MEASUREMENT REPORT
FCC PART 15.407 & RSS-247

FCC ID:	2AGN8-P22N13
IC:	20888-P22N13
APPLICANT:	Sengled Co., Ltd.

Application Type:	Certification
Product:	Pulse2
Model No.:	P22-N13
Brand Name:	sengled
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407
IC Rule(s):	RSS-247 Issue 1, RSS-Gen Issue 4
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v01r03
Test Date:	January 06 ~ August 23, 2016

Reviewed By Manager : Robin Wu
(Robin Wu)

Approved By CEO : Marlin Chen
(Marlin Chen)

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 789033 D02v01r03. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1608RSU00902	Rev. 01	Initial report	08-26-2016	Invalid
1608RSU00902	Rev. 02	Revised test equipment list	09-13-2016	Valid

CONTENTS

Description Page

§2.1033 General Information

Applicant:	Sengled Co., Ltd.
Applicant Address:	Room 201/15, Building 1, No. 498, Guoshoujing Road, Pilot Free Trade Zone, Shanghai, China
Manufacturer:	Sengled Co., Ltd.
Manufacturer Address:	Room 201/15, Building 1, No. 498, Guoshoujing Road, Pilot Free Trade Zone, Shanghai, China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT FCC Registration No.:	809388
MRT IC Registration No.:	11384A
FCC Rule Part(s):	Part 15.407
IC Rule(s):	RSS-247 Issue 1, RSS-Gen Issue 4
Model No.:	P22-N13
FCC ID:	2AGN8-P22N13
IC:	20888-P22N13
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Unlicensed National Information Infrastructure (UNII)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

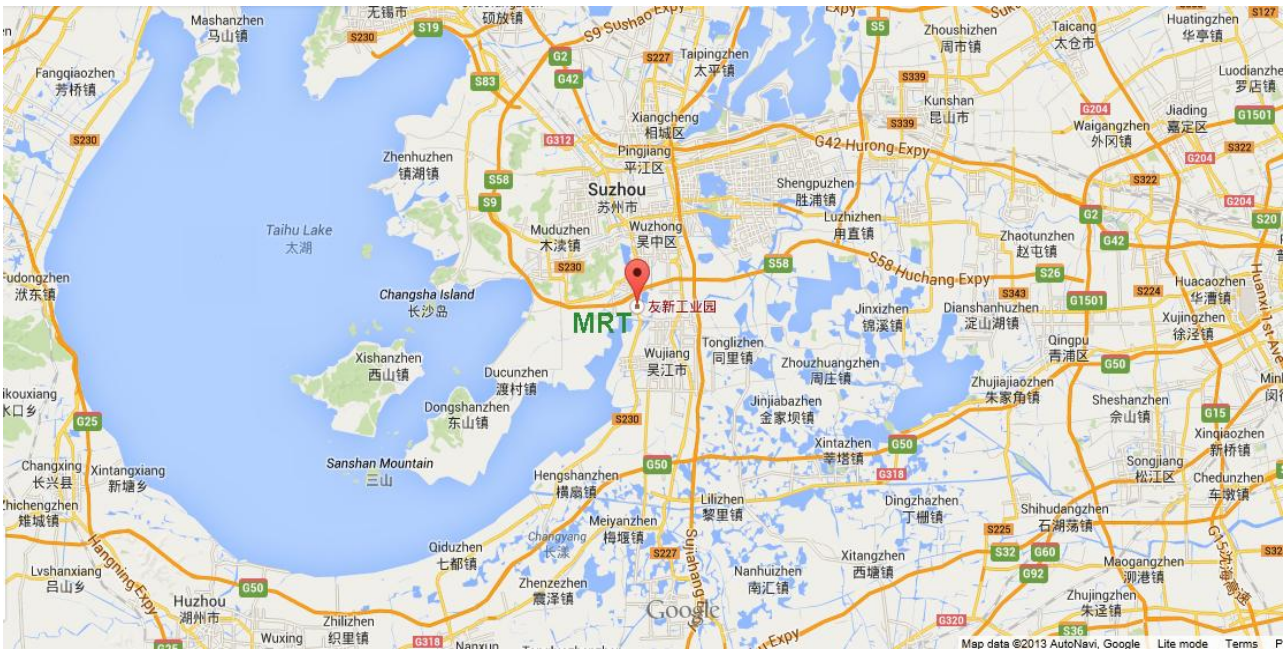
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Pulse2
Model No.	P22-N13
Brand Name	sengled
Wireless Specification	Using QPSK modulation and UNII-1/UNII-3 channel
Bluetooth Specification	v2.1 + EDR

2.2. Product Specification Subjective to this Standard

Product Specification Subjective to this Standard	
Frequency Range	5180 ~ 5240, 5745 ~ 5825MHz
Number of Channels	6
Type of Modulation	QPSK
Maximum Output Power	13.18dBm

Note: For other features of this EUT, test report will be issued separately.

2.3. Operation Frequency / Channel list

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	5180 MHz	02	5210 MHz	03	5240 MHz
04	5736 MHz	05	5762 MHz	06	5814 MHz

2.4. Description of Available Antennas

Antenna No.	Antenna Type	Frequency Band (MHz)	Manufacturer	Tx Paths	Max Peak Gain (dBi)
Antenna A	PCB Antenna	5180 ~ 5240	SMSC Inc.	1	3.0
		5736 ~ 5814		1	3.2
Antenna B	PCB Antenna	5180 ~ 5240	SMSC Inc.	1	3.0
		5736 ~ 5814		1	3.2

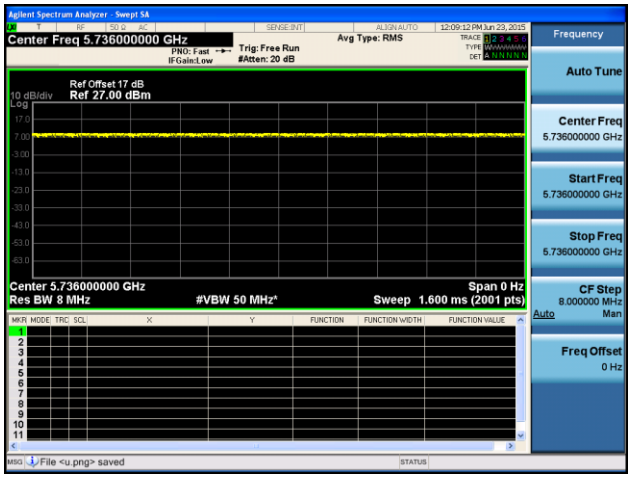
Note: For the wireless module, it has two diversity antennas which are used to avoid dropouts due to multipath fading. Only one antenna is selected for use at any time through the on-board RF switch.

2.5. Device Capabilities

This device contains the following capabilities:

Bluetooth (v2.1 + EDR) and 5GHz Wireless (UNII)

Note: 5GHz (NII) operation is possible in 20MHz channel bandwidth. The maximum achievable duty cycle was determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The duty cycle is as follow:

Duty Cycle (100%)


2.6. Test Configuration

The **Pulse2 FCC ID: 2AGN8-P22N13** was tested per the guidance of KDB 789033 D02v01r03. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.7. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.8. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v01r03 were used in the measurement of the **Pulse2 FCC ID: 2AGN8-P22N13.**

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

Line conducted emissions test results are shown in Section 7.10.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the **Pulse2** is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Pulse2 FCC ID: 2AGN8-P22N13** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	101683	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	101684	1 year	2016/11/03
RF Cable	HUBER+SUHNER	Cable 04	102	1 year	2017/03/29
Temperature/ Meter Humidity	Yuhuaze	N/A	N/A	1 year	2016/12/20
Shielding Anechoic Chamber	MIX-BEP	Chamber-SR2	N/A	1 year	2017/05/10

Radiated Emissions - AC2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9010A	MY56070124	1 year	2017/06/23
EMI Test Receiver	R&S	ESR7	101209	1 year	2016/11/03
Preamplifier	Schwarzbeck	BBV 9721	9721-008	1 year	2017/04/15
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2016/12/14
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2016/11/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2016/11/07
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	2017/01/04
RF Cable	HUBER+SUHNER	Cable 01	104	1 year	2017/03/29
RF Cable	HUBER+SUHNER	Cable 02	106	1 year	2017/03/29
Digital Thermometer & Hygrometer	Minggao	ETH529	N/A	1 year	2016/11/30
Anechoic Chamber	RIKEN	Chamber-AC2	N/A	1 year	2017/05/10

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2016/05/08
USB Wideband Power Sensor	Boonton	55006	8911	1 year	2016/05/08
Temperature/ Meter Humidity	Yuhuaze	N/A	N/A	1 year	2016/12/20
RF Cable	HUBER+SUHNER	Cable 03	N/A	1 year	2016/03/29
Attenuator	Woken	WATT-218FS-15	N/A	1 year	2016/03/29

Software	**Version**	**Function**
e3	V 8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test 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.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
Output Power - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Company Name: **Sengled Co., Ltd.**

FCC ID: **2AGN8-P22N13**

IC: **20888-P22N13**

Data Rate(s) Tested: **22Mbps**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	Pass	Section 7.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(iv), (3)	Maximum Conducted Output Power	≤ 24 dBm U-NII-1 ≤ 30 dBm U-NII-3		Pass	Section 7.5
15.407(a)(1)(iv), (3), (5)	Peak Power Spectral Density	≤ 11 dBm/MHz U-NII-1 ≤ 30 dBm/500kHz U-NII-3		Pass	Section 7.6
15.407(g)	Frequency Stability	N/A		Pass	Section 7.7
15.407(b)(1), (4)(i)	Undesirable Emissions	≤ -27dBm/MHz EIRP Detail see section 7.9.1	Radiated	Pass	Section 7.8 & 7.9
15.205, 15.209 15.407(b)(5), (6), (7)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.10

RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
RSS-247 §6.2	99% Bandwidth	N/A	Conducted	Pass	Section 7.2
RSS-247 §6.2.4	6dB Bandwidth	>500kHz		Pass	Section 7.3
RSS-247 §6.2.1	Operation Frequency Range of 26dB BW	26dBc frequency range above 5250MHz		Pass	Section 7.4
RSS-247 §6.2.1, §6.2.4	Max Conducted Output Power	5725~5850MHz, ≤ 30 dBm		Pass	Section 7.5
	Maximum E.I.R.P	5150~5250MHz ≤ 23 dBm or 10 + 10 log10(99% B)			
RSS-247 §6.2.1, §6.2.4	Peak Power Spectral Density	5150~5250MHz ≤ 10 dBm/MHz 5725~5850MHz, ≤ 30 dBm/500kHz		Pass	Section 7.6
RSS-Gen [8.11]	Frequency Stability	N/A		Pass	Section 7.7
RSS-247 §6.2.1,§6.2.4	Out-of-Band Emissions	≤ -27dBm/MHz EIRP ≤ -17dBm/MHz EIRP	Radiated	Pass	Section 7.8 & 7.9
RSS-247 §6.2.1, §6.2.4	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in RSS-Gen [8.9]		Pass	
RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	< RSS-Gen [8.8] limits	Line Conducted	Pass	Section 7.10

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
4) For radiated spurious emission test item, we selected the worst case ANT B to perform testing.

7.2. 26dB Bandwidth Measurement

7.2.1. Test Limit

N/A

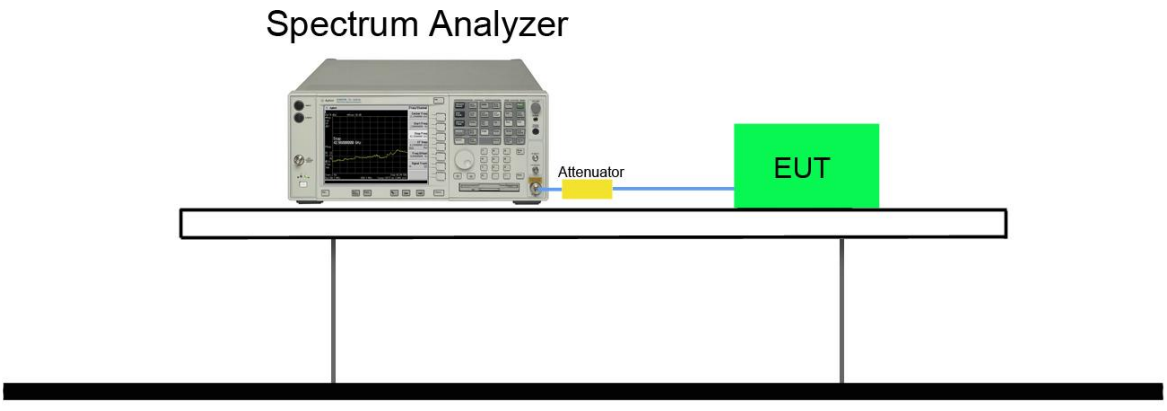
7.2.2. Test Procedure used

KDB 789033 D02v01r03 – Section C.1

7.2.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.

7.2.4. Test Setup

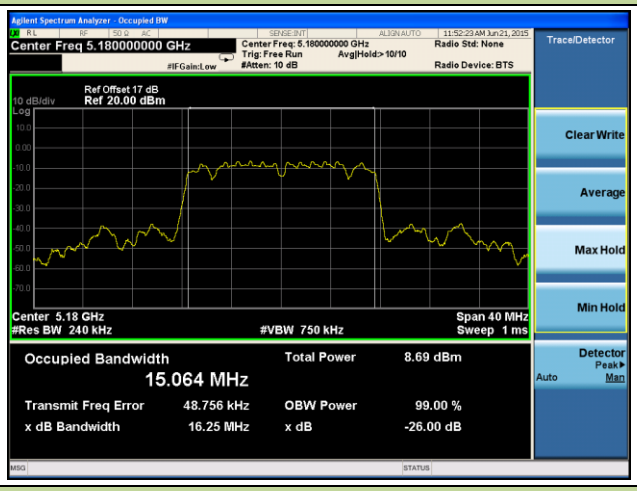


7.2.5. Test Result

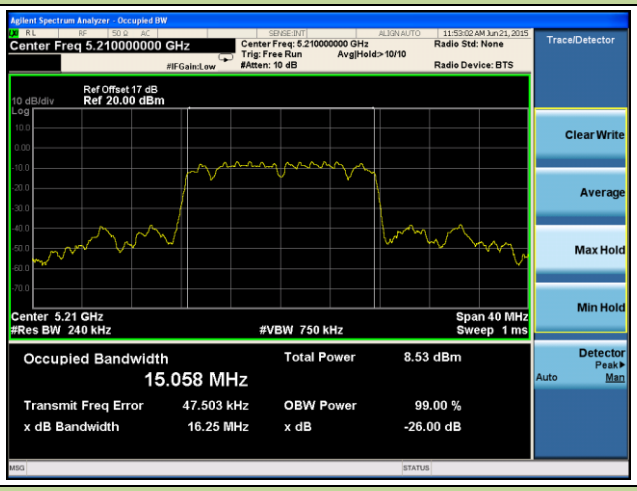
Type of Modulation	Data Rate (Mbps)	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Ant A						
QPSK	22	01	5180	16.25	15.06	Pass
	22	02	5210	16.25	15.06	Pass
	22	03	5240	16.25	15.06	Pass
QPSK	22	04	5736	16.64	13.85	Pass
	22	05	5762	16.67	13.85	Pass
	22	06	5814	16.66	13.83	Pass
Ant B						
QPSK	22	01	5180	16.25	15.06	Pass
	22	02	5210	16.25	15.06	Pass
	22	03	5240	16.25	15.05	Pass
QPSK	22	04	5736	16.66	13.84	Pass
	22	05	5762	16.68	13.85	Pass
	22	06	5814	16.68	13.84	Pass

26dB Bandwidth & 99% Bandwidth - Ant A

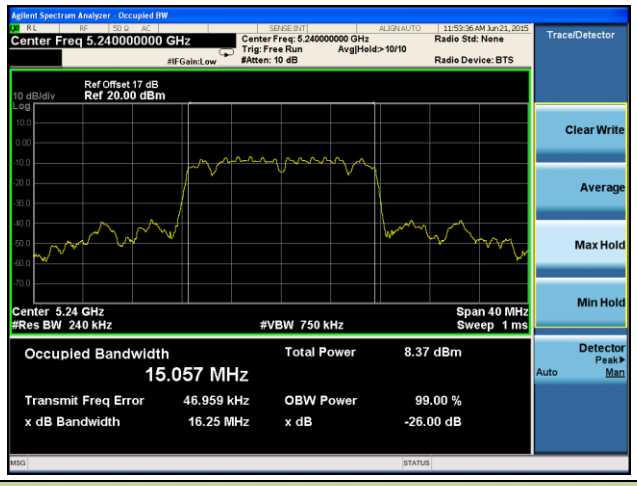
Channel 01 (5180MHz)



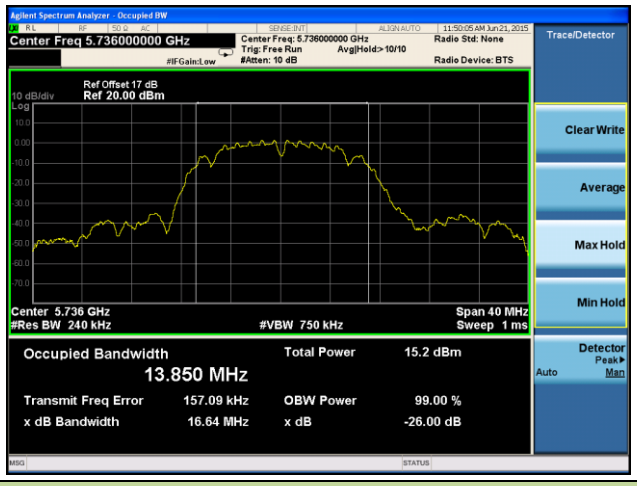
Channel 02 (5210MHz)



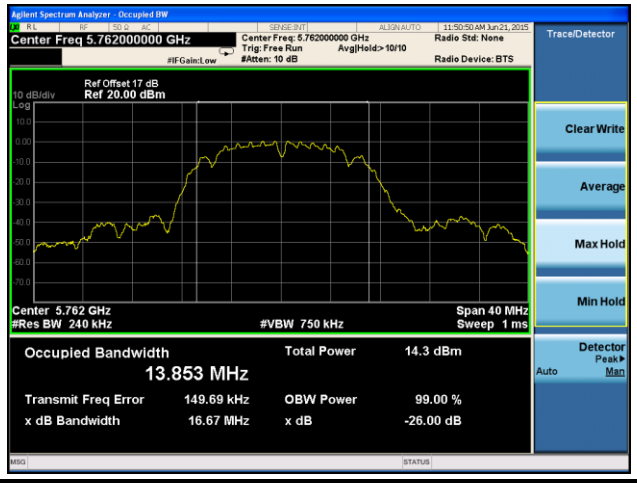
Channel 03 (5240MHz)



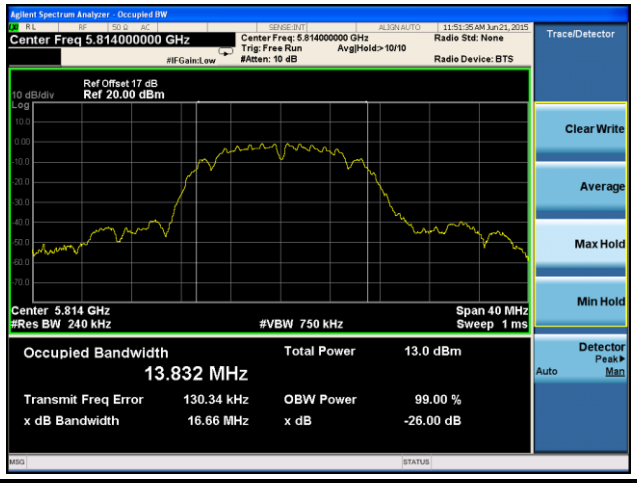
Channel 04 (5736MHz)



Channel 05 (5762MHz)

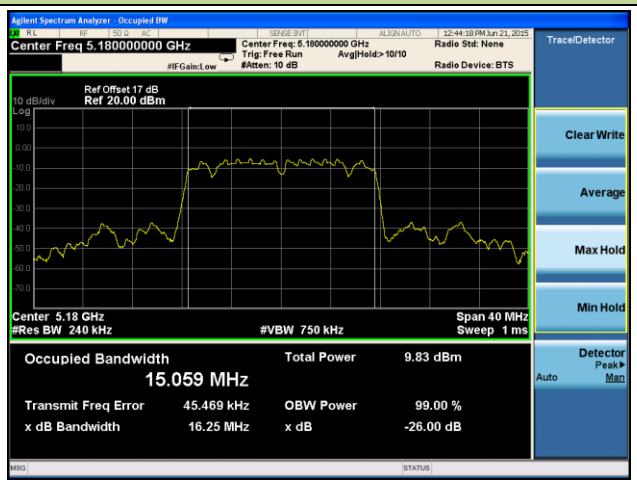


Channel 06 (5814MHz)

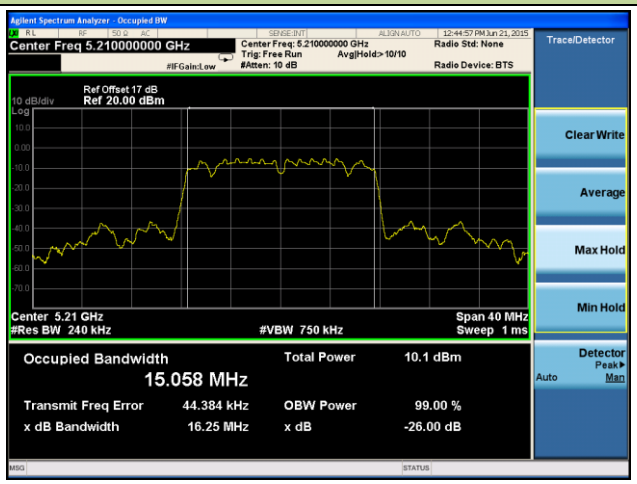


26dB Bandwidth & 99% Bandwidth - Ant B

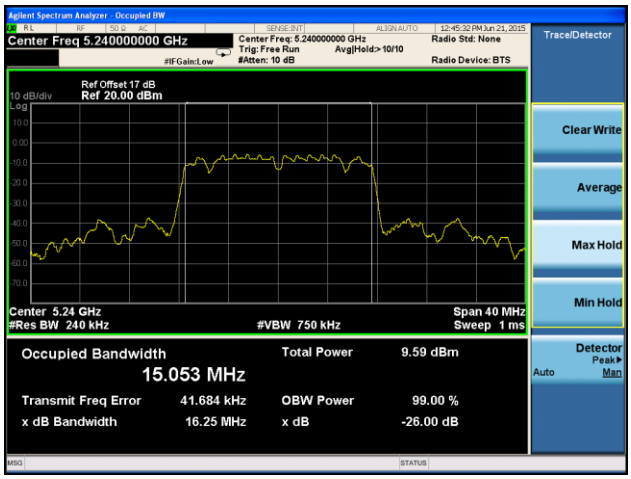
Channel 01 (5180MHz)



Channel 02 (5210MHz)

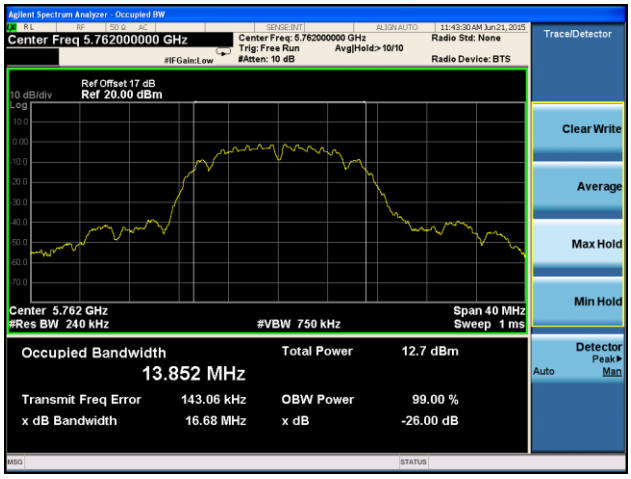


Channel 03 (5240MHz)



Channel 04 (5736MHz)

Channel 05 (5762MHz)



Channel 06 (5814MHz)

7.3. 6dB Bandwidth Measurement

7.3.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

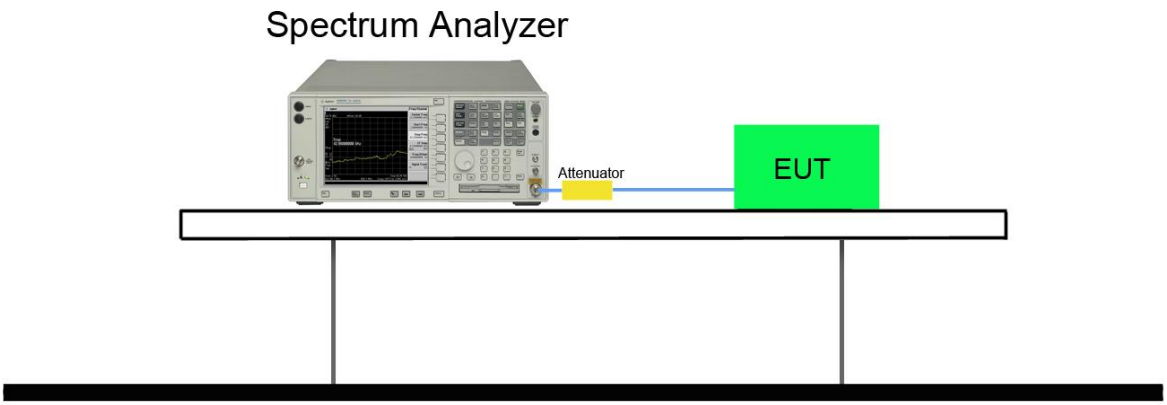
7.3.2. Test Procedure used

KDB 789033 D02v01r03 – Section C.2

7.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≧ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

7.3.4. Test Setup

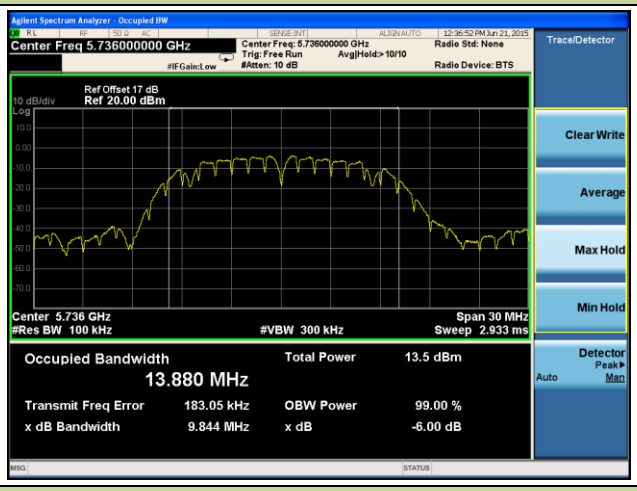


7.3.5. Test Result

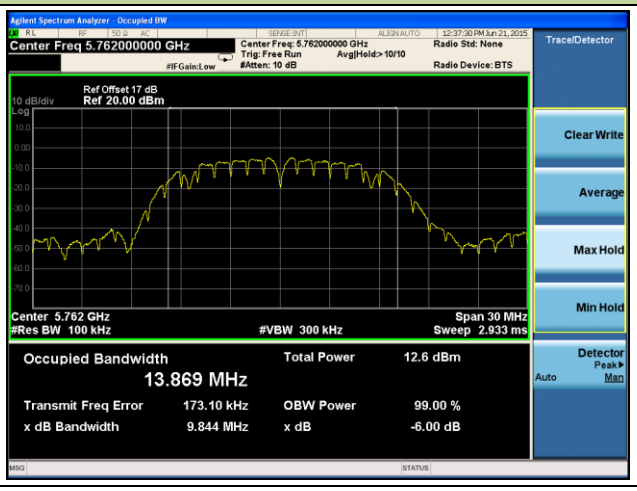
Type of Modulation	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant A						
QPSK	22	04	5736	9.84	≥ 0.5	Pass
	22	05	5762	9.84	≥ 0.5	Pass
	22	06	5814	9.85	≥ 0.5	Pass
Ant B						
QPSK	22	04	5736	9.84	≥ 0.5	Pass
	22	05	5762	9.85	≥ 0.5	Pass
	22	06	5814	9.84	≥ 0.5	Pass

6dB Bandwidth - Ant A

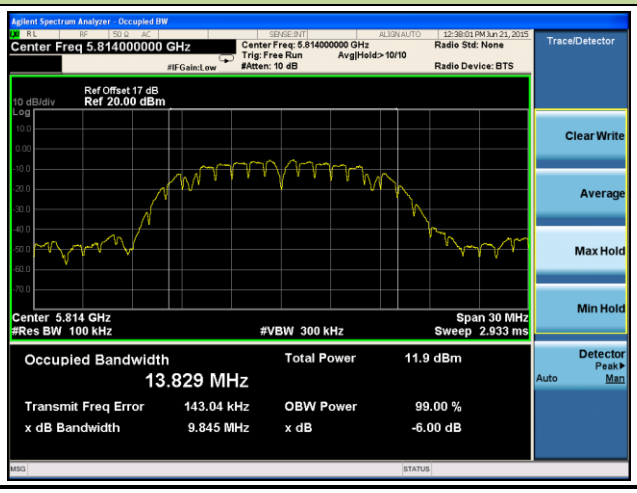
Channel 04 (5736MHz)

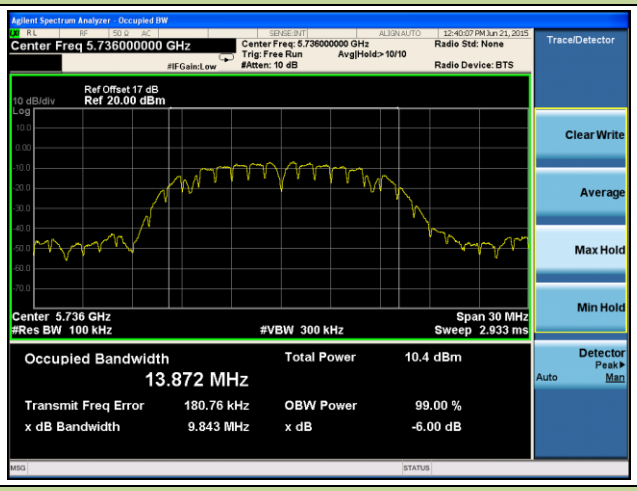
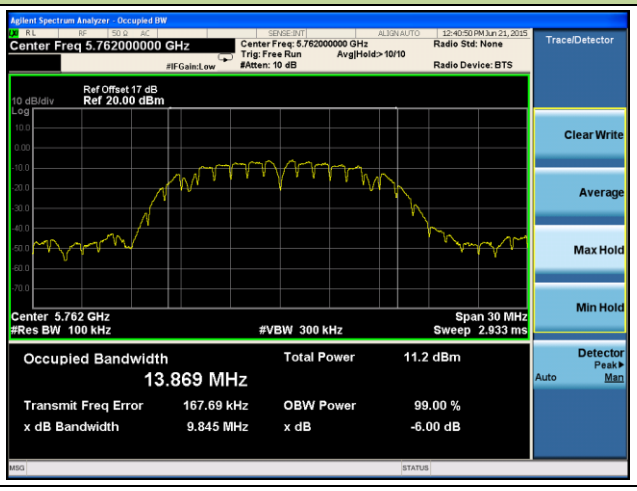


Channel 05 (5762MHz)



Channel 06 (5814MHz)



6dB Bandwidth - Ant B	
Channel 04 (5736MHz)	**Channel 05 (5762MHz)**
	
Channel 06 (5814MHz)	
	

7.4. Operation Frequency Range of 26dBc Bandwidth Measurement

7.4.1. Test Limit

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz.

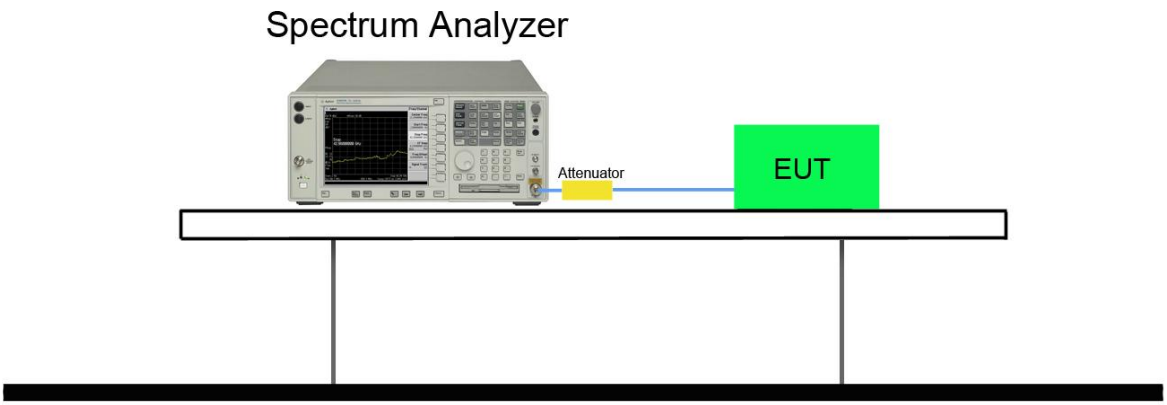
7.4.2. Test Procedure used

N/A

7.4.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. Span = 1.5 times to 5.0 times the OBW.
3. RBW = 1 % to 5 % of the OBW.
4. VBW ≥ 3 × RBW.
5. Detector = Peak.
6. Trace mode = max hold.
7. Allow the trace to stabilize and set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
8. Determine the “−26 dB down amplitude” using [(reference value) − 26].
9. Using the marker function of the instrument to show 5250MHz frequency level.

7.4.4. Test Setup



7.4.5. Test Result

Type of Modulation	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Result
Ant A				
QPSK	22	03	5240	Pass
Ant B				
QPSK	22	03	5240	Pass

Operation Frequency Range of 26dBc Bandwidth - Ant A	
Channel 03 (5240MHz)	
	

Operation Frequency Range of 26dBc Bandwidth - Ant B	
Channel 03 (5240MHz)	
	

7.5. Output Power Measurement

7.5.1. Test Limit

For FCC

For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

For IC

For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW (23.01dBm) or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

For the 5.725-5.85 GHz band, the maximum conducted output power shall not exceed 1 W.

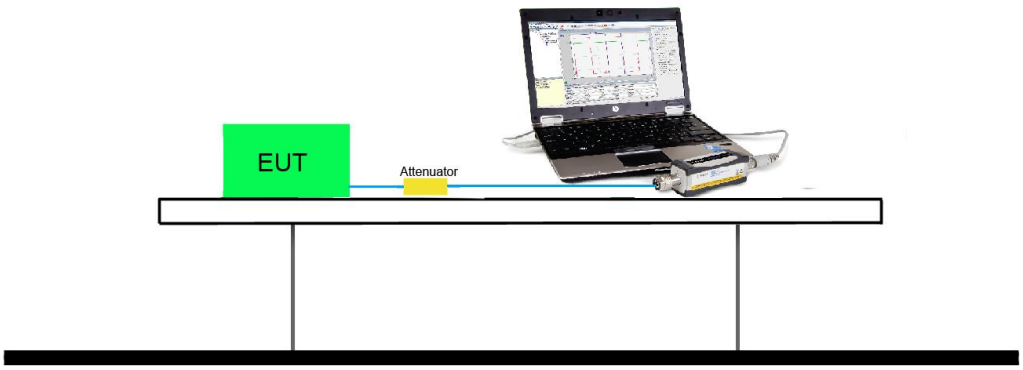
7.5.2. Test Procedure Used

KDB 789033 D02v01r03 - Section E) 3) b) Method PM-G

7.5.3. Test Setting

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

7.5.4. Test Setup



7.5.5. Test Result

Type of Modulation	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Output Power (dBm)	Output Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
Ant A								
QPSK	22	01	5180	8.20	≤ 24	11.20	≤ 21.78	Pass
	22	02	5210	8.05	≤ 24	11.05	≤ 21.78	Pass
	22	03	5240	7.92	≤ 24	10.92	≤ 21.78	Pass
QPSK	22	04	5736	10.52	≤ 30	---	---	Pass
	22	05	5762	10.45	≤ 30	---	---	Pass
	22	06	5814	12.34	≤ 30	---	---	Pass
Ant B								
QPSK	22	01	5180	9.46	≤ 24	12.46	≤ 21.78	Pass
	22	02	5210	9.29	≤ 24	12.29	≤ 21.78	Pass
	22	03	5240	8.86	≤ 24	11.86	≤ 21.78	Pass
QPSK	22	04	5736	11.35	≤ 30	---	---	Pass
	22	05	5762	11.07	≤ 30	---	---	Pass
	22	06	5814	13.18	≤ 30	---	---	Pass

Note: Max EIRP (dBm) = RMS Power (dBm) + Antenna Gain.

For 5150-5250MHz, EIRP Limit: $10 + 10 \log_{10}$ (15.05MHz) = 21.78dBm < 23.01dBm.

7.6. Power Spectral Density Measurement

7.6.1. Test Limit

For FCC

For the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

For IC

For the band 5.15-5.25 GHz, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

For the 5.725-5.85 GHz band, the power spectral density shall not exceed 30 dBm in any 500 kHz band.

7.6.2. Test Procedure Used

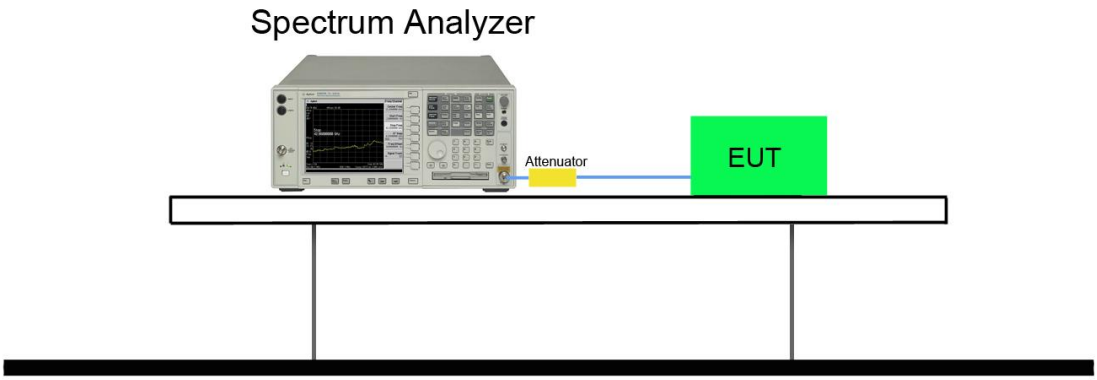
KDB 789033 D02v01r03 - Section F

7.6.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 100 kHz
4. VBW = 3MHz
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (RMS)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
10. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

11. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor 10*log(500kHz/100kHz) = 7 dB to the measured result

7.6.4. Test Setup



7.6.5. Test Result

Type of Modulation	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Reading PSD (dBm/ MHz)	Duty Cycle (%)	PSD Limit (dBm/ MHz)	EIRP PSD (dBm/ MHz)	EIRP PSD Limit (dBm/ MHz)	Result
Ant A									
QPSK	22	01	5180	-5.26	100	≤ 11	-2.26	≤ 10	Pass
	22	02	5210	-5.44	100	≤ 11	-2.44	≤ 10	Pass
	22	03	5240	-5.55	100	≤ 11	-2.55	≤ 10	Pass
Ant B									
QPSK	22	01	5180	-5.03	100	≤ 11	-2.03	≤ 10	Pass
	22	02	5210	-4.94	100	≤ 11	-1.94	≤ 10	Pass
	22	03	5240	-5.34	100	≤ 11	-2.34	≤ 10	Pass

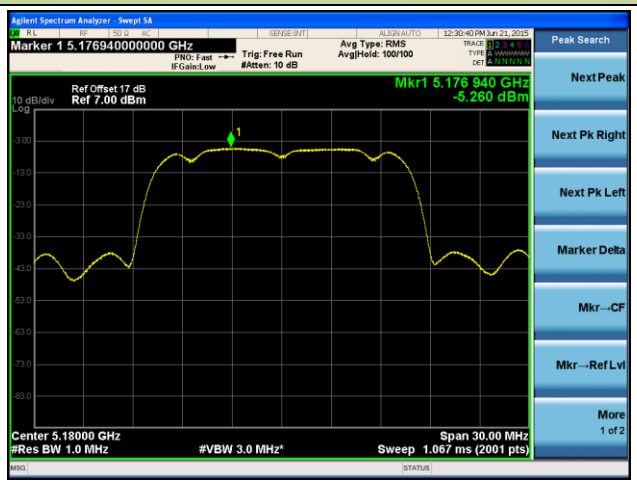
Note: EIRP PSD Level (dBm/MHz) = Reading PSD Level (dBm/MHz) + Antenna Gain.

Type of Modulation	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Reading PSD (dBm/ 100kHz)	Duty Cycle (%)	Constant Factor	Max PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
Ant A									
QPSK	22	04	5736	-5.20	100	7	1.80	≤ 30	Pass
	22	05	5762	-7.23	100	7	-0.23	≤ 30	Pass
	22	06	5814	-7.08	100	7	-0.08	≤ 30	Pass
Ant B									
QPSK	22	04	5736	-6.94	100	7	0.06	≤ 30	Pass
	22	05	5762	-6.70	100	7	0.30	≤ 30	Pass
	22	06	5814	-6.43	100	7	0.57	≤ 30	Pass

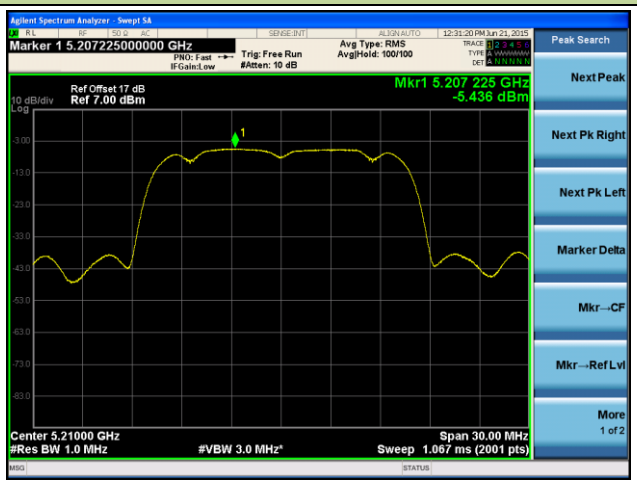
Note: The Max PSD Level = Reading PSD Level + Constant Factor.

Power Spectral Density - Ant A

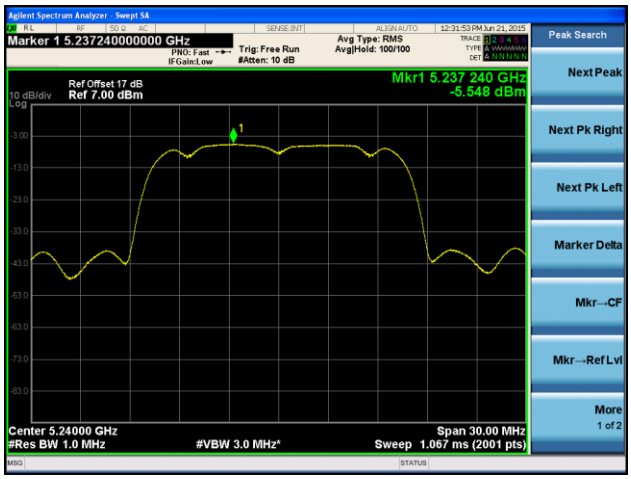
Channel 01 (5180MHz)



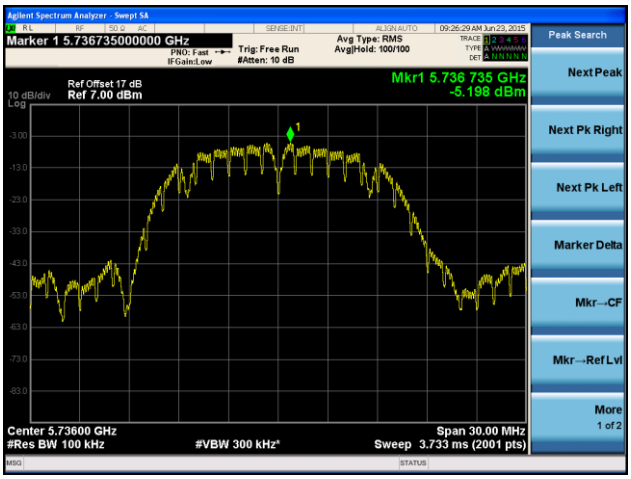
Channel 02 (5210MHz)



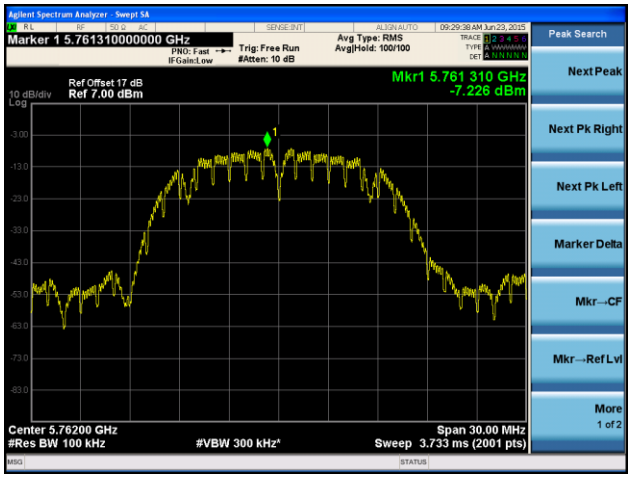
Channel 03 (5240MHz)



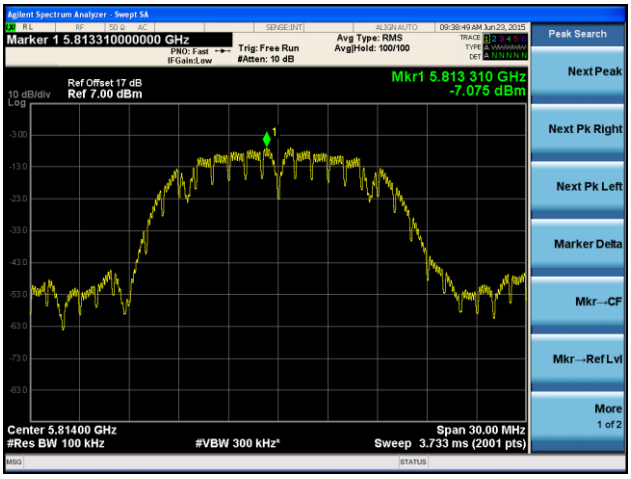
Channel 04 (5736MHz)

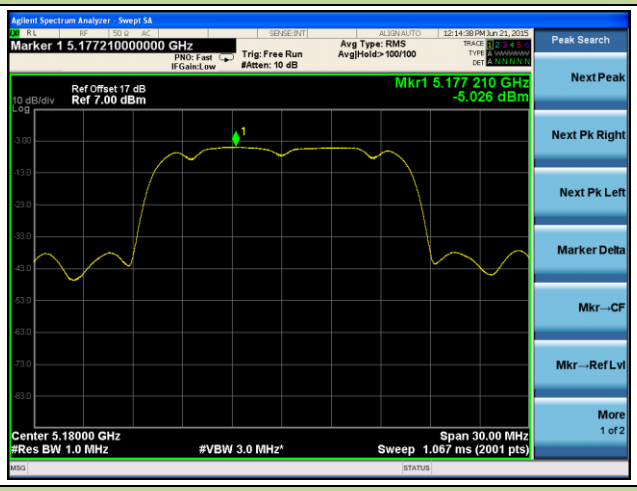
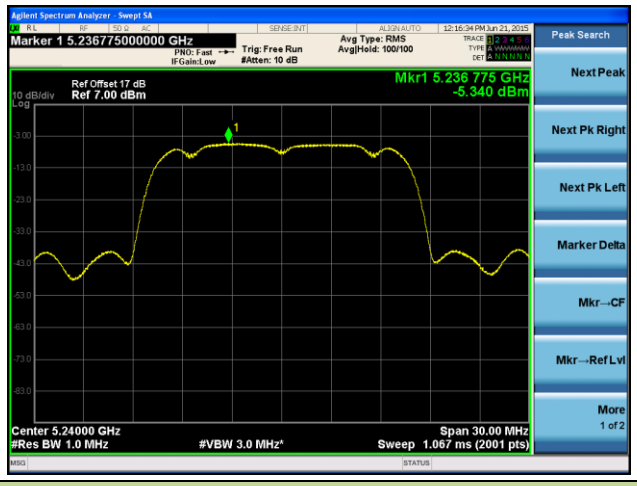
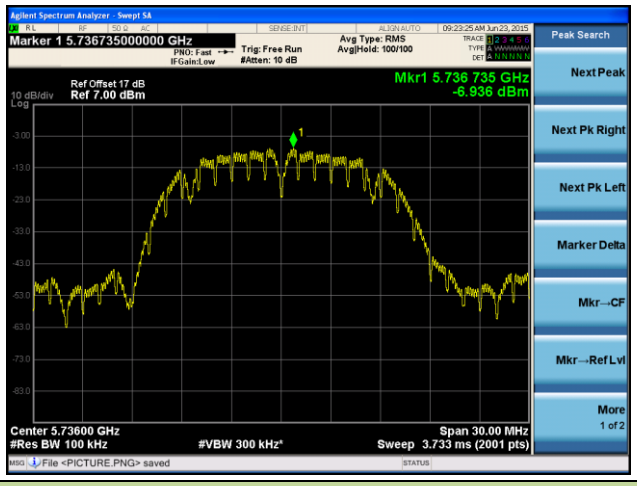
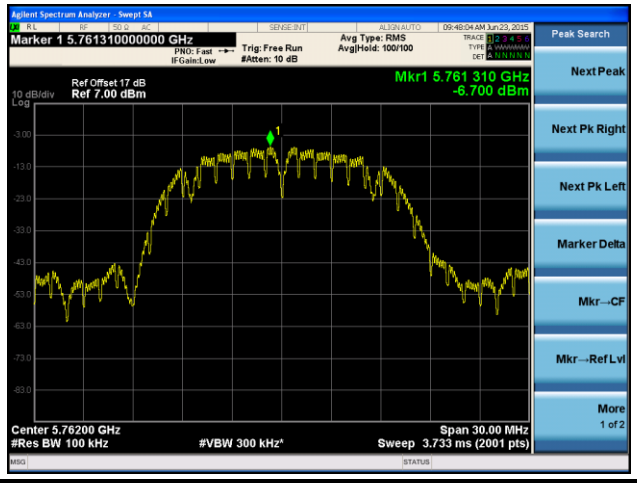
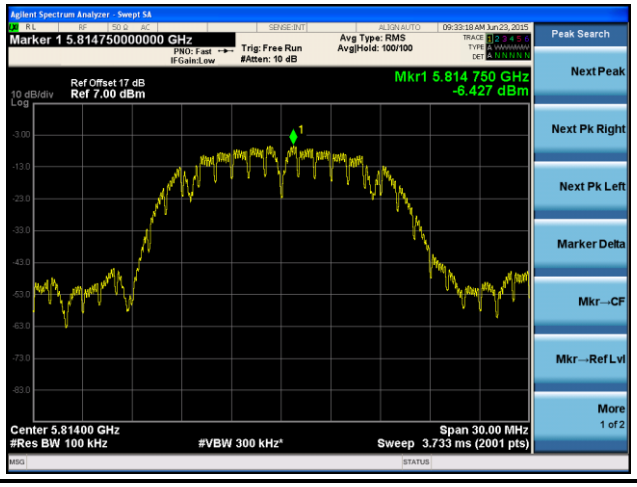


Channel 05 (5762MHz)



Channel 06 (5814MHz)



Power Spectral Density - Ant B	
Channel 01 (5180MHz)	**Channel 02 (5210MHz)**
	
Channel 03 (5240MHz)	**Channel 04 (5736MHz)**
	
Channel 05 (5762MHz)	**Channel 06 (5814MHz)**
	

7.7. Frequency Stability Measurement

7.7.1. Test Limit

Manufactures 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.

7.7.2. Test Procedure Used

Frequency Stability Under Temperature Variations:

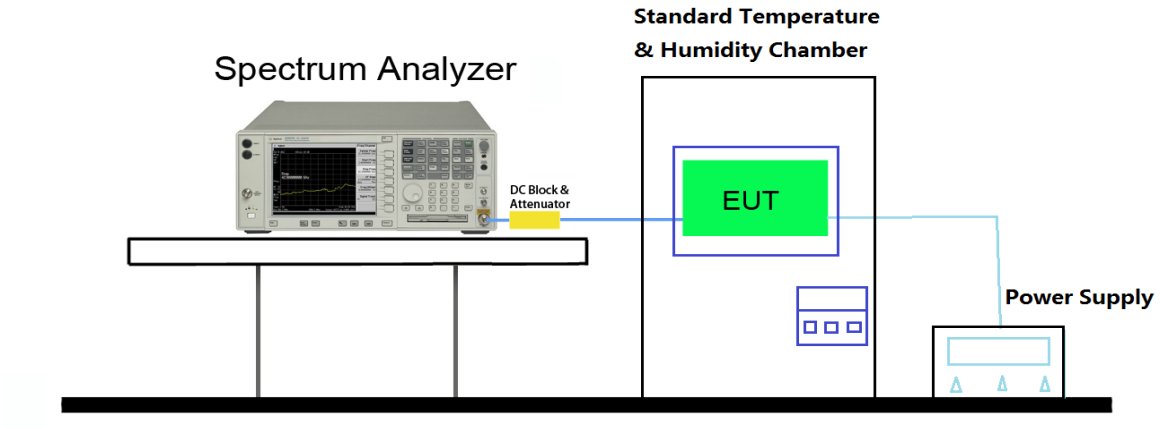
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

7.7.3. Test Setup



7.7.4. Test Result

Test Engineer	Milo Li	Temperature	-30 ~ 50°C
Test Time	06-20-2015	Relative Humidity	52%RH

Voltage (%)	Power (VAC)	Temp (°C)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	120	- 30	4.02	4.15	4.05	4.11
		- 20	4.09	4.12	4.20	4.19
		- 10	4.13	4.11	4.15	4.20
		0	4.11	4.07	4.05	4.10
		+ 10	4.21	4.11	4.15	4.13
		+ 20 (Ref)	4.31	4.31	4.35	4.30
		+ 30	4.32	4.35	4.29	4.31
		+ 40	4.33	4.31	4.34	4.25
		+ 50	4.28	4.31	4.35	4.29
115%	138	+ 20	4.30	4.31	4.33	4.30
85%	102	+ 20	4.35	4.37	4.23	4.31

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) – Declared Frequency (Hz)] / Declared Frequency (Hz)} *10^6.

7.8. Radiated Spurious Emission Measurement

7.8.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.8.2. Test Procedure Used

KDB 789033 D02v01r03 – Section G

7.8.3. Test Setting

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Quasi-Peak Measurements below 1GHz

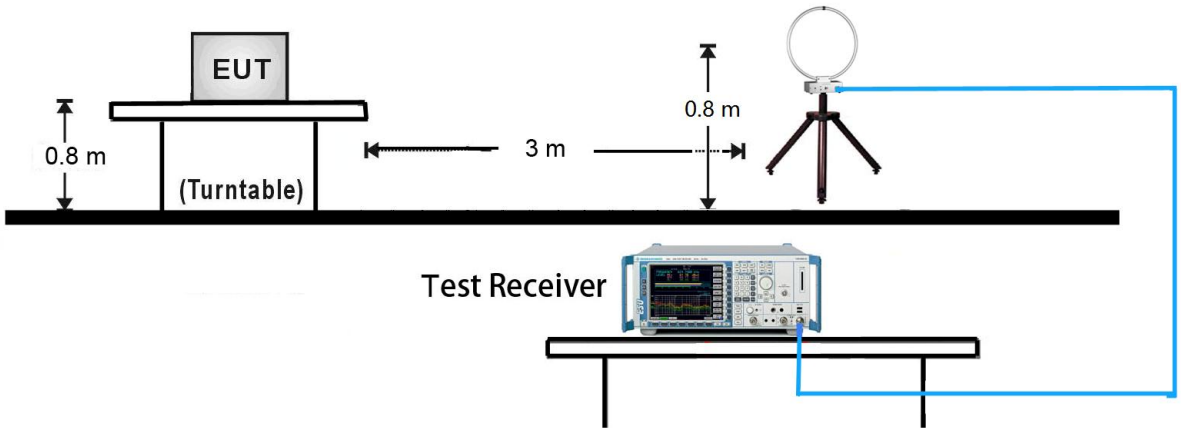
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 120 kHz
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Average Measurements above 1GHz (Method AD)

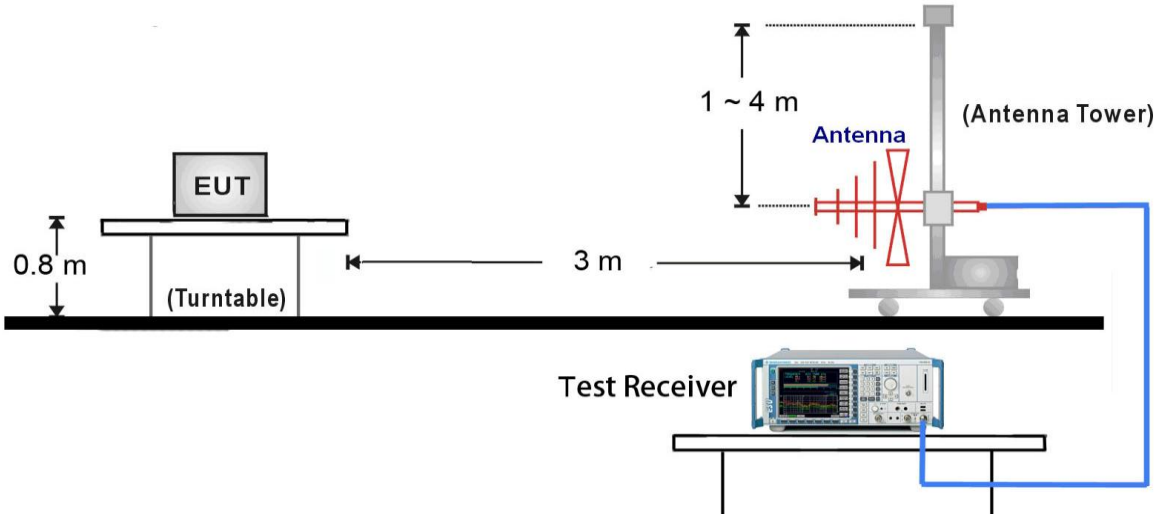
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be > 2 x span/RBW)
6. Sweep time = auto
7. Trace was averaged over at 100 sweeps

7.8.4. Test Setup

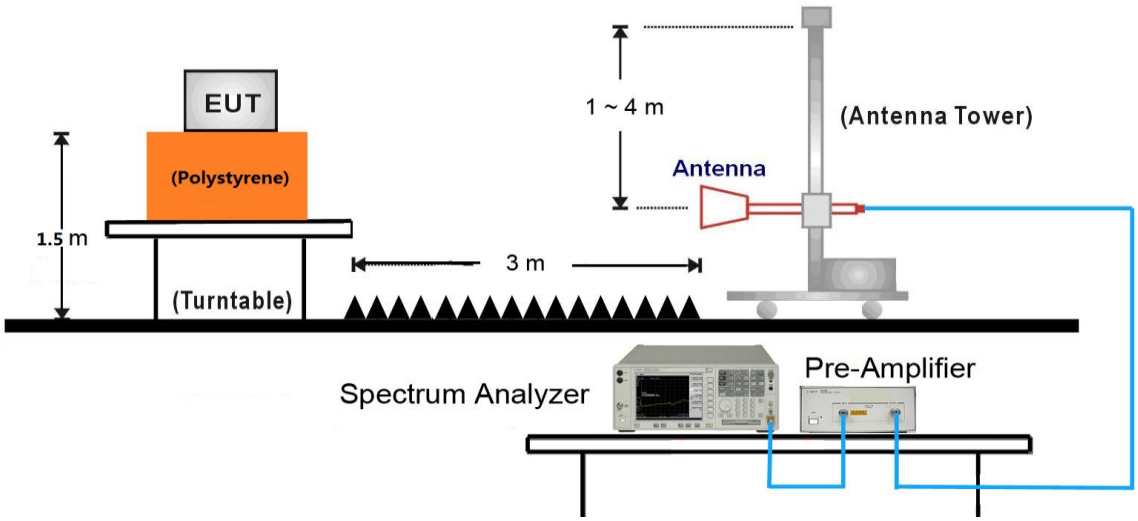
9kHz ~ 30MHz Test Setup:



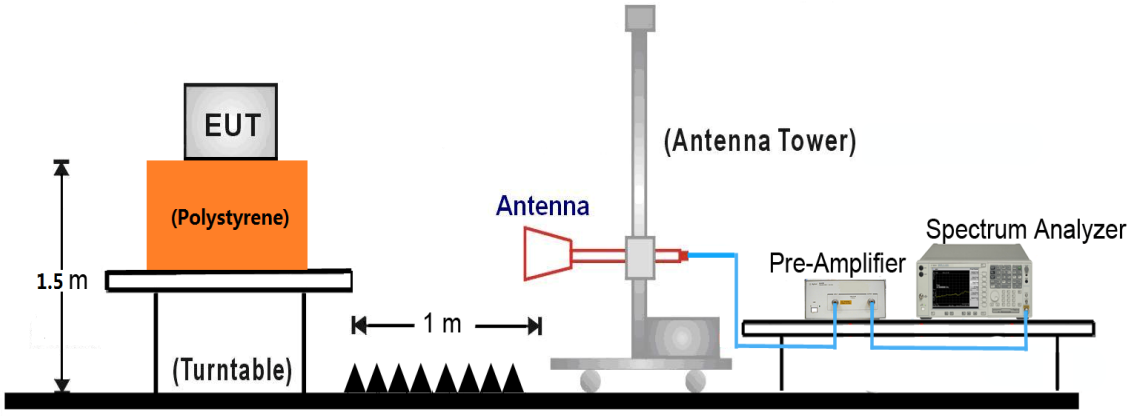
30MHz ~ 1GHz Test Setup:



1GHz ~18GHz Test Setup:



18GHz ~40GHz Test Setup:



7.8.5. Test Result

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	01	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4264.0	39.2	0.9	40.1	74.0	-33.9	Peak	Horizontal
	4918.5	36.5	2.6	39.1	74.0	-34.9	Peak	Horizontal
*	6984.0	35.9	9.1	45.0	68.2	-23.2	Peak	Horizontal
*	10146.0	34.9	13.8	48.7	68.2	-19.5	Peak	Horizontal
	4247.0	39.1	0.7	39.8	74.0	-34.2	Peak	Vertical
	4995.0	36.7	2.6	39.3	74.0	-34.7	Peak	Vertical
*	6975.5	34.9	9.0	43.9	68.2	-24.3	Peak	Vertical
*	10358.5	36.8	14.9	51.7	68.2	-16.5	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	02	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4264.0	38.6	0.9	39.5	74.0	-34.5	Peak	Horizontal
	4961.0	37.1	2.7	39.8	74.0	-34.2	Peak	Horizontal
*	7162.5	33.8	10.5	44.3	68.2	-23.9	Peak	Horizontal
*	10180.0	34.3	14.3	48.6	68.2	-19.6	Peak	Horizontal
	4264.0	38.9	0.9	39.8	74.0	-34.2	Peak	Vertical
	4952.5	36.5	2.7	39.2	74.0	-34.8	Peak	Vertical
*	6975.5	35.0	9.0	44.0	68.2	-24.2	Peak	Vertical
*	10418.0	36.6	14.9	51.5	68.2	-16.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	03	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4213.0	38.8	0.8	39.6	74.0	-34.4	Peak	Horizontal
	4935.5	36.8	2.7	39.5	74.0	-34.5	Peak	Horizontal
*	6958.5	34.7	8.9	43.6	68.2	-24.6	Peak	Horizontal
*	10333.0	33.8	14.7	48.5	68.2	-19.7	Peak	Horizontal
	4264.0	39.5	0.9	40.4	74.0	-33.6	Peak	Vertical
	4910.0	36.9	2.5	39.4	74.0	-34.6	Peak	Vertical
*	7145.5	34.4	10.5	44.9	68.2	-23.3	Peak	Vertical
*	10477.5	35.4	14.8	50.2	68.2	-18.0	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	04	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4272.5	39.7	0.8	40.5	74.0	-33.5	Peak	Horizontal
	4935.5	36.3	2.7	39.0	74.0	-35.0	Peak	Horizontal
*	6967.0	35.2	9.0	44.2	68.2	-24.0	Peak	Horizontal
*	10248.0	34.6	14.3	48.9	68.2	-19.3	Peak	Horizontal
	4264.0	38.5	0.9	39.4	74.0	-34.6	Peak	Vertical
	4901.5	36.6	2.6	39.2	74.0	-34.8	Peak	Vertical
*	7086.0	34.5	10.0	44.5	68.2	-23.7	Peak	Vertical
*	10231.0	33.5	14.4	47.9	68.2	-20.3	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	05	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4255.5	38.6	0.8	39.4	74.0	-34.6	Peak	Horizontal
	4952.5	35.9	2.7	38.6	74.0	-35.4	Peak	Horizontal
*	7205.0	34.2	10.5	44.7	68.2	-23.5	Peak	Horizontal
*	10163.0	34.2	13.8	48.0	68.2	-20.2	Peak	Horizontal
	4255.5	39.1	0.8	39.9	74.0	-34.1	Peak	Vertical
	4986.5	36.6	2.7	39.3	74.0	-34.7	Peak	Vertical
*	7145.5	34.1	10.5	44.6	68.2	-23.6	Peak	Vertical
*	10231.0	35.1	14.4	49.5	68.2	-18.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Test Mode:	Ant B	Test Site:	AC2
Test Channel:	06	Test Engineer:	Bruce Wang
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4264.0	39.0	0.9	39.9	74.0	-34.1	Peak	Horizontal
	4893.0	35.9	2.7	38.6	74.0	-35.4	Peak	Horizontal
*	7077.5	35.6	9.9	45.5	68.2	-22.7	Peak	Horizontal
*	10171.5	34.1	14.0	48.1	68.2	-20.1	Peak	Horizontal
	4238.5	39.7	0.7	40.4	74.0	-33.6	Peak	Vertical
	4935.5	36.8	2.7	39.5	74.0	-34.5	Peak	Vertical
*	7154.0	35.2	10.5	45.7	68.2	-22.5	Peak	Vertical
*	10163.0	34.6	13.8	48.4	68.2	-19.8	Peak	Vertical

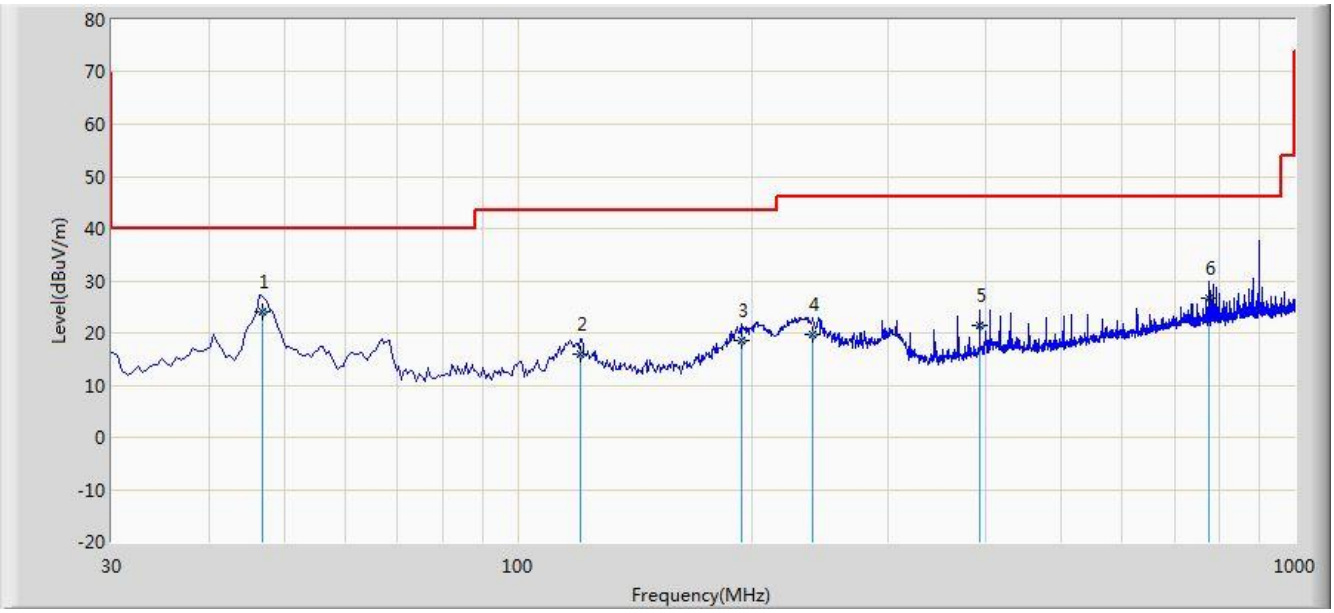
Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2016/08/16 - 14:15
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Worst Mode: Transmit at channel 5180MHz ANT B	

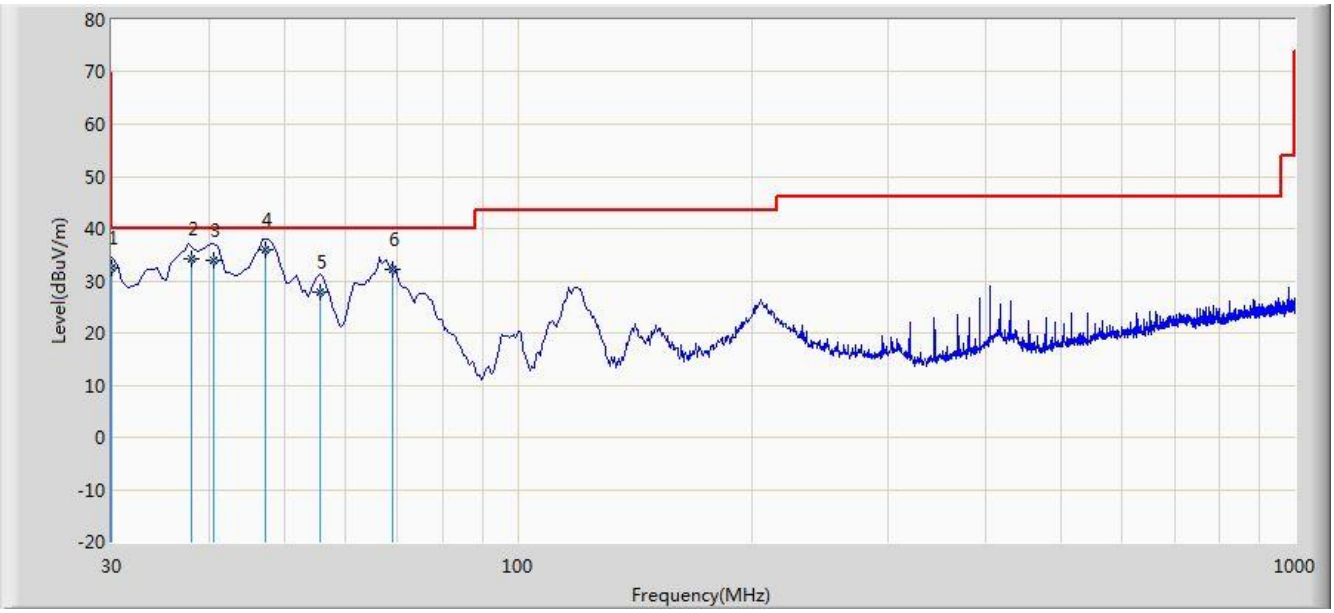


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	46.975	23.983	9.003	-16.017	40.000	14.980	QP
2			120.210	15.845	4.592	-27.655	43.500	11.253	QP
3			193.930	18.663	6.631	-24.837	43.500	12.032	QP
4			240.005	19.780	6.360	-26.220	46.000	13.420	QP
5			393.265	21.358	4.768	-24.642	46.000	16.590	QP
6			774.475	26.781	4.225	-19.219	46.000	22.556	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/16 - 14:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Worst Mode: Transmit at channel 5180MHz ANT B	

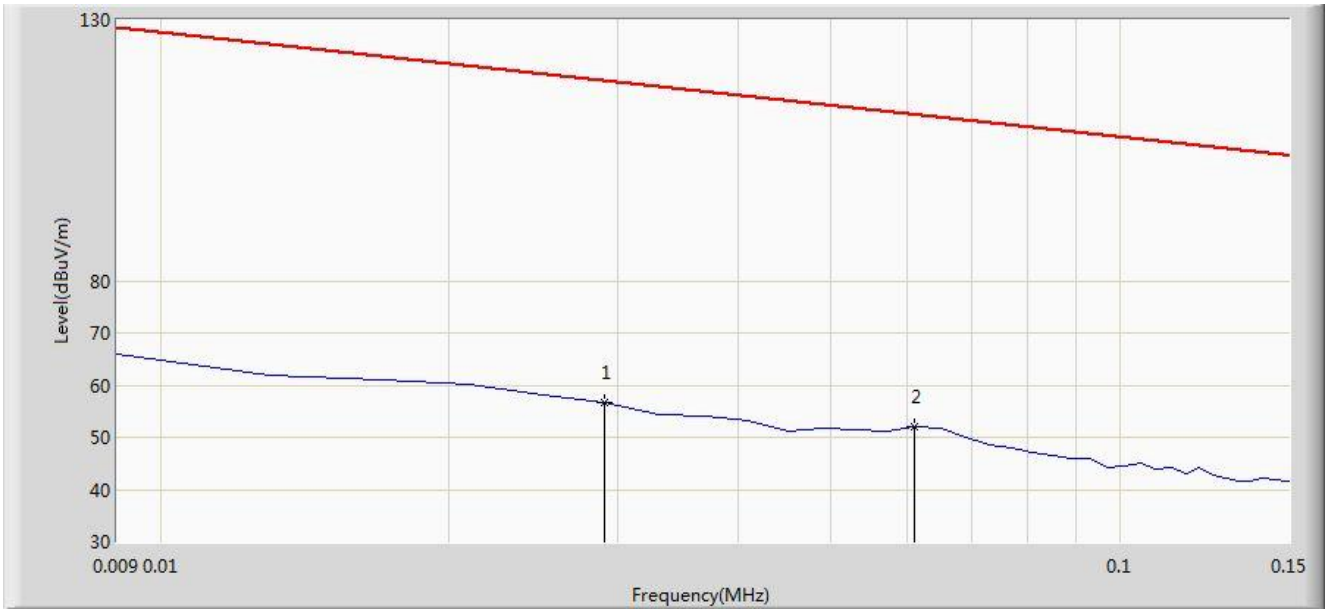


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			30.000	32.467	20.400	-7.533	40.000	12.067	QP
2			38.006	34.157	20.700	-5.843	40.000	13.457	QP
3			40.680	33.891	19.900	-6.109	40.000	13.991	QP
4		*	47.370	36.071	21.100	-3.929	40.000	14.971	QP
5			55.705	27.898	13.334	-12.102	40.000	14.564	QP
6			68.944	32.241	21.000	-7.759	40.000	11.241	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/20 - 19:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: Pulse2	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

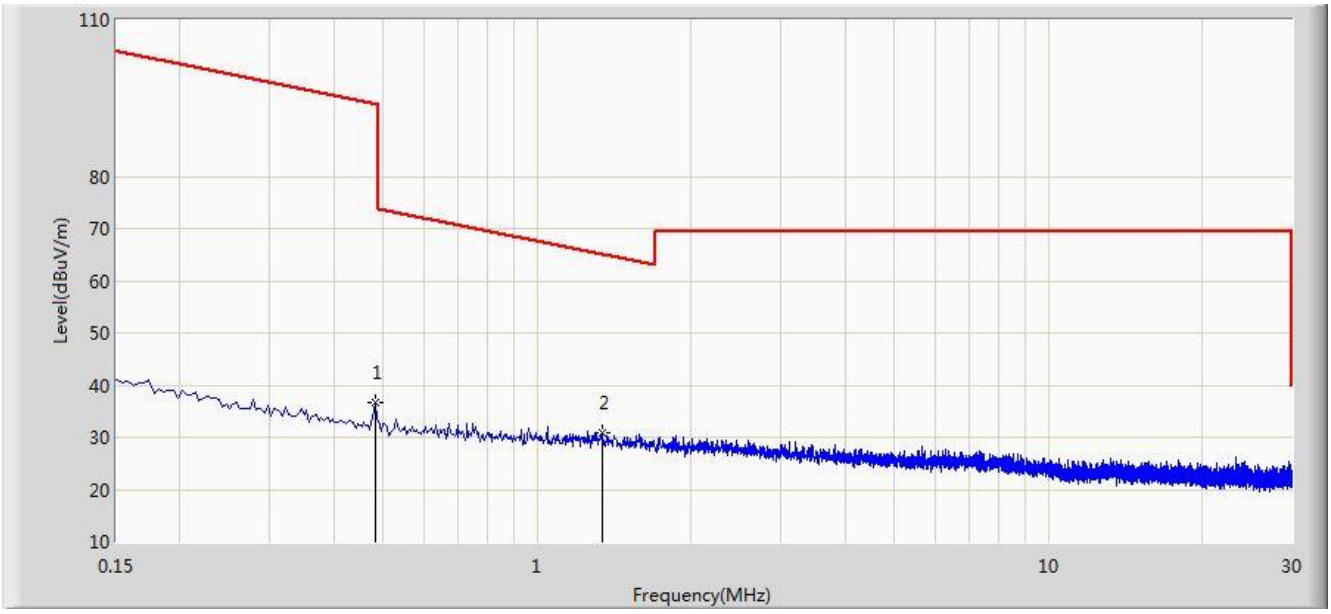


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.029	56.610	35.660	-61.732	118.342	21.049	AV
2		*	0.061	51.899	31.588	-59.988	111.887	20.311	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/20 - 19:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Roy Cheng
Probe: FMZB1519_0.009-30MHz	Polarity: Face on
EUT: Pulse2	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 9kHz~30MHz.	

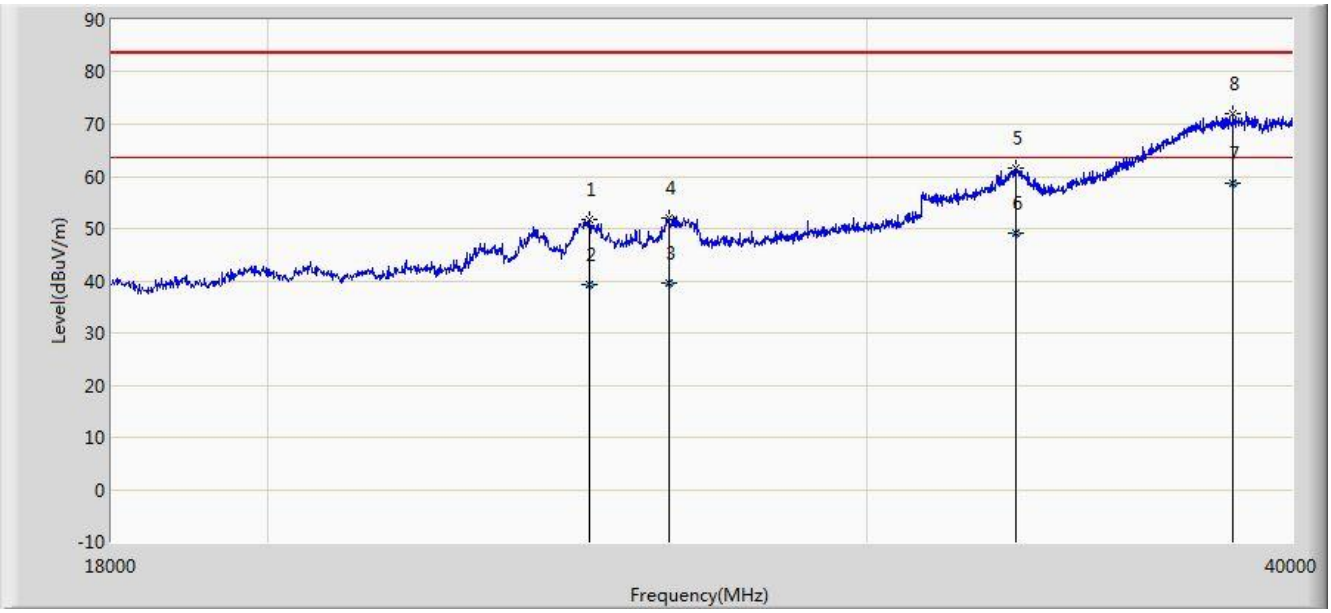


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.482	36.584	16.183	-57.359	93.943	20.401	AV
2		*	1.338	31.001	10.512	-34.074	65.075	20.489	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/20 - 21:25
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~40GHz.	

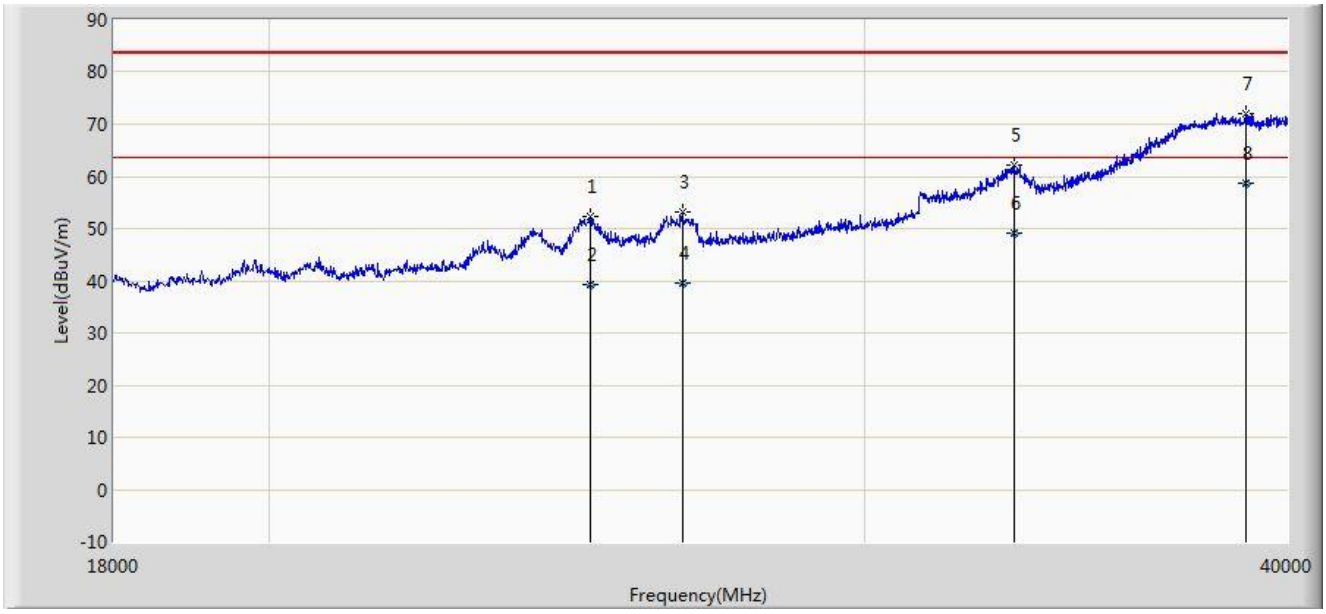


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			24864.000	51.836	37.061	-31.664	83.500	14.775	PK
2			24864.088	39.225	24.450	-24.275	63.500	14.775	AV
3			26260.988	39.469	24.050	-24.031	63.500	15.419	AV
4			26261.000	51.956	36.537	-31.544	83.500	15.419	PK
5			33180.000	61.461	39.940	-22.039	83.500	21.521	PK
6			33180.361	49.061	27.540	-14.439	63.500	21.521	AV
7		*	38437.980	58.523	31.190	-4.977	63.500	27.333	AV
8			38438.000	72.021	44.688	-11.479	83.500	27.333	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

Site: AC2	Time: 2016/08/20 - 21:28
Limit: FCC_Part15.209_RE(1m)	Engineer: Roy Cheng
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Note: There is the ambient noise within frequency range 18GHz~40GHz.	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			24886.000	52.313	37.528	-31.187	83.500	14.785	PK
2			24886.970	39.234	24.449	-24.266	63.500	14.785	AV
3			26503.000	53.227	37.207	-30.273	83.500	16.020	PK
4			26503.872	39.572	23.550	-23.928	63.500	16.022	AV
5			33213.000	62.110	40.572	-21.390	83.500	21.538	PK
6			33213.984	49.098	27.560	-14.402	63.500	21.538	AV
7			38900.000	72.096	44.211	-11.404	83.500	27.885	PK
8		*	38900.755	58.705	30.820	-4.795	63.500	27.885	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

7.9. Radiated Restricted Band Edge Measurement

7.9.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.25 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 – 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

For RSS-Gen Section 8.10 Requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 8.10 of RSS-Gen, must also comply with the radiated emission limits specified in Section 8.9.

Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.009 - 0.110	240 - 285	9.0 - 9.2
2.1735 - 2.1905	322 - 335.4	9.3 - 9.5
3.020 - 3.026	399.9 - 410	10.6 - 12.7
4.125 - 4.128	608 - 614	13.25 - 13.4
4.17725 - 4.17775	960 - 1427	14.47 - 14.5
4.20725 - 4.20775	1435 - 1626.5	15.35 - 16.2
5.677 - 5.683	1645.5 - 1646.5	17.7 - 21.4
6.215 - 6.218	1660 - 1710	22.01 - 23.12
6.26775 - 6.26825	1718.8 -1722.2	23.6 - 24.0
6.31175 - 6.31225	2200 - 2300	31.2 - 31.8
8.291 - 8.294	2310 -2390	36.43 - 36.5
8.362 - 8.366	2655 - 2900	Above 38.6
8.37625 - 8.38675	3260 - 3267	--
8.41425 - 8.41475	3332 -3339	
12.29 - 12.293	334.5 - 3358	
12.51975 - 12.52025	3500 - 4400	
12.57675 - 12.57725	4500 - 5150	
13.36 -13.41	5350 - 5460	
16.42 - 16.423	7250 - 7750	
16.69475 - 16.69525	8025 - 8500	
16.80425 - 16.80475	--	
25.5 - 25.67		
37.5 - 38.25		
73 - 74.6		
74.8 - 75.2		
108 - 138		
156.52475 - 156.525225		
156.7 - 156.9		

For 15.407(b) requirement:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: 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.

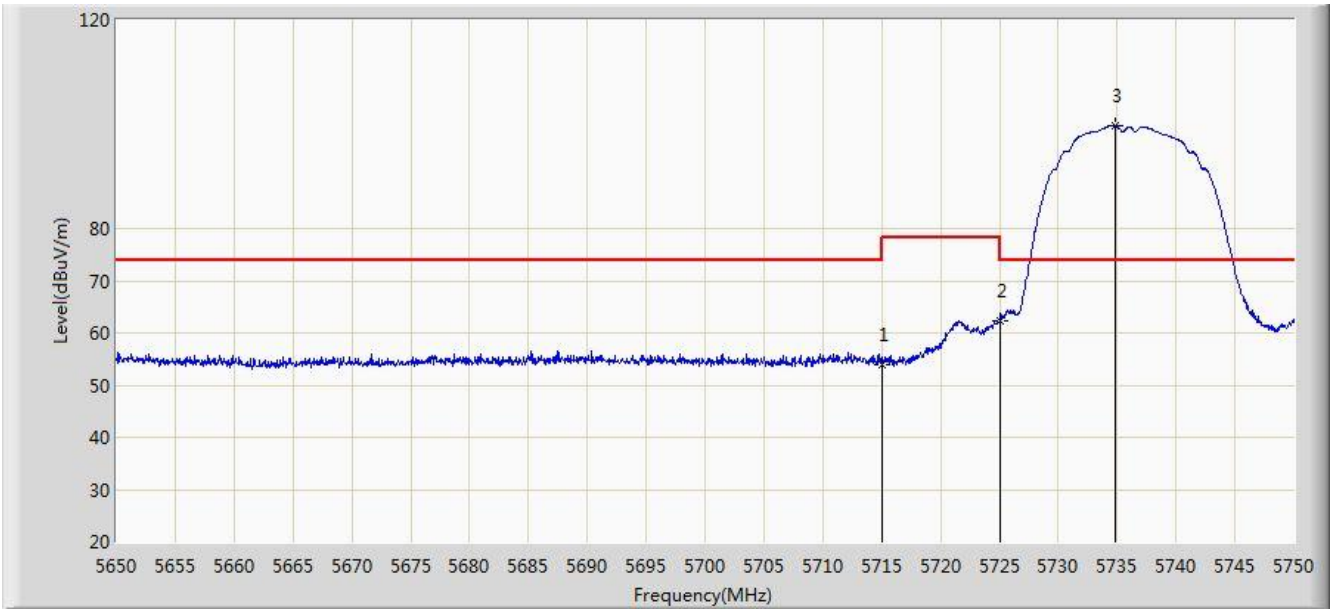
All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [V/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.9.2. Test Result of Radiated Restricted Band Edge

For IC:

Site: AC2	Time: 2016/08/18 - 14:04
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

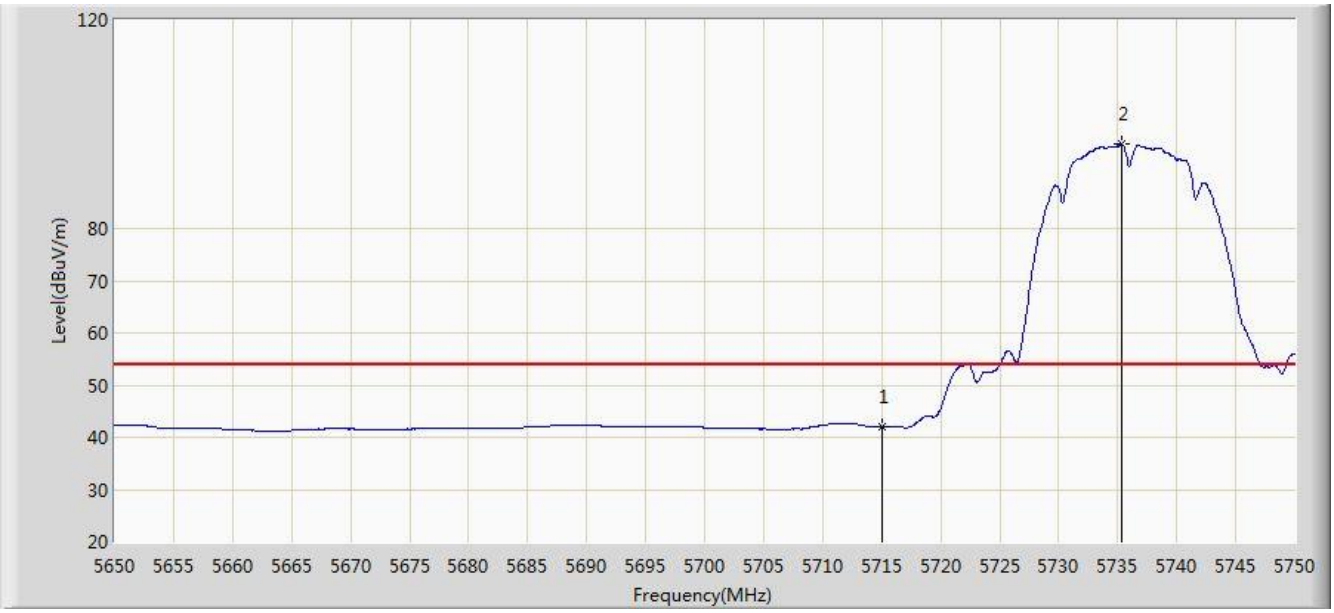


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	53.859	50.000	-20.141	74.000	3.860	PK
2			5725.000	62.422	58.316	-15.778	78.200	4.105	PK
3		*	5734.850	99.691	95.402	N/A	N/A	4.290	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

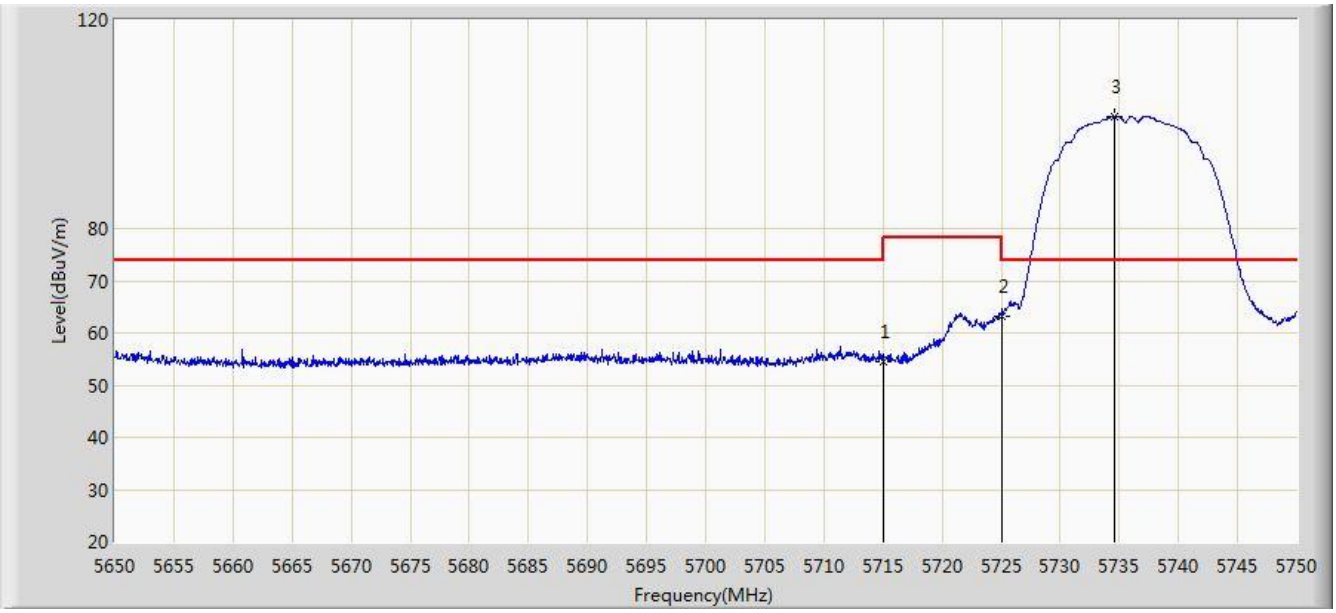


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	42.114	38.255	-11.886	54.000	3.860	AV
2		*	5735.350	96.215	91.927	N/A	N/A	4.289	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:41
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

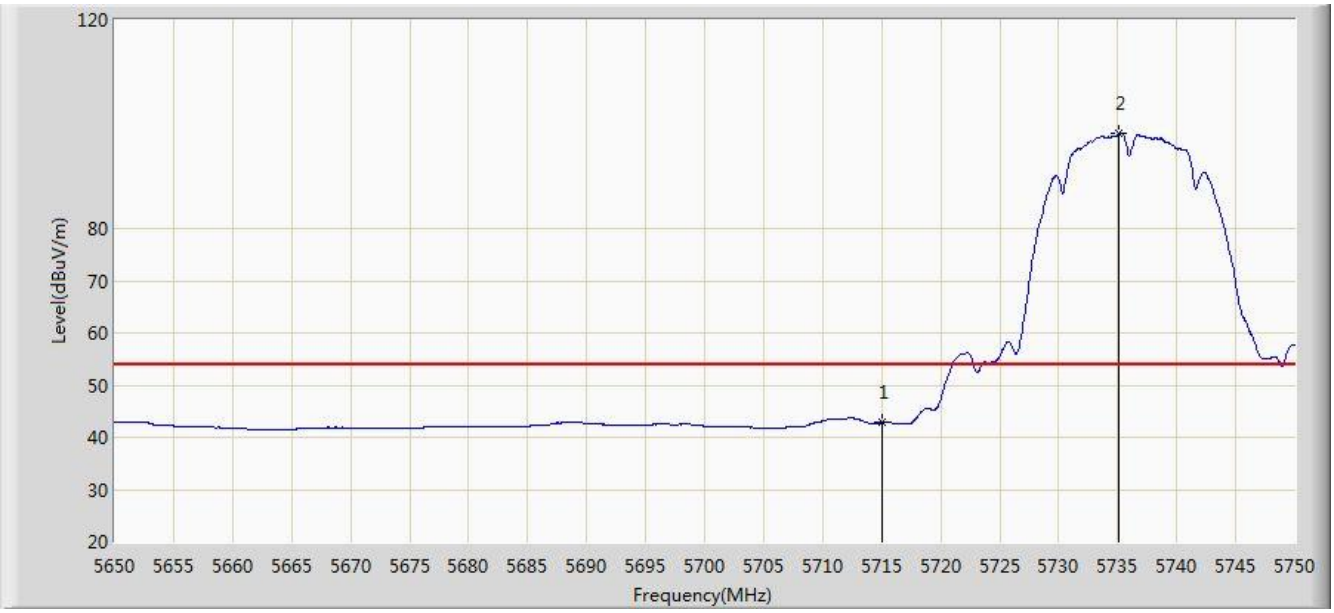


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	54.466	50.607	-19.534	74.000	3.860	PK
2			5725.000	63.187	59.081	-15.013	78.200	4.105	PK
3		*	5734.600	101.583	97.293	N/A	N/A	4.290	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

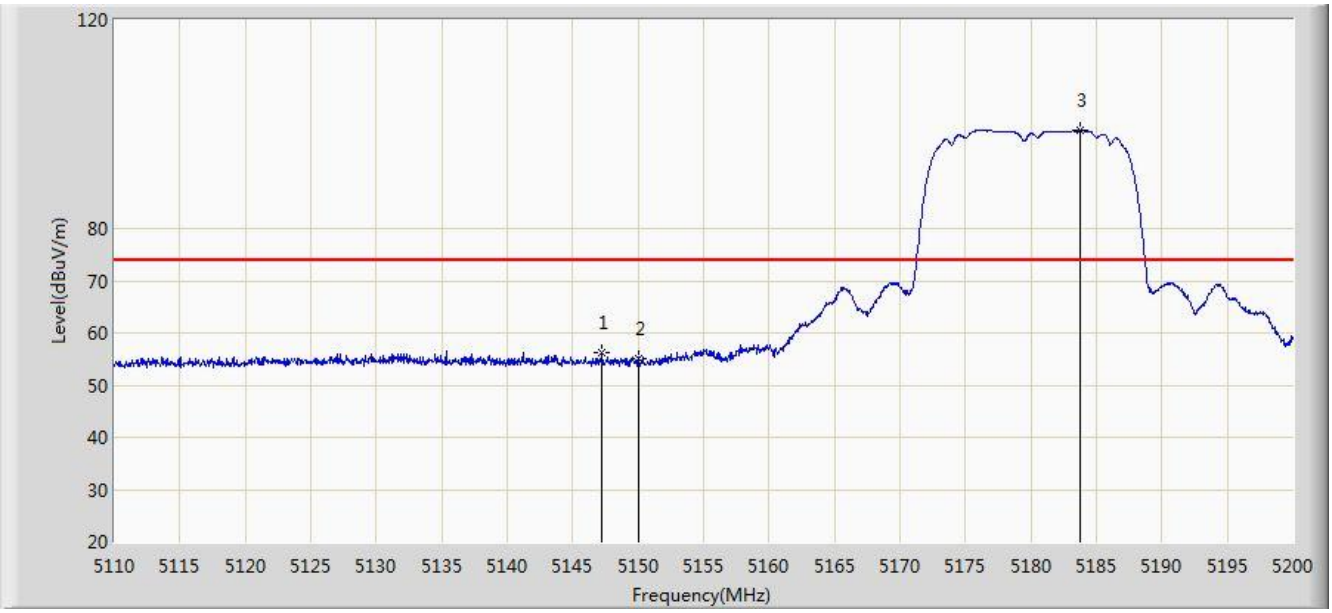


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	42.782	38.923	-11.218	54.000	3.860	AV
2		*	5735.150	98.117	93.828	N/A	N/A	4.289	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:47
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

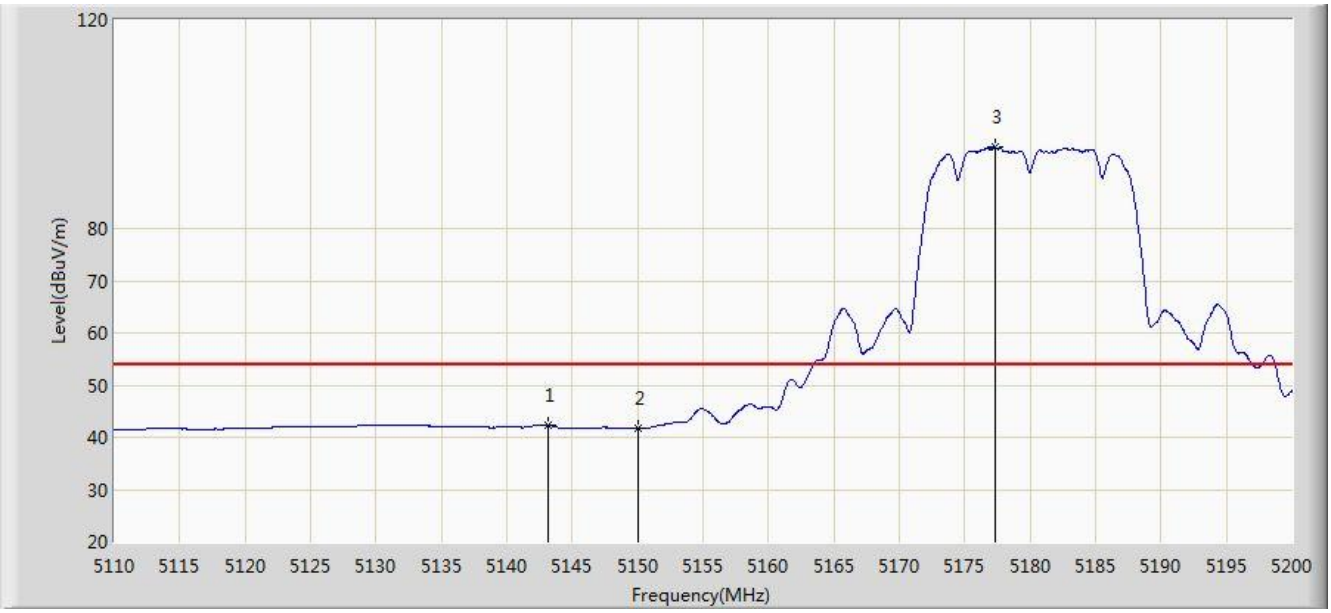


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5147.260	56.231	53.155	-17.769	74.000	3.077	PK
2			5150.000	55.075	52.005	-18.925	74.000	3.069	PK
3		*	5183.755	98.752	95.723	N/A	N/A	3.029	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

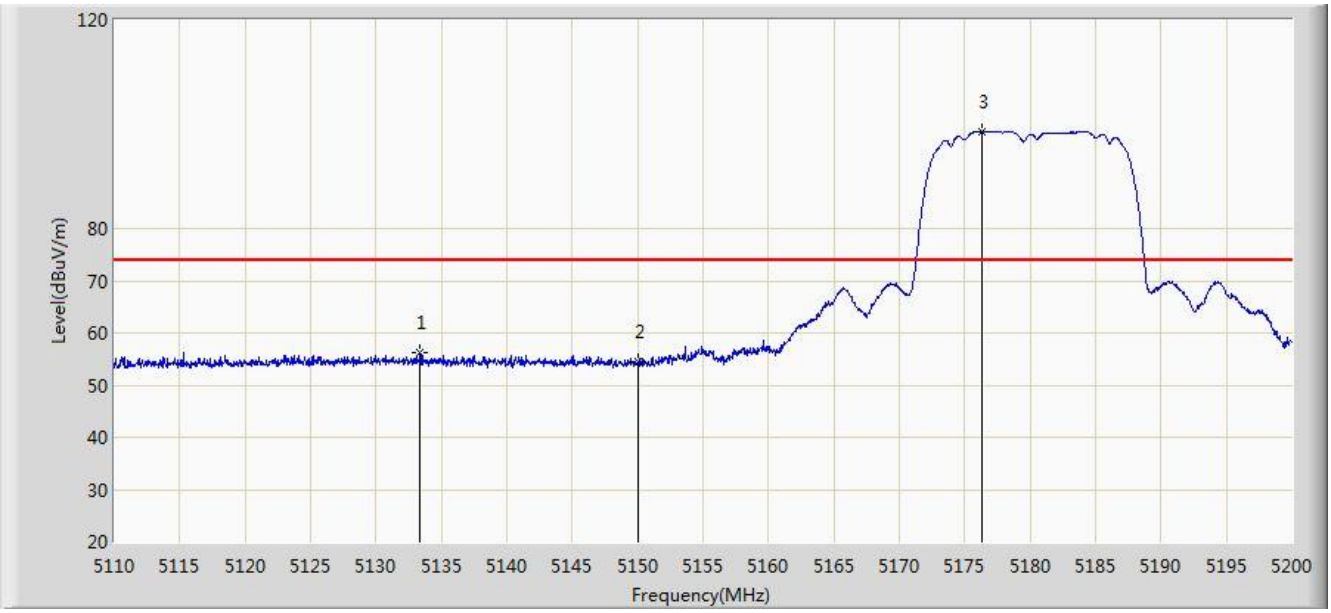


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5143.210	42.310	39.224	-11.690	54.000	3.087	AV
2			5150.000	41.738	38.668	-12.262	54.000	3.069	AV
3		*	5177.275	95.608	92.576	N/A	N/A	3.032	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:51
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

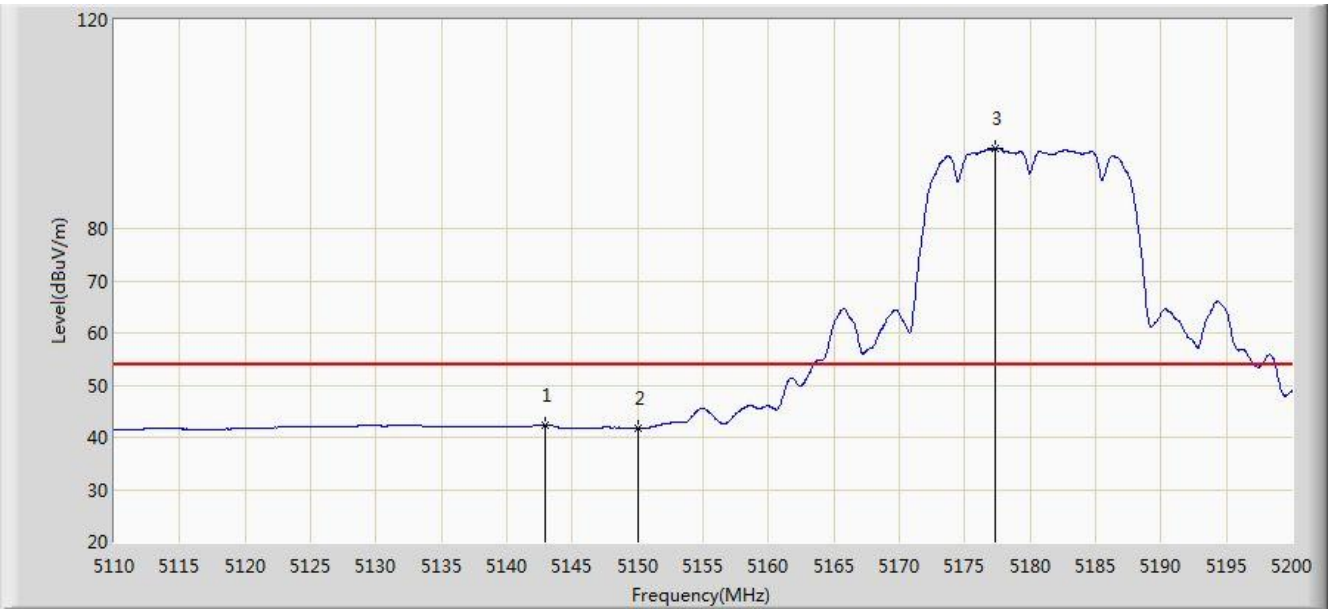


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5133.400	56.155	53.020	-17.845	74.000	3.134	PK
2			5150.000	54.548	51.478	-19.452	74.000	3.069	PK
3		*	5176.285	98.677	95.649	N/A	N/A	3.029	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 16:53
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

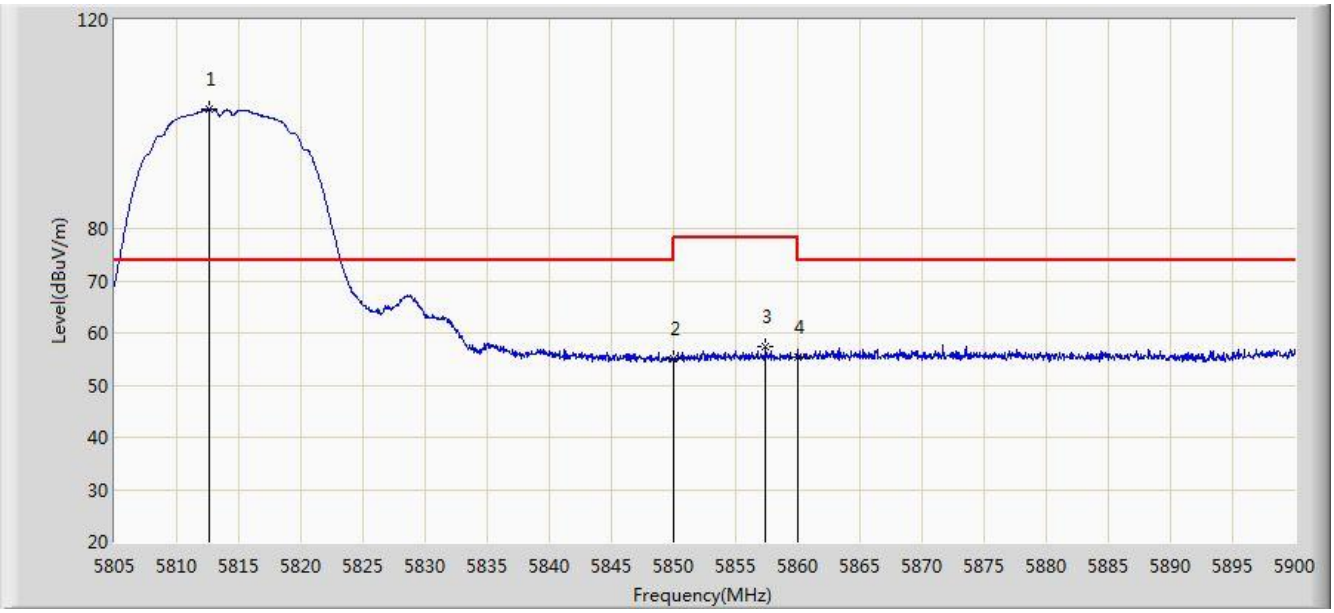


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5142.985	42.385	39.298	-11.615	54.000	3.087	AV
2			5150.000	41.712	38.642	-12.288	54.000	3.069	AV
3		*	5177.275	95.454	92.422	N/A	N/A	3.032	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	

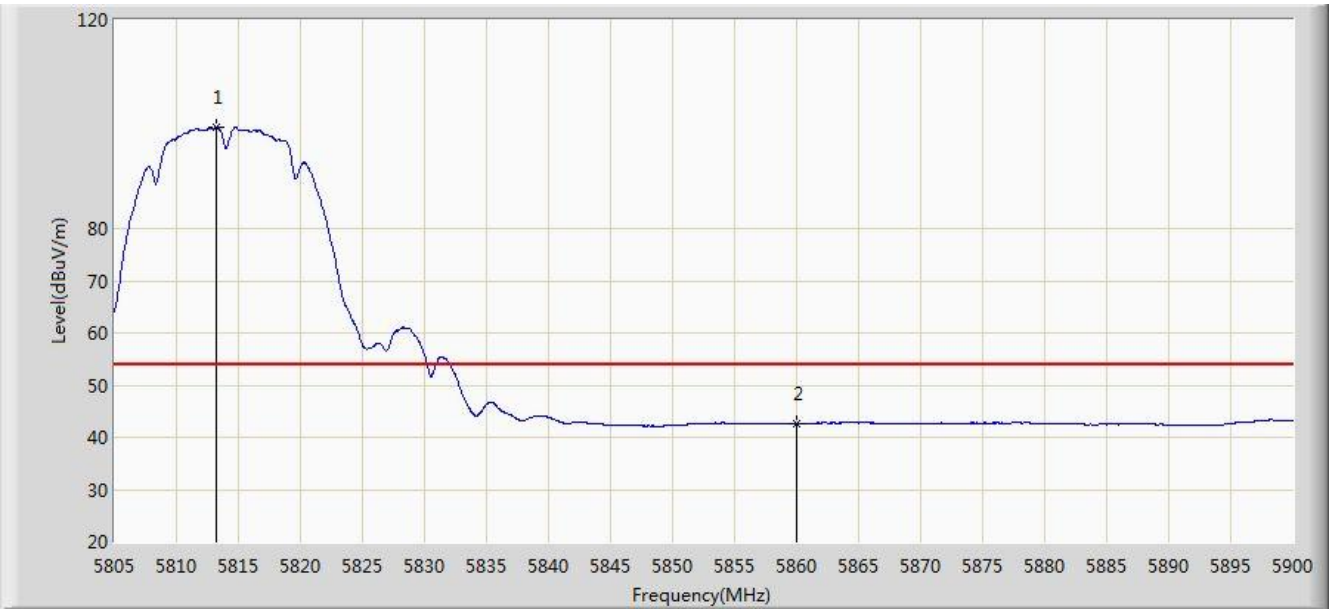


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5812.647	102.861	98.205	N/A	N/A	4.656	PK
2			5850.000	54.994	49.999	-23.206	78.200	4.995	PK
3			5857.440	57.303	52.319	-20.897	78.200	4.984	PK
4			5860.000	55.360	50.381	-18.640	74.000	4.979	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:08
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	

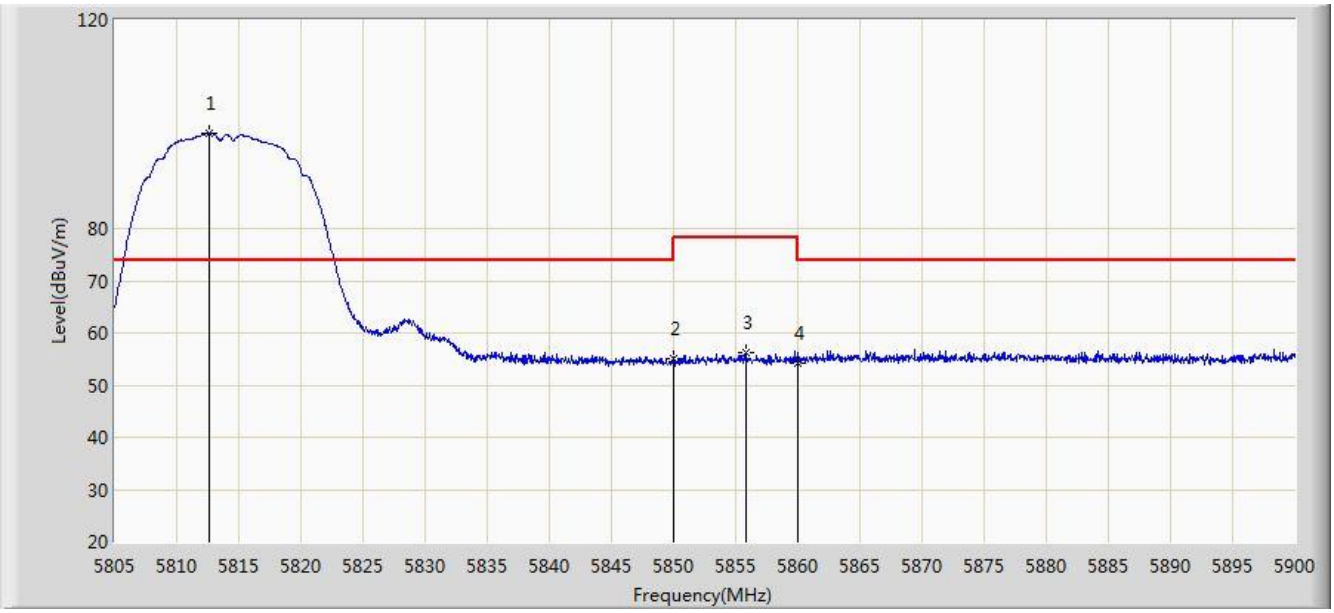


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5813.217	99.550	94.894	N/A	N/A	4.656	AV
2			5860.000	42.678	37.699	-11.322	54.000	4.979	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:09
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	

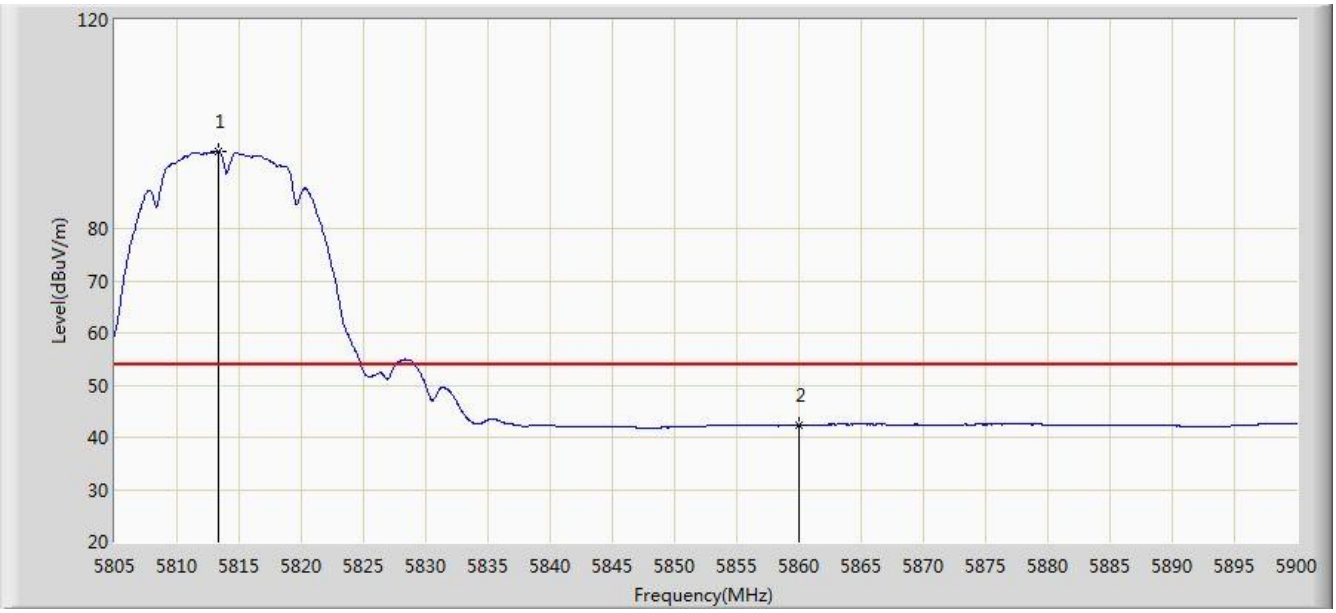


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5812.600	98.202	93.546	N/A	N/A	4.656	PK
2			5850.000	54.947	49.952	-23.253	78.200	4.995	PK
3			5855.777	56.283	51.297	-21.917	78.200	4.986	PK
4			5860.000	54.329	49.350	-19.671	74.000	4.979	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	



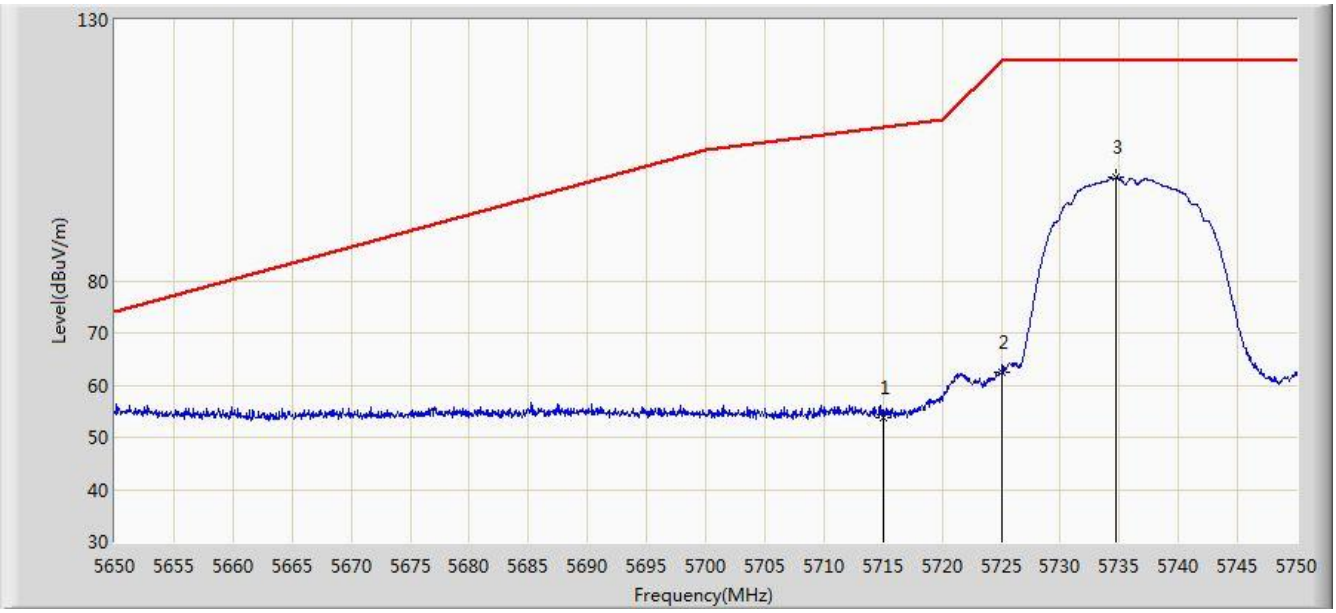
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5813.360	94.899	90.243	N/A	N/A	4.656	AV
2			5860.000	42.260	37.281	-11.740	54.000	4.979	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

For FCC:

Site: AC2	Time: 2016/08/18 - 17:42
Limit: FCC_Part15.407_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

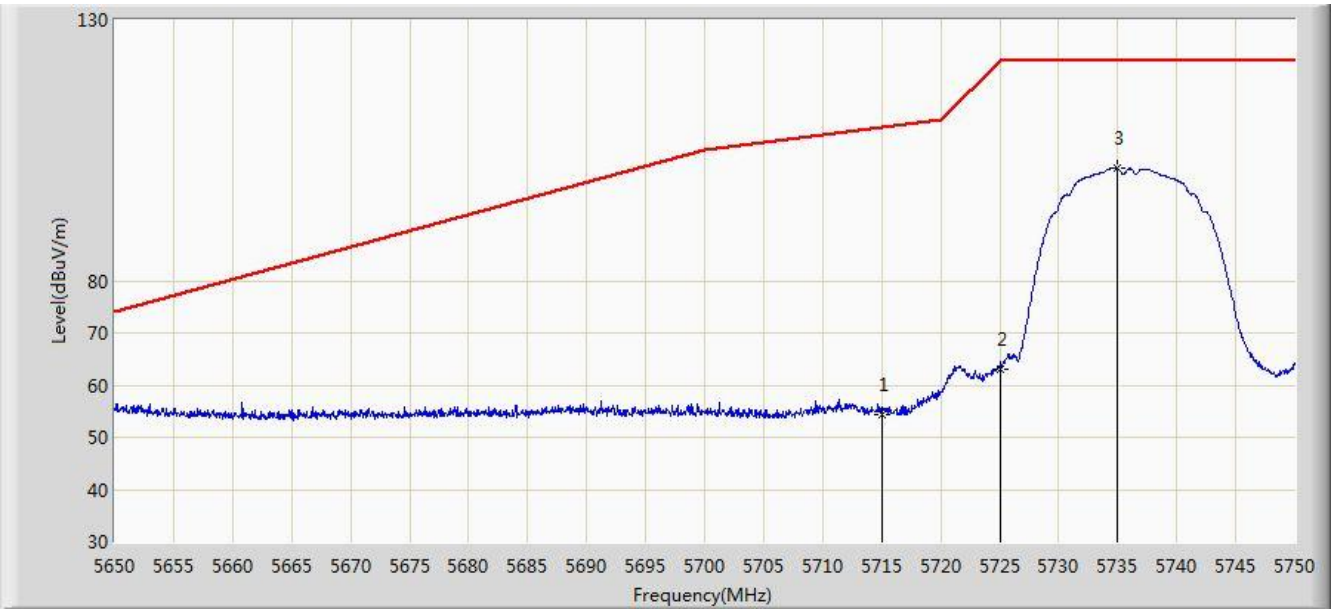


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	53.859	50.000	-55.542	109.402	3.860	PK
2			5725.000	62.422	58.316	-59.778	122.200	4.105	PK
3		*	5734.700	99.717	95.427	N/A	N/A	4.289	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:43
Limit: FCC_Part15.407_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5736MHz Ant B	

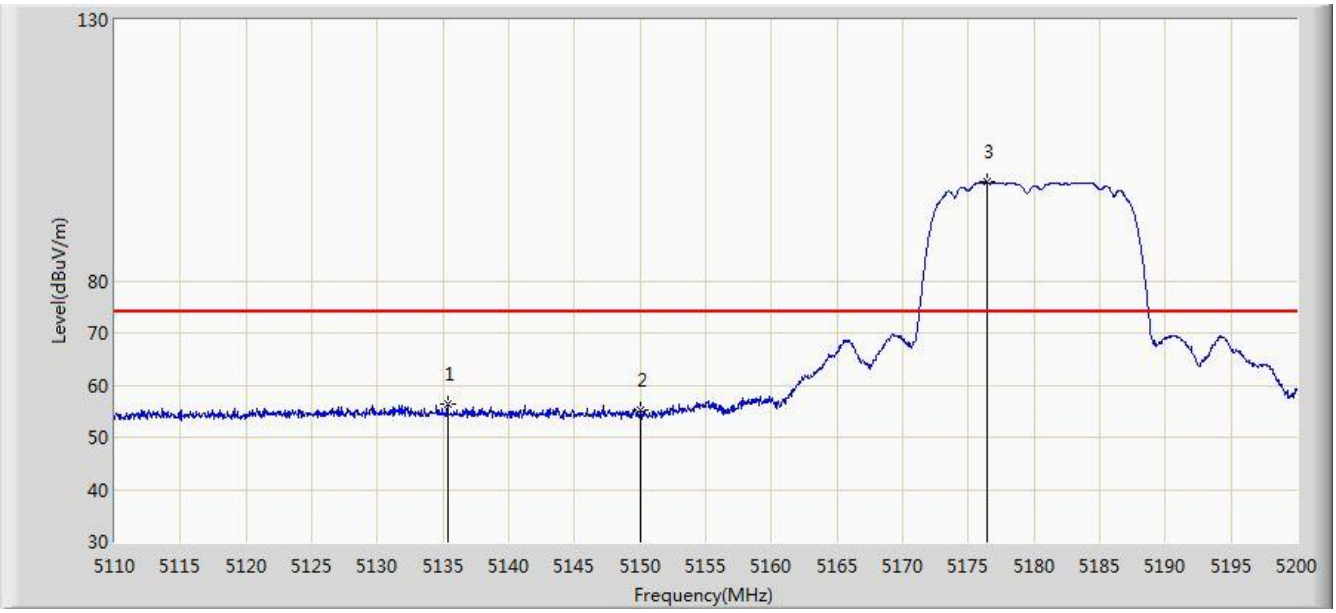


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5715.000	54.466	50.607	-54.935	109.402	3.860	PK
2			5725.000	63.187	59.081	-59.013	122.200	4.105	PK
3		*	5735.000	101.518	97.229	N/A	N/A	4.289	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

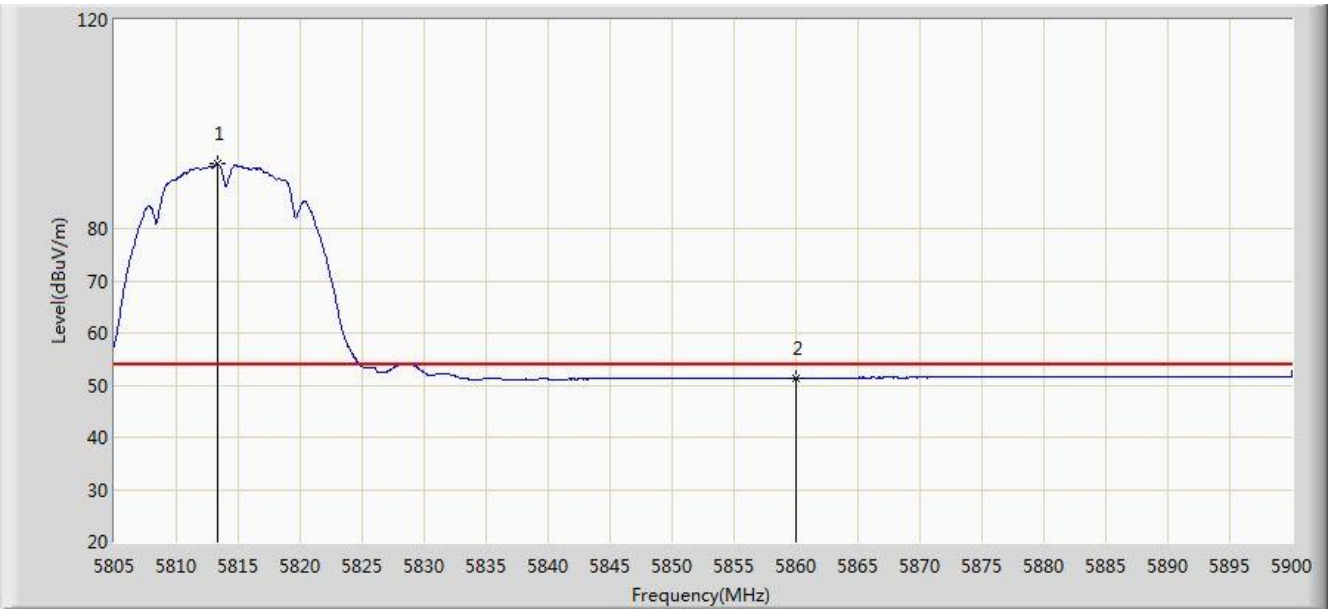


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5135.380	56.389	53.270	-17.611	74.000	3.119	PK
2			5150.000	55.075	52.005	-18.925	74.000	3.069	PK
3		*	5176.420	98.865	95.836	N/A	N/A	3.029	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:44
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

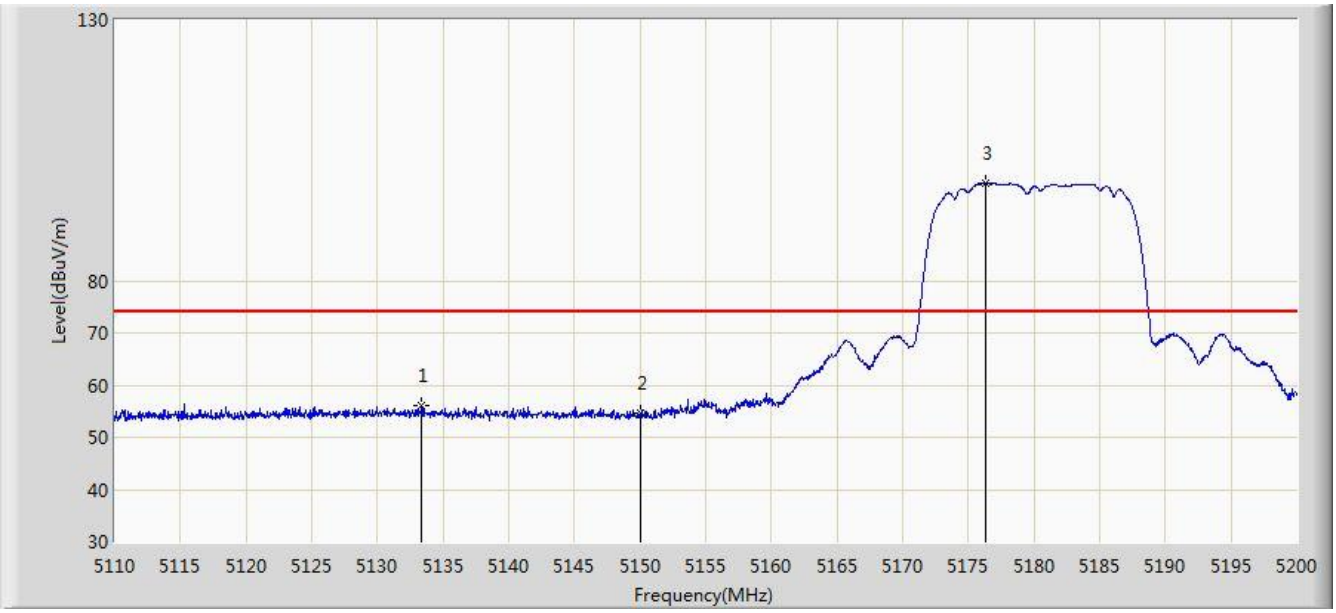


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5143.210	42.310	39.224	-11.690	54.000	3.087	AV
2			5150.000	41.738	38.668	-12.262	54.000	3.069	AV
3		*	5177.275	95.608	92.576	N/A	N/A	3.032	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:45
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

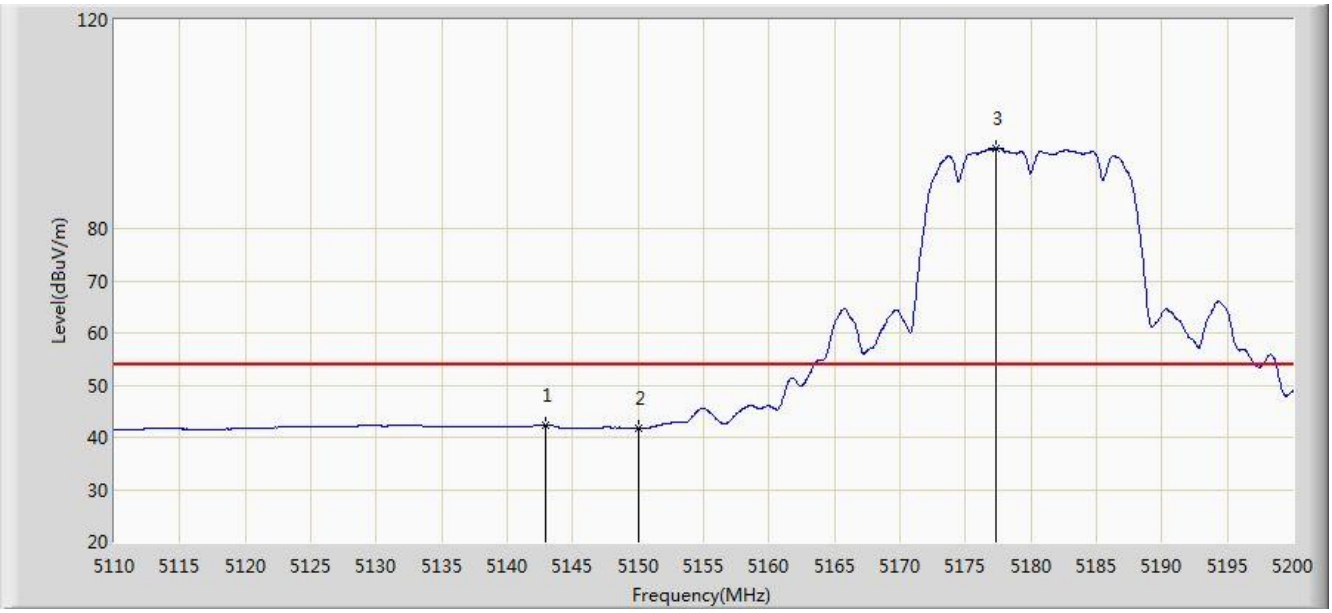


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5133.400	56.155	53.020	-17.845	74.000	3.134	PK
2			5150.000	54.548	51.478	-19.452	74.000	3.069	PK
3		*	5176.285	98.677	95.649	N/A	N/A	3.029	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:46
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5180MHz Ant B	

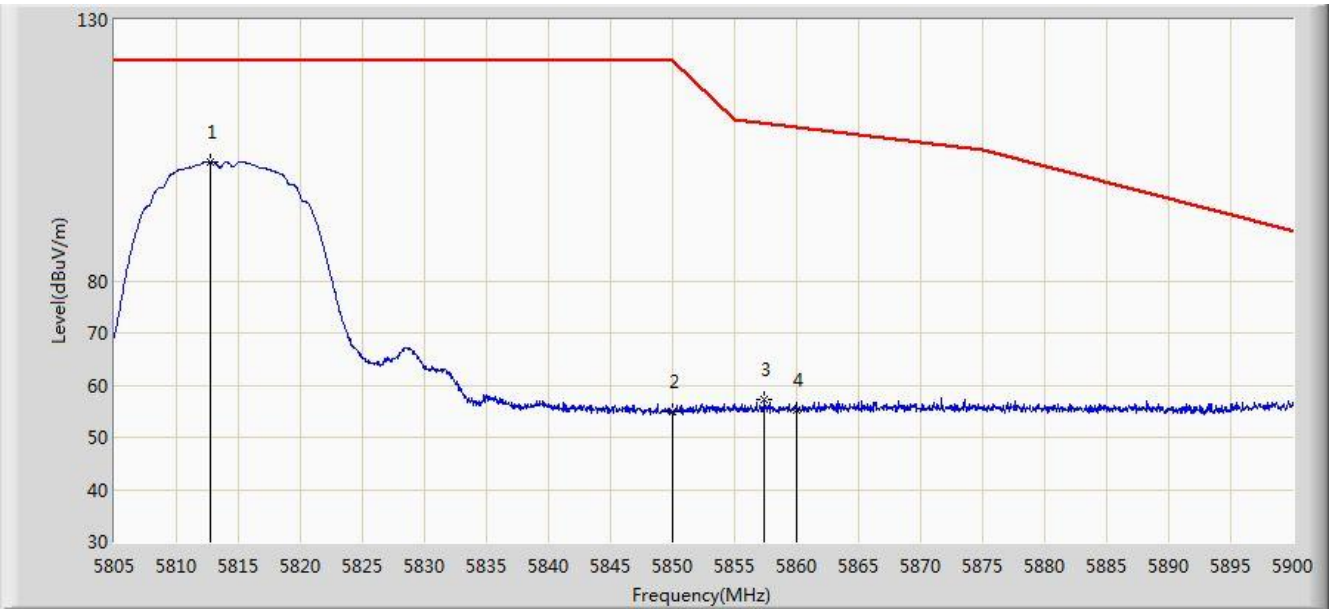


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			5142.985	42.385	39.298	-11.615	54.000	3.087	AV
2			5150.000	41.712	38.642	-12.288	54.000	3.069	AV
3		*	5177.275	95.454	92.422	N/A	N/A	3.032	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:46
Limit: FCC_Part15.407_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	

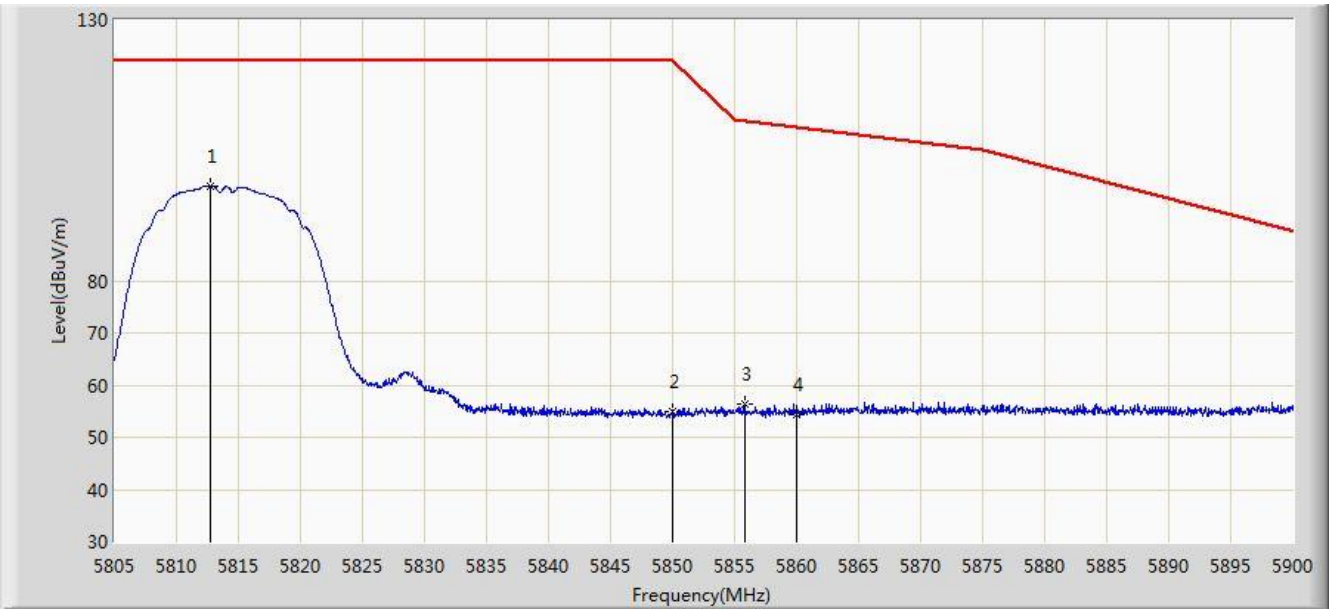


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5812.790	102.876	98.220	N/A	N/A	4.656	PK
2			5850.000	54.994	49.999	-67.206	122.200	4.995	PK
3			5857.440	57.303	52.319	-52.813	110.116	4.984	PK
4			5860.000	55.360	50.381	-54.038	109.398	4.979	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC2	Time: 2016/08/18 - 17:47
Limit: FCC_Part15.407_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Pulse2	Power: AC 120V/60Hz
Test Mode: Transmit at channel 5814MHz Ant B	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	5812.790	98.198	93.542	N/A	N/A	4.656	PK
2			5850.000	54.947	49.952	-67.253	122.200	4.995	PK
3			5855.777	56.283	51.297	-54.299	110.582	4.986	PK
4			5860.000	54.329	49.350	-55.069	109.398	4.979	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.10. AC Conducted Emissions Measurement

7.10.1. Test Limit

FCC Part 15 Subpart E Paragraph 15.207		
Frequency (MHz)	QP (dBμV)	AV (dBμV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

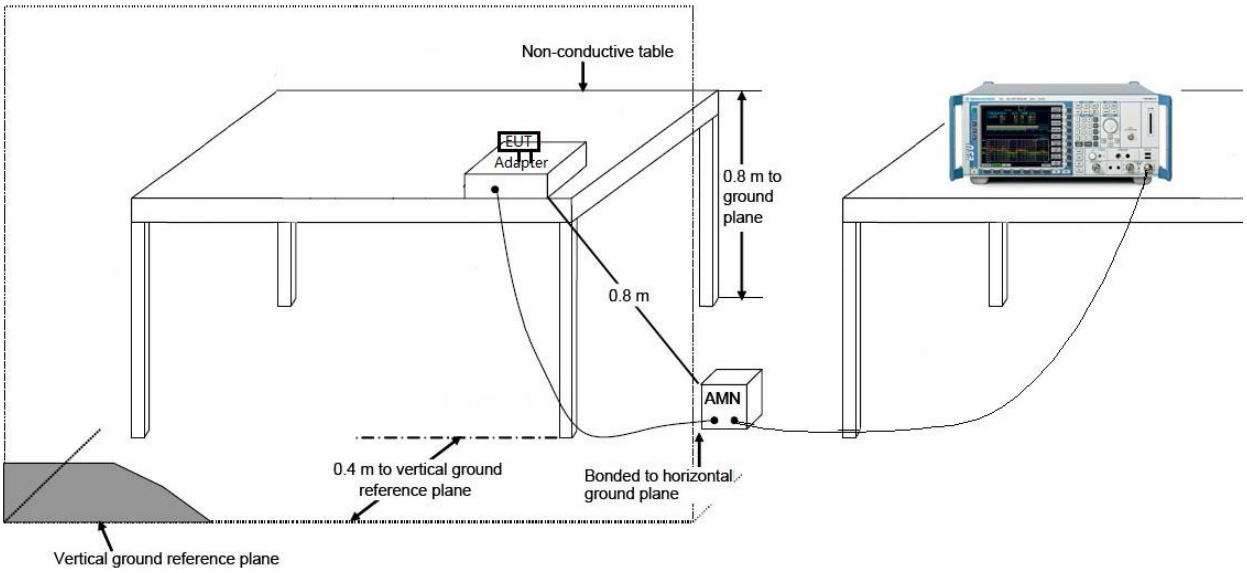
7.10.2. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 789033 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

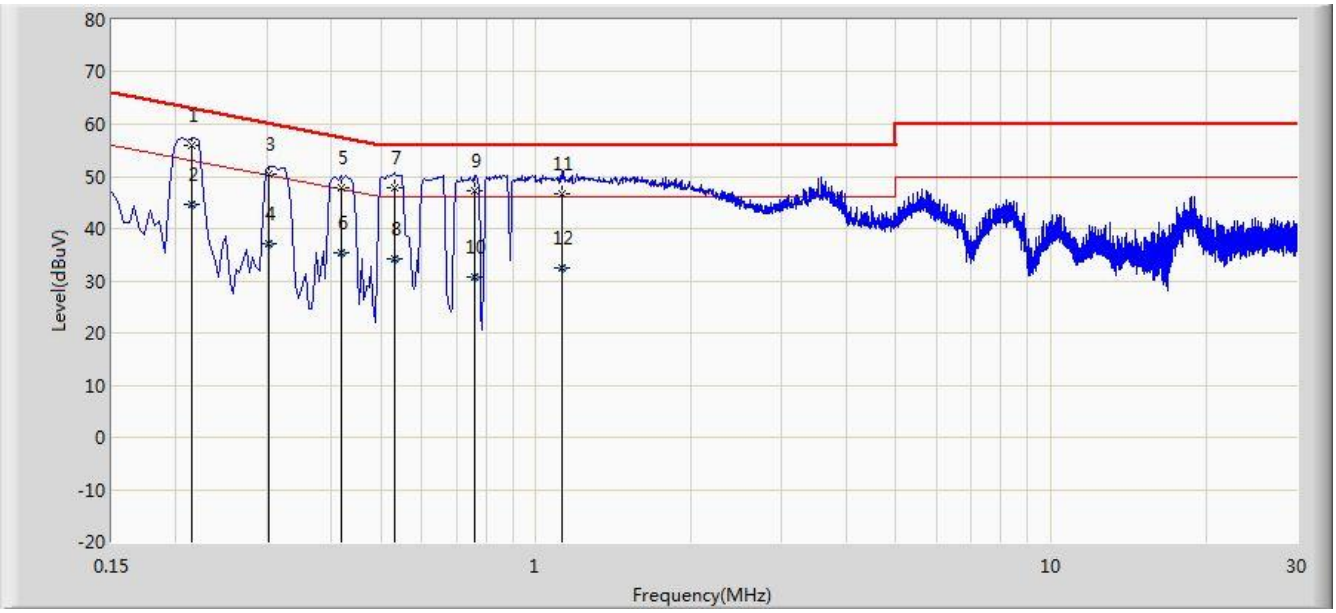
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

7.10.3. Test Setup



7.10.4. Test Result

Site: SR2	Time: 2016/08/22 - 13:39
Limit: FCC_Part15.207_CE_AC Power	Engineer: Vince Yu
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Pulse2	Power: AC 120V/60Hz
Note: Mode1	

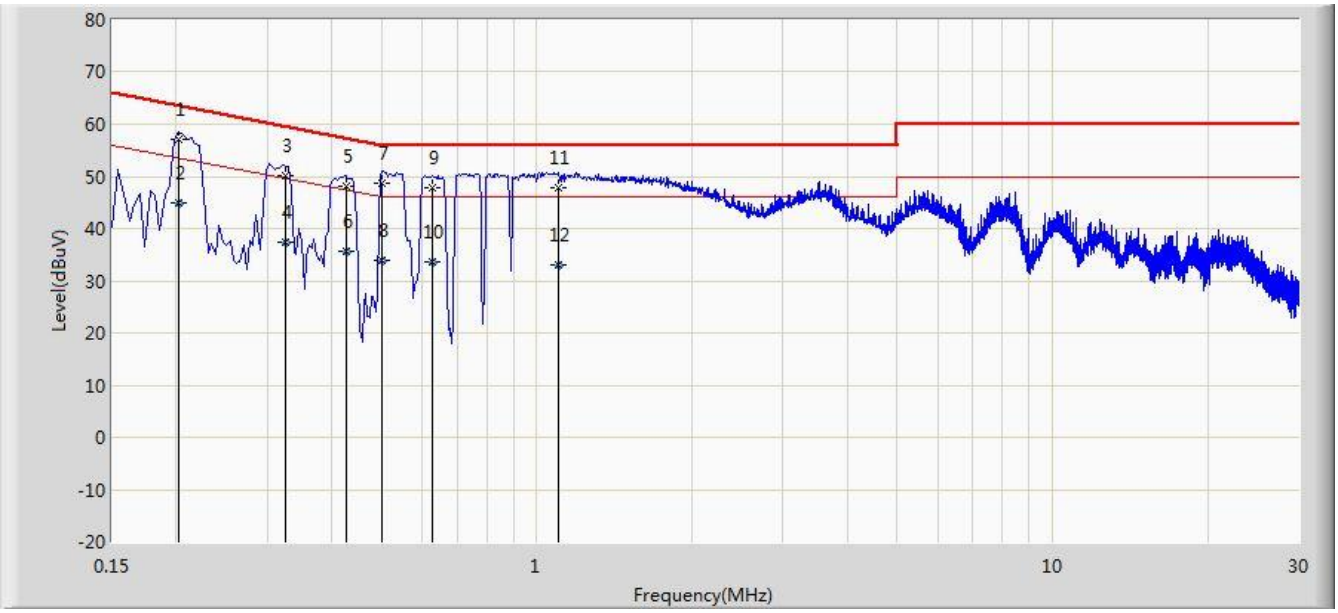


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.214	55.944	45.988	-7.104	63.049	9.957	QP
2			0.214	44.771	34.814	-8.278	53.049	9.957	AV
3			0.302	50.352	40.346	-9.836	60.188	10.006	QP
4			0.302	37.004	26.999	-13.183	50.188	10.006	AV
5			0.418	47.741	37.641	-9.747	57.488	10.101	QP
6			0.418	35.335	25.235	-12.153	47.488	10.101	AV
7			0.530	47.963	37.812	-8.037	56.000	10.151	QP
8			0.530	34.256	24.105	-11.744	46.000	10.151	AV
9			0.758	47.235	37.202	-8.765	56.000	10.033	QP
10			0.758	30.808	20.775	-15.192	46.000	10.033	AV
11			1.122	46.595	36.691	-9.405	56.000	9.904	QP
12			1.122	32.336	22.432	-13.664	46.000	9.904	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2016/08/22 - 13:44
Limit: FCC_Part15.207_CE_AC Power	Engineer: Vince Yu
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Pulse2	Power: AC 120V/60Hz
Note: Mode1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.202	57.156	47.148	-6.372	63.528	10.008	QP
2			0.202	44.964	34.956	-8.564	53.528	10.008	AV
3			0.326	50.048	39.991	-9.504	59.552	10.057	QP
4			0.326	37.400	27.343	-12.153	49.552	10.057	AV
5			0.426	48.160	38.028	-9.170	57.330	10.132	QP
6			0.426	35.527	25.395	-11.803	47.330	10.132	AV
7			0.502	48.777	38.599	-7.223	56.000	10.177	QP
8			0.502	33.801	23.623	-12.199	46.000	10.177	AV
9			0.626	47.766	37.649	-8.234	56.000	10.117	QP
10			0.626	33.571	23.454	-12.429	46.000	10.117	AV
11			1.102	47.969	38.065	-8.031	56.000	9.905	QP
12			1.102	33.093	23.188	-12.907	46.000	9.905	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Pulse2 FCC ID: 20888-P22N13** is in compliance with Part 15E of the FCC Rules.

The End