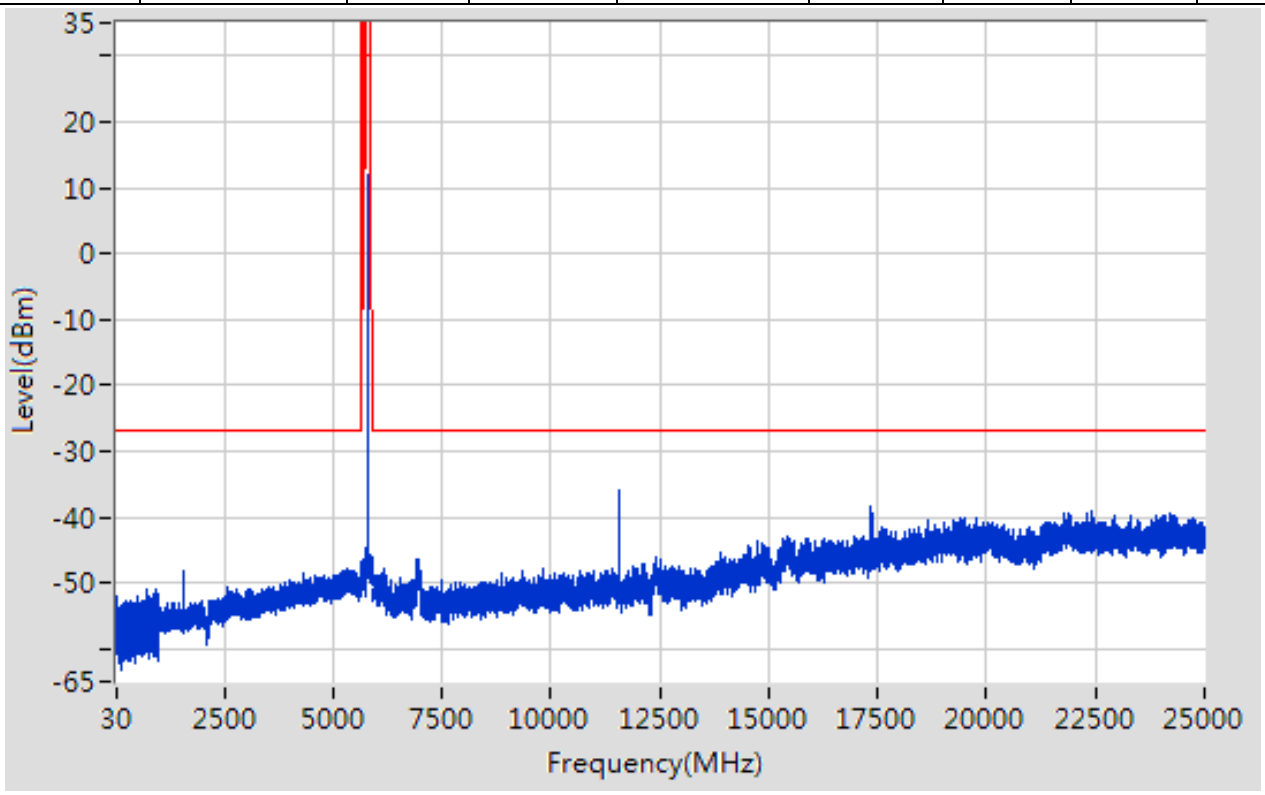
LOW CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	838.983	-51.16	-27	Pass	9700
1000	5649.5	1	Peak	1530.171	-45.94	-27	Pass	4649
5650.5	5699.5	1	Peak	5650.784	-48.26	-26.79	Pass	691
5700.5	5719.5	1	Peak	5703.143	-45.74	10.78	Pass	691
5720.5	5724.5	1	Peak	5720.558	-46.11	15.77	Pass	691
5725.5	5849.5	1	Peak	5735.564	13.41	30	Pass	691
5850.5	5854.5	1	Peak	5854.274	-46.71	16.24	Pass	691
5855.5	5874.5	1	Peak	5872.848	-45.92	10.49	Pass	691
5875.5	5925	1	Peak	5924.857	-48.71	-26.89	Pass	691
5925	25000	1	Peak	21835.834	-38.85	-27	Pass	19075



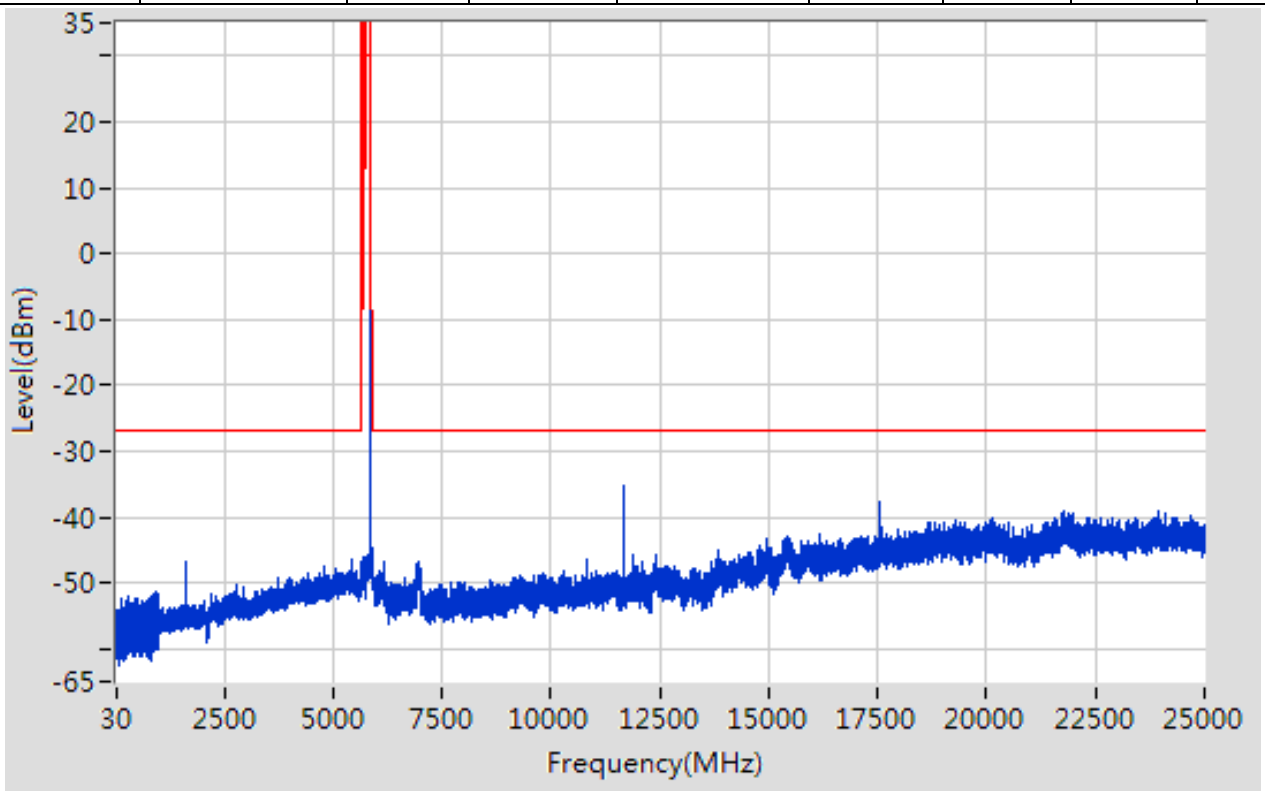
MIDDLE CHANNEL

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
30	1000	0.1	Peak	736.273	-51.06	-27	Pass	9700
1000	5649.5	1	Peak	5639.497	-47.43	-27	Pass	4649
5650.5	5699.5	1	Peak	5651.068	-47.3	-26.57	Pass	691
5700.5	5719.5	1	Peak	5702.07	-47.29	10.46	Pass	691
5720.5	5724.5	1	Peak	5720.552	-47.42	15.75	Pass	691
5725.5	5849.5	1	Peak	5785.703	11.9	30	Pass	691
5850.5	5854.5	1	Peak	5854.372	-46.81	15.96	Pass	691
5855.5	5874.5	1	Peak	5874.307	-47.21	10.06	Pass	691
5875.5	5925	1	Peak	5924.928	-48.35	-26.95	Pass	691
5925	25000	1	Peak	11568.296	-35.98	-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	953.795	-51.44	-27	Pass	9700
1000	5649.5	1	Peak	5424.427	-46.56	-27	Pass	4649
5650.5	5699.5	1	Peak	5650.713	-48.66	-26.84	Pass	691
5700.5	5719.5	1	Peak	5702.4	-47.19	10.56	Pass	691
5720.5	5724.5	1	Peak	5720.604	-49.67	15.9	Pass	691
5725.5	5849.5	1	Peak	5839.436	13.39	30	Pass	691
5850.5	5854.5	1	Peak	5854.291	-44	16.19	Pass	691
5855.5	5874.5	1	Peak	5874.28	-46.34	10.06	Pass	691
5875.5	5925	1	Peak	5923.78	-46.17	-26.09	Pass	691
5925	25000	1	Peak	11678.302	-35.11	-27	Pass	19075



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

Test Data

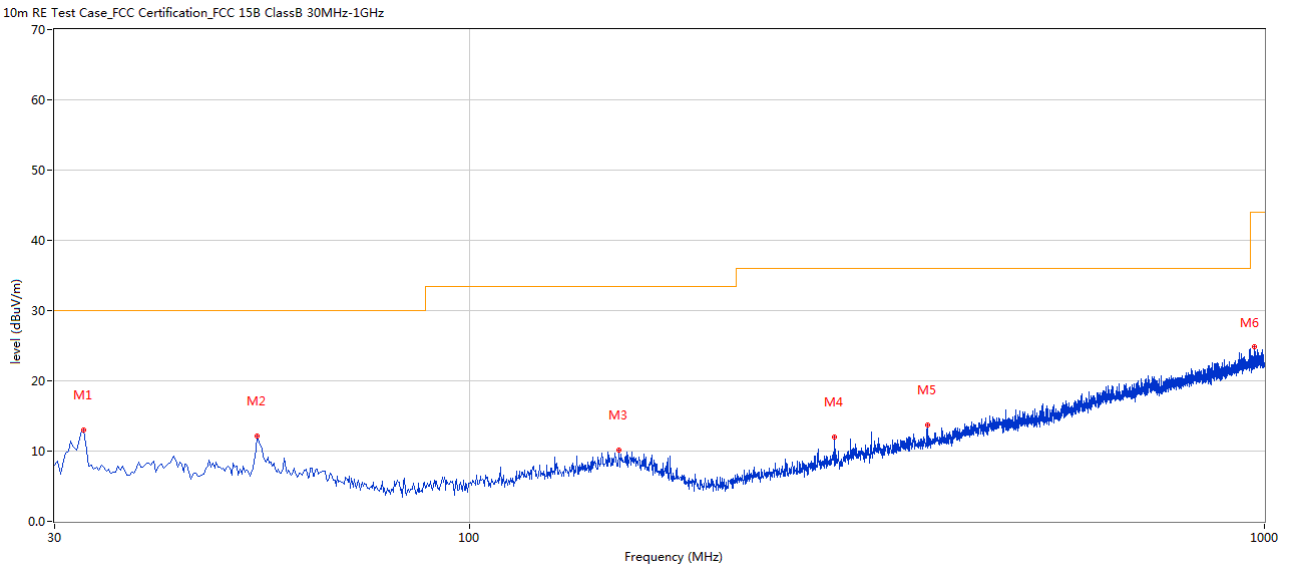
Note [1]: The symbol of "--" in the table which means not application.

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.

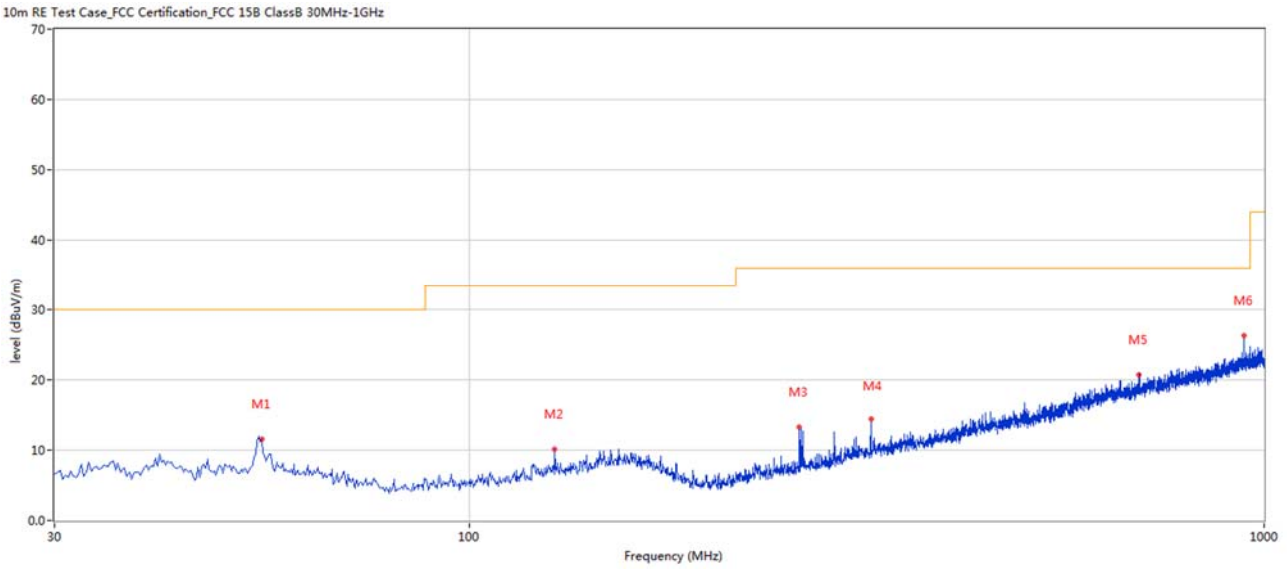
Note [4]: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

30 MHz to 1 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	32.667	12.95	-27.44	30.0	-17.05	Peak	360.00	200	Vertical	Pass
2	54.001	12.13	-27.62	30.0	-17.87	Peak	270.00	400	Vertical	Pass
3	154.129	10.15	-25.80	33.5	-23.35	Peak	179.00	400	Vertical	Pass
4	287.956	12.05	-26.09	36.0	-23.95	Peak	360.00	200	Vertical	Pass
5	376.446	13.76	-23.82	36.0	-22.24	Peak	9.00	100	Vertical	Pass
6	971.392	24.84	-11.43	44.0	-19.16	Peak	341.00	400	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 (Degree)	Height (cm)	Antenna	Verdict
1	54.729	11.61	-27.54	30.0	-18.39	Peak	356.00	200	Horizontal	Pass
2	127.946	10.12	-27.34	33.5	-23.38	Peak	80.00	100	Horizontal	Pass
3	260.075	13.31	-27.30	36.0	-22.69	Peak	360.00	400	Horizontal	Pass
4	319.958	14.41	-25.31	36.0	-21.59	Peak	226.00	300	Horizontal	Pass
5	695.011	20.77	-15.81	36.0	-15.23	Peak	150.00	100	Horizontal	Pass
6	943.027	26.24	-11.48	36.0	-9.76	Peak	0.00	300	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 spurious above 18G is noise only, do not show on the 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 (Degree)	Height (cm)	Antenna	Verdict
1	1125.400	42.11	-15.29	74.0	-31.89	Peak	91.00	150	Vertical	Pass
1**	1125.400	39.43	-15.29	54.0	-14.57	AV	91.00	150	Vertical	Pass
2	2769.400	42.56	-8.54	74.0	-31.44	Peak	121.00	150	Vertical	Pass
2**	2769.400	31.80	-8.54	54.0	-22.20	AV	121.00	150	Vertical	Pass
3	4021.400	45.81	-4.04	74.0	-28.19	Peak	58.00	150	Vertical	Pass
3**	4021.400	37.26	-4.04	54.0	-16.74	AV	58.00	150	Vertical	Pass
4	5159.400	100.59	-0.61	--	--	Peak	300.00	150	Vertical	N/A
4**	5159.400	96.99	-0.61	--	--	AV	300.00	150	Vertical	N/A
5	11640.250	50.25	20.36	74.0	-23.75	Peak	152.00	150	Vertical	Pass
5**	11640.250	38.54	20.36	54.0	-15.46	AV	152.00	150	Vertical	Pass
6	16018.125	55.29	23.97	74.0	-18.71	Peak	24.00	150	Vertical	Pass
6**	16018.125	42.15	23.97	54.0	-11.85	AV	24.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1040.300	43.23	-14.89	74.0	-30.77	Peak	171.00	150	Horizontal	Pass
1**	1040.300	41.07	-14.89	54.0	-12.93	AV	171.00	150	Horizontal	Pass
2	2828.000	42.50	-8.27	74.0	-31.50	Peak	45.00	150	Horizontal	Pass
2**	2828.000	31.71	-8.27	54.0	-22.29	AV	45.00	150	Horizontal	Pass
3	4050.800	46.37	-3.80	74.0	-27.63	Peak	92.00	150	Horizontal	Pass
3**	4050.800	37.11	-3.80	54.0	-16.89	AV	92.00	150	Horizontal	Pass
4	5160.600	107.05	-0.56	--	--	Peak	204.00	150	Horizontal	N/A
4**	5160.600	103.36	-0.56	--	--	AV	204.00	150	Horizontal	N/A
5	11627.025	49.87	20.28	74.0	-24.13	Peak	110.00	150	Horizontal	Pass
5**	11627.025	38.69	20.28	54.0	-15.31	AV	110.00	150	Horizontal	Pass
6	15548.775	55.14	23.62	74.0	-18.86	Peak	154.00	150	Horizontal	Pass
6**	15548.775	44.66	23.62	54.0	-9.34	AV	154.00	150	Horizontal	Pass

1 GHz to 18 GHz, ANT V, Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1125.500	41.62	-15.29	74.0	-32.38	Peak	149.00	150	Vertical	Pass
1**	1125.500	39.15	-15.29	54.0	-14.85	AV	149.00	150	Vertical	Pass
2	2811.900	42.42	-8.41	74.0	-31.58	Peak	327.00	150	Vertical	Pass
2**	2811.900	32.36	-8.41	54.0	-21.64	AV	327.00	150	Vertical	Pass
3	4206.600	47.03	-4.02	74.0	-26.97	Peak	124.00	150	Vertical	Pass
3**	4206.600	36.68	-4.02	54.0	-17.32	AV	124.00	150	Vertical	Pass
4	5200.600	99.34	-0.61	--	--	Peak	300.00	150	Vertical	N/A
4**	5200.600	95.53	-0.61	--	--	AV	300.00	150	Vertical	N/A
5	9035.787	50.10	18.15	74.0	-23.90	Peak	29.00	150	Vertical	Pass
5**	9035.787	38.42	18.15	54.0	-15.58	AV	29.00	150	Vertical	Pass
6	15921.526	55.55	23.67	74.0	-18.45	Peak	107.00	150	Vertical	Pass
6**	15921.526	43.51	23.67	54.0	-10.49	AV	107.00	150	Vertical	Pass

1 GHz to 18 GHz, ANT H, Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1040.300	42.67	-14.89	74.0	-31.33	Peak	177.00	150	Horizontal	Pass
1**	1040.300	41.02	-14.89	54.0	-12.98	AV	177.00	150	Horizontal	Pass
2	2753.500	42.02	-9.03	74.0	-31.98	Peak	362.00	150	Horizontal	Pass
2**	2753.500	32.38	-9.03	54.0	-21.62	AV	362.00	150	Horizontal	Pass
3	4207.200	46.04	-4.00	74.0	-27.96	Peak	235.00	150	Horizontal	Pass
3**	4207.200	37.26	-4.00	54.0	-16.74	AV	235.00	150	Horizontal	Pass
4	5200.600	106.73	-0.61	--	--	Peak	212.00	150	Horizontal	N/A
4**	5200.600	101.67	-0.61	--	--	AV	212.00	150	Horizontal	N/A
5	11932.349	49.19	18.16	74.0	-24.81	Peak	211.00	150	Horizontal	Pass
5**	11932.349	36.74	18.16	54.0	-17.26	AV	211.00	150	Horizontal	Pass
6	15592.088	55.57	23.56	74.0	-18.43	Peak	0.00	150	Horizontal	Pass
6**	15592.088	43.38	23.56	54.0	-10.62	AV	0.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1125.500	41.56	-15.29	74.0	-32.44	Peak	152.00	150	Vertical	Pass
1**	1125.500	39.54	-15.29	54.0	-14.46	AV	152.00	150	Vertical	Pass
2	2845.400	42.03	-8.43	74.0	-31.97	Peak	362.00	150	Vertical	Pass
2**	2845.400	32.22	-8.43	54.0	-21.78	AV	362.00	150	Vertical	Pass
3	4027.800	45.51	-3.90	74.0	-28.49	Peak	71.00	150	Vertical	Pass
3**	4027.800	37.14	-3.90	54.0	-16.86	AV	71.00	150	Vertical	Pass
4	5240.600	99.60	-0.96	--	--	Peak	295.00	150	Vertical	N/A
4**	5240.600	96.13	-0.96	--	--	AV	295.00	150	Vertical	N/A
5	12227.613	49.91	20.44	74.0	-24.09	Peak	92.00	150	Vertical	Pass
5**	12227.613	39.37	20.44	54.0	-14.63	AV	92.00	150	Vertical	Pass
6	15646.425	55.61	23.54	74.0	-18.39	Peak	175.00	150	Vertical	Pass
6**	15646.425	43.82	23.54	54.0	-10.18	AV	175.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1040.300	42.74	-14.89	74.0	-31.26	Peak	179.00	150	Horizontal	Pass
1**	1040.300	40.80	-14.89	54.0	-13.20	AV	179.00	150	Horizontal	Pass
2	2836.300	41.95	-8.47	74.0	-32.05	Peak	297.00	150	Horizontal	Pass
2**	2836.300	32.55	-8.47	54.0	-21.45	AV	297.00	150	Horizontal	Pass
3	4163.400	46.62	-3.54	74.0	-27.38	Peak	343.00	150	Horizontal	Pass
3**	4163.400	37.14	-3.54	54.0	-16.86	AV	343.00	150	Horizontal	Pass
4	5240.600	106.57	-0.96	--	--	Peak	211.00	150	Horizontal	N/A
4**	5240.600	103.21	-0.96	--	--	AV	211.00	150	Horizontal	N/A
5	11611.500	50.51	20.19	74.0	-23.49	Peak	305.00	150	Horizontal	Pass
5**	11611.500	38.11	20.19	54.0	-15.89	AV	305.00	150	Horizontal	Pass
6	15549.038	56.28	23.62	74.0	-17.72	Peak	361.00	150	Horizontal	Pass
6**	15549.038	44.63	23.62	54.0	-9.37	AV	361.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1088.800	40.46	-15.01	74.0	-33.54	Peak	0.00	150	Vertical	Pass
1**	1088.800	37.95	-15.01	54.0	-16.05	AV	0.00	150	Vertical	Pass
2	2867.400	42.59	-8.10	74.0	-31.41	Peak	250.00	150	Vertical	Pass
2**	2867.400	34.66	-8.10	54.0	-19.34	AV	250.00	150	Vertical	Pass
3	4268.800	47.10	-3.47	74.0	-26.90	Peak	305.00	150	Vertical	Pass
3**	4268.800	36.29	-3.47	54.0	-17.71	AV	305.00	150	Vertical	Pass
4	5733.600	94.54	-0.20	--	--	Peak	314.00	150	Vertical	N/A
4**	5733.600	85.12	-0.20	--	--	AV	314.00	150	Vertical	N/A
5	11471.200	51.00	18.89	74.0	-23.00	Peak	58.00	150	Vertical	Pass
5**	11471.200	42.83	18.89	54.0	-11.17	AV	58.00	150	Vertical	Pass
6	15915.750	55.66	23.56	74.0	-18.34	Peak	343.00	150	Vertical	Pass
6**	15915.750	44.07	23.56	54.0	-9.93	AV	343.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1202.800	41.50	-15.08	74.0	-32.50	Peak	91.00	150	Horizontal	Pass
1**	1202.800	37.28	-15.08	54.0	-16.72	AV	91.00	150	Horizontal	Pass
2	2867.300	42.28	-8.10	74.0	-31.72	Peak	52.00	150	Horizontal	Pass
2**	2867.300	35.53	-8.10	54.0	-18.47	AV	52.00	150	Horizontal	Pass
3	4240.200	46.36	-3.40	74.0	-27.64	Peak	359.00	150	Horizontal	Pass
3**	4240.200	37.64	-3.40	54.0	-16.36	AV	359.00	150	Horizontal	Pass
4	5733.600	99.28	-0.20	--	--	Peak	243.00	150	Horizontal	N/A
4**	5733.600	90.38	-0.20	--	--	AV	243.00	150	Horizontal	N/A
5	11653.188	50.55	20.35	74.0	-23.45	Peak	305.00	150	Horizontal	Pass
5**	11653.188	38.42	20.35	54.0	-15.58	AV	305.00	150	Horizontal	Pass
6	15485.776	55.29	23.74	74.0	-18.71	Peak	142.00	150	Horizontal	Pass
6**	15485.776	43.17	23.74	54.0	-10.83	AV	142.00	150	Horizontal	Pass

1 GHz to 18 GHz, ANT V, Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1088.600	39.94	-15.00	74.0	-34.06	Peak	0.00	150	Vertical	Pass
1**	1088.600	36.89	-15.00	54.0	-17.11	AV	0.00	150	Vertical	Pass
2	2865.200	42.18	-8.05	74.0	-31.82	Peak	126.00	150	Vertical	Pass
2**	2865.200	32.81	-8.05	54.0	-21.19	AV	126.00	150	Vertical	Pass
3	4358.800	47.02	-3.31	74.0	-26.98	Peak	219.00	150	Vertical	Pass
3**	4358.800	37.47	-3.31	54.0	-16.53	AV	219.00	150	Vertical	Pass
4	5785.600	106.13	0.77	--	--	Peak	263.00	150	Vertical	N/A
4**	5785.600	102.40	0.77	--	--	AV	263.00	150	Vertical	N/A
5	11571.250	52.58	19.84	74.0	-21.42	Peak	72.00	150	Vertical	Pass
5**	11571.250	45.92	19.84	54.0	-8.08	AV	72.00	150	Vertical	Pass
6	15450.863	55.84	23.40	74.0	-18.16	Peak	64.00	150	Vertical	Pass
6**	15450.863	43.24	23.40	54.0	-10.76	AV	64.00	150	Vertical	Pass

1 GHz to 18 GHz, ANT H, Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1203.100	41.83	-15.07	74.0	-32.17	Peak	103.00	150	Horizontal	Pass
1**	1203.100	40.05	-15.07	54.0	-13.95	AV	103.00	150	Horizontal	Pass
2	2892.300	42.53	-7.98	74.0	-31.47	Peak	258.00	150	Horizontal	Pass
2**	2892.300	36.94	-7.98	54.0	-17.06	AV	258.00	150	Horizontal	Pass
3	4091.600	46.52	-4.46	74.0	-27.48	Peak	94.00	150	Horizontal	Pass
3**	4091.600	36.04	-4.46	54.0	-17.96	AV	94.00	150	Horizontal	Pass
4	5785.600	110.54	0.77	--	--	Peak	240.00	150	Horizontal	N/A
4**	5785.600	107.31	0.77	--	--	AV	240.00	150	Horizontal	N/A
5	11571.250	50.35	19.84	74.0	-23.65	Peak	47.00	150	Horizontal	Pass
5**	11571.250	41.46	19.84	54.0	-12.54	AV	47.00	150	Horizontal	Pass
6	15521.738	55.05	23.77	74.0	-18.95	Peak	294.00	150	Horizontal	Pass
6**	15521.738	43.92	23.77	54.0	-10.08	AV	294.00	150	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 (Degree)	Height (cm)	Antenna	Verdict
1	1185.400	40.64	-15.11	74.0	-33.36	Peak	111.00	150	Vertical	Pass
1**	1185.400	36.83	-15.11	54.0	-17.17	AV	111.00	150	Vertical	Pass
2	2832.200	41.61	-8.42	74.0	-32.39	Peak	207.00	150	Vertical	Pass
2**	2832.200	32.25	-8.42	54.0	-21.75	AV	207.00	150	Vertical	Pass
3	4282.000	46.84	-3.76	74.0	-27.16	Peak	101.00	150	Vertical	Pass
3**	4282.000	36.45	-3.76	54.0	-17.55	AV	101.00	150	Vertical	Pass
4	5838.600	95.75	0.92	--	--	Peak	263.00	150	Vertical	N/A
4**	5838.600	88.67	0.92	--	--	AV	263.00	150	Vertical	N/A
5	11681.075	53.40	20.05	74.0	-20.60	Peak	74.00	150	Vertical	Pass
5**	11681.075	42.55	20.05	54.0	-11.45	AV	74.00	150	Vertical	Pass
6	15914.438	55.16	23.54	74.0	-18.84	Peak	201.00	150	Vertical	Pass
6**	15914.438	42.72	23.54	54.0	-11.28	AV	201.00	150	Vertical	Pass

1 GHz to 18 GHz, ANT H, High Channel

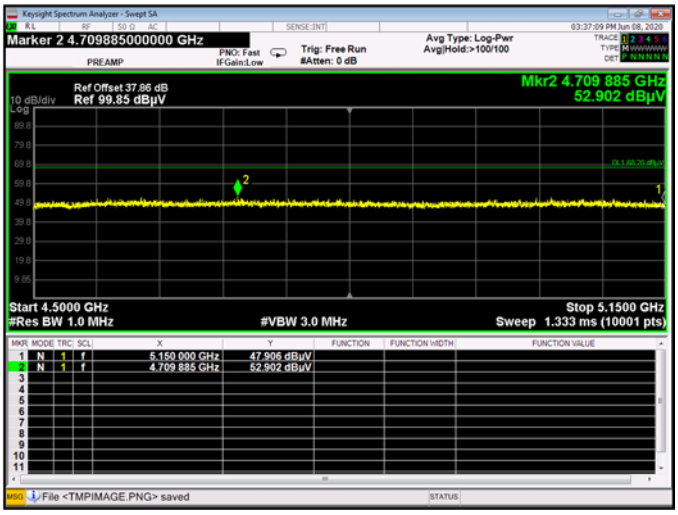
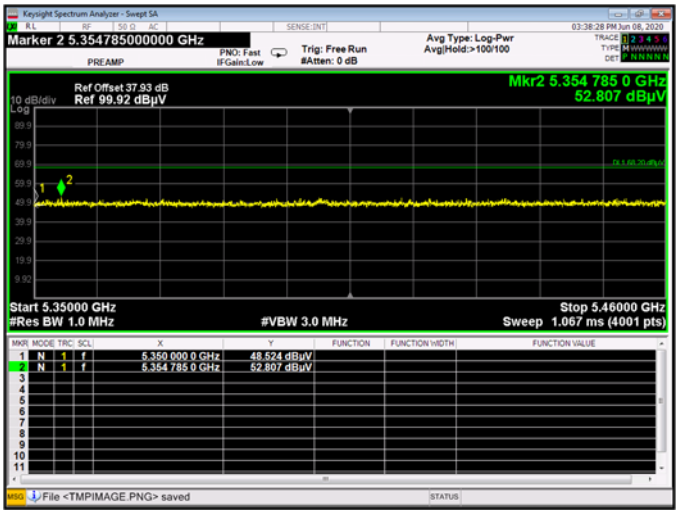
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1203.000	41.86	-15.08	74.0	-32.14	Peak	98.00	150	Horizontal	Pass
1**	1203.000	39.73	-15.08	54.0	-14.27	AV	98.00	150	Horizontal	Pass
2	2761.200	41.79	-8.84	74.0	-32.21	Peak	177.00	150	Horizontal	Pass
2**	2761.200	32.35	-8.84	54.0	-21.65	AV	177.00	150	Horizontal	Pass
3	4259.000	46.50	-3.41	74.0	-27.50	Peak	42.00	150	Horizontal	Pass
3**	4259.000	36.59	-3.41	54.0	-17.41	AV	42.00	150	Horizontal	Pass
4	5842.000	94.18	1.10	--	--	Peak	225.00	150	Horizontal	N/A
4**	5842.000	89.68	1.10	--	--	AV	225.00	150	Horizontal	N/A
5	11678.775	52.88	20.08	74.0	-21.12	Peak	329.00	150	Horizontal	Pass
5**	11678.775	43.09	20.08	54.0	-10.91	AV	329.00	150	Horizontal	Pass
6	15539.063	54.76	23.71	74.0	-19.24	Peak	96.00	150	Horizontal	Pass
6**	15539.063	44.46	23.71	54.0	-9.54	AV	96.00	150	Horizontal	Pass

A.7.2 Band Edge (Restricted-band)

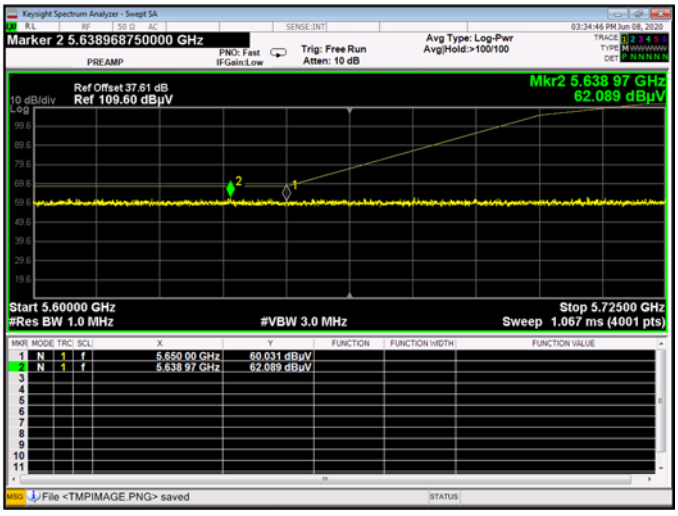
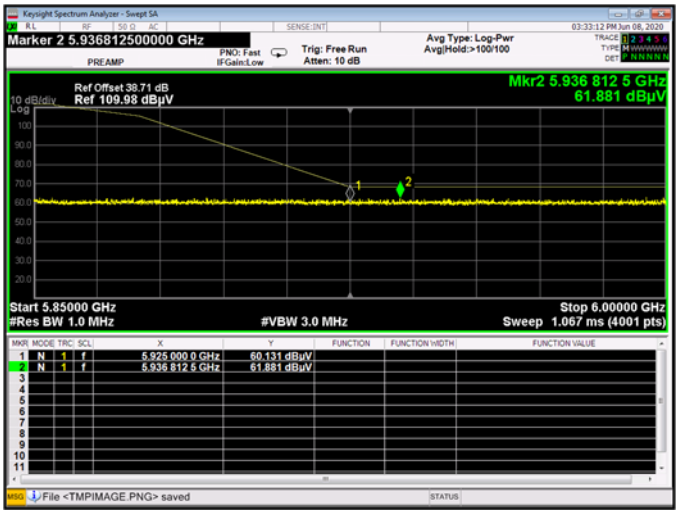
Test Band	Channel	Verdict
Band I (5160 - 5240 MHz)	Low	Pass
	High	Pass
Band IV (5735 - 5840 MHz)	Low	Pass
	High	Pass

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	5159.991201	1.7052
Middle	5199.989676	1.9854
High	5239.989426	2.0179

Band IV (5735 - 5840 MHz)		
Channel	Frequency Error(MHz)	ppm
Low	5734.987802	2.1269
Middle	5784.988451	1.9964
High	5839.988351	1.9947

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2050656-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2050656-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2050656-AI.PDF”.

--END OF REPORT--