MEASUREMENT REPORT

FCC PART 15 Subpart E- WLAN 802.11a/n

FCC ID:	XBG-RENCB
APPLICANT:	Avalue Technology Inc
Application Type:	Certification
Product:	Gateway
Model No.:	REN-CB
Trademark:	avalue
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15 Subpart E (Section 15.407)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v02r01, KDB 662911 D01v02r01
Received Date:	March 26, 2018
Test Date:	April 11~17, 2018

Tested By : Peter Syu
(Peter Syu)

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

Testing Laboratory
3261

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 D02v02r01. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1803TW3102-U4	1.0	Original Report	2019-01-19	

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§2.1033 General Information

Applicant	Avalue Technology Inc
Applicant Address	7F, 228, Lian-cheng Road, Zhonghe Dist., New Taipei City 235, Taiwan
Manufacturer	Avalue Technology Inc
Manufacturer Address	7F, 228, Lian-cheng Road, Zhonghe Dist., New Taipei City 235, Taiwan
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
FCC Rule Part(s)	Part 15 Subpart E (Section 15.407)
Model No.:	REN-CB
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 Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.**
- **MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.**

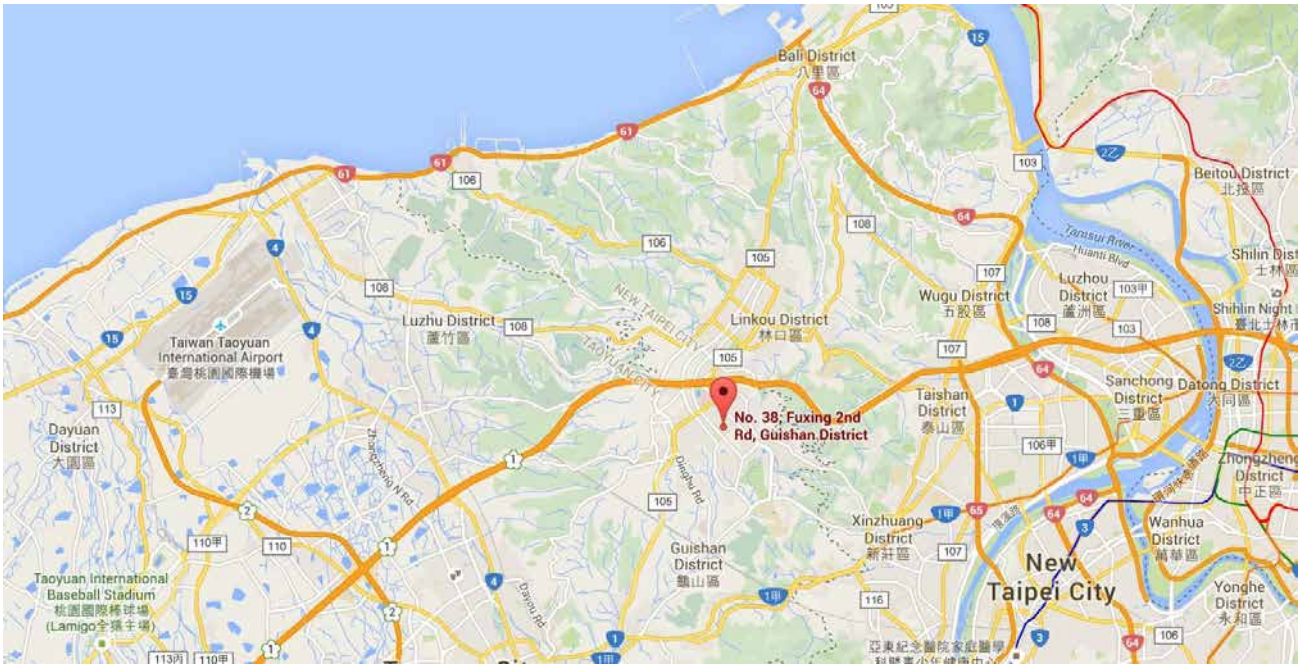
1. INTRODUCTION

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 Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Gateway
Model No.	REN-CB
Trademark	
Supports Radios Spec.	WLAN: 2.4G: 802.11b/g/n-20/n-40; 5G: 802.11a/n-20/n-40, Band1, 4 Bluetooth: V2.1+EDR/ V4.0 LE
Wi-Fi Specification	802.11a/n
Frequency Range	**5GHz:** For 802.11a/n-HT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40: 5190~5230MHz, 5755~5795MHz
Maximum Output Power	802.11a: 9.97dBm 802.11n-HT20: 9.20dBm 802.11n-HT40: 8.54dBm
Modulation Type	802.11a/n-20/n-40: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Adapter	Manufacturer: FSP TECHNOLOGY INC. M/N: FSP010-FPDN Input: 100-240V ~ 50/60Hz, 0.25A Output: 5Vdc, 2.0A

2.2. Operation Frequencies and Channel List

802.11 a/ n-HT20/ ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	149	5745 MHz	153	5765 MHz
157	5785 MHz	161	5805 MHz	165	5825 MHz

802.11 n-HT40/ ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz
159	5795 MHz	--	--	--	--

2.3. Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20
	Mode 3: Transmit by 802.11n-HT40

2.4. Test Software

The test utility software used during testing was “wl”.

2.5. Device Capabilities

This device contains the following capabilities:
2.4GHz WLAN (DTS) and 5GHz WLAN (NII).
Note: 5GHz (NII) operation is possible in 20MHz, 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = average per the guidance of Section B)2)b) of KDB 789033 D02v02r01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11a	87%
802.11n-HT20	87%
802.11n-HT40	77%

2.6. Test Configuration

This device was tested per the guidance of KDB 789033 D02v02r01. 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 were used in the measurement of the device.

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

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 9'x4'x3' 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 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 **Gateway,** is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT unit complies with the requirement of §15.203.

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ARISTOTLE ENTERPRISES	RFA-25-P327-70B-60	FPCB	-1dBi

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions – SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2019/3/20
Cable	Rosnol	N1C50-RG400-B 1C50-500CM	MRTTWE00013	1 year	2019/5/18
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2019/3/19

Radiated Emissions – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2019/5/22
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2019/3/19
Acitve Loop Antenna	Schwarzbeck	FMZB 1519B	MRTTWA00002	1 year	2019/4/24
Broadband Horn antenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2019/4/24
Breitband Hornantenna	Schwarzbeck	BBHA 9170	MRTTWA00004	1 year	2019/4/23
Broadband Amplifier	Schwarzbeck	BBV 9721	MRTTWA00006	1 year	2019/4/23
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2019/4/23
Cable	HUBERSUHNER	SF106	MRTTWA00010	1 year	2019/5/18
Cable	Rosnol	K1K50-UP0264-K1K50-4M	MRTTWA00012	1 year	2019/7/30

Conducted Test Equipment – SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/7/30
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2019/3/20

Test Software

Software	Version	Function
e3	9.160520a	EMI Test Software
EMI	V3	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: 2.42dB
Conducted Measurement– SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.3dB
Radiated Emission Measurement – AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 9K~30MHz: 4.14dB 30MHz~1GHz: 4.22dB 1GHz~40GHz: 4.05dB Vertical: 9K~30MHz: 4.14dB 30MHz~1GHz: 3.37dB 1GHz~40GHz: 4.08dB

7. TEST RESULT

7.1. Summary

Company Name: **Gateway**
FCC ID: **XBG-RENCB**
Model No.: **REN-CB**
Data Rate(s) Tested: **6Mbps ~ 54Mbps (a);**
6.5/7.2Mbps ~ 65/72.2Mbps (n-HT20);
13.5/15.0Mbps ~ 135/150Mbps (n-HT40);

FCC 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)(i), (2), (3)	Maximum Conducted Output Power	Refer to Section 7.5		Pass	Section 7.5
15.407(h)(1)	Transmit Power Control	≤ 24 dBm		N/A	Section 7.6
15.407(a)(1)(i), (2), (3), (5)	Power Spectral Density	Refer to Section 7.7		Pass	Section 7.7
15.407(b)(1), (4)	Undesirable Emissions	≤ -27dBm/MHz EIRP ≤ -17dBm/MHz EIRP	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

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. 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.

7.2. 26dB Bandwidth Measurement

7.2.1. Test Limit

N/A

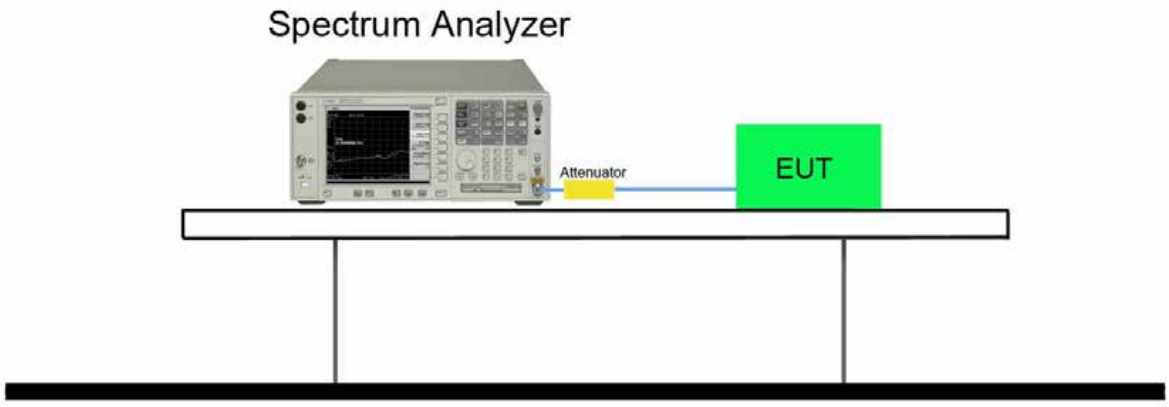
7.2.2. Test Procedure used

KDB 789033 D02v02r01 - 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



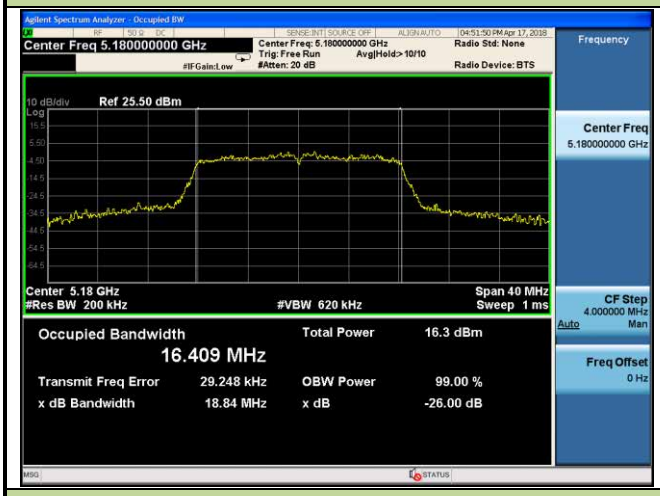
7.2.5. Test Result

Product	Gateway	Test Engineer	Peter
Test Site	SR2	Test Date	2018/4/17
Test Item	26dB Bandwidth		

Test Mode	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	36	5180	18.84	16.409
802.11a	44	5220	19.03	16.422
802.11a	48	5240	18.77	16.404
802.11a	149	5745	21.17	16.501
802.11a	157	5785	19.19	16.462
802.11a	165	5825	18.83	16.453
802.11n-HT20	36	5180	19.05	17.521
802.11n-HT20	44	5220	19.12	17.509
802.11n-HT20	48	5240	19.15	17.503
802.11n-HT20	149	5745	19.15	17.559
802.11n-HT20	157	5785	19.29	17.548
802.11n-HT20	165	5825	19.55	17.517
802.11n-HT40	38	5190	39.34	36.101
802.11n-HT40	46	5230	39.33	36.105
802.11n-HT40	151	5755	39.41	36.106
802.11n-HT40	159	5795	39.02	36.095

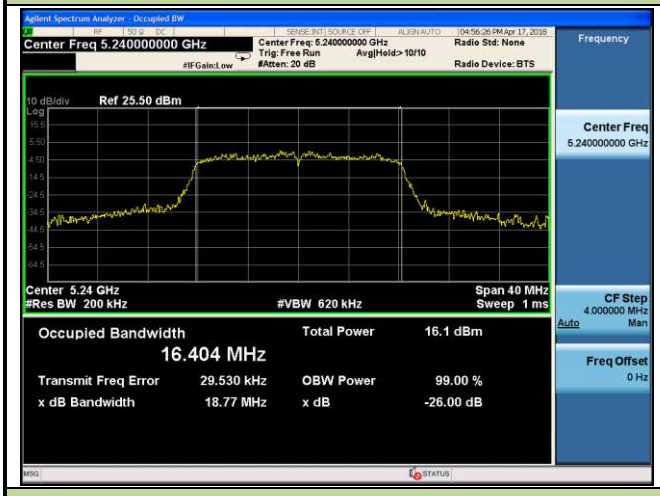
802.11a 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)

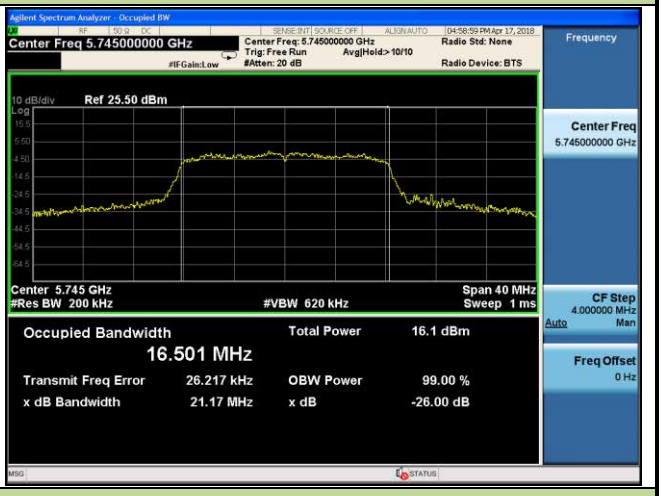


Channel 44 (5220MHz)

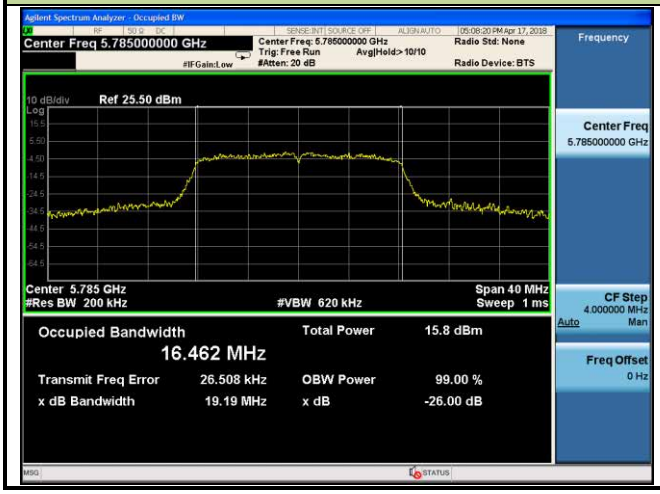
Channel 48 (5240MHz)



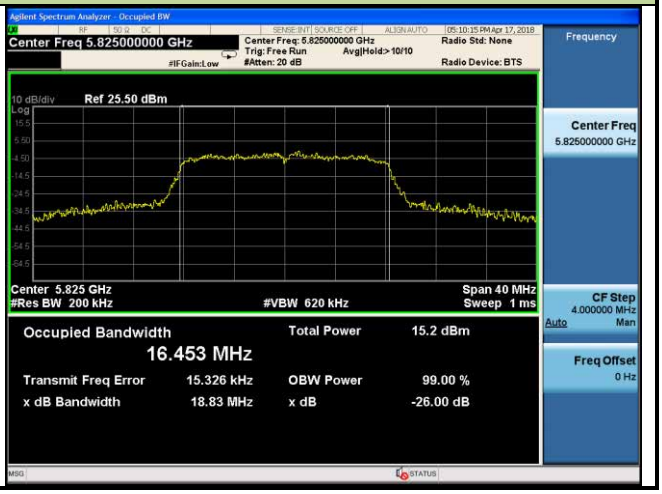
Channel 149 (5745MHz)



Channel 157 (5785MHz)

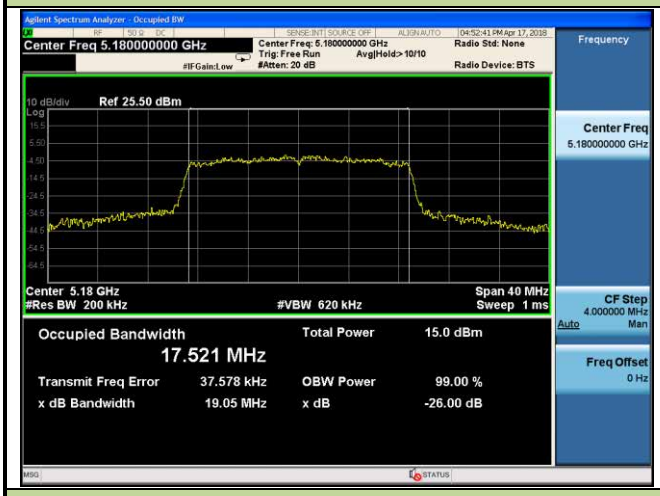


Channel 165 (5825MHz)



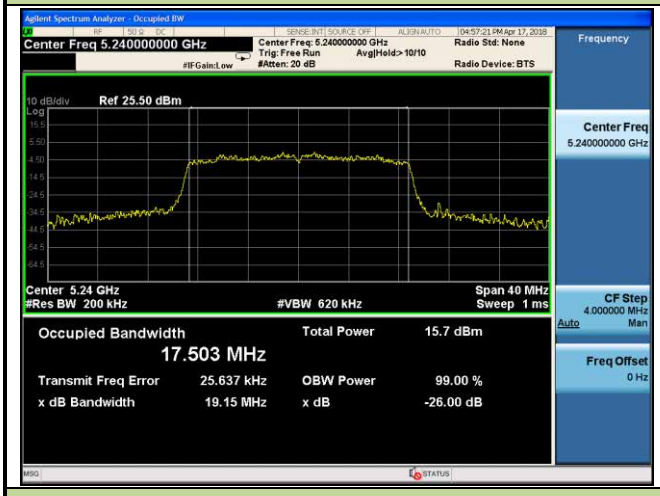
802.11n-HT20 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)



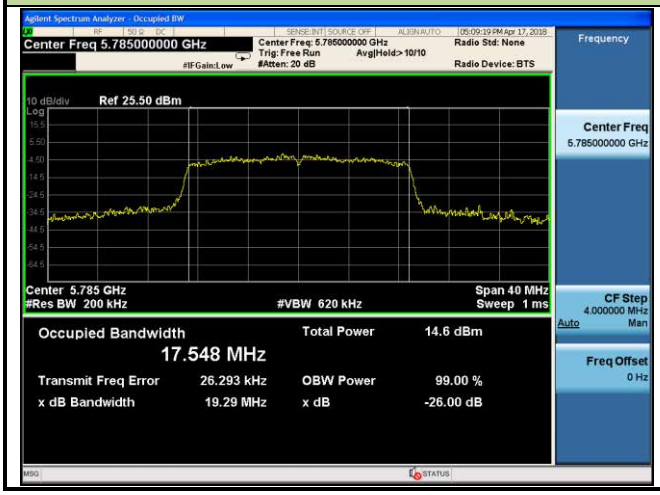
Channel 44 (5220MHz)

Channel 48 (5240MHz)

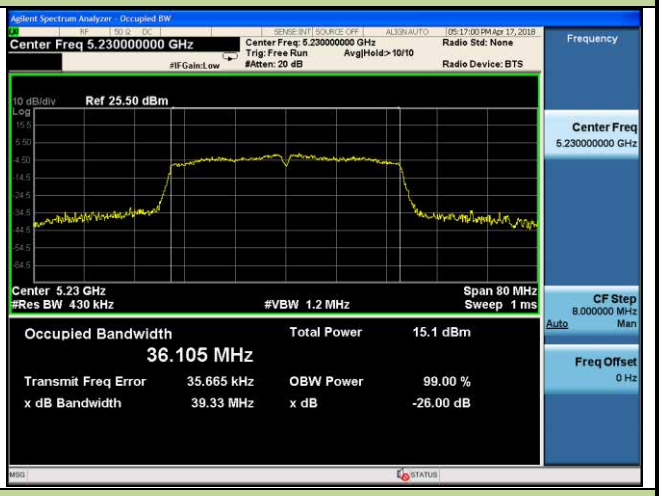
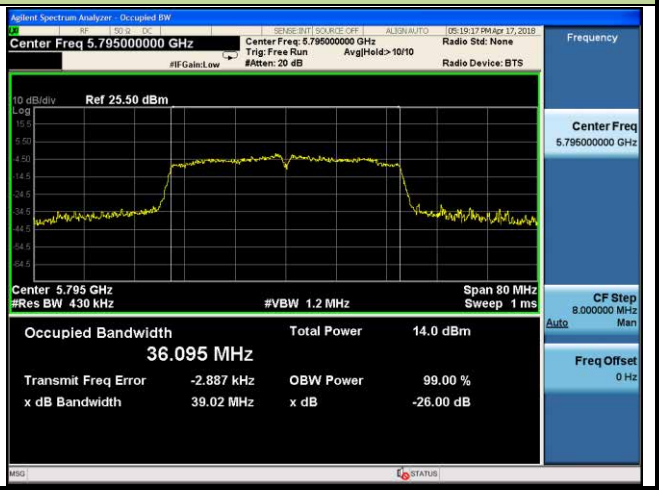


Channel 149 (5745MHz)

Channel 157 (5785MHz)



Channel 165 (5825MHz)

802.11n-HT40 26dB Bandwidth & 99% Bandwidth	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

7.3. 6dB Bandwidth Measurement

7.3.1. Test Limit

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

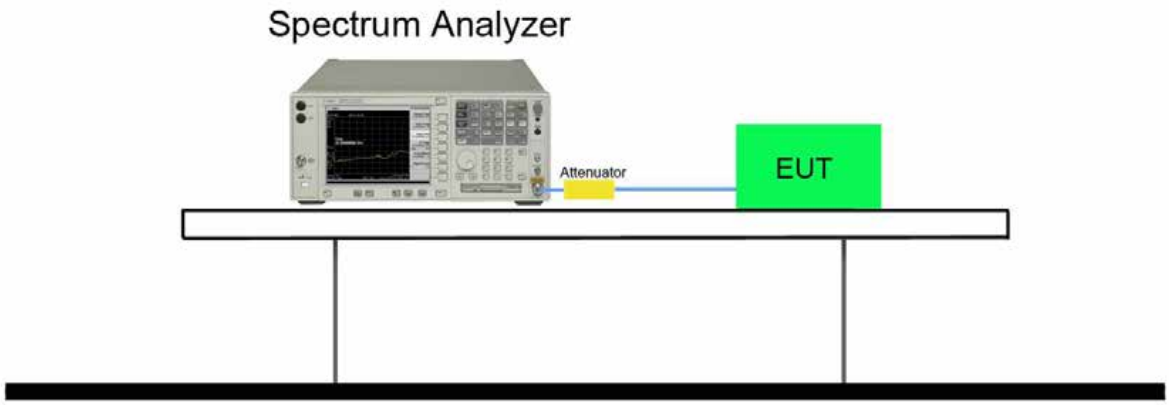
7.3.2. Test Procedure used

KDB 789033 D02v02r01 - 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



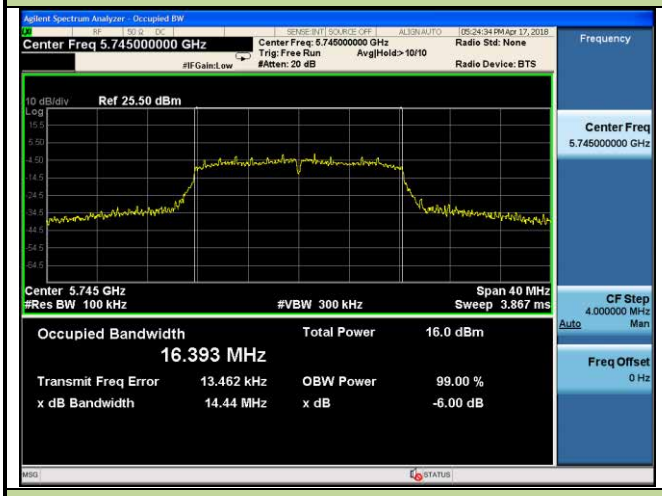
7.3.5. Test Result

Product	Gateway	Test Engineer	Peter
Test Site	SR2	Test Date	2018/4/17
Test Item	6dB Bandwidth		

Test Mode	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	149	5745	14.44	≥ 0.5	Pass
802.11a	157	5785	15.36	≥ 0.5	Pass
802.11a	165	5825	16.09	≥ 0.5	Pass
802.11n-HT20	149	5745	16.94	≥ 0.5	Pass
802.11n-HT20	157	5785	17.09	≥ 0.5	Pass
802.11n-HT20	165	5825	15.10	≥ 0.5	Pass
802.11n-HT40	151	5755	35.20	≥ 0.5	Pass
802.11n-HT40	159	5795	35.12	≥ 0.5	Pass

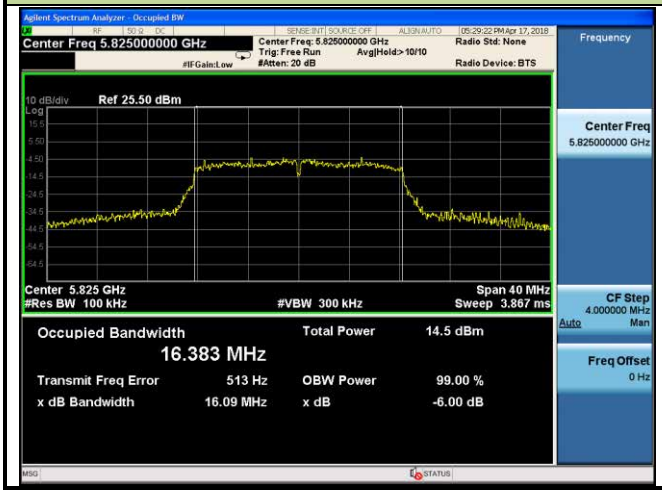
802.11a 6dB Bandwidth

Channel 149 (5745MHz)



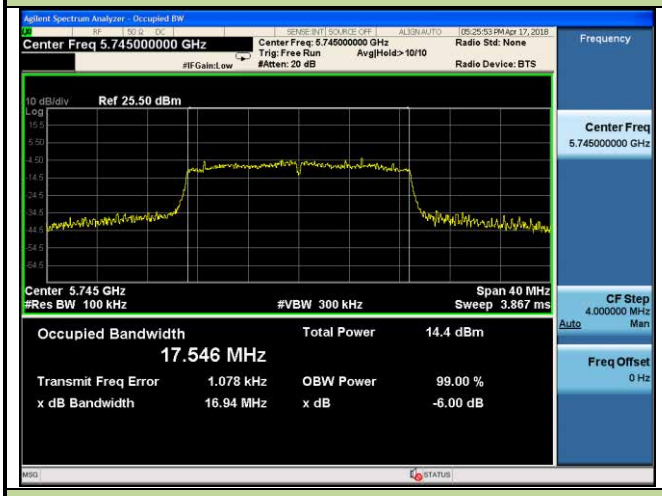
Channel 157 (5785MHz)

Channel 165 (5825MHz)



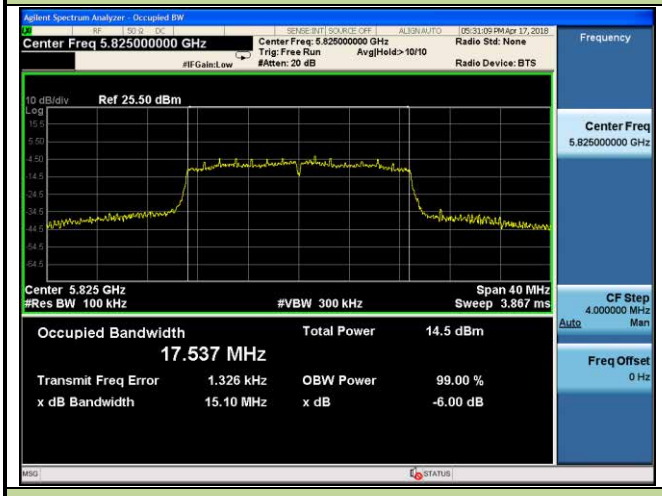
802.11n-HT20 6dB Bandwidth

Channel 149 (5745MHz)



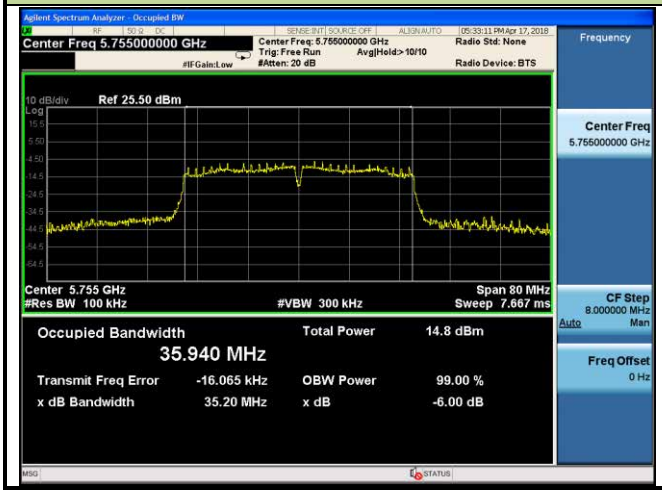
Channel 157 (5785MHz)

Channel 165 (5825MHz)

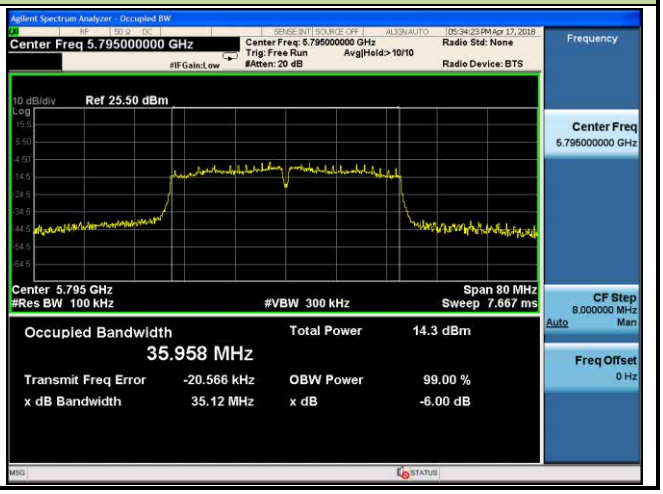


802.11n-HT40 6dB Bandwidth - Ant 0

Channel 151 (5755MHz)



Channel 159 (5795MHz)



7.4. Output Power Measurement

7.4.1. Test Limit

For FCC Power Measurement Limit

For client operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 250mW.
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (23.98dBm) or 11dBm +10 log (26dB BW).
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).

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For IC Power Measurement Limit

For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW (23.01dBm) or 10 + 10*log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power shall not exceed 250 mW (23.98dBm) or 11 + 10 log10 B, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W (30dBm) or 17 + 10 log10 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.
If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Max Conducted Output Power Limit Calculation as below:

For U-NII-1 (5150-5250MHz)

24dBm for Client Device

For U-NII-3 (5725-5850MHz)

30dBm for Client Device

EIRP Limit Calculation as below:

For U-NII-1 (5150-5250MHz)

36dBm with 6dBi Antenna Gain

For U-NII-3 (5725-5850MHz)

36dBm with 6dBi Antenna Gain

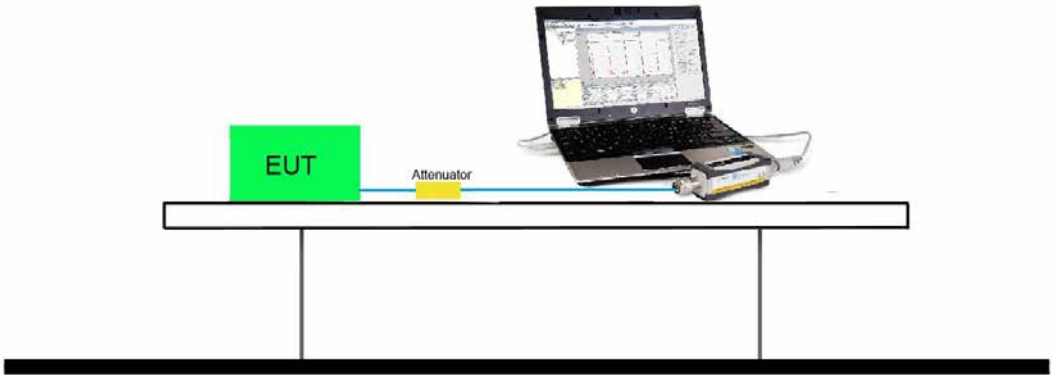
7.4.2. Test Procedure Used

KDB 789033 D02v02r01 - Section E) 3) b) Method PM-G

7.4.3. 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.

7.4.4. Test Setup



7.4.5. Test Result

Product	Gateway	Test Engineer	Peter
Test Site	SR2	Test Date	2018/4/17
Test Item	Output Power		

Max Conducted Output Power

802.11a									
Channel No.	Frequency (MHz)	Average Power For different Data Rate (Mbps)							Required Limit (dBm)
		6	9	12	18	24	36	48	54	
36	5180	9.81	--	--	--	--	--	--	--	≤ 24
44	5220	9.95	9.45	8.94	8.63	8.35	8.06	7.54	7.06	≤ 24
48	5240	9.97	--	--	--	--	--	--	--	≤ 24
149	5745	9.41	--	--	--	--	--	--	--	≤ 30
157	5785	9.47	9.06	8.57	8.15	7.79	7.30	6.92	6.60	≤ 30
165	5825	9.31	--	--	--	--	--	--	--	≤ 30

802.11n-20M									
Channel No.	Frequency (MHz)	Average Power For different Data Rate (Mbps)							Required Limit (dBm)
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
36	5180	9.13	--	--	--	--	--	--	--	≤ 24
44	5220	9.10	8.47	7.89	7.33	6.98	6.64	6.31	6.04	≤ 24
48	5240	9.20	--	--	--	--	--	--	--	≤ 24
149	5745	8.76	--	--	--	--	--	--	--	≤ 30
157	5785	8.11	7.75	7.51	6.93	6.55	5.84	5.42	4.93	≤ 30
165	5825	7.80	--	--	--	--	--	--	--	≤ 30

802.11n-40M									
Channel No.	Frequency (MHz)	Average Power For different Data Rate (Mbps)							Required Limit (dBm)
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
38	5190	8.03	--	--	--	--	--	--	--	≤ 24
46	5230	8.54	8.02	7.20	6.37	5.31	4.98	4.55	4.22	≤ 24
151	5755	7.61	--	--	--	--	--	--	--	≤ 30
159	5795	7.77	7.09	6.30	5.34	4.88	4.49	4.05	3.54	≤ 30

EIRP Power

Test Mode	Channel No.	Freq. (MHz)	EIRP (dBm)	EIRP Limit (dBm)	Result
11a	36	5180	8.825	≤ 36	Pass
11a	44	5220	8.965	≤ 36	Pass
11a	48	5240	8.985	≤ 36	Pass
11a	149	5745	8.425	≤ 36	Pass
11a	157	5785	8.485	≤ 36	Pass
11a	165	5825	8.325	≤ 36	Pass
11n-HT20	36	5180	8.125	≤ 36	Pass
11n-HT20	44	5220	8.095	≤ 36	Pass
11n-HT20	48	5240	8.195	≤ 36	Pass
11n-HT20	149	5745	7.755	≤ 36	Pass
11n-HT20	157	5785	7.105	≤ 36	Pass
11n-HT20	165	5825	6.795	≤ 36	Pass
11n-HT40	38	5190	7.035	≤ 36	Pass
11n-HT40	46	5230	7.545	≤ 36	Pass
11n-HT40	151	5755	6.615	≤ 36	Pass
11n-HT40	159	5795	6.775	≤ 36	Pass

7.5. Transmit Power Control

7.5.1. Test Limit

The U-NII-2A & U-NII-2C device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

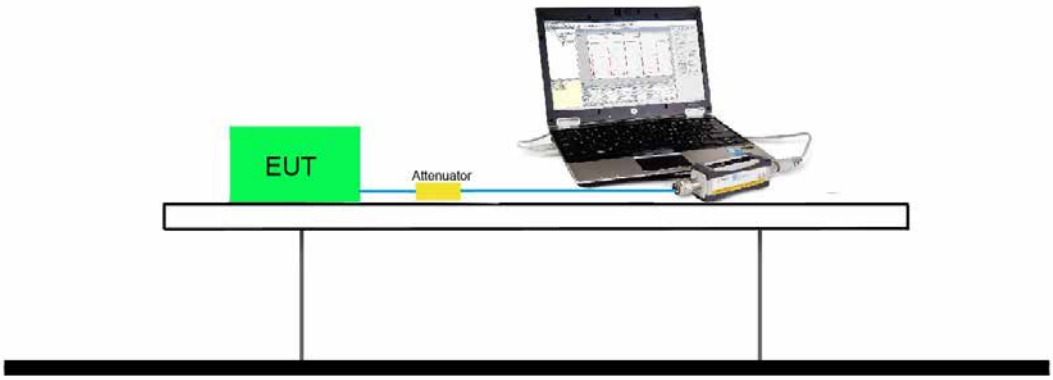
7.5.2. Test Procedure Used

KDB 789033 D02v02r01 - 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

Note: TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

7.6. Power Spectral Density Measurement

7.6.1. Test Limit

For FCC Power Spectral Density Limit

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

For a master operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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.

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For IC Power Spectral Density Limit

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 5.25-5.35 GHz and 5.47-5.725 GHz bands, the power spectral density shall not exceed 11 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.

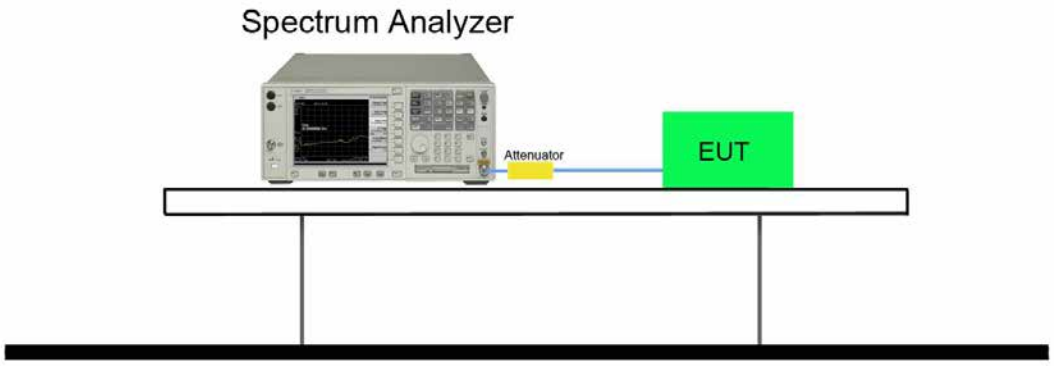
7.6.2. Test Procedure Used

KDB 789033 D02v02r01 - 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,
4. RBW = 100 kHz
5. VBW = 3MHz
6. Number of sweep points ≥ 2 × (span / RBW)
7. Detector = power averaging (Average)
8. Sweep time = auto
9. Trigger = free run
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. 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.
12. 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

Product	Gateway	Test Engineer	Peter
Test Site	SR2	Test Date	2018/4/17
Test Item	Power Spectral Density		

For UNII-1

Test Mode	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/MHz)	Result
11a	36	5180	-0.446	87%	0.159	≤ 11	Pass
11a	44	5220	0.480	87%	1.085	≤ 11	Pass
11a	48	5240	-0.327	87%	0.278	≤ 11	Pass
11n-HT20	36	5180	-1.205	87%	-0.600	≤ 11	Pass
11n-HT20	44	5220	-0.560	87%	0.045	≤ 11	Pass
11n-HT20	48	5240	-1.002	87%	-0.397	≤ 11	Pass
11n-HT40	38	5190	-4.427	77%	-3.292	≤ 11	Pass
11n-HT40	46	5230	-4.416	77%	-3.281	≤ 11	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + 10*log(1/duty cycle)

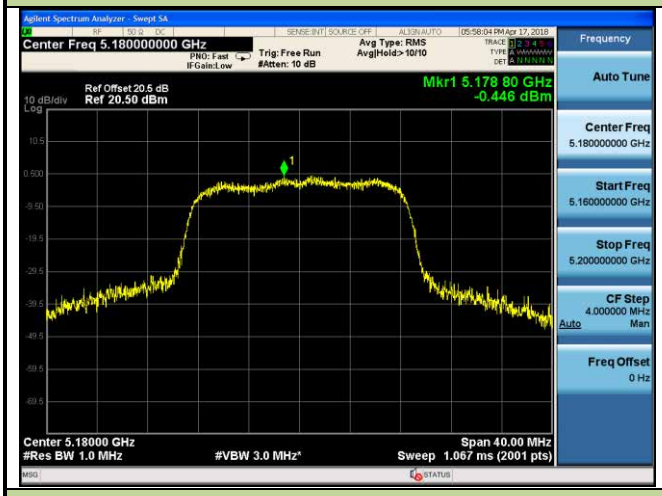
For UNII-4

Test Mode	Channel No.	Freq. (MHz)	PSD (dBm/100kHz)	Duty Cycle (%)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
11a	149	5745	-9.615	87%	-9.010	≤ 30	Pass
11a	157	5785	-9.787	87%	-9.182	≤ 30	Pass
11a	165	5825	-9.836	87%	-9.231	≤ 30	Pass
11n-HT20	149	5745	-11.525	87%	-10.920	≤ 30	Pass
11n-HT20	157	5785	-10.869	87%	-10.264	≤ 30	Pass
11n-HT20	165	5825	-9.430	87%	-8.825	≤ 30	Pass
11n-HT40	151	5755	-14.755	77%	-13.620	≤ 30	Pass
11n-HT40	159	5795	-13.725	77%	-12.590	≤ 30	Pass

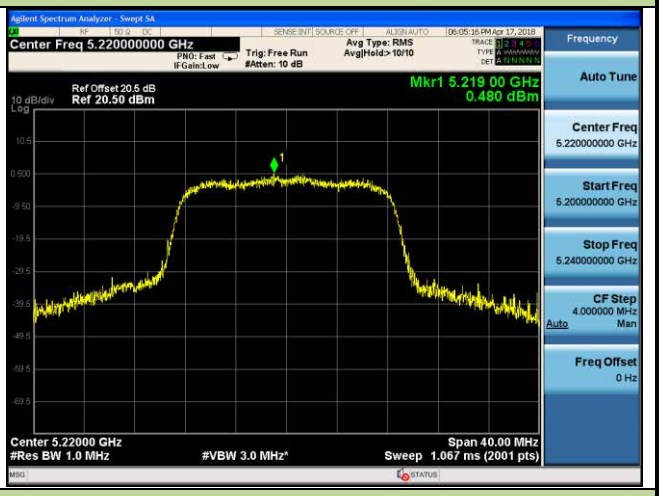
Note: Total PSD (dBm/500kHz) = Ant PSD (dBm/100kHz) + 10*log(1/duty cycle).

802.11a Power Spectral Density

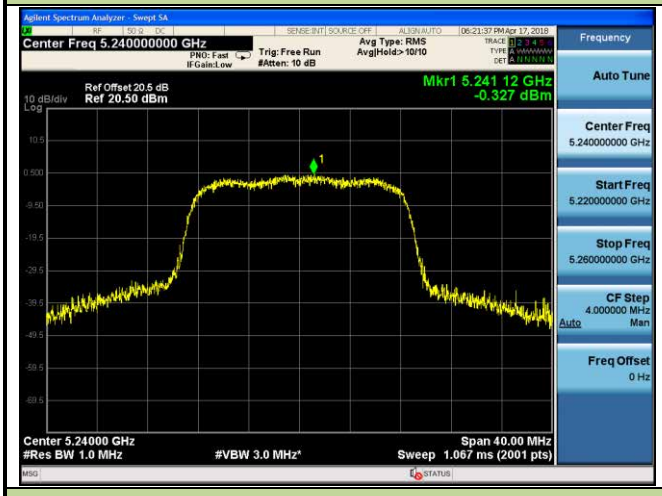
Channel 36 (5180MHz)



Channel 44 (5220MHz)

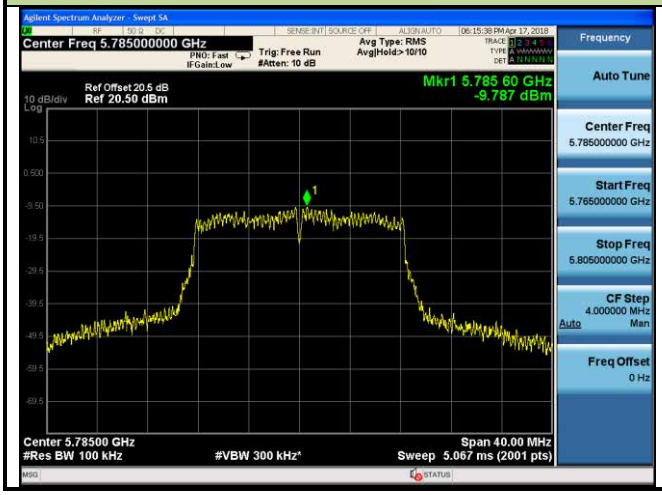


Channel 48 (5240MHz)

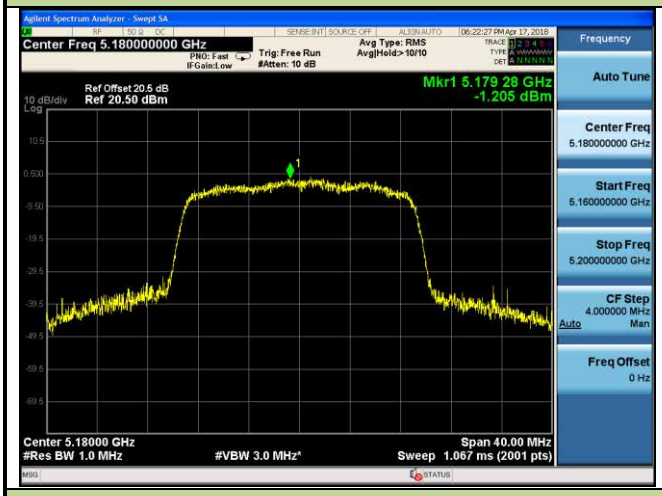
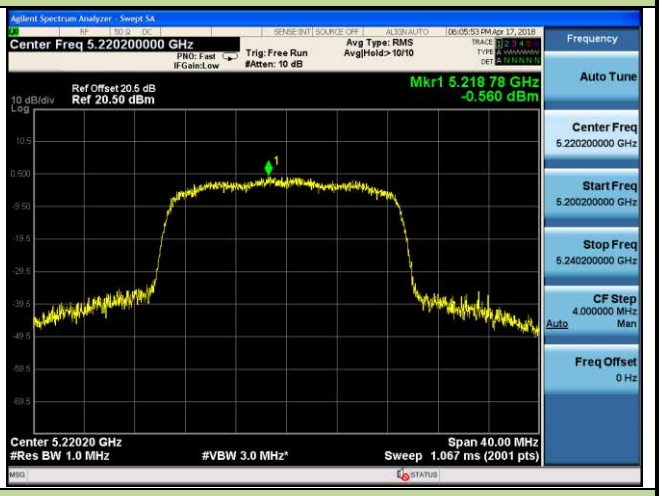
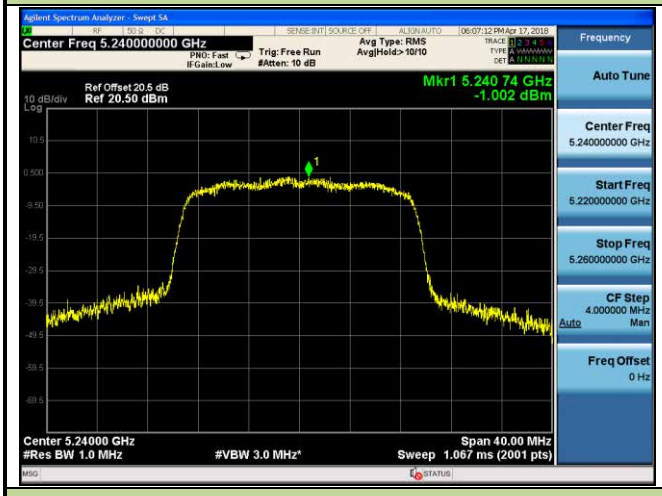
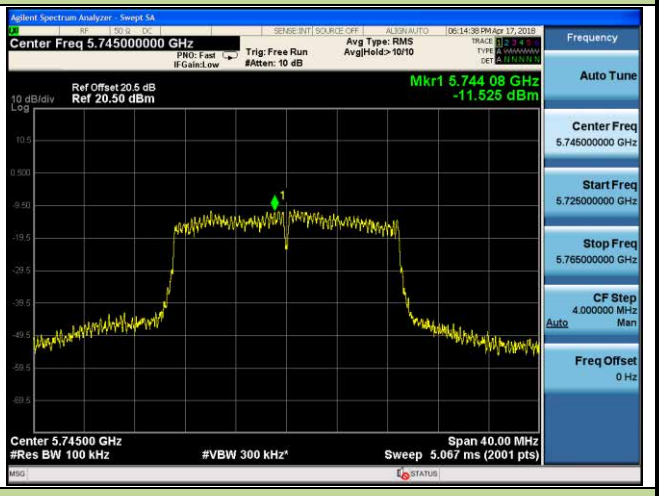
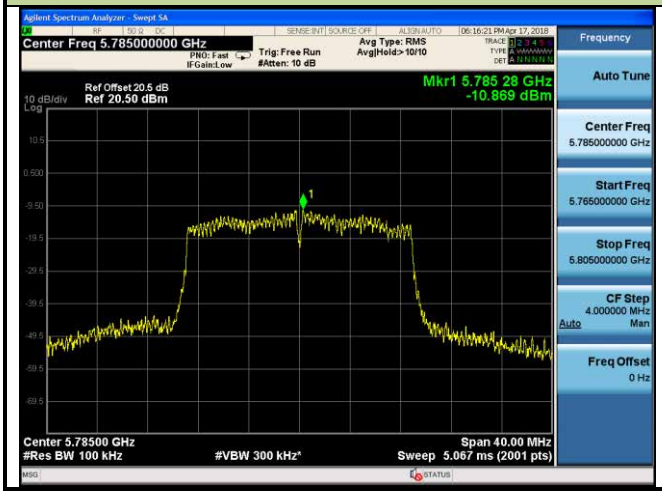


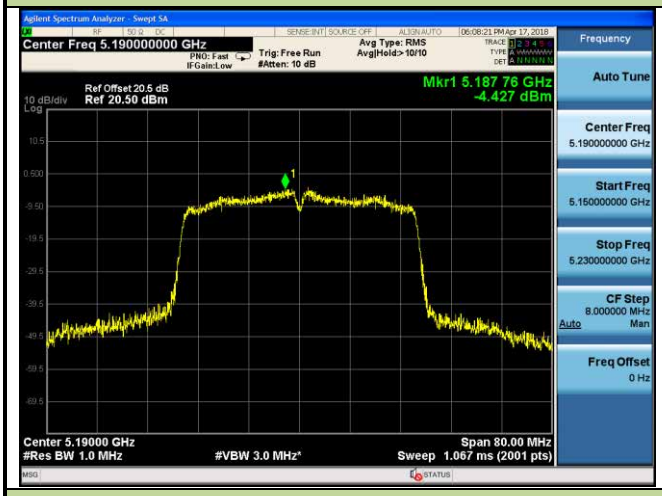
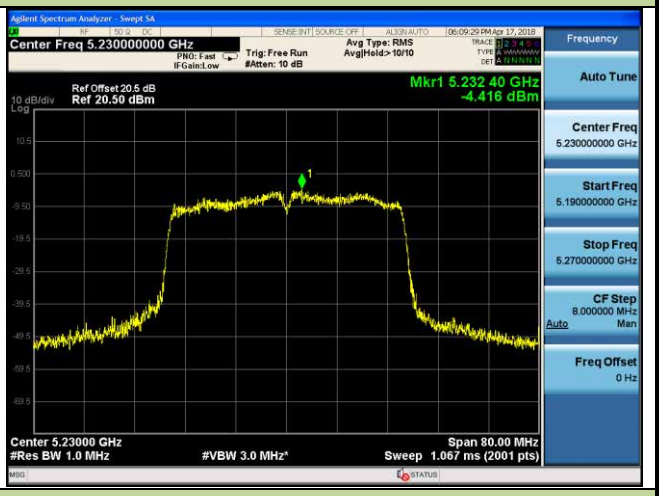
Channel 149 (5745MHz)

Channel 157 (5785MHz)



Channel 165 (5825MHz)

802.11n-HT20 Power Spectral Density	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT40 Power Spectral Density	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

7.7. Radiated Spurious Emission Measurement

7.7.1. 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 [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

7.7.2. Test Procedure Used

KDB 789033 D02v02r01 – Section G

7.7.3. 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)

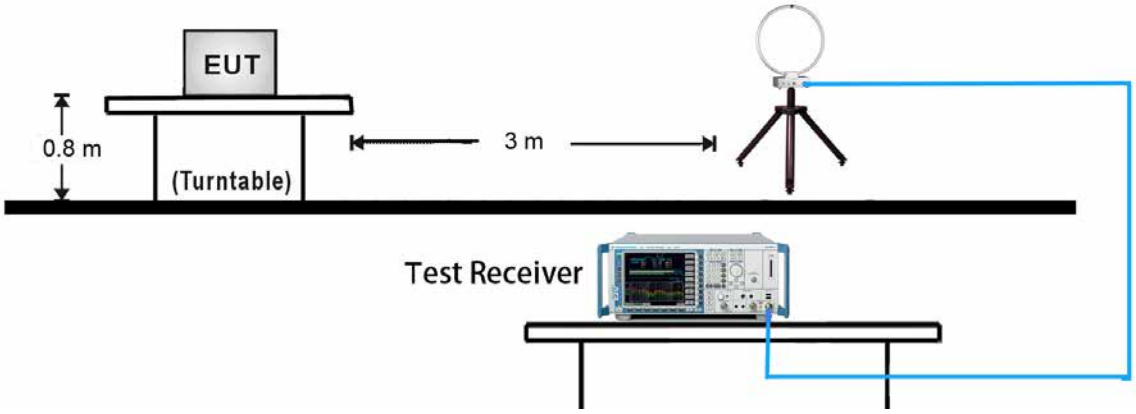
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (Average)
5. Number of measurement points = 1001 (Number of points must be > 2 x span/RBW)
6. Sweep time = auto
7. Trace was averaged over at 100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

Quasi-Peak & Average Measurements below 30MHz

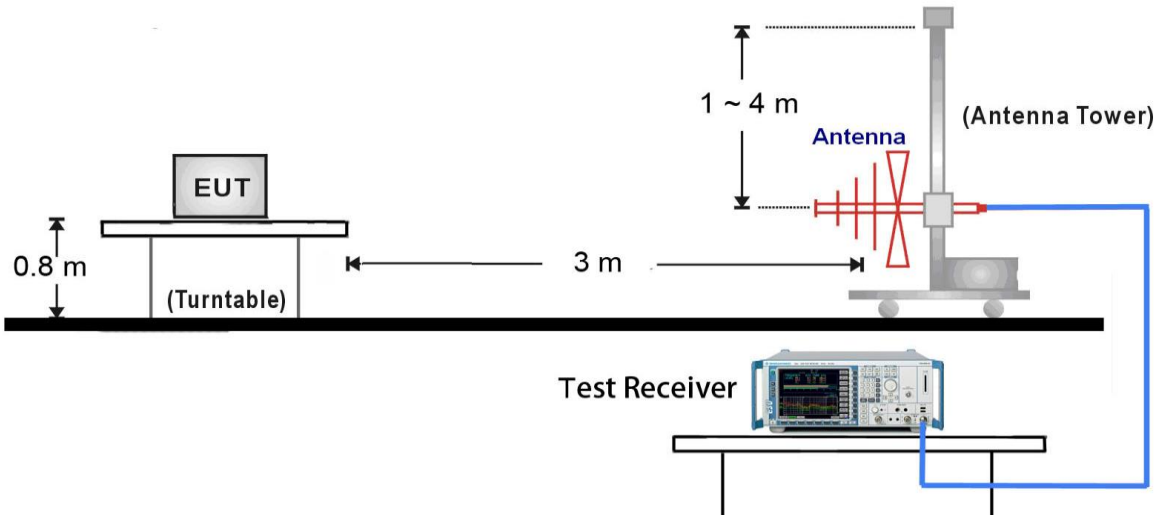
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 200Hz for 9kHz to 150kHz frequency; RBW = 9kHz for 0.15MHz to 30MHz frequency
4. Detector = CISPR quasi-peak or power average (Average)
5. Sweep time = auto couple
6. Trace was allowed to stabilize

7.7.4. Test Setup

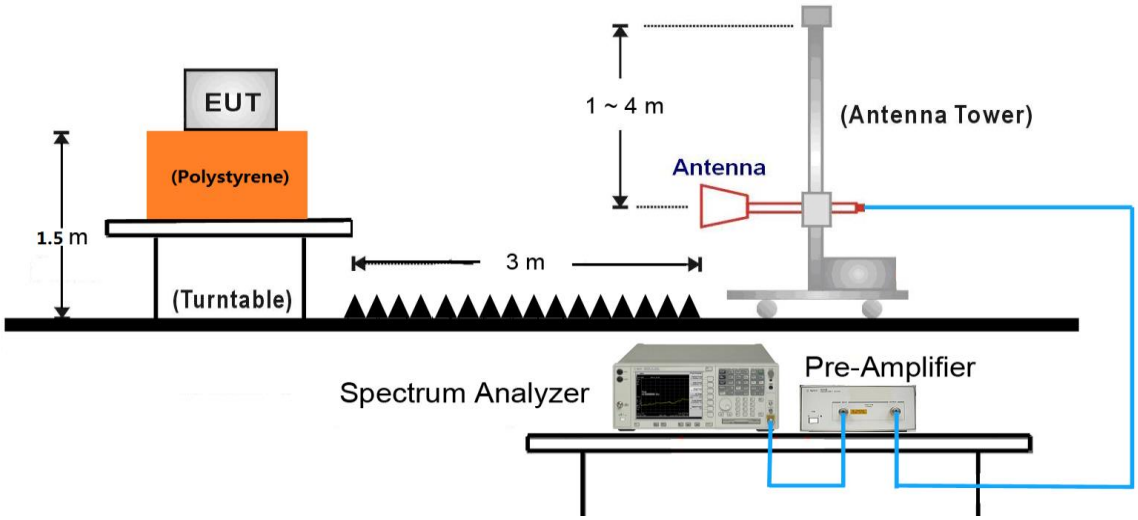
9kHz ~ 30MHz Test Setup:



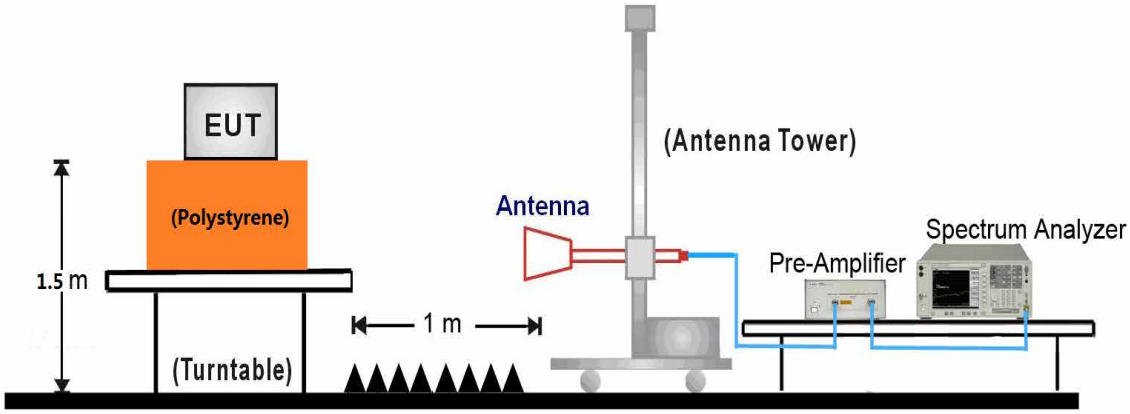
30MHz ~ 1GHz Test Setup:



1GHz ~18GHz Test Setup:

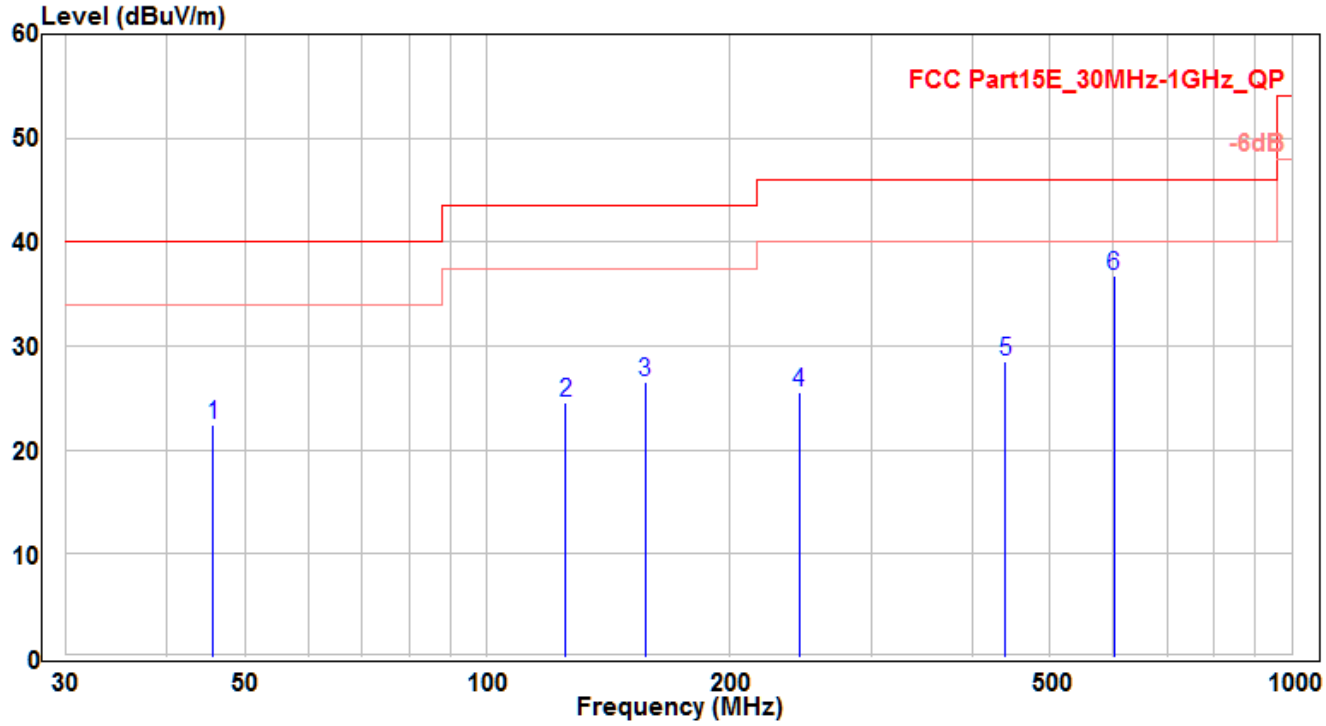


18GHz ~40GHz Test Setup:



7.7.5. Test Result

EUT	Gateway	Test Date	2018/4/13
Factor	VULB 9162 (30MHz~8GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2_CH44	Test Voltage	AC 120V/60Hz

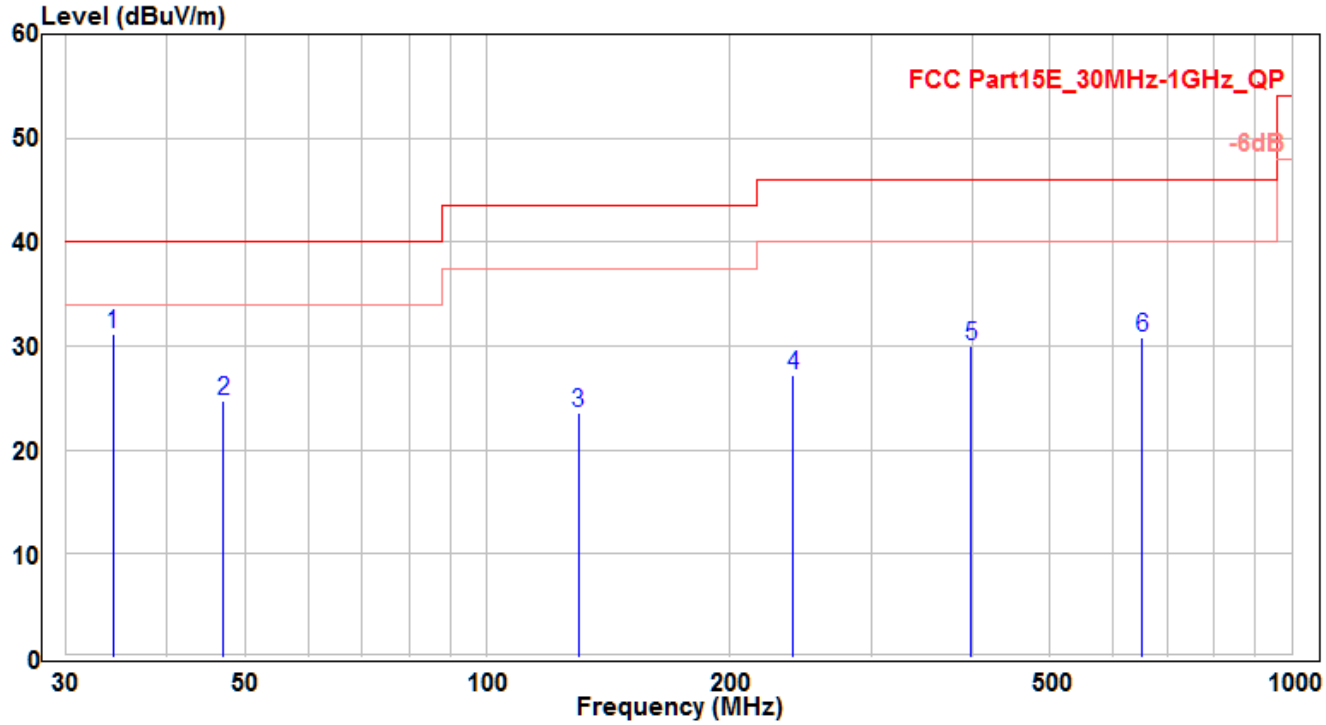


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		45.702	1.05	21.42	22.47	-17.53	40	100	120	QP
2		125.121	7.92	16.7	24.62	-18.88	43.5	195	320	QP
3		157.04	10.5	16.12	26.62	-16.88	43.5	175	120	QP
4		243.976	5.3	20.34	25.64	-20.36	46	110	200	QP
5		440.158	3.55	24.9	28.45	-17.55	46	185	-40	QP
6	*	600.754	9.09	27.71	36.8	-9.2	46	130	225	QP

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

EUT	Gateway	Test Date	2018/4/13
Factor	VULB 9162 (30MHz~8GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2_CH44	Test Voltage	AC 120V/60Hz

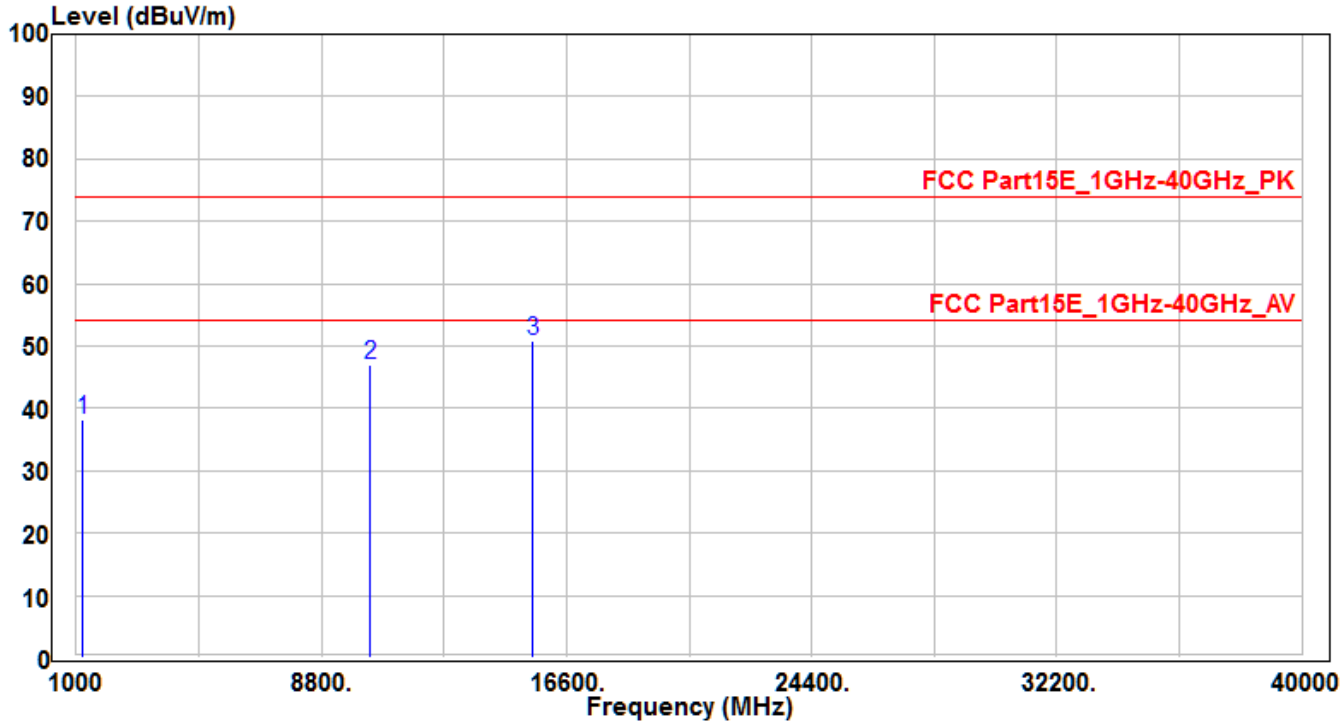


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	34.304	12.43	18.78	31.21	-8.79	40	115	60	QP
2		47.036	3.25	21.46	24.71	-15.29	40	150	180	QP
3		129.971	7.3	16.28	23.58	-19.92	43.5	100	400	QP
4		239.975	7.01	20.2	27.21	-18.79	46	195	360	QP
5		399.782	5.79	24.16	29.95	-16.05	46	120	240	QP
6		651.618	2.04	28.73	30.77	-15.23	46	175	145	QP

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH36	Test Voltage	AC 120V/60Hz

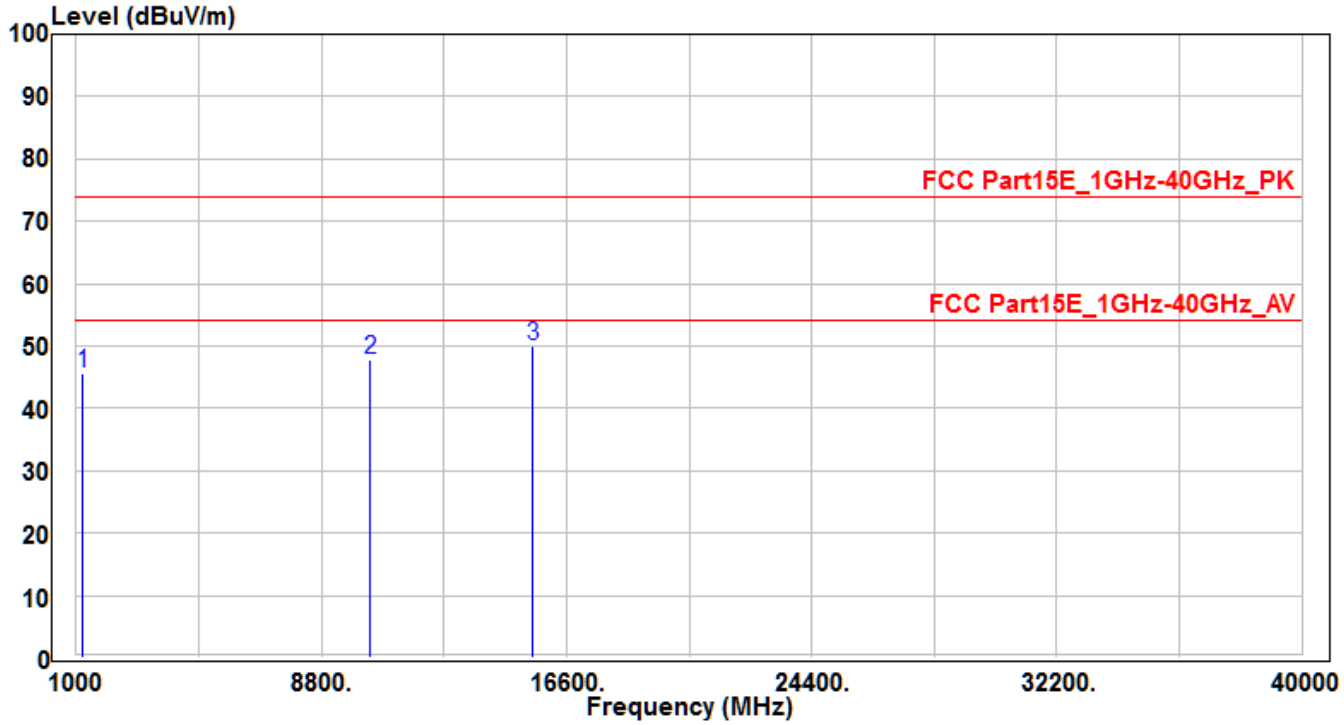


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1198.98	45.37	-7.06	38.31	-35.69	74	150	400	Peak
2		10360	30.13	16.73	46.86	-27.14	74	150	400	Peak
3	*	15540	29.91	21.01	50.92	-23.08	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH36	Test Voltage	AC 120V/60Hz

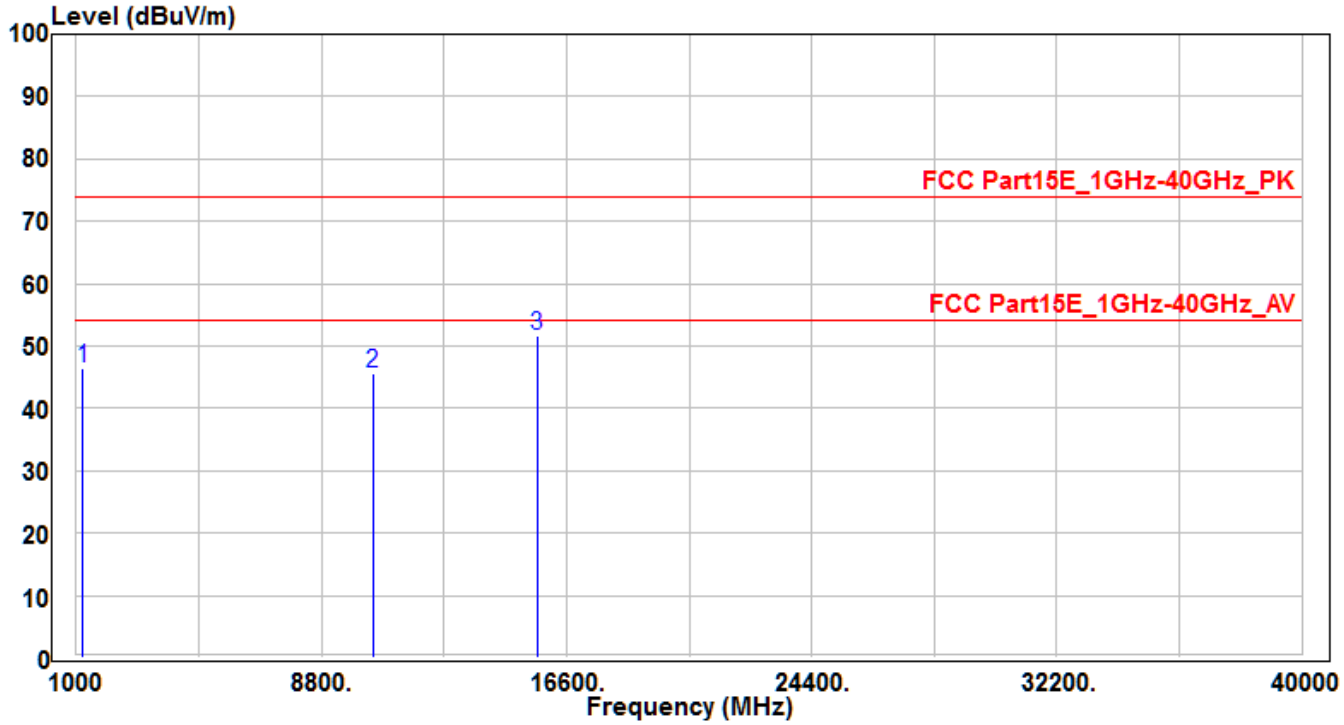


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.73	52.71	-7.07	45.64	-28.36	74	150	400	Peak
2		10360	30.99	16.73	47.72	-26.28	74	150	400	Peak
3	*	15540	29	21.01	50.01	-23.99	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH44	Test Voltage	AC 120V/60Hz

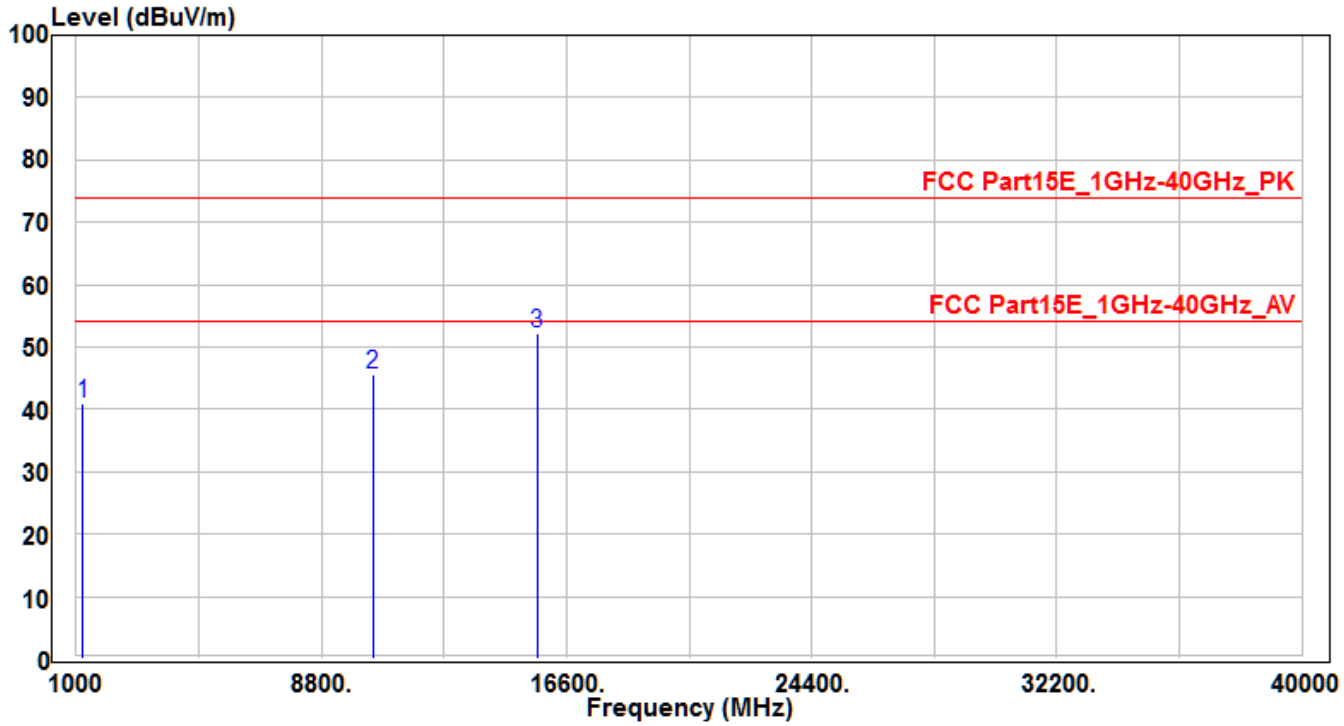


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.26	53.6	-7.07	46.53	-27.47	74	150	400	Peak
2		10440	28.53	17.04	45.57	-28.43	74	150	400	Peak
3	*	15660	30.79	20.84	51.63	-22.37	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH44	Test Voltage	AC 120V/60Hz

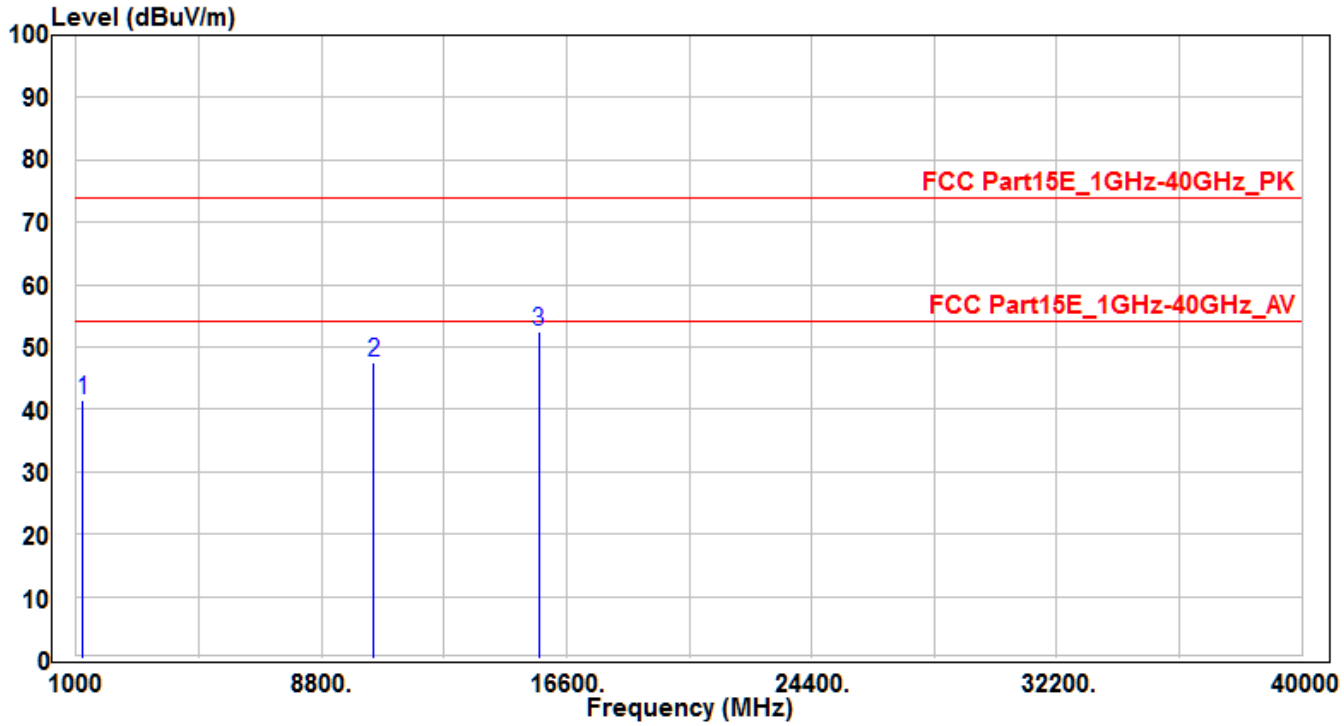


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.1	48.1	-7.07	41.03	-32.97	74	150	400	Peak
2		10440	28.61	17.04	45.65	-28.35	74	150	400	Peak
3	*	15660	31.29	20.84	52.13	-21.87	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH48	Test Voltage	AC 120V/60Hz

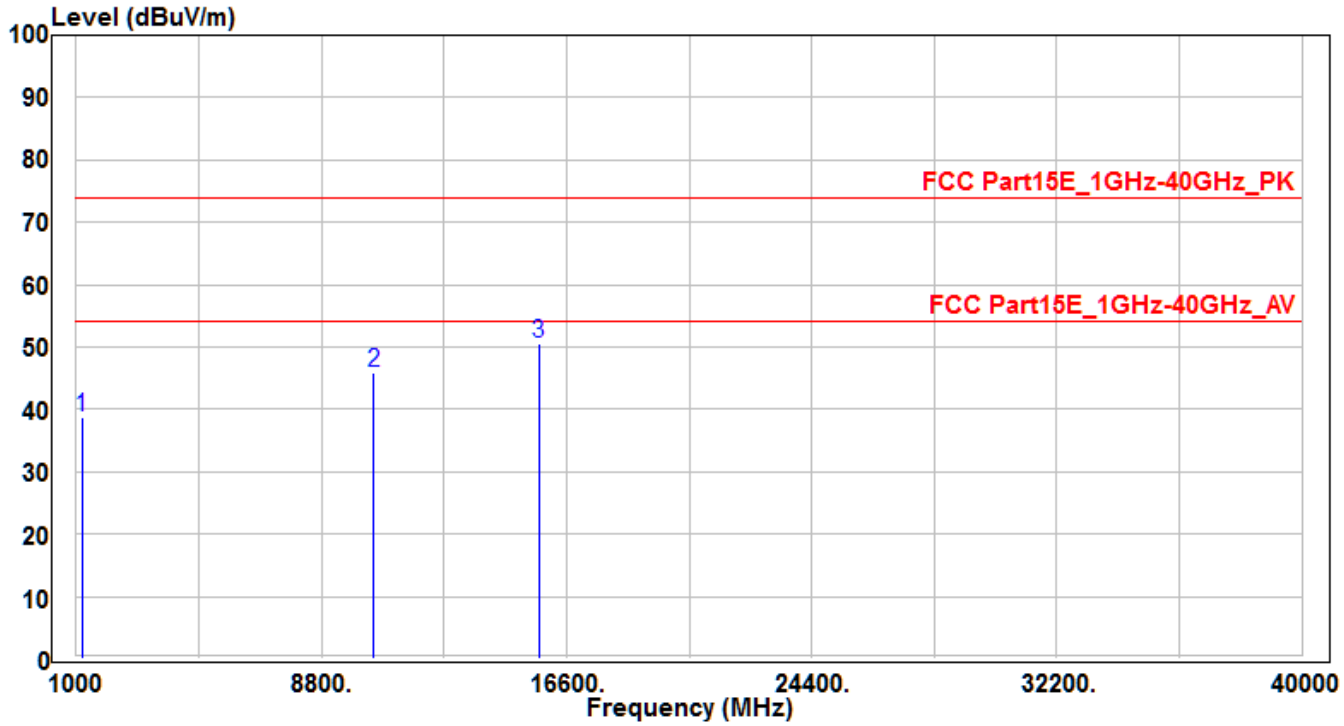


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1198.56	48.59	-7.06	41.53	-32.47	74	150	400	Peak
2		10480	30.2	17.2	47.4	-26.6	74	150	400	Peak
3	*	15720	31.84	20.77	52.61	-21.39	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH48	Test Voltage	AC 120V/60Hz

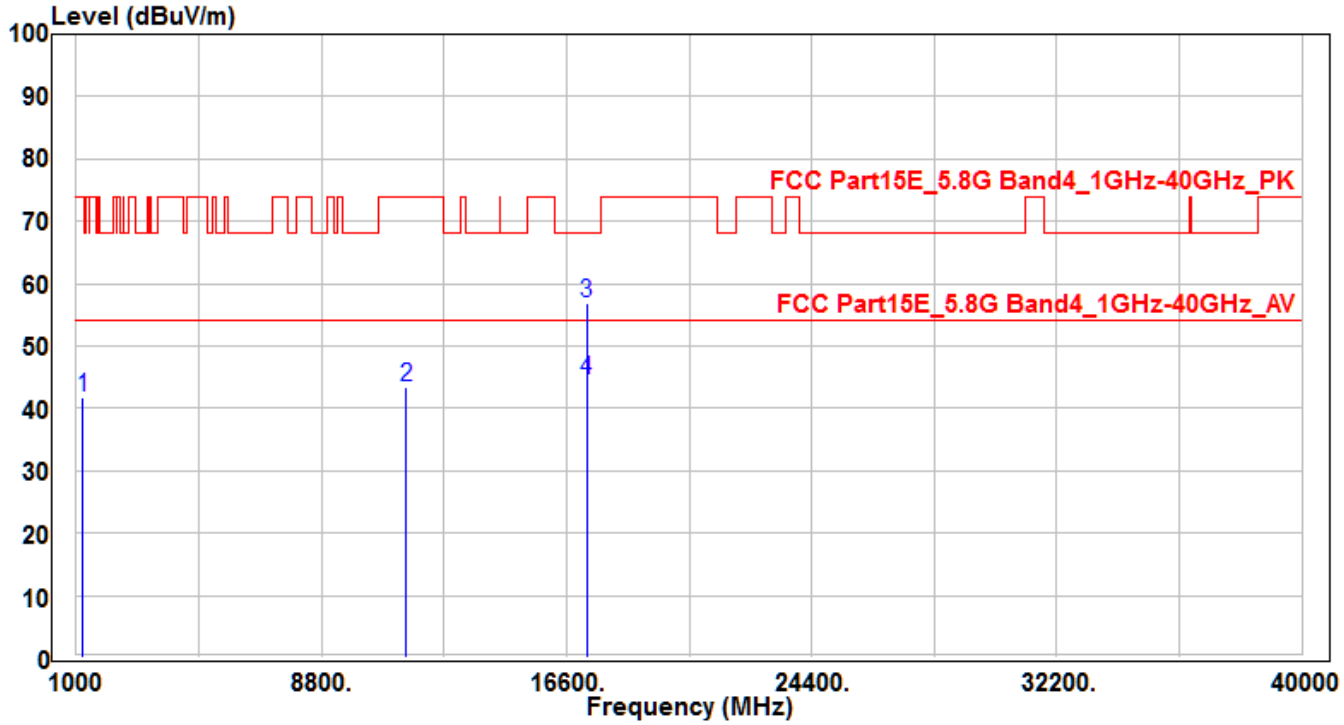


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1195.63	45.69	-7.07	38.62	-35.38	74	150	400	Peak
2		10480	28.78	17.2	45.98	-28.02	74	150	400	Peak
3	*	15720	29.81	20.77	50.58	-23.42	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH149	Test Voltage	AC 120V/60Hz

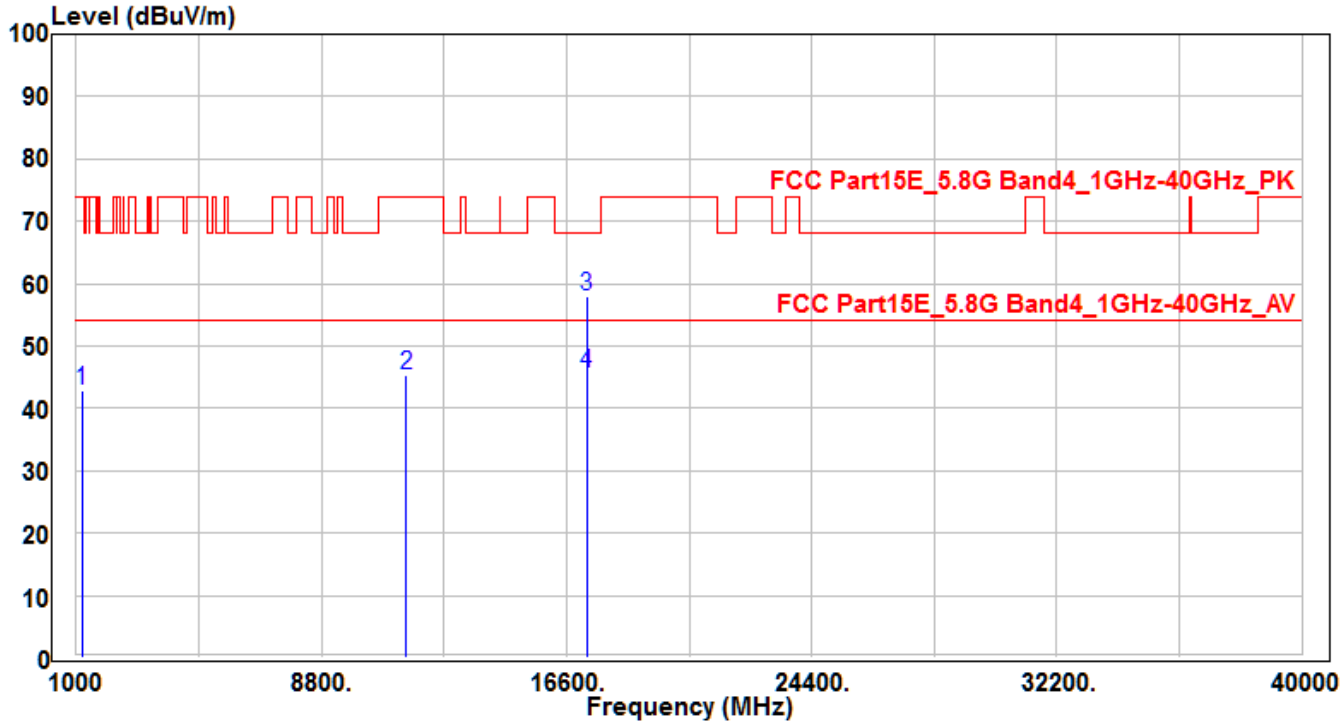


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.84	48.7	-7.07	41.63	-32.37	74	150	400	Peak
2		11490	25.06	18.35	43.41	-30.59	74	150	400	Peak
3	*	17235	29.89	26.96	56.85	-11.35	68.2	165	60	Peak
4	*	17235	17.5	26.96	44.46	-9.54	54	165	60	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH149	Test Voltage	AC 120V/60Hz

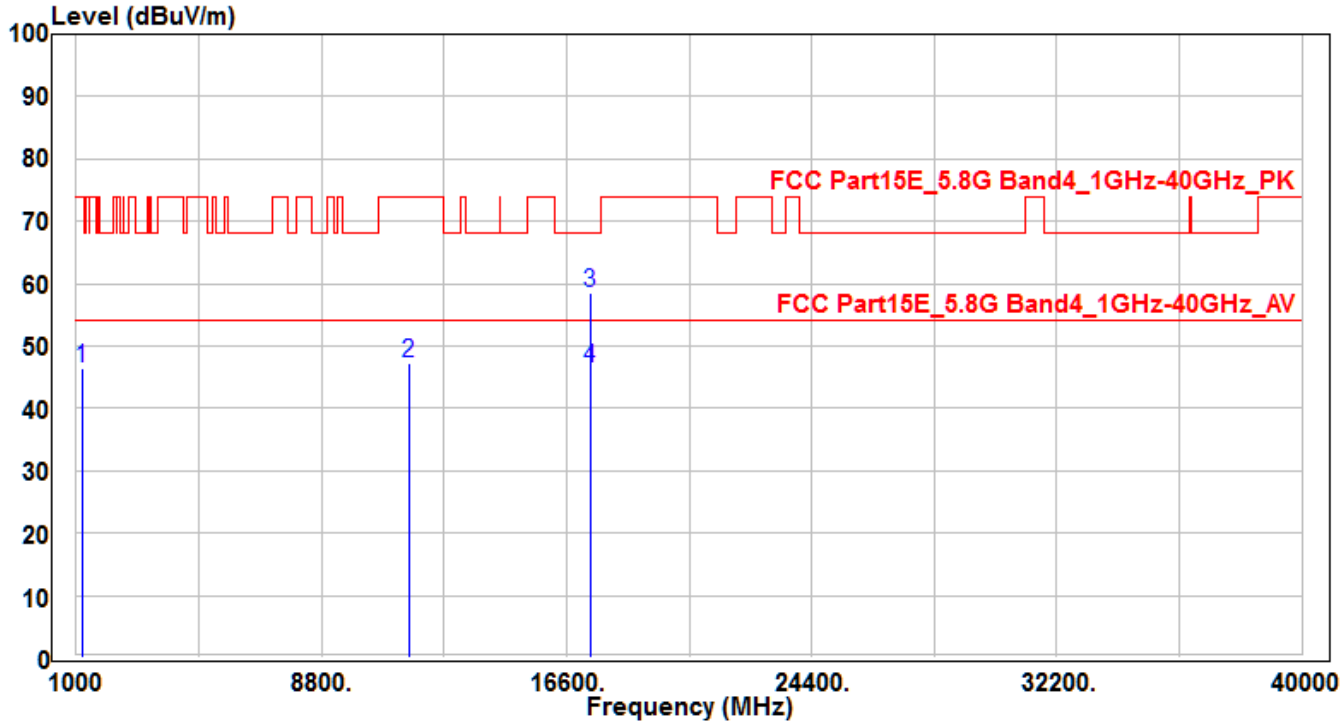


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1193.689	49.95	-7.07	42.88	-31.12	74	150	400	Peak
2		11490	26.98	18.35	45.33	-28.67	74	150	400	Peak
3	*	17235	30.97	26.96	57.93	-10.27	68.2	160	-25	Peak
4	*	17235	18.7	26.96	45.66	-8.34	54	160	-25	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH157	Test Voltage	AC 120V/60Hz

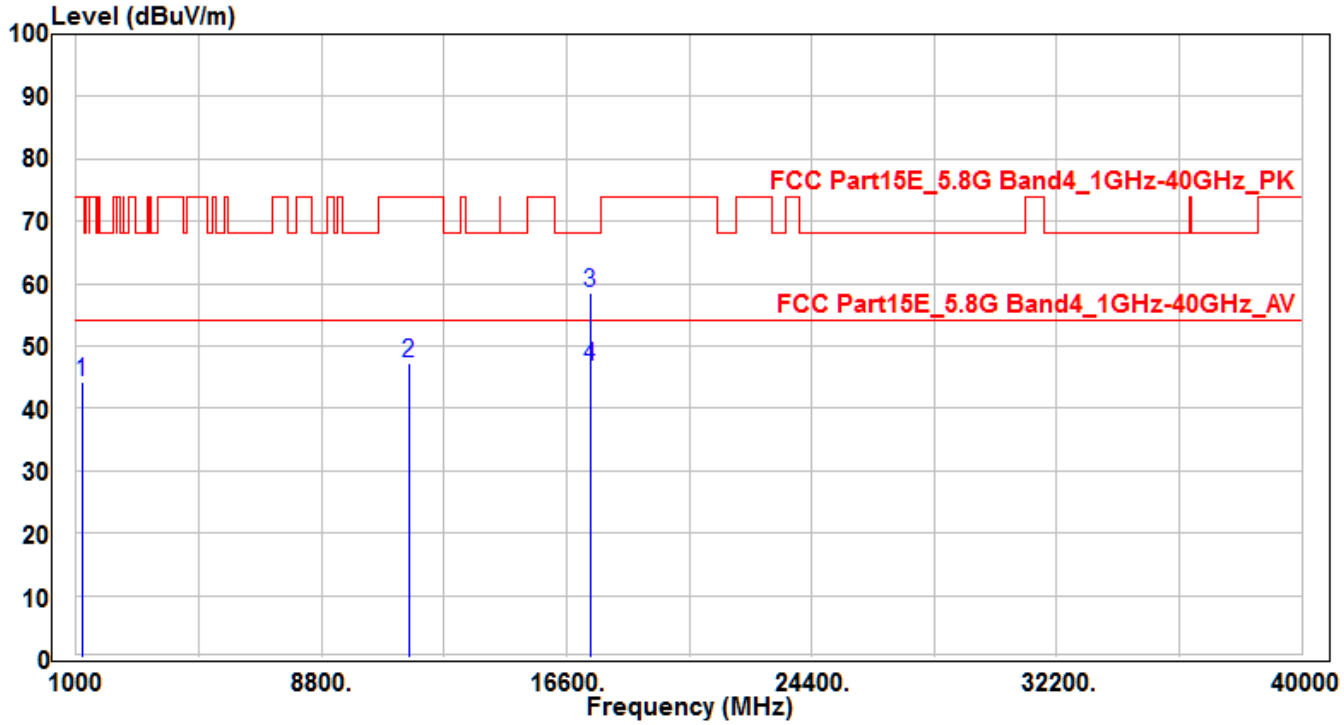


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1190.36	53.62	-7.09	46.53	-27.47	74	150	400	Peak
2		11570	28.97	18.24	47.21	-26.79	74	150	400	Peak
3	*	17355	30.63	27.81	58.44	-9.76	68.2	160	250	Peak
4	*	17355	18.57	27.81	46.38	-7.62	54	160	250	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH157	Test Voltage	AC 120V/60Hz

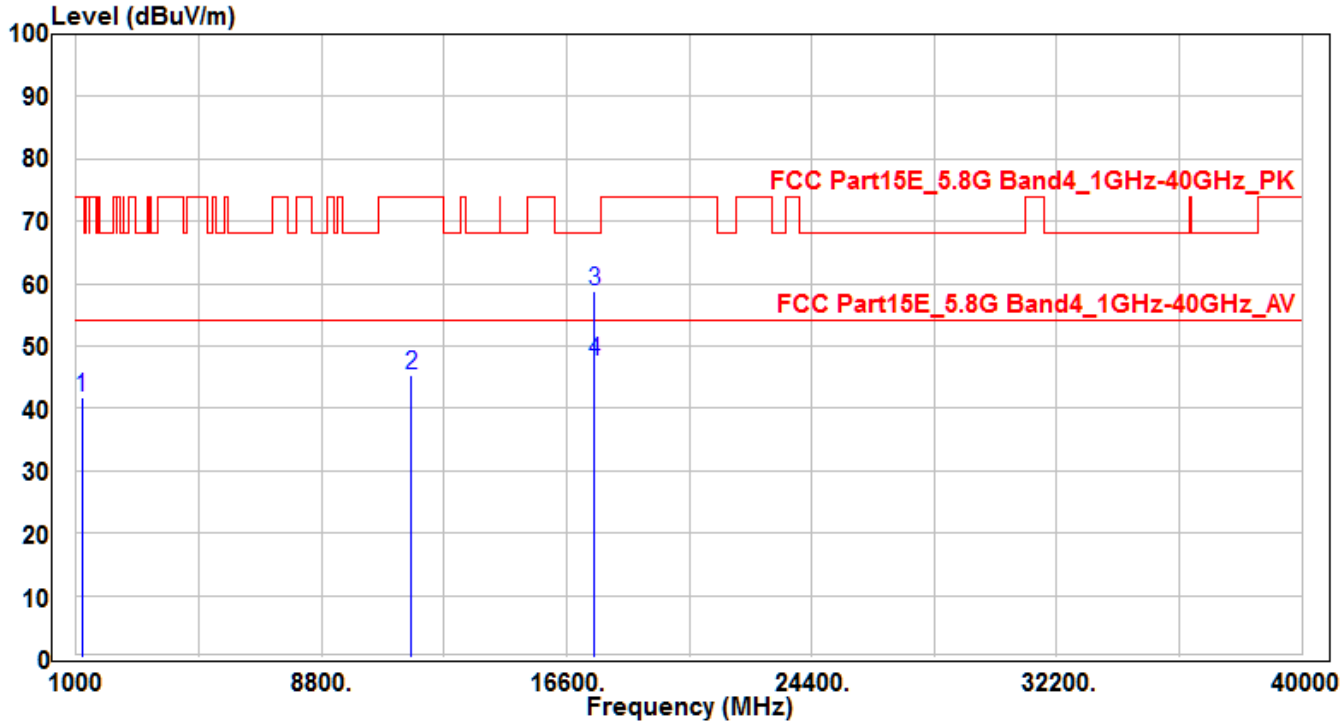


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1195.98	51.24	-7.07	44.17	-29.83	74	150	400	Peak
2		11570	28.9	18.24	47.14	-26.86	74	150	400	Peak
3	*	17355	30.68	27.81	58.49	-9.71	68.2	160	-40	Peak
4	*	17355	18.97	27.81	46.78	-7.22	54	160	-40	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH165	Test Voltage	AC 120V/60Hz

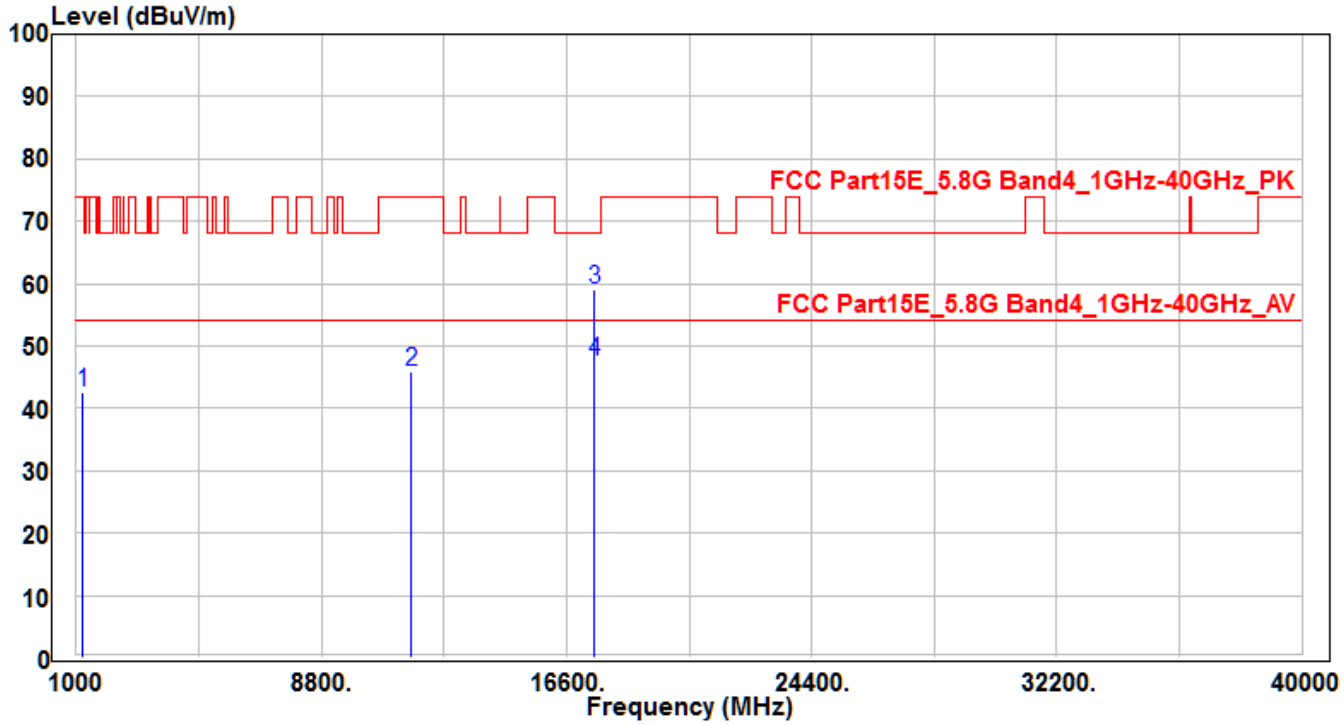


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1187.8	48.96	-7.09	41.87	-32.13	74	150	400	Peak
2		11650	27.34	18.1	45.44	-28.56	74	150	400	Peak
3	*	17475	30.08	28.66	58.74	-9.46	68.2	170	120	Peak
4	*	17475	18.95	28.66	47.61	-6.39	54	170	120	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1 -CH165	Test Voltage	AC 120V/60Hz

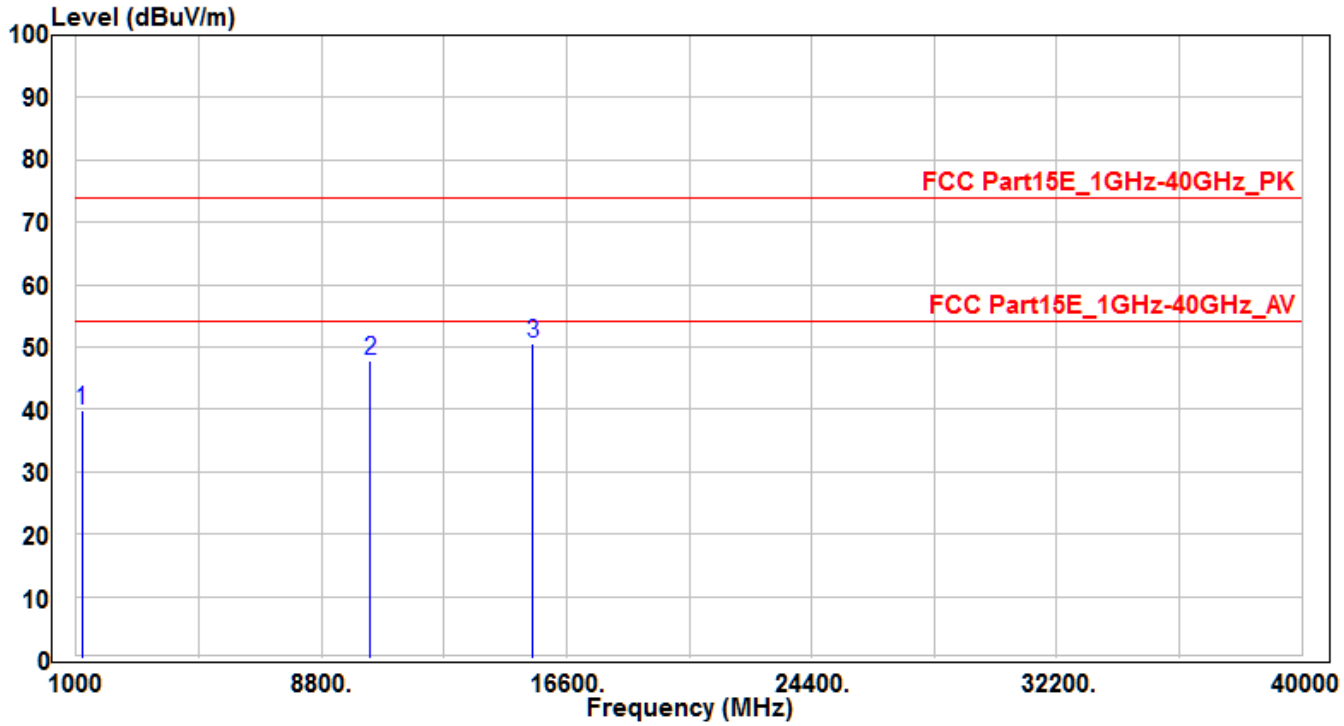


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1198.605	49.61	-7.06	42.55	-31.45	74	150	400	Peak
2		11650	27.71	18.1	45.81	-28.19	74	150	400	Peak
3	*	17475	30.44	28.66	59.1	-9.1	68.2	155	400	Peak
4	*	17475	19	28.66	47.66	-6.34	54	155	400	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH36	Test Voltage	AC 120V/60Hz

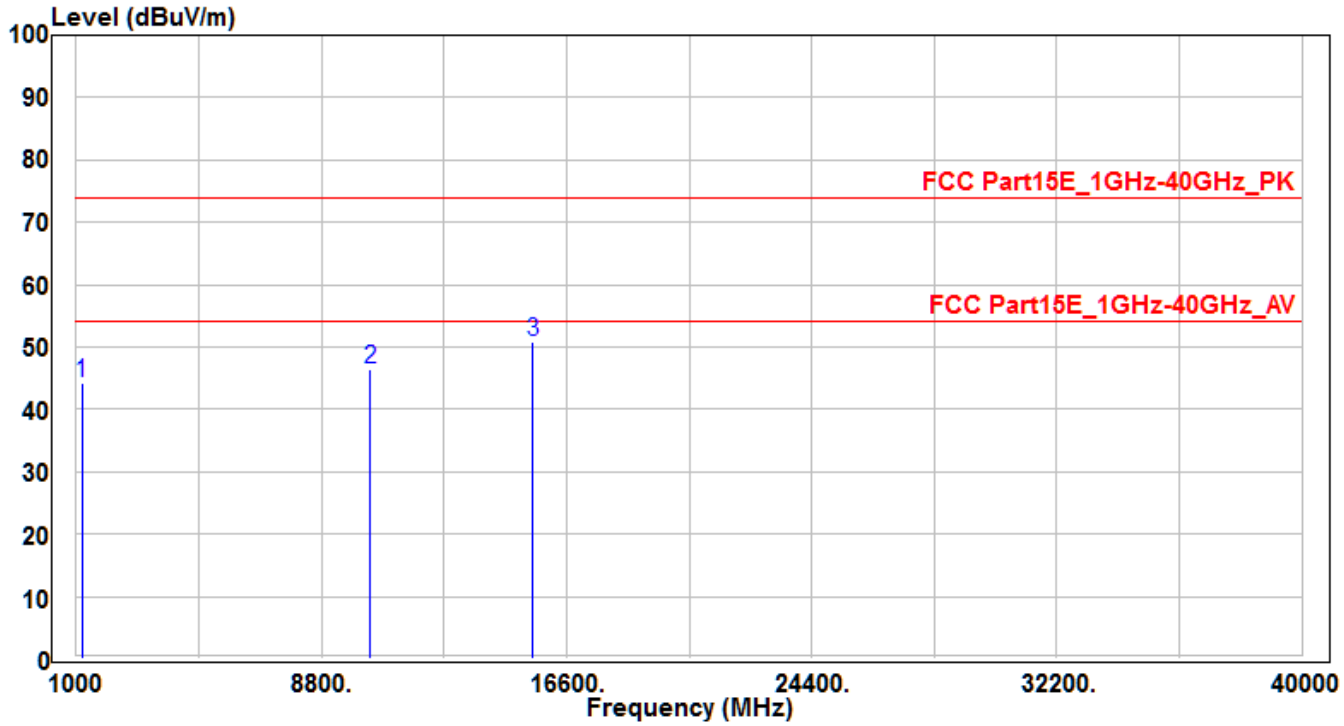


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1189.96	46.9	-7.09	39.81	-34.19	74	150	400	Peak
2		10360	31.04	16.73	47.77	-26.23	74	150	400	Peak
3	*	15540	29.43	21.01	50.44	-23.56	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH36	Test Voltage	AC 120V/60Hz

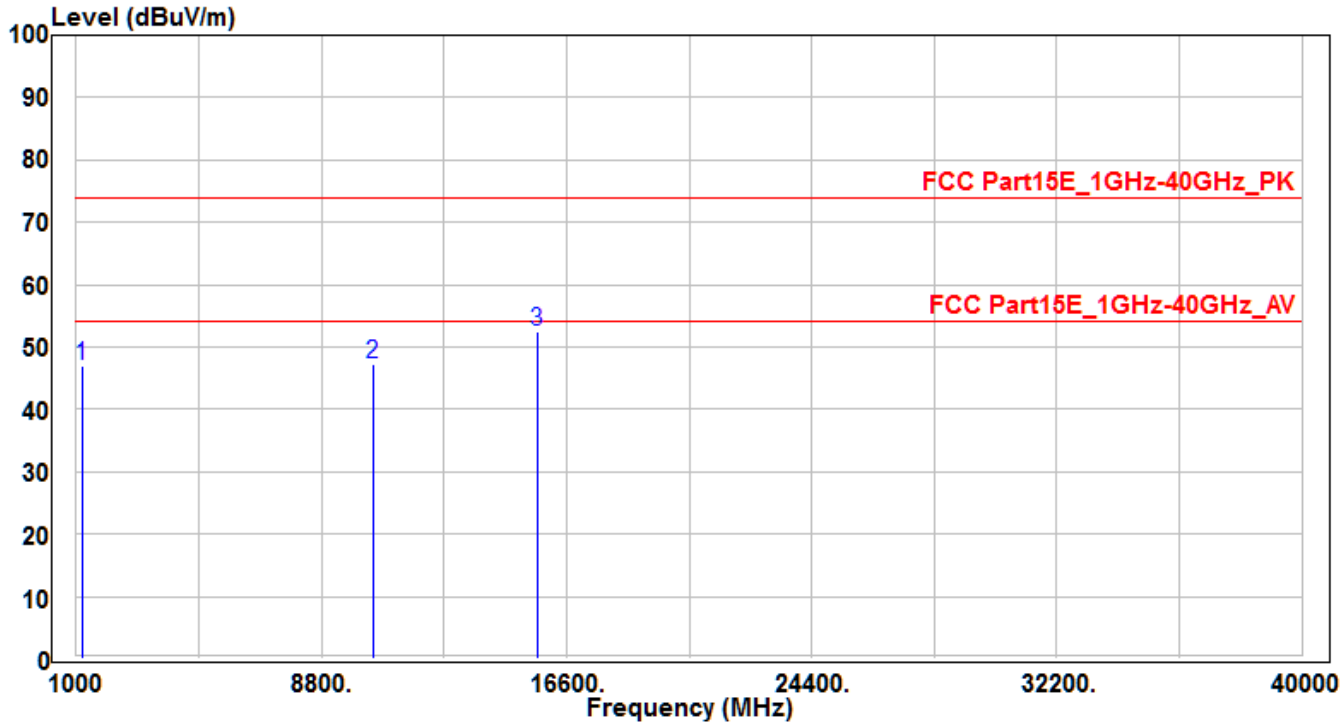


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1195.65	51.36	-7.07	44.29	-29.71	74	150	400	Peak
2		10360	29.74	16.73	46.47	-27.53	74	150	400	Peak
3	*	15540	29.72	21.01	50.73	-23.27	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH44	Test Voltage	AC 120V/60Hz

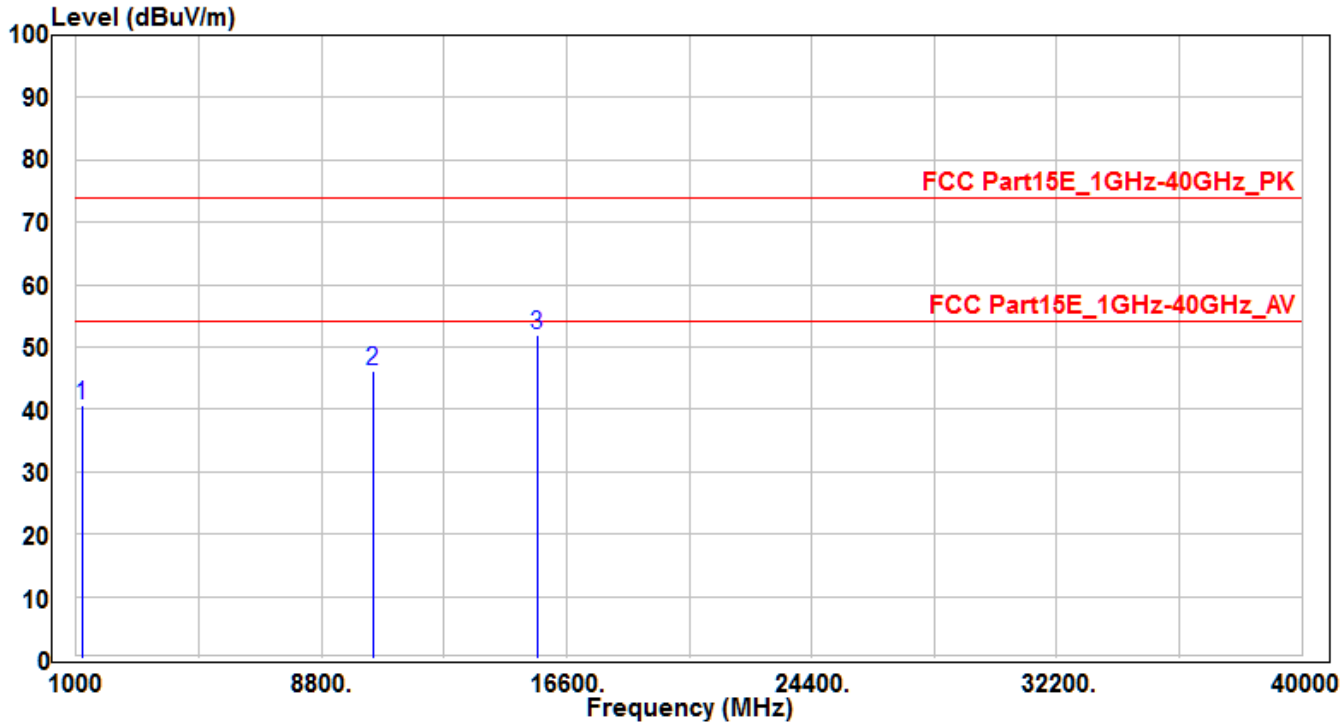


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1185.96	54.12	-7.1	47.02	-26.98	74	150	400	Peak
2		10440	30.09	17.04	47.13	-26.87	74	150	400	Peak
3	*	15660	31.66	20.84	52.5	-21.5	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH44	Test Voltage	AC 120V/60Hz

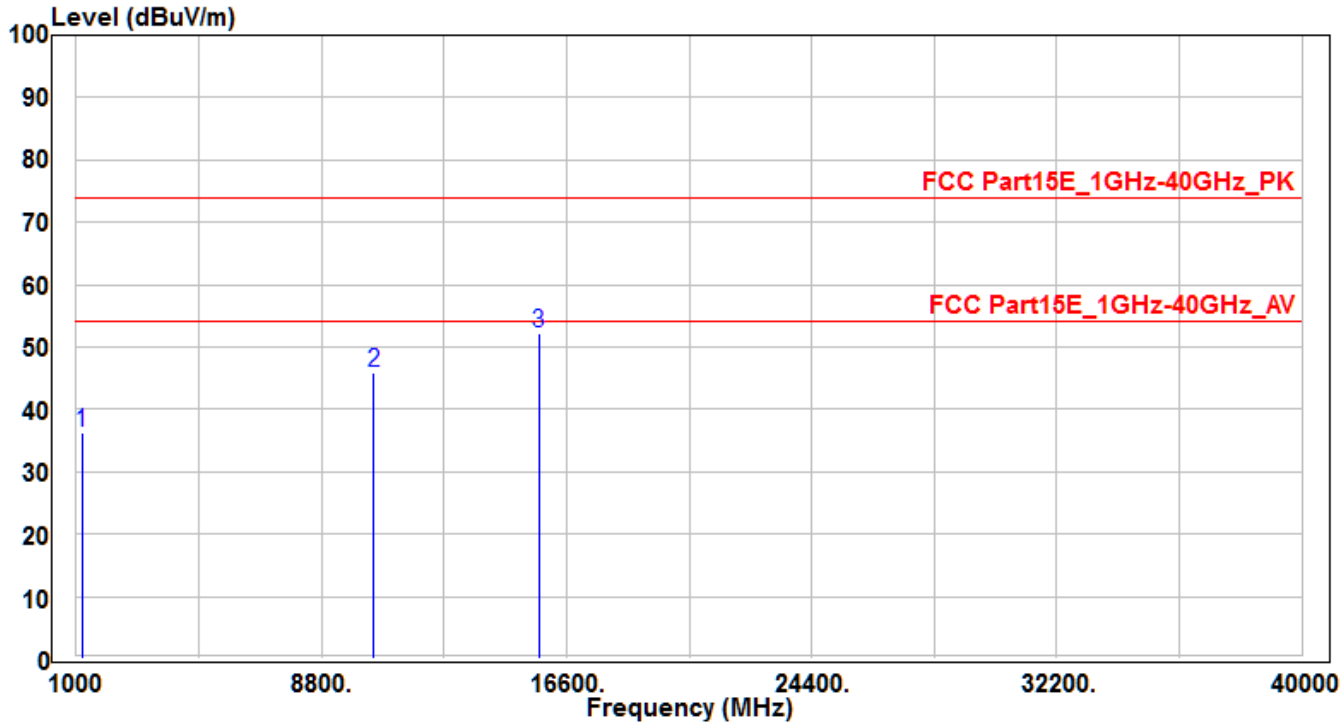


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1192.41	47.84	-7.07	40.77	-33.23	74	150	400	Peak
2		10440	29.13	17.04	46.17	-27.83	74	150	400	Peak
3	*	15660	31.22	20.84	52.06	-21.94	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH48	Test Voltage	AC 120V/60Hz

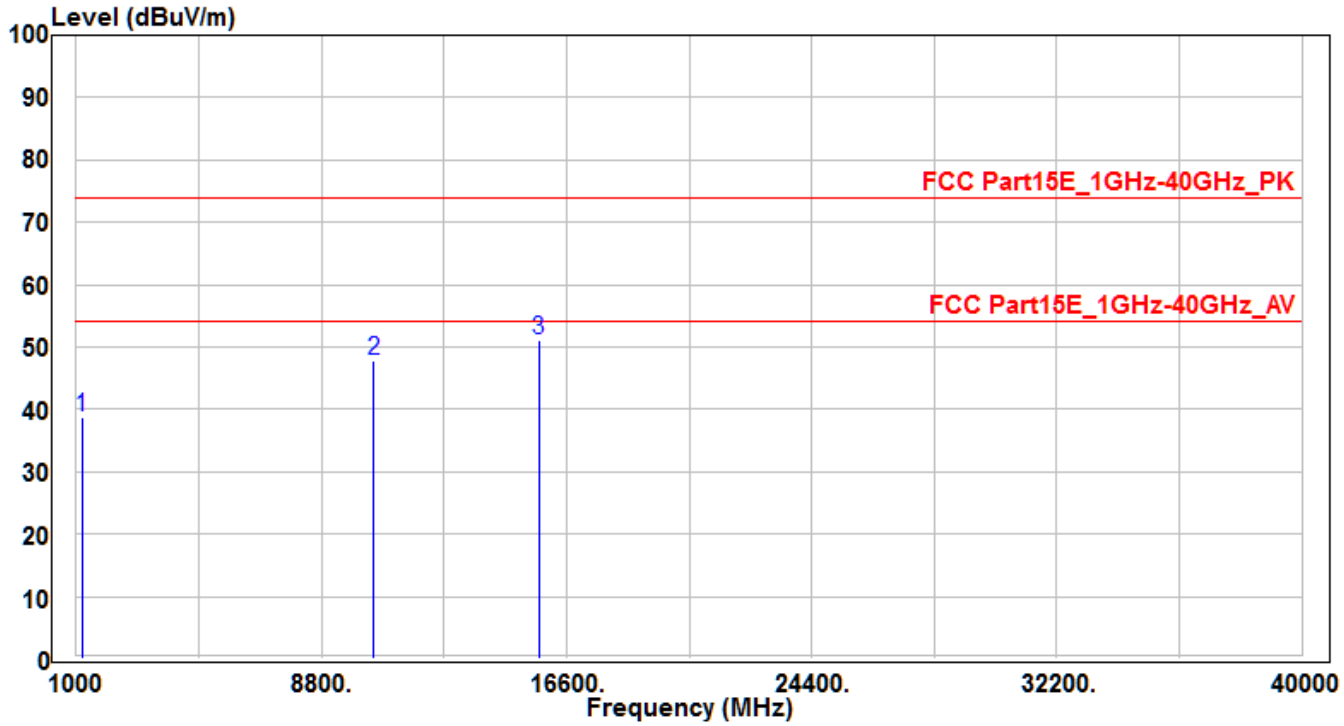


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1193.64	43.24	-7.07	36.17	-37.83	74	150	400	Peak
2		10480	28.82	17.2	46.02	-27.98	74	150	400	Peak
3	*	15720	31.45	20.77	52.22	-21.78	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH48	Test Voltage	AC 120V/60Hz

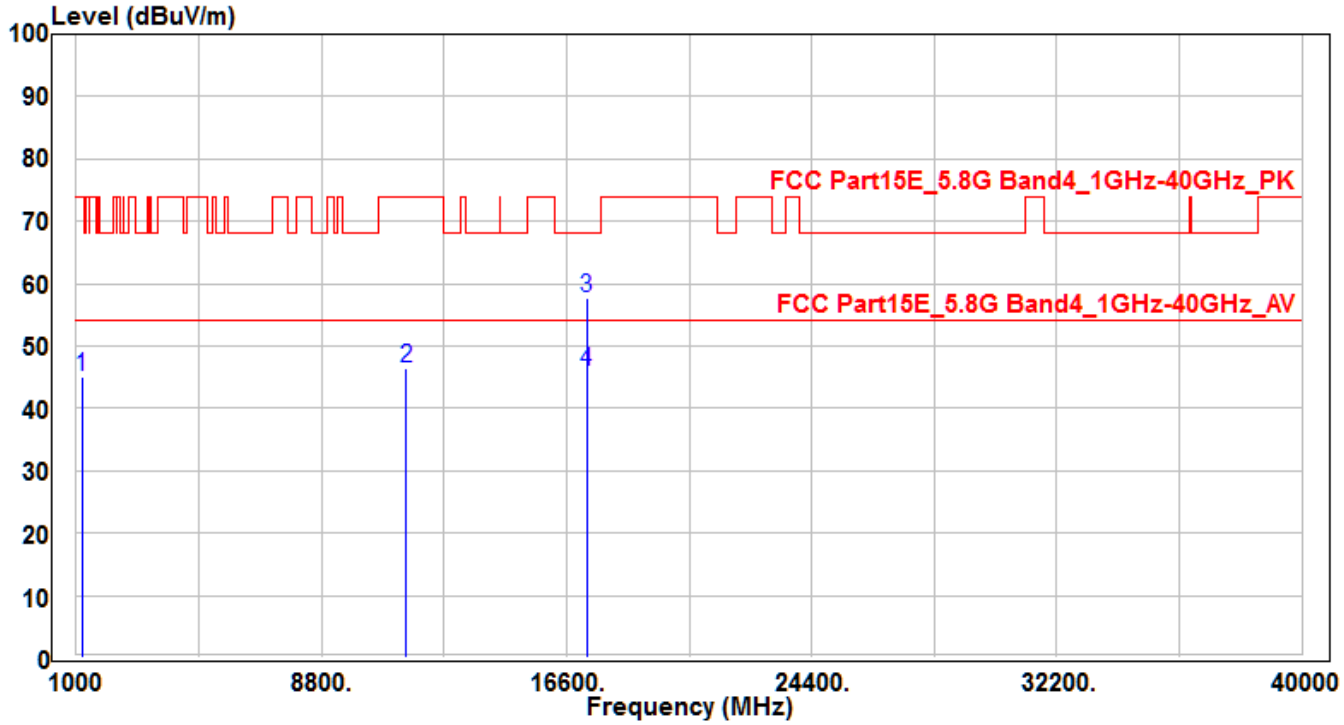


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1194.81	45.85	-7.07	38.78	-35.22	74	150	400	Peak
2		10480	30.58	17.2	47.78	-26.22	74	150	400	Peak
3	*	15720	30.37	20.77	51.14	-22.86	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH149	Test Voltage	AC 120V/60Hz

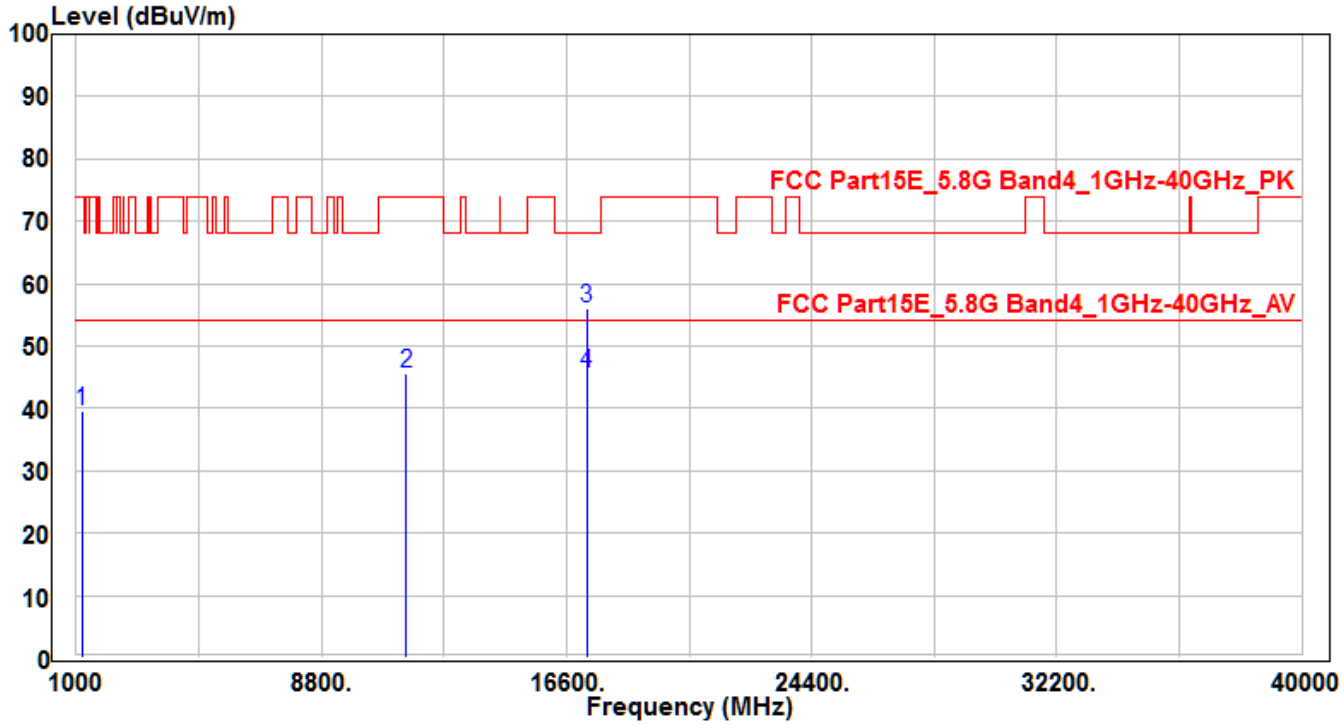


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1195.69	52.21	-7.07	45.14	-28.86	74	150	400	Peak
2		11490	28.02	18.35	46.37	-27.63	74	150	400	Peak
3	*	17235	30.65	26.96	57.61	-10.59	68.2	150	280	Peak
4	*	17235	18.97	26.96	45.93	-8.07	54	150	280	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH149	Test Voltage	AC 120V/60Hz

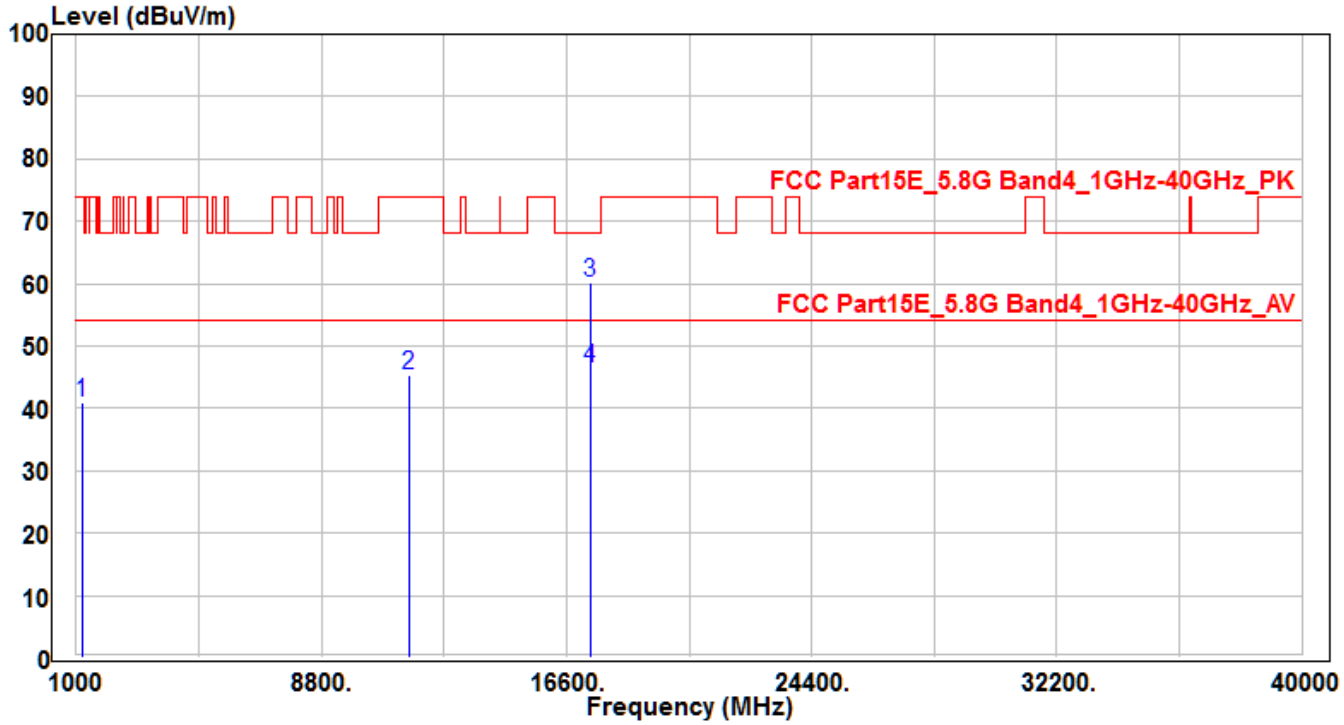


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1193.6	46.62	-7.07	39.55	-34.45	74	150	400	Peak
2		11490	27.16	18.35	45.51	-28.49	74	150	400	Peak
3	*	17235	29.1	26.96	56.06	-12.14	68.2	175	40	Peak
4	*	17235	18.76	26.96	45.72	-8.28	54	175	40	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH157	Test Voltage	AC 120V/60Hz

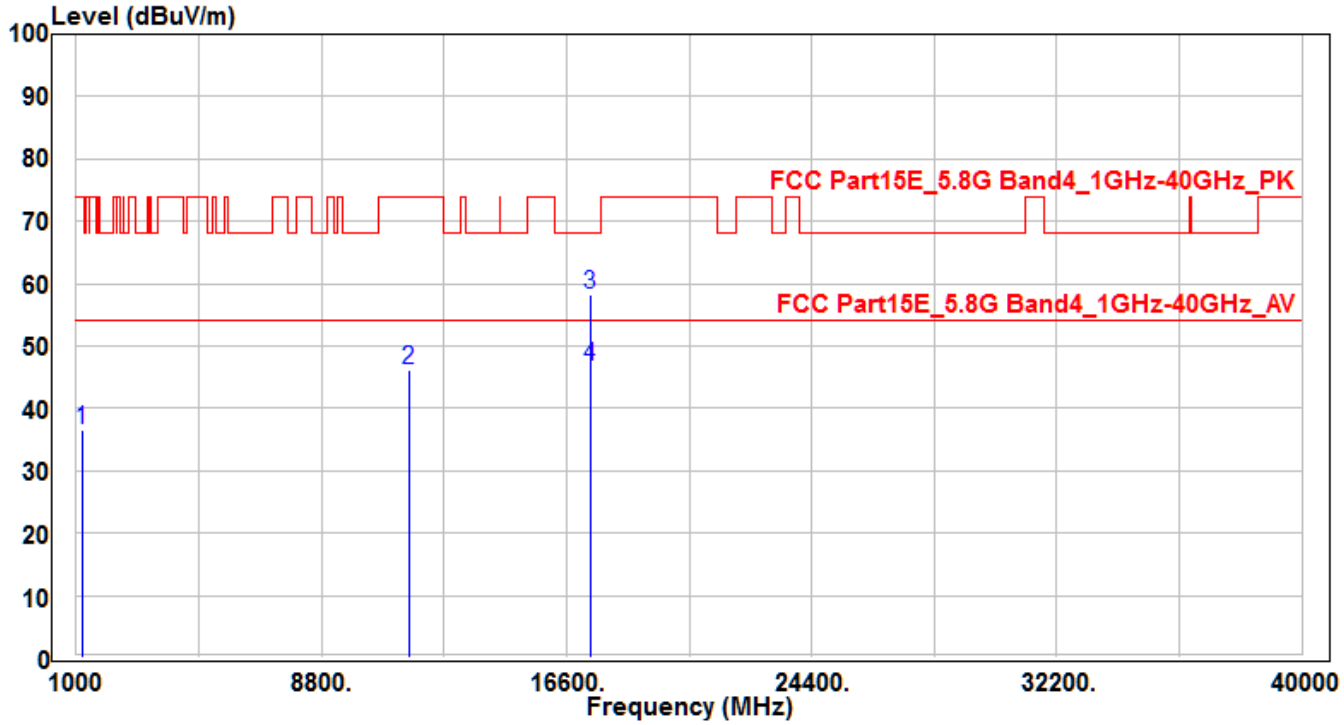


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1185.74	47.91	-7.1	40.81	-33.19	74	150	400	Peak
2		11570	26.99	18.24	45.23	-28.77	74	150	400	Peak
3	*	17355	32.5	27.81	60.31	-7.89	68.2	160	320	Peak
4	*	17355	18.59	27.81	46.4	-7.6	54	160	320	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH157	Test Voltage	AC 120V/60Hz

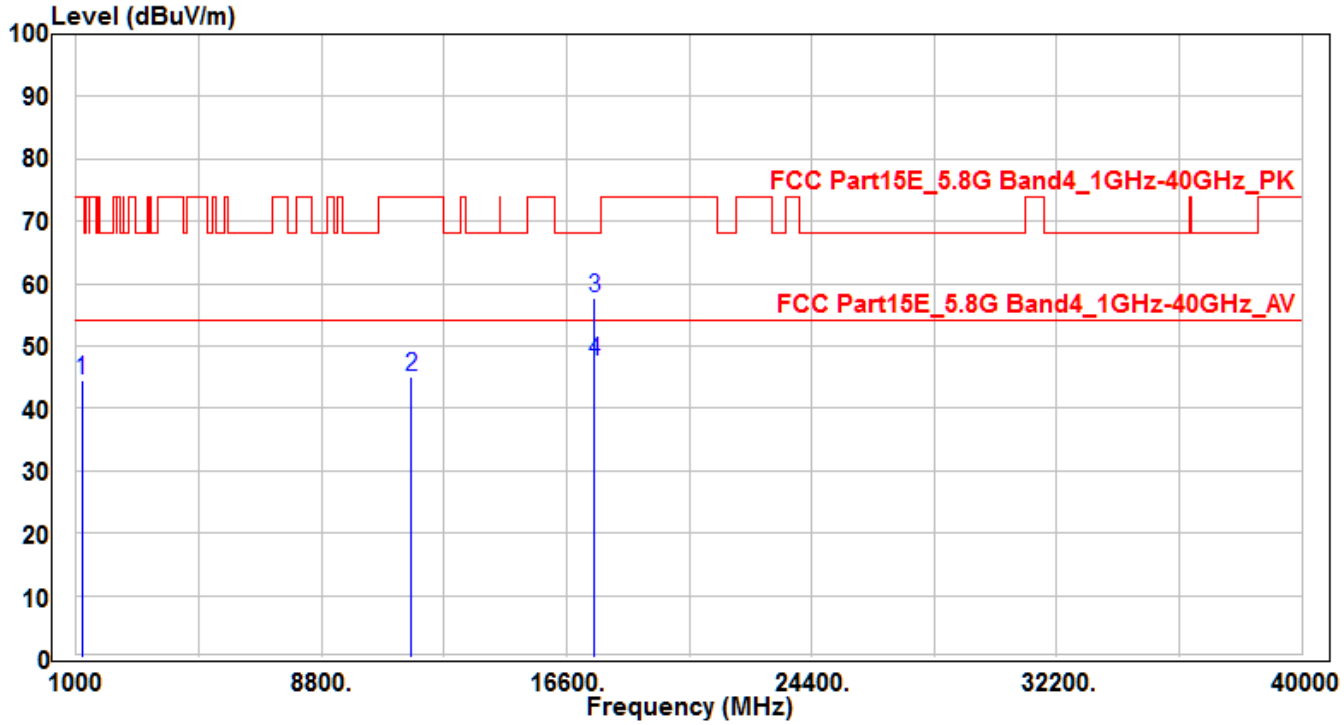


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1189.23	43.69	-7.09	36.6	-37.4	74	150	400	Peak
2		11570	27.97	18.24	46.21	-27.79	74	150	400	Peak
3	*	17355	30.53	27.81	58.34	-9.86	68.2	165	210	Peak
4	*	17355	18.97	27.81	46.78	-7.22	54	165	210	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH165	Test Voltage	AC 120V/60Hz

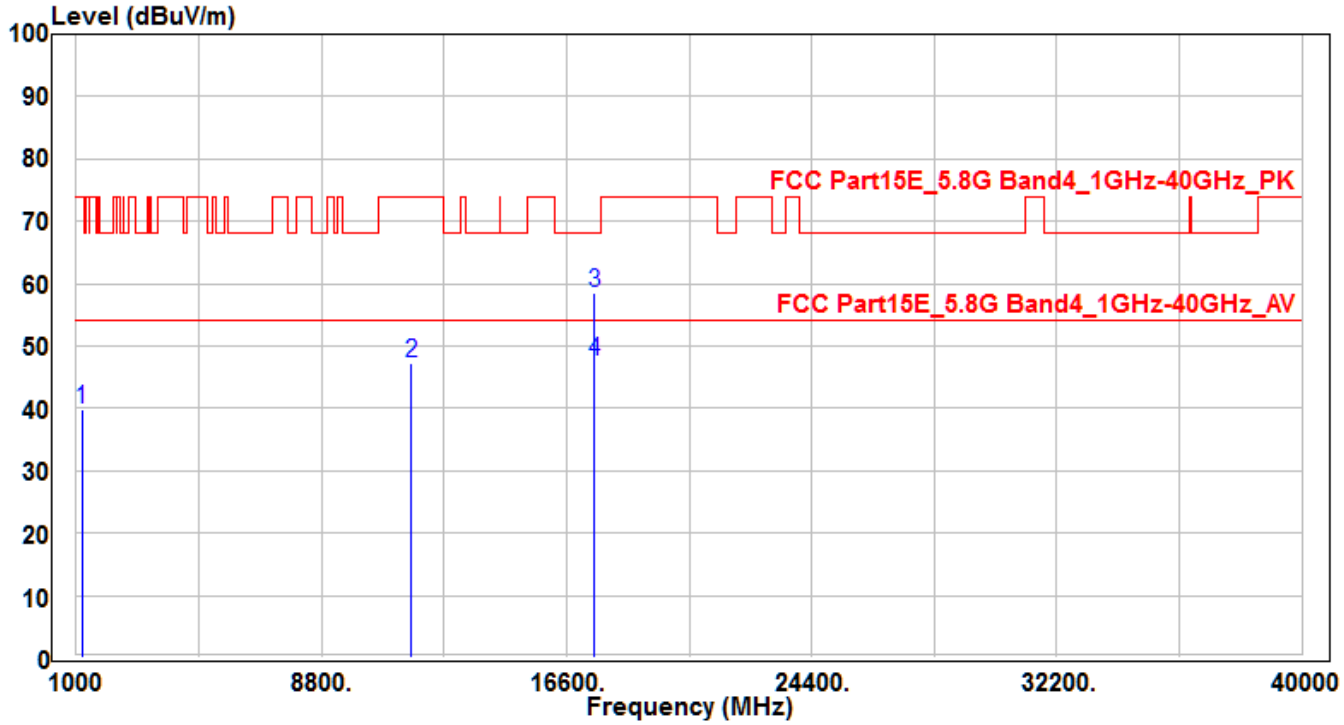


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1195	51.52	-7.07	44.45	-29.55	74	150	400	Peak
2		11650	27.06	18.1	45.16	-28.84	74	150	400	Peak
3	*	17475	28.94	28.66	57.6	-10.6	68.2	175	140	Peak
4	*	17475	18.94	28.66	47.6	-6.4	54	175	140	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2 -CH165	Test Voltage	AC 120V/60Hz

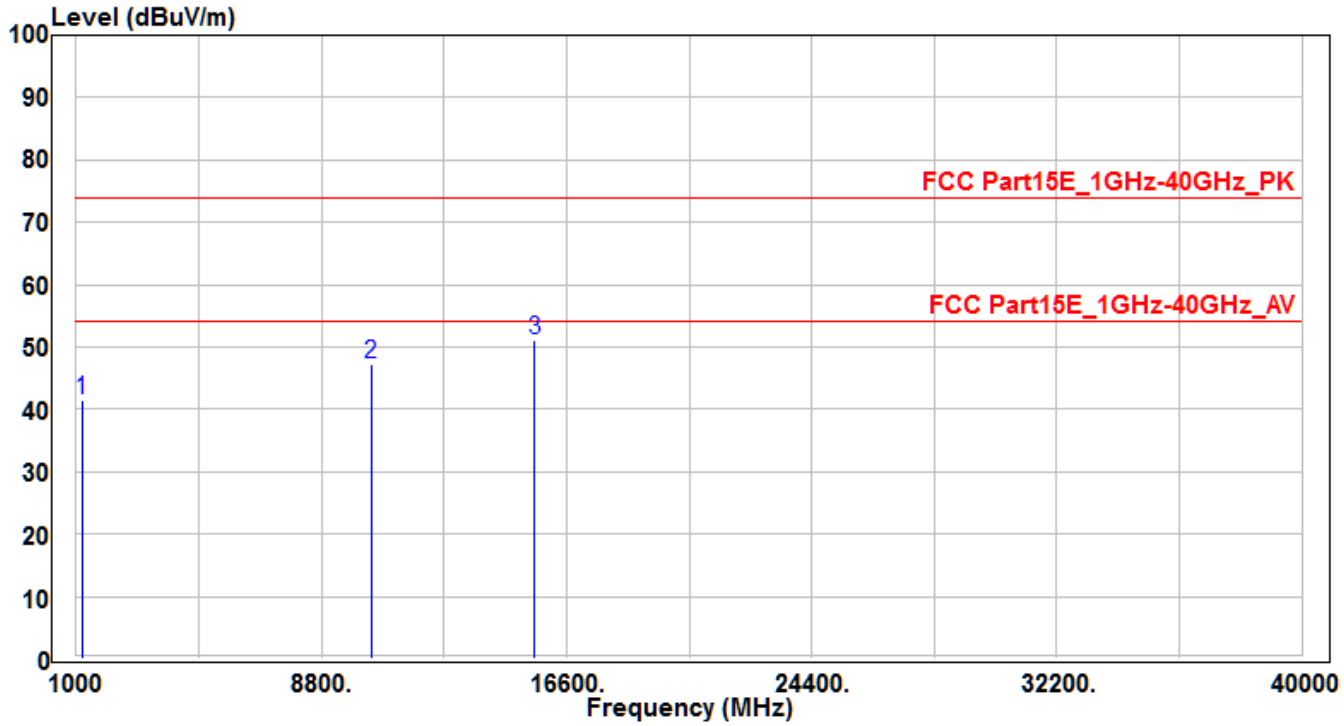


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1185.5	46.92	-7.1	39.82	-34.18	74	150	400	Peak
2		11650	29.27	18.1	47.37	-26.63	74	150	400	Peak
3	*	17475	29.74	28.66	58.4	-9.8	68.2	155	-40	Peak
4	*	17475	19	28.66	47.66	-6.34	54	155	-40	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH38	Test Voltage	AC 120V/60Hz

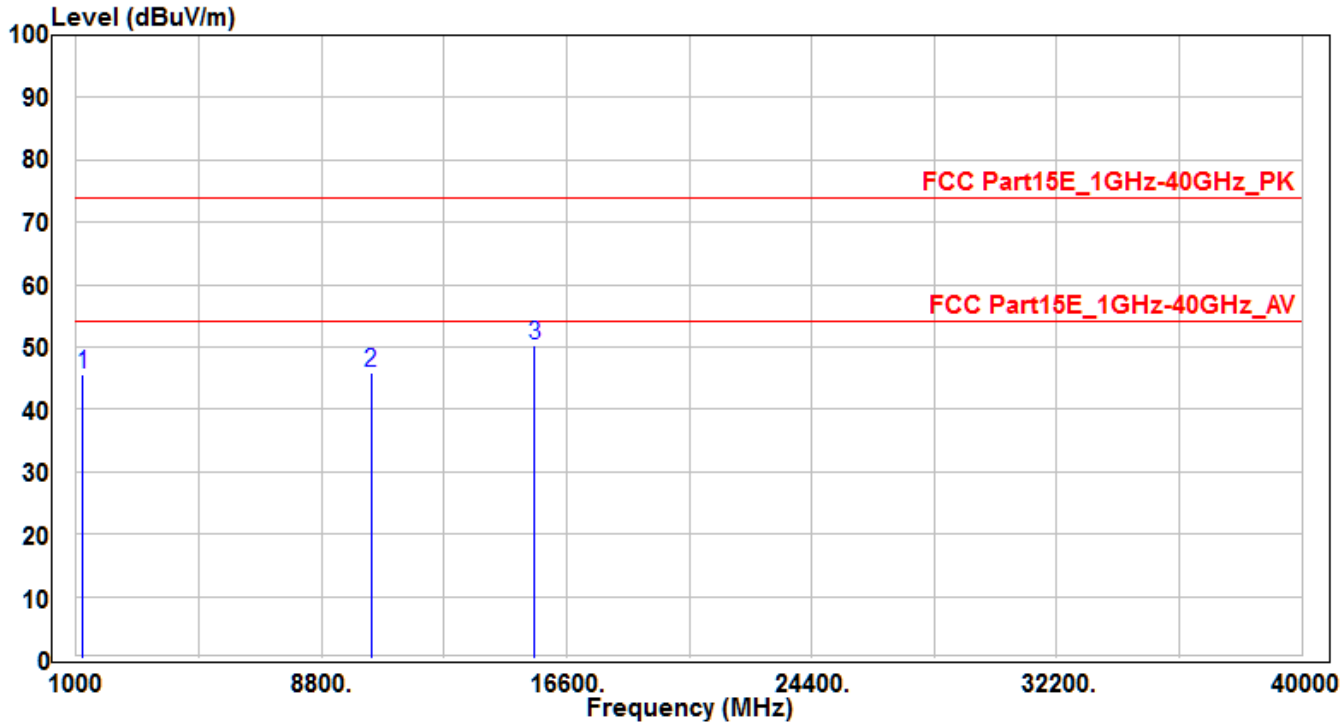


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1186.93	48.61	-7.1	41.51	-32.49	74	150	400	Peak
2		10380	30.36	16.82	47.18	-26.82	74	150	400	Peak
3	*	15570	30.26	20.96	51.22	-22.78	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH38	Test Voltage	AC 120V/60Hz

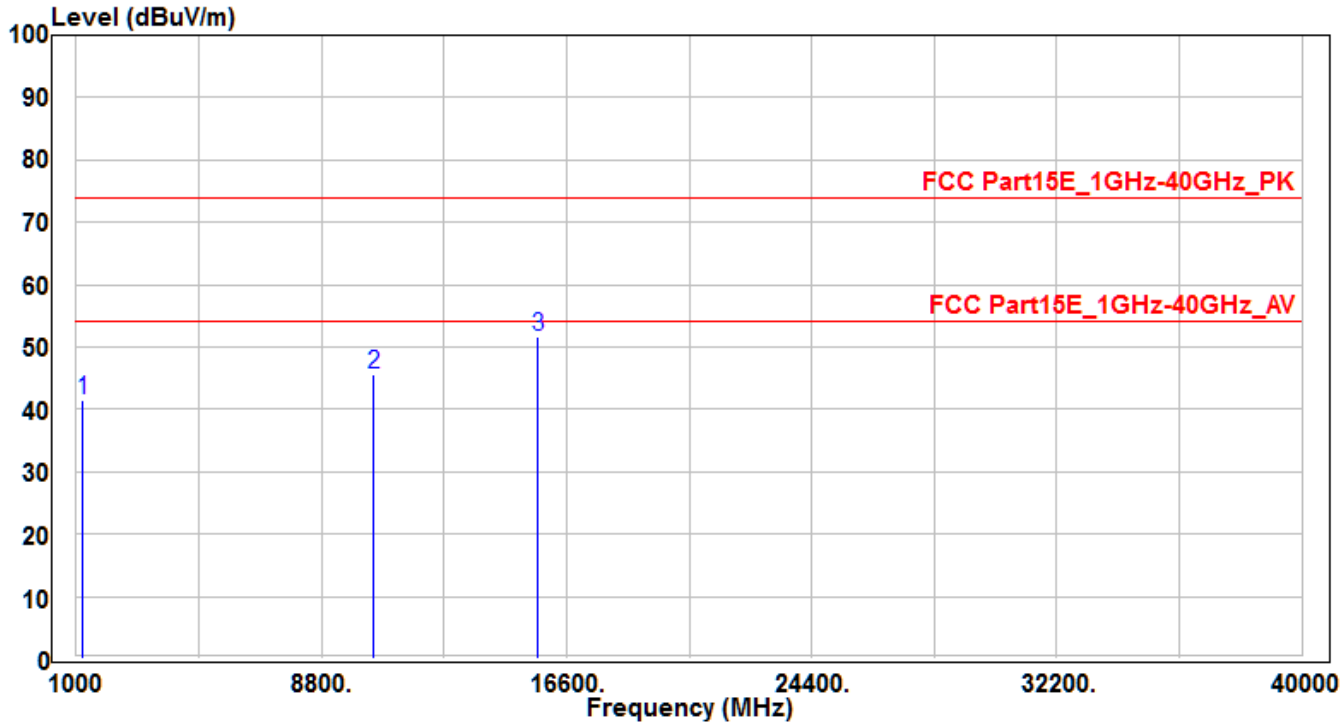


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1198.65	52.6	-7.06	45.54	-28.46	74	150	400	Peak
2		10380	29.15	16.82	45.97	-28.03	74	150	400	Peak
3	*	15570	29.27	20.96	50.23	-23.77	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH46	Test Voltage	AC 120V/60Hz

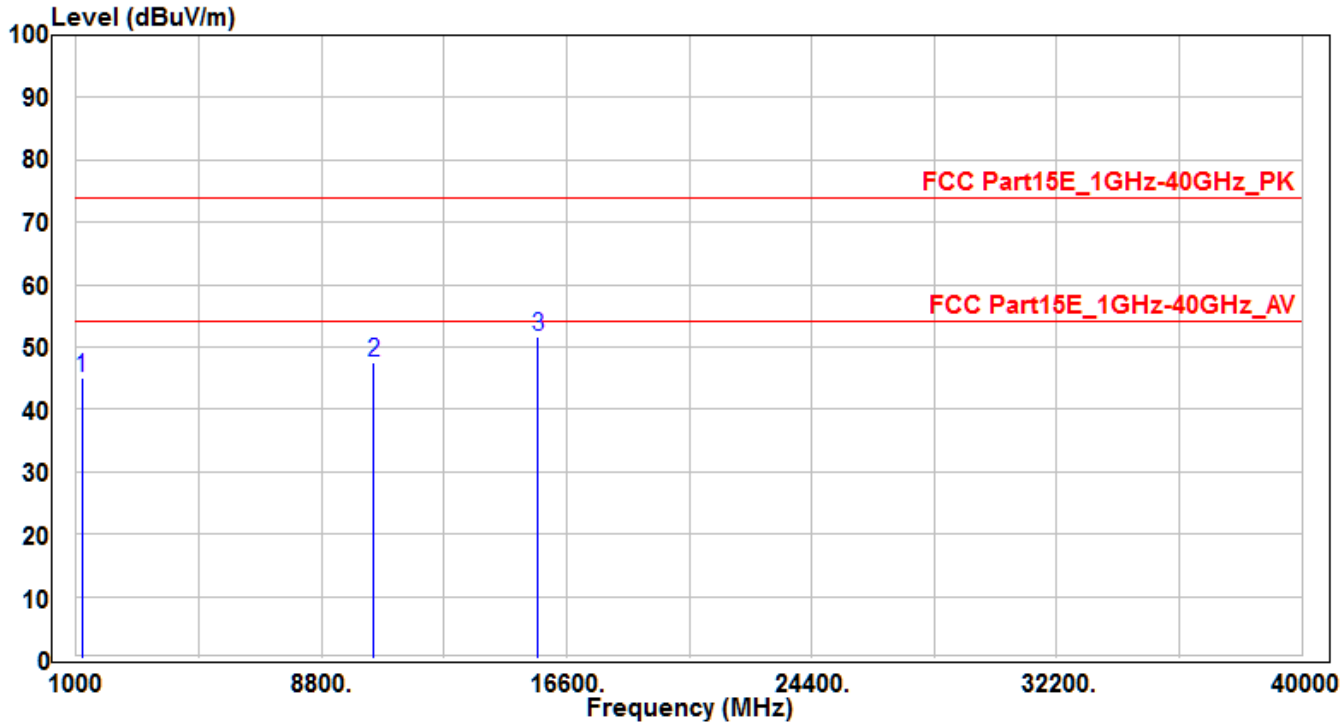


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.874	48.58	-7.07	41.51	-32.49	74	150	400	Peak
2		10460	28.43	17.12	45.55	-28.45	74	150	400	Peak
3	*	15690	30.83	20.81	51.64	-22.36	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH46	Test Voltage	AC 120V/60Hz

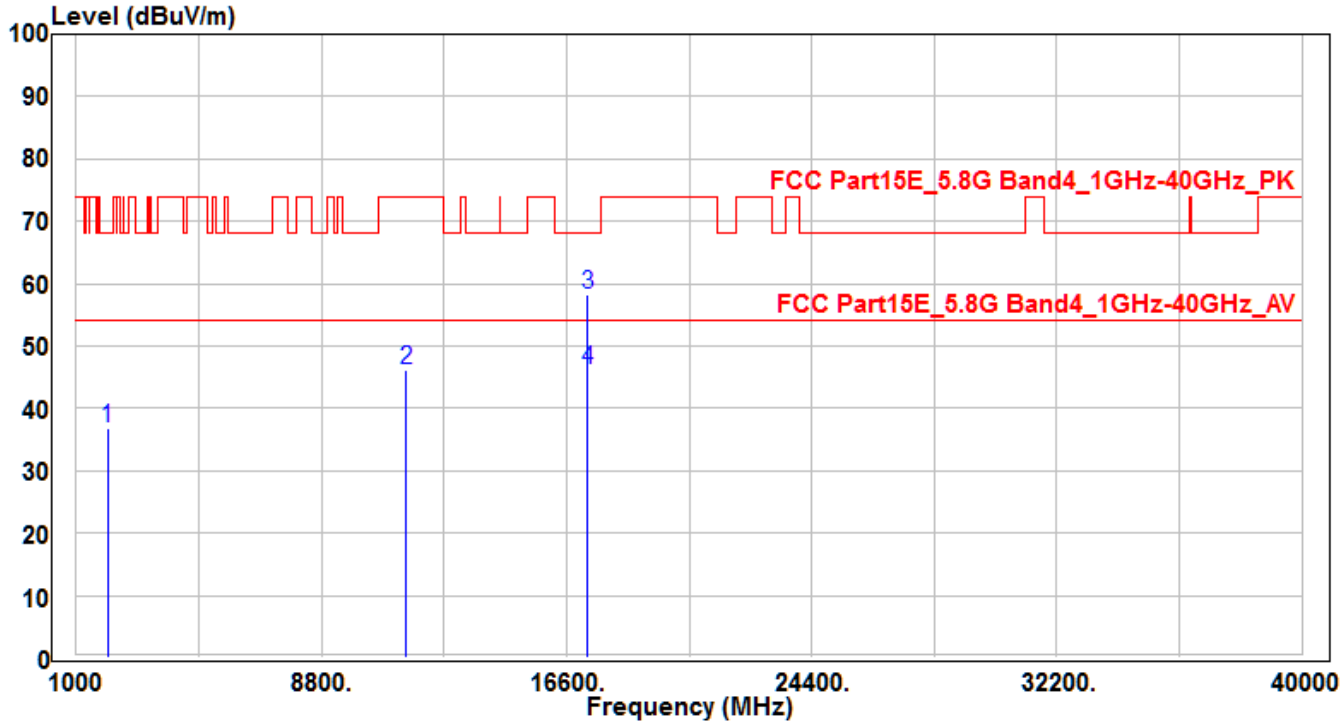


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1185.96	52.21	-7.1	45.11	-28.89	74	150	400	Peak
2		10460	30.35	17.12	47.47	-26.53	74	150	400	Peak
3	*	15690	30.96	20.81	51.77	-22.23	74	150	400	Peak

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH151	Test Voltage	AC 120V/60Hz

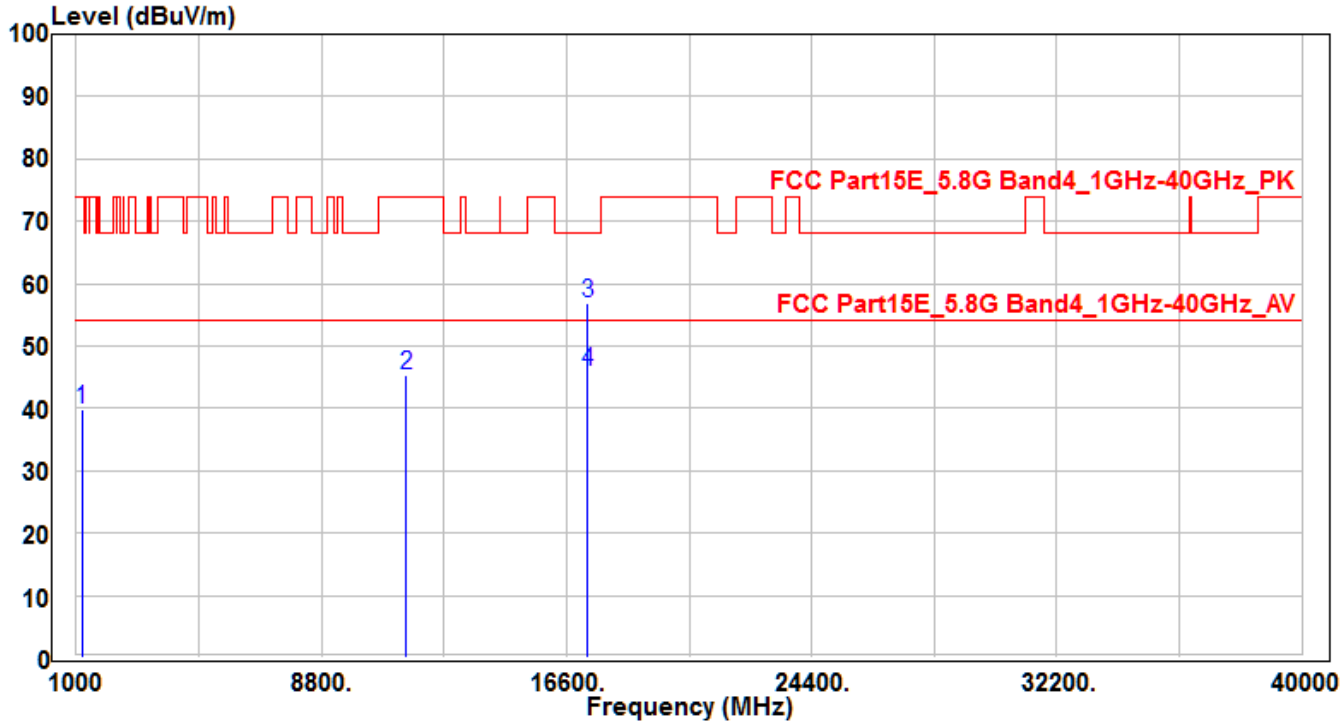


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1995.64	41.52	-4.64	36.88	-31.32	68.2	150	400	Peak
2		11510	27.91	18.34	46.25	-27.75	74	150	400	Peak
3	*	17265	30.94	27.19	58.13	-10.07	68.2	165	120	Peak
4	*	17265	18.95	27.19	46.14	-7.86	54	165	120	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH151	Test Voltage	AC 120V/60Hz

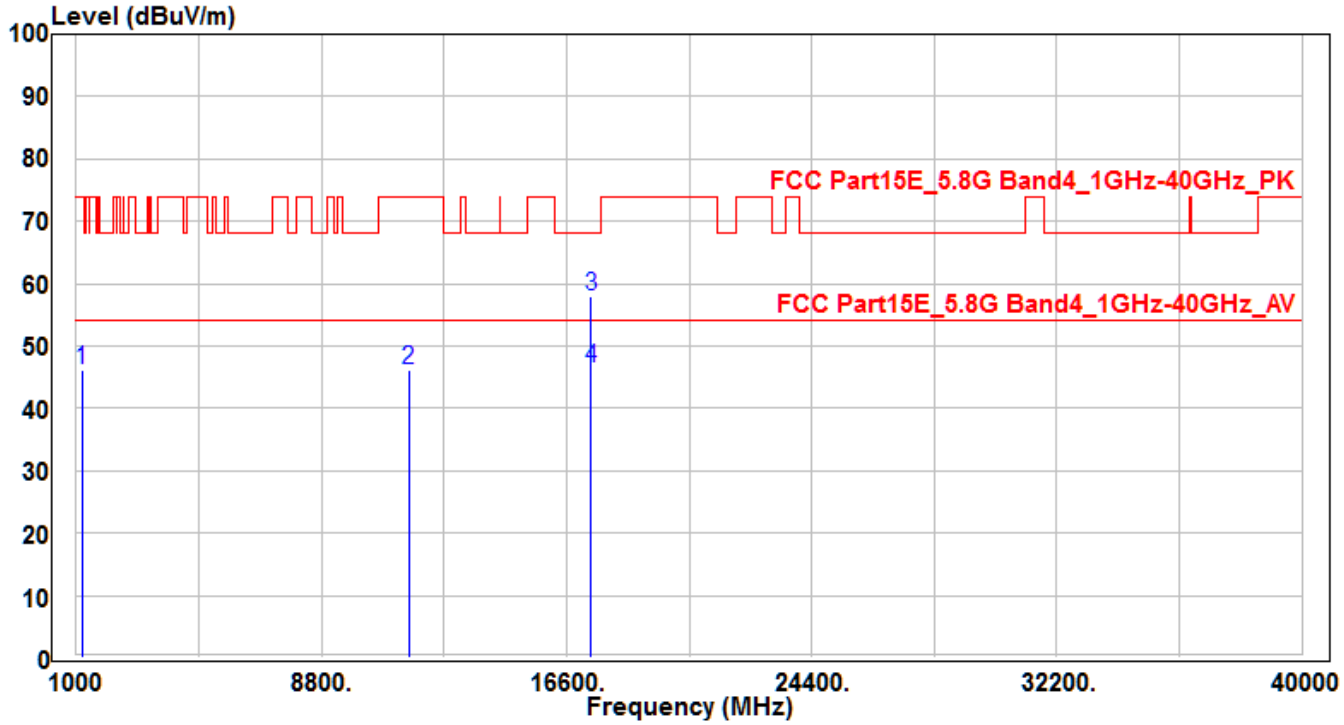


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1194.68	46.96	-7.07	39.89	-34.11	74	150	400	Peak
2		11510	26.92	18.34	45.26	-28.74	74	150	400	Peak
3	*	17265	29.62	27.19	56.81	-11.39	68.2	155	-25	Peak
4	*	17265	18.74	27.19	45.93	-8.07	54	155	-25	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH159	Test Voltage	AC 120V/60Hz

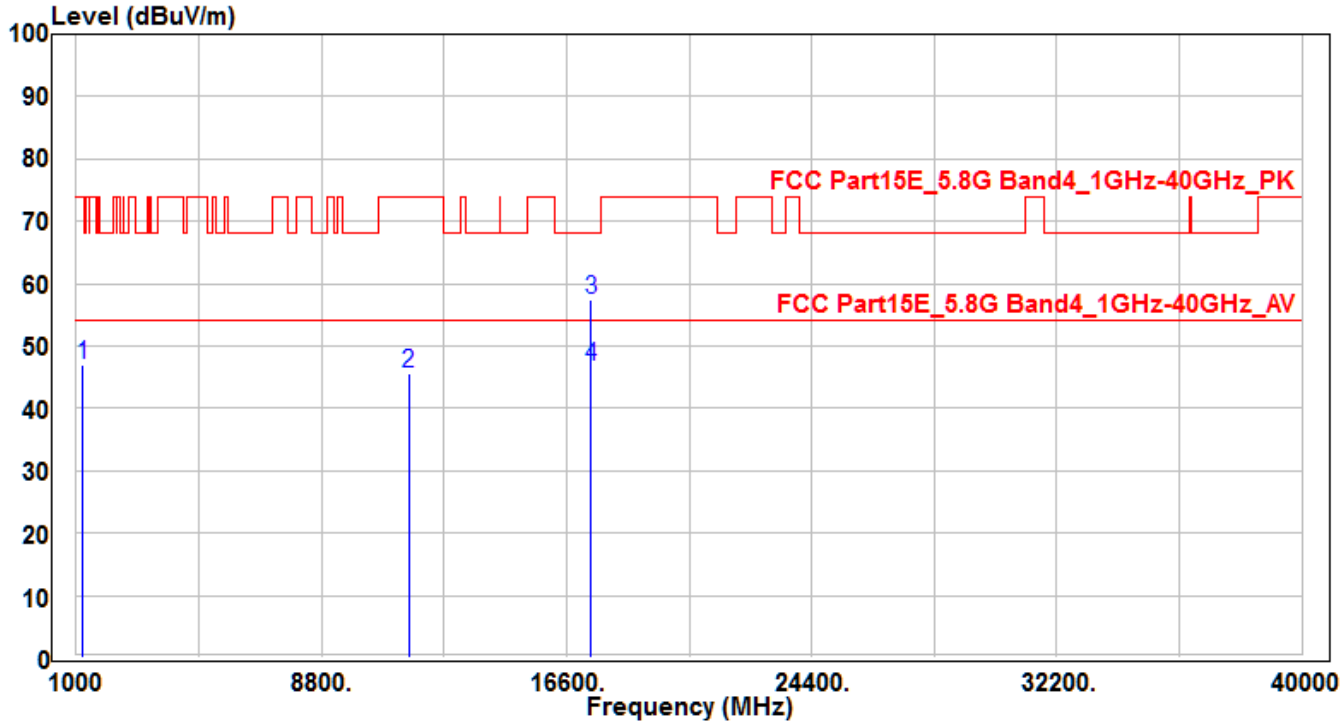


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1193.63	53.19	-7.07	46.12	-27.88	74	150	400	Peak
2		11590	28.03	18.2	46.23	-27.77	74	150	400	Peak
3	*	17385	29.95	28.02	57.97	-10.23	68.2	155	200	Peak
4	*	17385	18.52	28.02	46.54	-7.46	54	155	200	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	25°C / 60%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3 -CH159	Test Voltage	AC 120V/60Hz



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1197.86	54.15	-7.07	47.08	-26.92	74	150	400	Peak
2		11590	27.49	18.2	45.69	-28.31	74	150	400	Peak
3	*	17385	29.38	28.02	57.4	-10.8	68.2	145	210	Peak
4	*	17385	18.65	28.02	46.67	-7.33	54	145	210	Average

Note:

1. " * " means the worst value in this measurement data.
2. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) – Preamplifier(dB)
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

7.8. Radiated Restricted Band Edge Measurement

7.8.1.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 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 5.25-5.35 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 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For FCC 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.

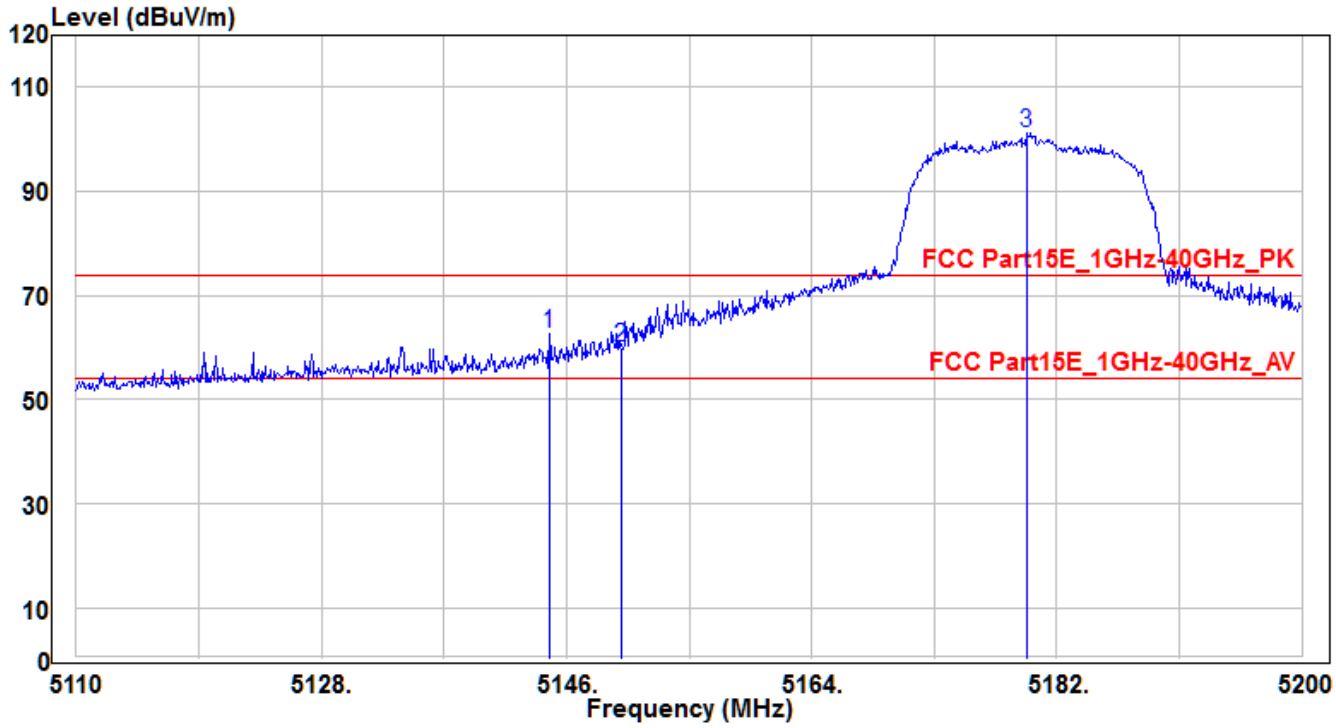
For IC transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.
Refer to KDB 789033 D02v02r01 G)2)c), as specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission 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-Radiated emission limits; general requirements.

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

7.8.2.Test Result

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH36	Test Voltage	AC 120V/60Hz

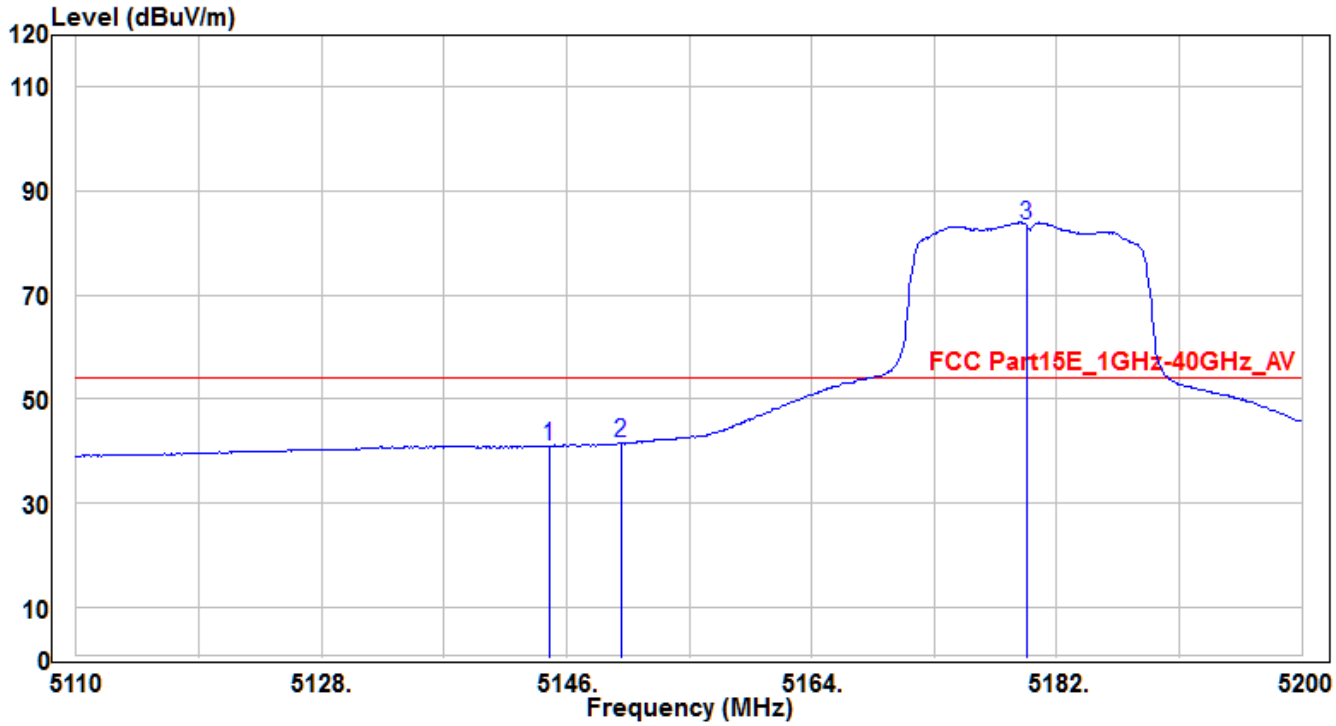


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5144.74	59.19	3.34	62.53	-11.47	74	150	330	Peak
2		5150	56.57	3.36	59.93	-14.07	74	150	330	Peak
3		5179.75	97.67	3.42	101.09	27.09	74	150	330	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH36	Test Voltage	AC 120V/60Hz

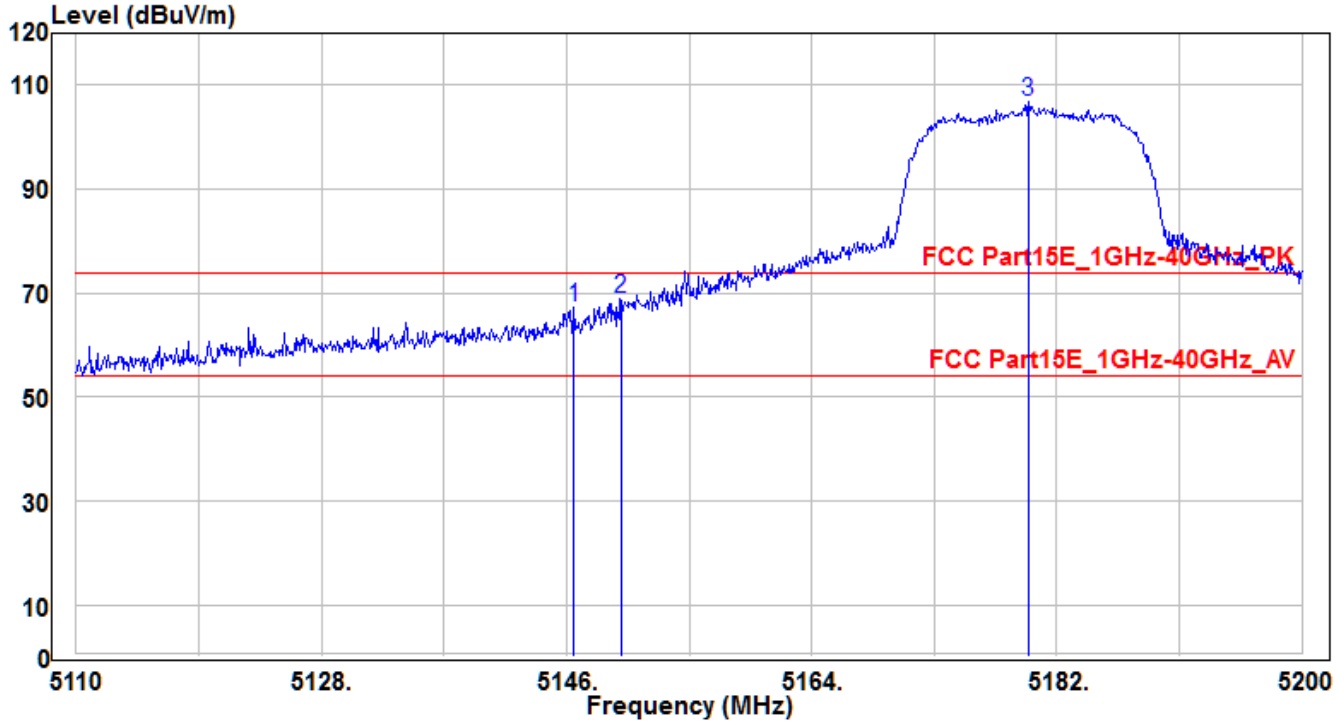


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5144.74	37.62	3.34	40.96	-13.04	54	150	330	Average
2	*	5150	38.04	3.36	41.4	-12.6	54	150	330	Average
3		5179.75	80.07	3.42	83.49	29.49	54	150	330	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH36	Test Voltage	AC 120V/60Hz

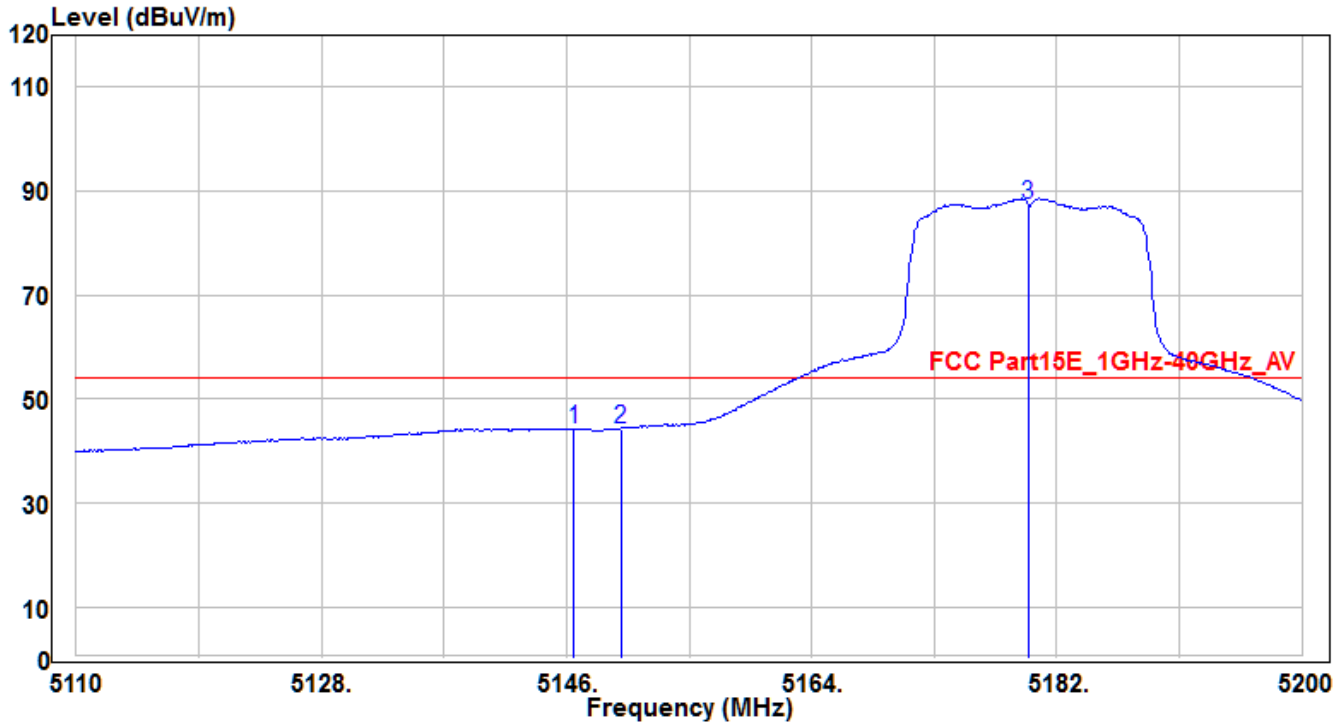


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5146.54	63.86	3.34	67.2	-6.8	74	180	280	Peak
2	*	5150	65.48	3.36	68.84	-5.16	74	180	280	Peak
3		5179.93	103.36	3.42	106.78	32.78	74	180	280	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH36	Test Voltage	AC 120V/60Hz

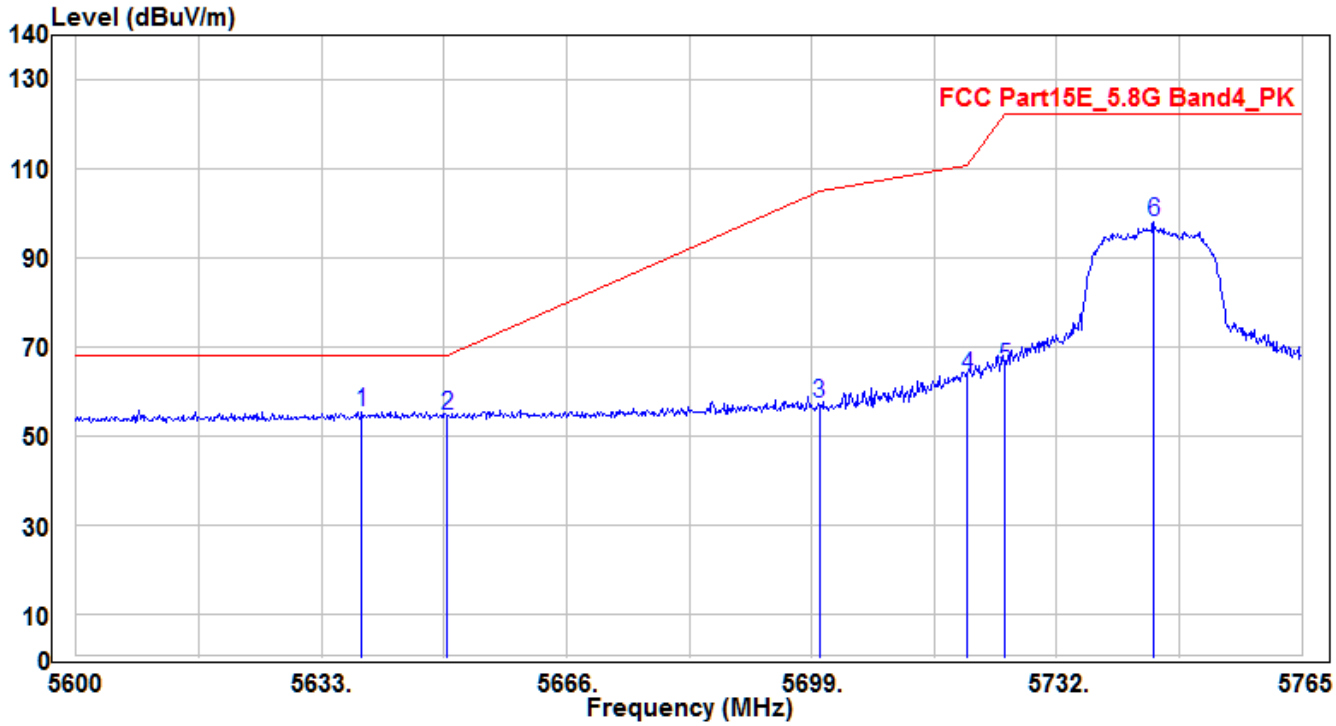


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5146.54	40.86	3.34	44.2	-9.8	54	180	280	Average
2	*	5150	40.94	3.36	44.3	-9.7	54	180	280	Average
3		5179.93	84.04	3.42	87.46	33.46	54	180	280	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH149	Test Voltage	AC 120V/60Hz

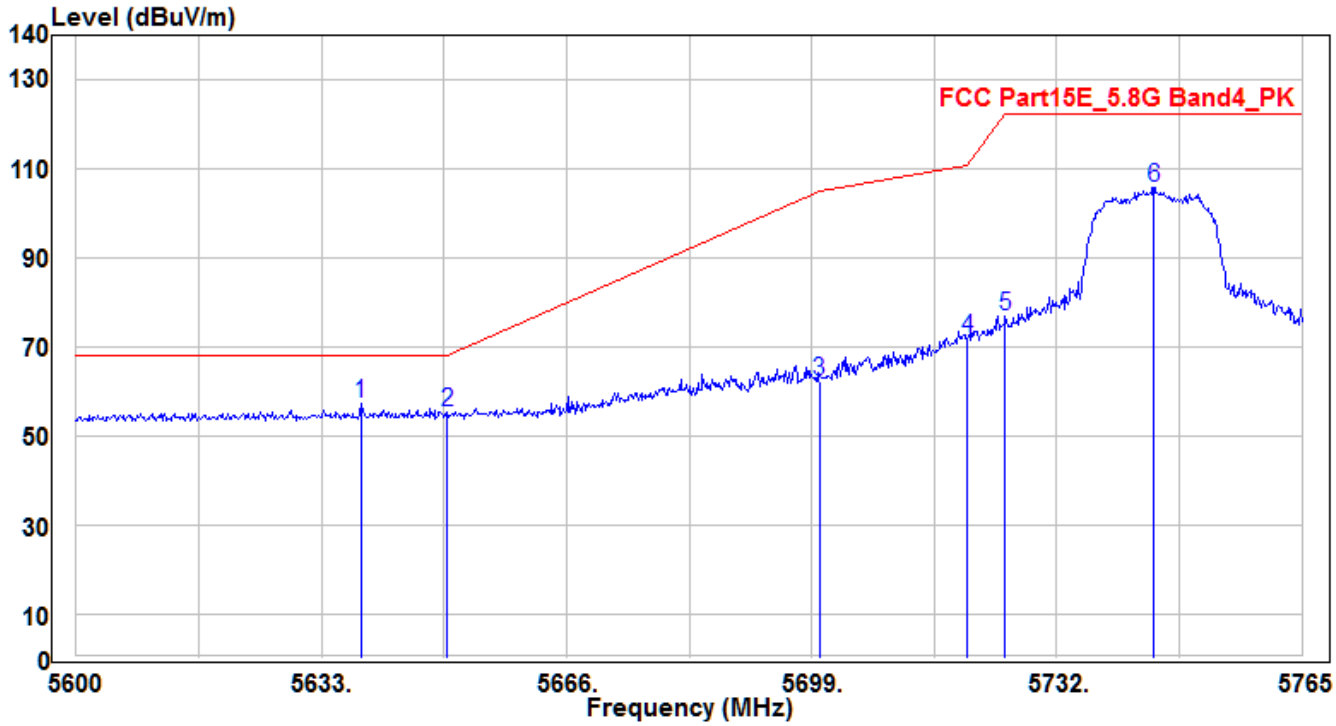


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5638.445	50.73	4.6	55.33	-12.87	68.2	160	340	Peak
2		5650	49.95	4.65	54.6	-13.6	68.2	160	340	Peak
3		5700	52.67	4.84	57.51	-47.69	105.2	160	340	Peak
4		5720	58.47	4.91	63.38	-47.42	110.8	160	340	Peak
5		5725	60.5	4.93	65.43	-56.77	122.2	160	340	Peak
6		5745.035	93	5.01	98.01	-24.19	122.2	160	340	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH149	Test Voltage	AC 120V/60Hz

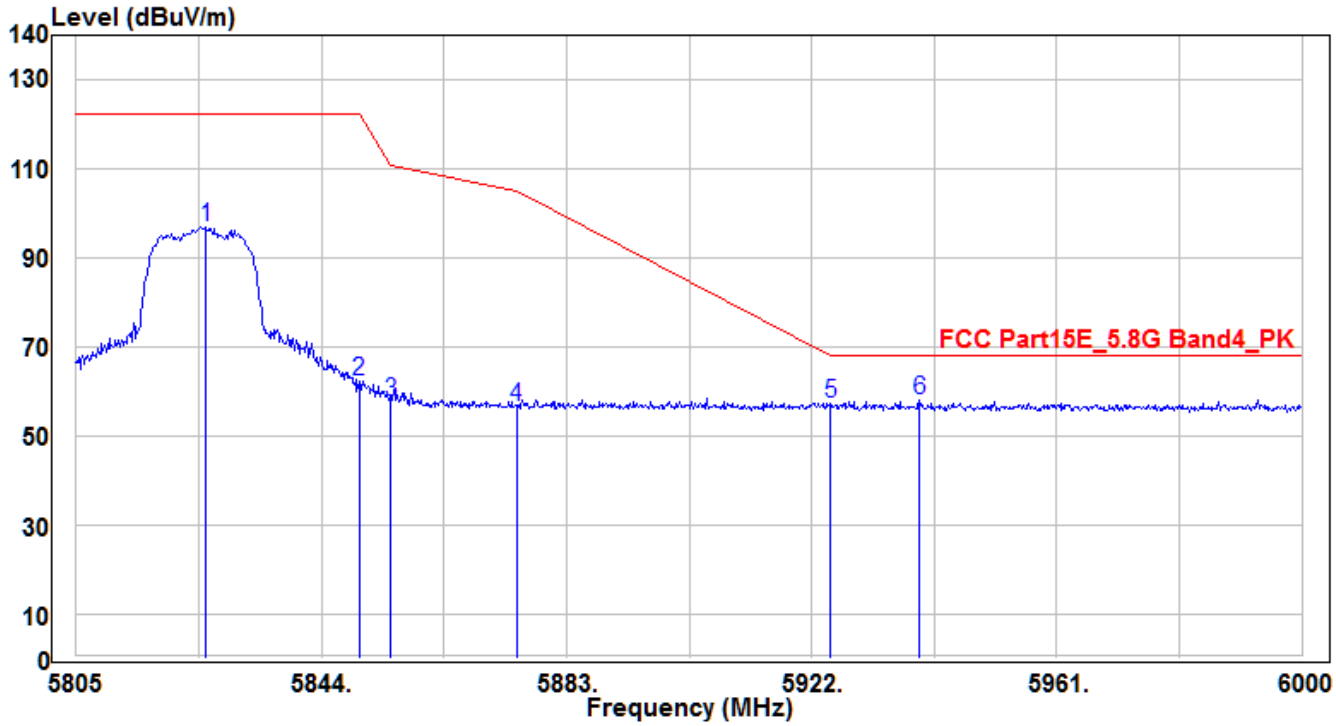


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5638.28	52.64	4.6	57.24	-10.96	68.2	150	270	Peak
2		5650	50.79	4.65	55.44	-12.76	68.2	150	270	Peak
3		5700	57.55	4.84	62.39	-42.81	105.2	150	270	Peak
4		5720	67.15	4.91	72.06	-38.74	110.8	150	270	Peak
5		5725	72.04	4.93	76.97	-45.23	122.2	150	270	Peak
6		5745.035	100.93	5.01	105.94	-16.26	122.2	150	270	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH165	Test Voltage	AC 120V/60Hz

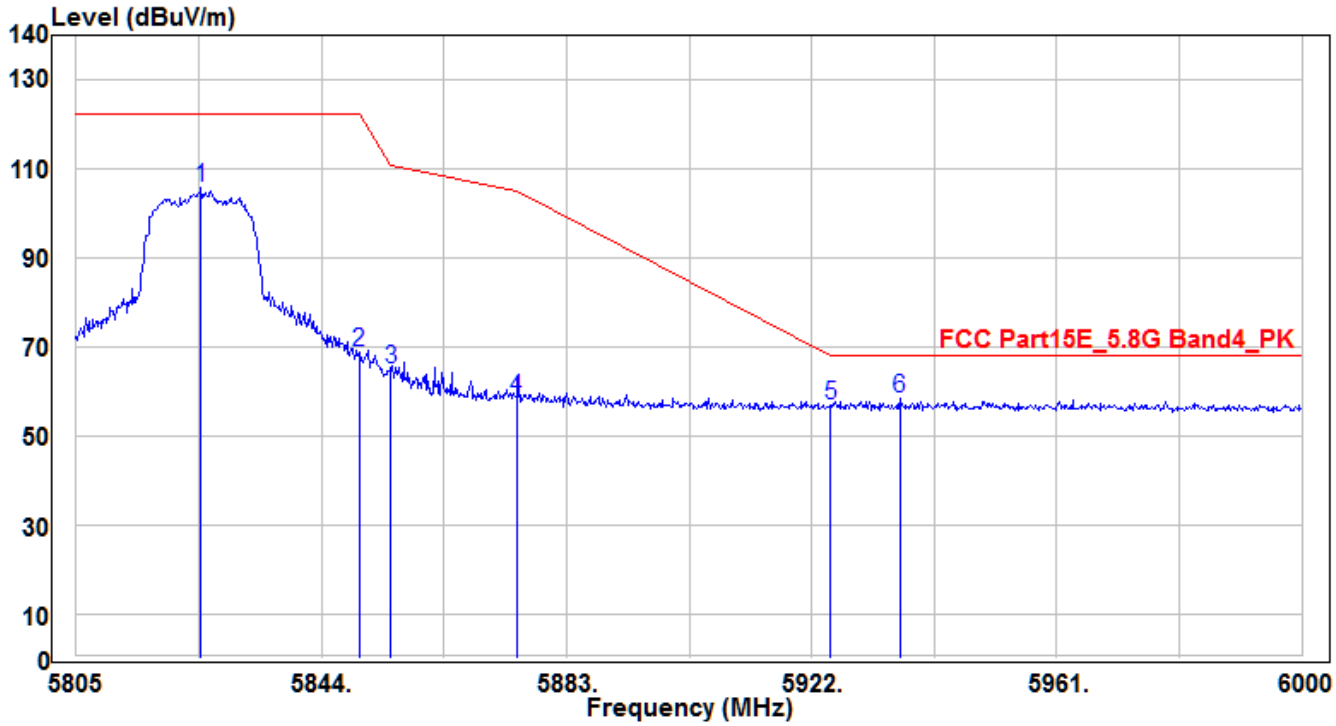


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5825.67	91.56	5.32	96.88	-25.32	122.2	175	-30	Peak
2		5850	56.91	5.41	62.32	-59.88	122.2	175	-30	Peak
3		5855	52.17	5.44	57.61	-53.19	110.8	175	-30	Peak
4		5875	51.04	5.51	56.55	-48.65	105.2	175	-30	Peak
5		5925	51.45	5.7	57.15	-11.05	68.2	175	-30	Peak
6	*	5939.16	52.37	5.75	58.12	-10.08	68.2	175	-30	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE1-CH165	Test Voltage	AC 120V/60Hz

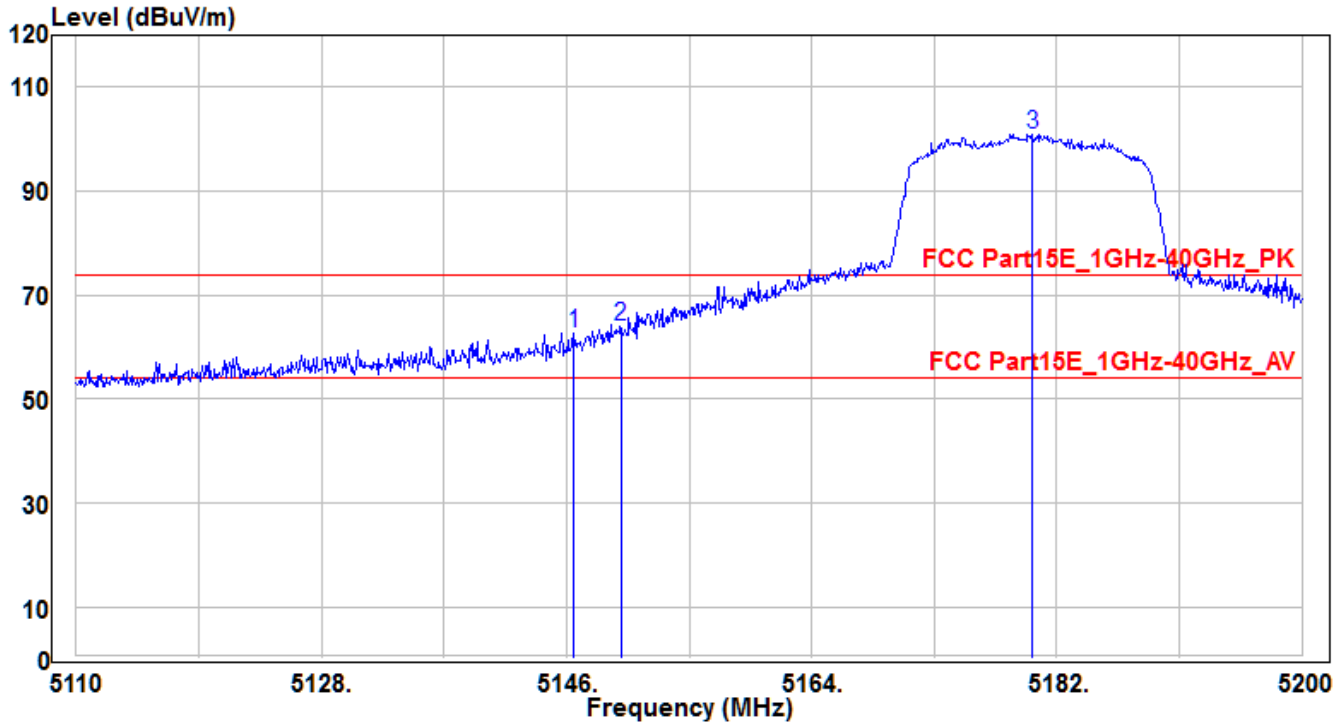


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5824.89	100.46	5.31	105.77	-16.43	122.2	185	310	Peak
2		5850	63.61	5.41	69.02	-53.18	122.2	185	310	Peak
3		5855	59.75	5.44	65.19	-45.61	110.8	185	310	Peak
4		5875	53.02	5.51	58.53	-46.67	105.2	185	310	Peak
5		5925	51.19	5.7	56.89	-11.31	68.2	185	310	Peak
6	*	5936.04	52.75	5.75	58.5	-9.7	68.2	185	310	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH36	Test Voltage	AC 120V/60Hz

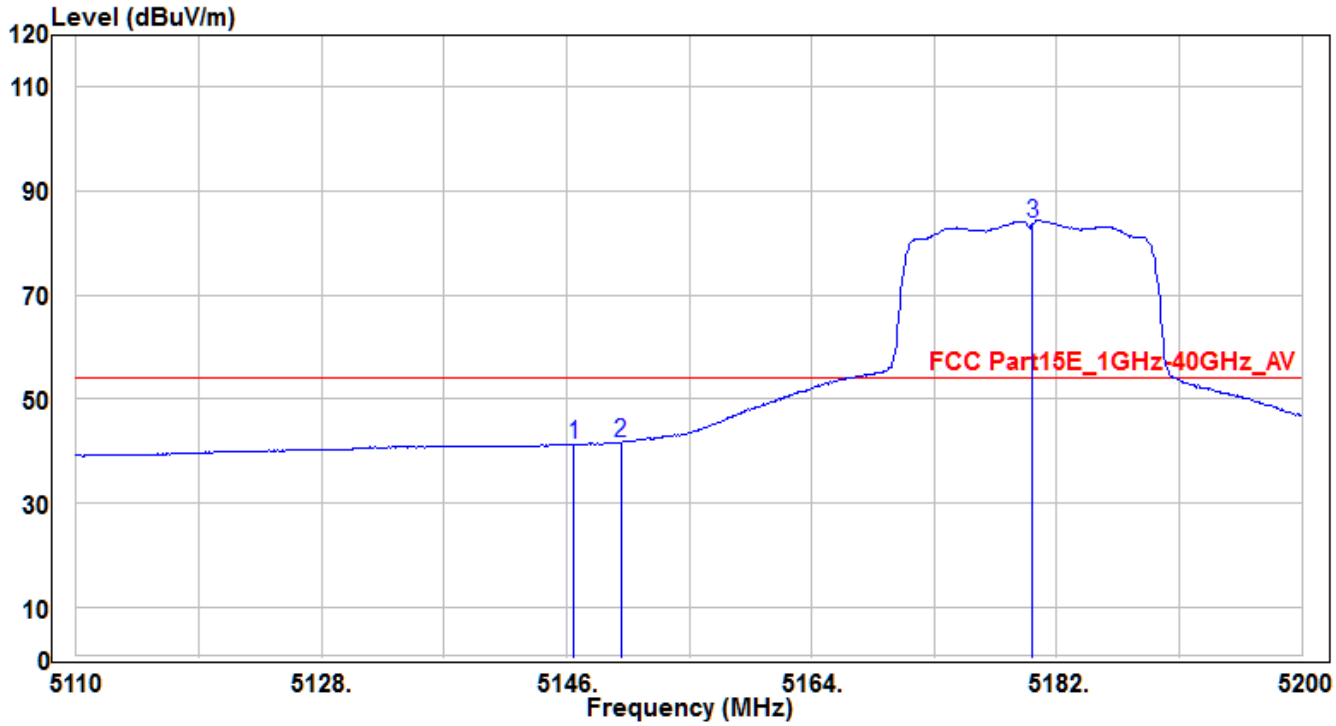


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5146.54	59.25	3.34	62.59	-11.41	74	170	-35	Peak
2	*	5150	60.73	3.36	64.09	-9.91	74	170	-35	Peak
3		5180.2	97.57	3.42	100.99	26.99	74	170	-35	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH36	Test Voltage	AC 120V/60Hz

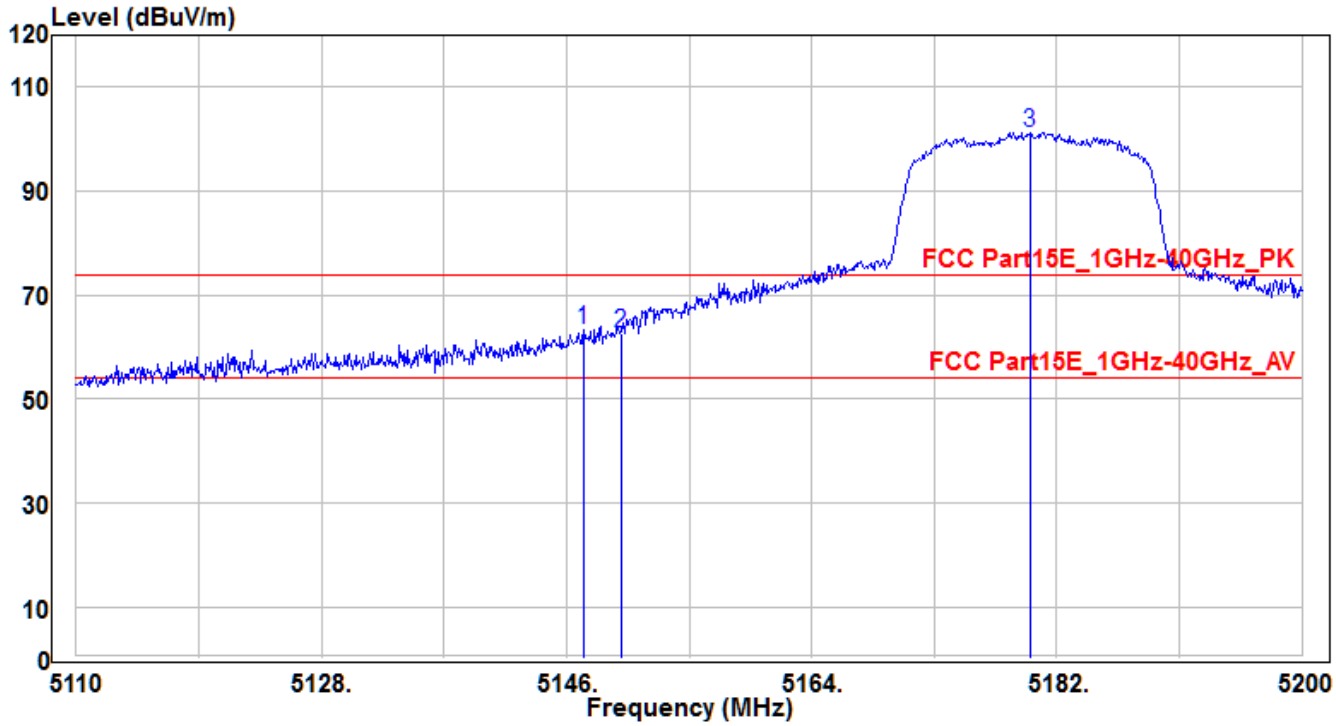


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5146.54	37.78	3.34	41.12	-12.88	54	170	-35	Average
2	*	5150	38.32	3.36	41.68	-12.32	54	170	-35	Average
3		5180.2	80.17	3.42	83.59	29.59	54	170	-35	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH36	Test Voltage	AC 120V/60Hz

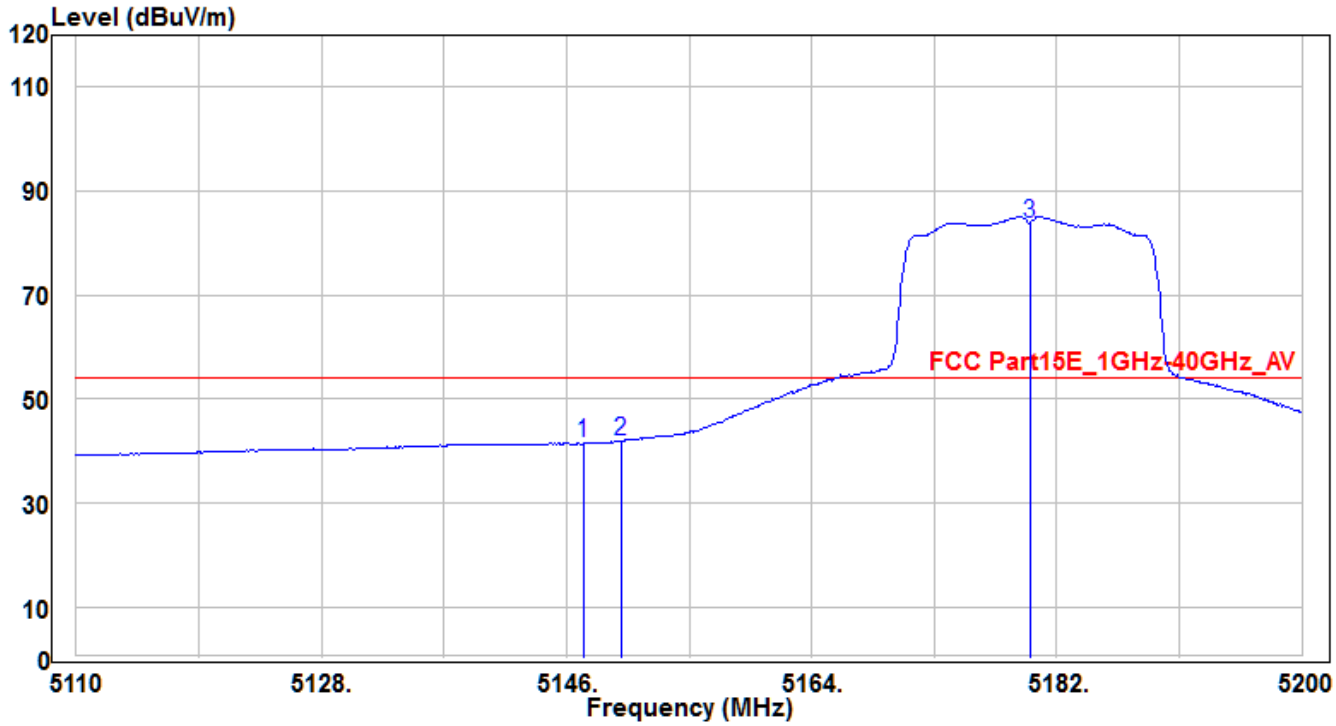


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5147.26	60	3.35	63.35	-10.65	74	165	325	Peak
2		5150	59.4	3.36	62.76	-11.24	74	165	325	Peak
3		5180.02	97.75	3.42	101.17	27.17	74	165	325	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH36	Test Voltage	AC 120V/60Hz

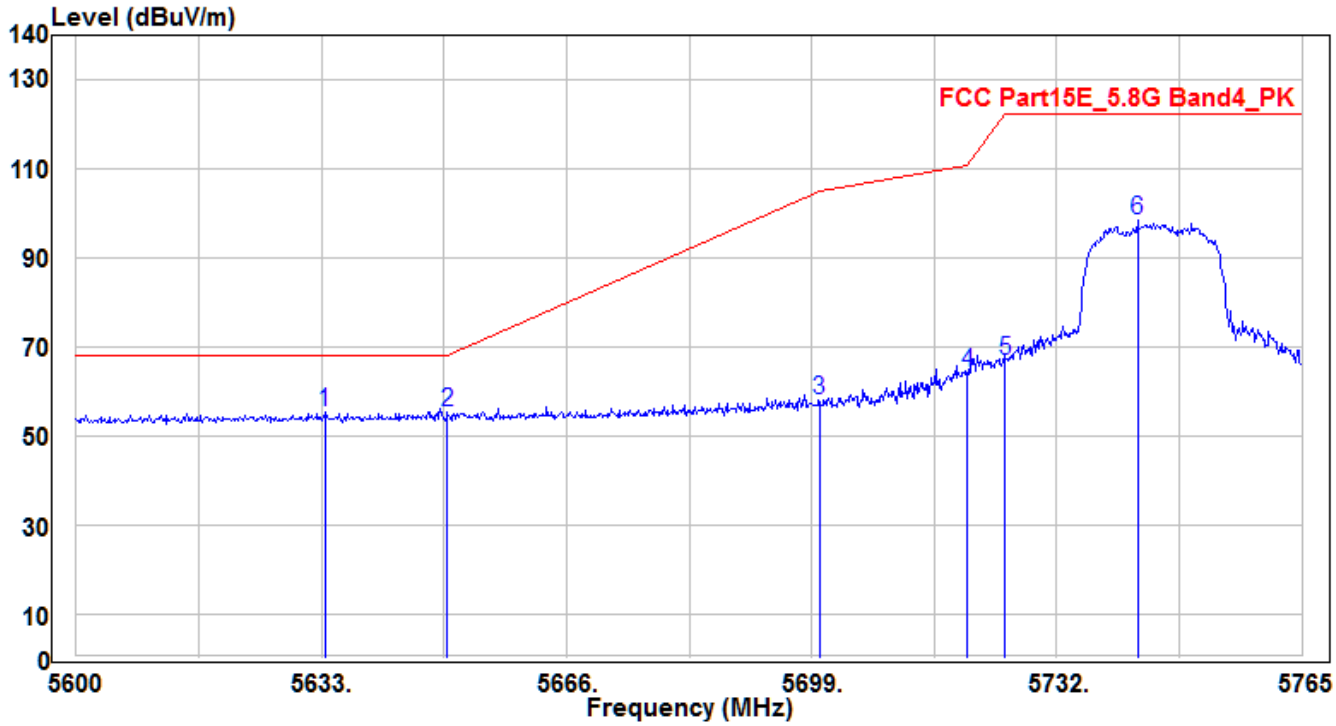


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5147.26	38.11	3.35	41.46	-12.54	54	165	325	Average
2	*	5150	38.53	3.36	41.89	-12.11	54	165	325	Average
3		5180.02	80.19	3.42	83.61	29.61	54	165	325	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH149	Test Voltage	AC 120V/60Hz

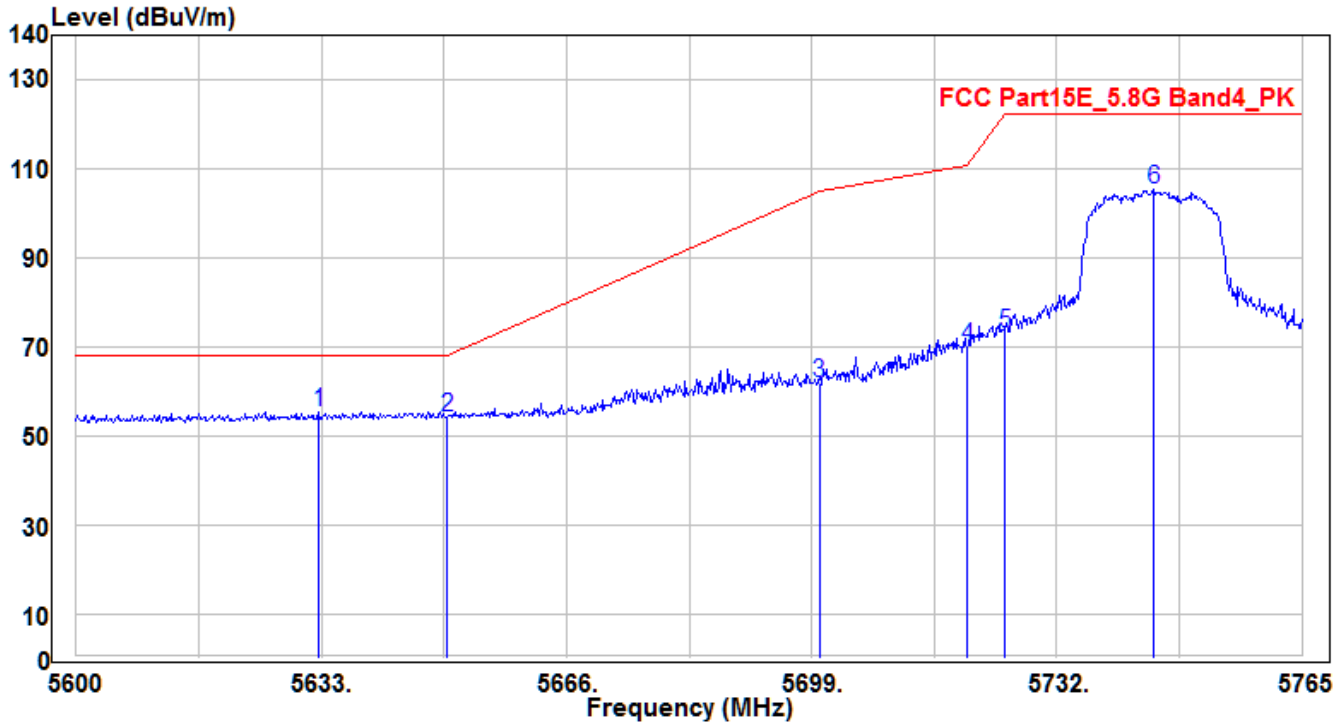


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5633.495	50.64	4.58	55.22	-12.98	68.2	155	-40	Peak
2	*	5650	50.59	4.65	55.24	-12.96	68.2	155	-40	Peak
3		5700	53.36	4.84	58.2	-47	105.2	155	-40	Peak
4		5720	59.2	4.91	64.11	-46.69	110.8	155	-40	Peak
5		5725	62.02	4.93	66.95	-55.25	122.2	155	-40	Peak
6		5742.89	93.37	5	98.37	-23.83	122.2	155	-40	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH149	Test Voltage	AC 120V/60Hz

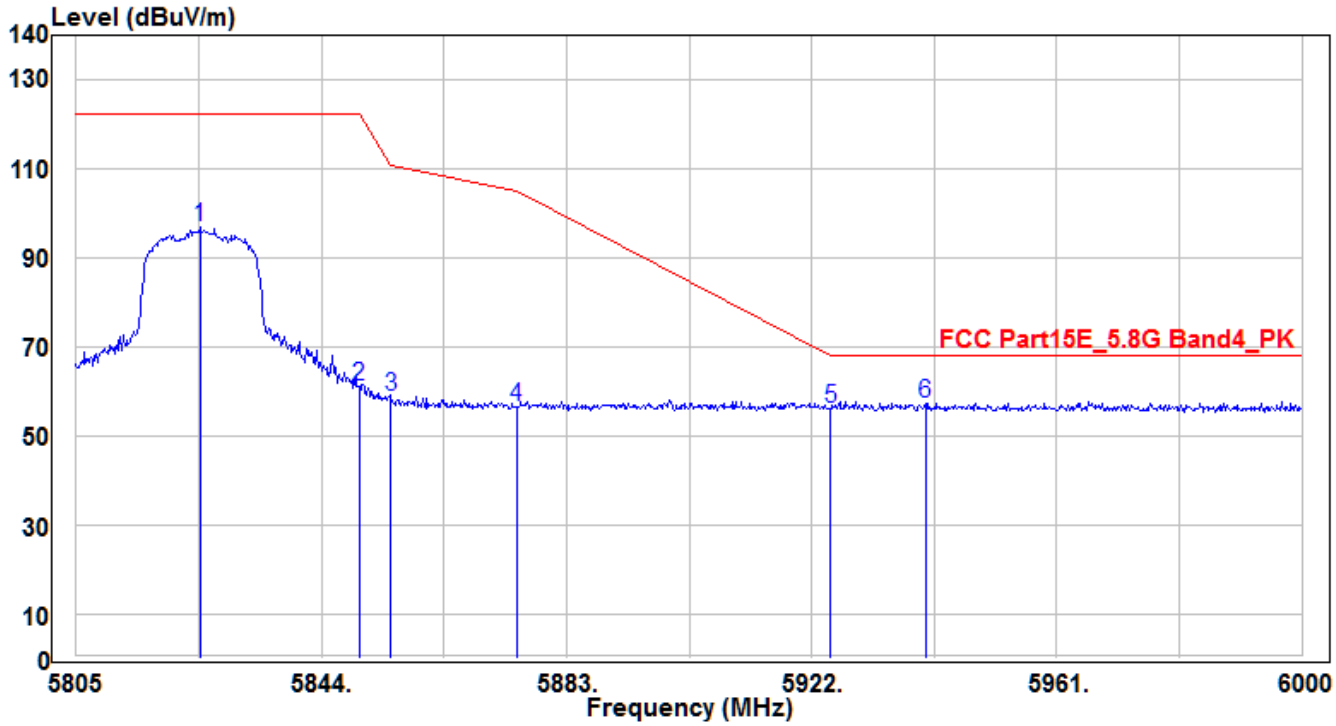


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5632.67	50.97	4.58	55.55	-12.65	68.2	165	310	Peak
2		5650	49.67	4.65	54.32	-13.88	68.2	165	310	Peak
3		5700	57.02	4.84	61.86	-43.34	105.2	165	310	Peak
4		5720	65.28	4.91	70.19	-40.61	110.8	165	310	Peak
5		5725	68.31	4.93	73.24	-48.96	122.2	165	310	Peak
6		5745.035	100.26	5.01	105.27	-16.93	122.2	165	310	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH165	Test Voltage	AC 120V/60Hz

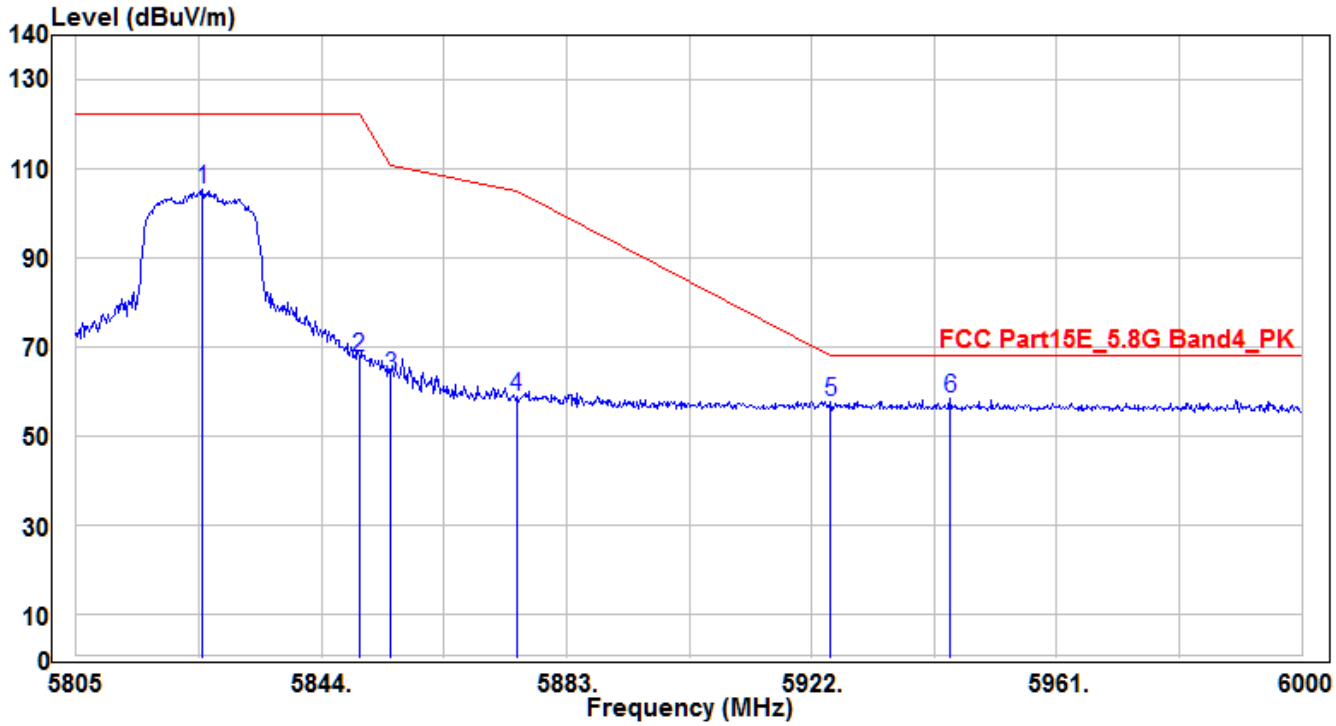


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5824.695	91.44	5.31	96.75	-25.45	122.2	155	-25	Peak
2		5850	55.92	5.41	61.33	-60.87	122.2	155	-25	Peak
3		5855	53.3	5.44	58.74	-52.06	110.8	155	-25	Peak
4		5875	51.09	5.51	56.6	-48.6	105.2	155	-25	Peak
5		5925	50.54	5.7	56.24	-11.96	68.2	155	-25	Peak
6	*	5940.135	51.47	5.76	57.23	-10.97	68.2	155	-25	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE2-CH165	Test Voltage	AC 120V/60Hz

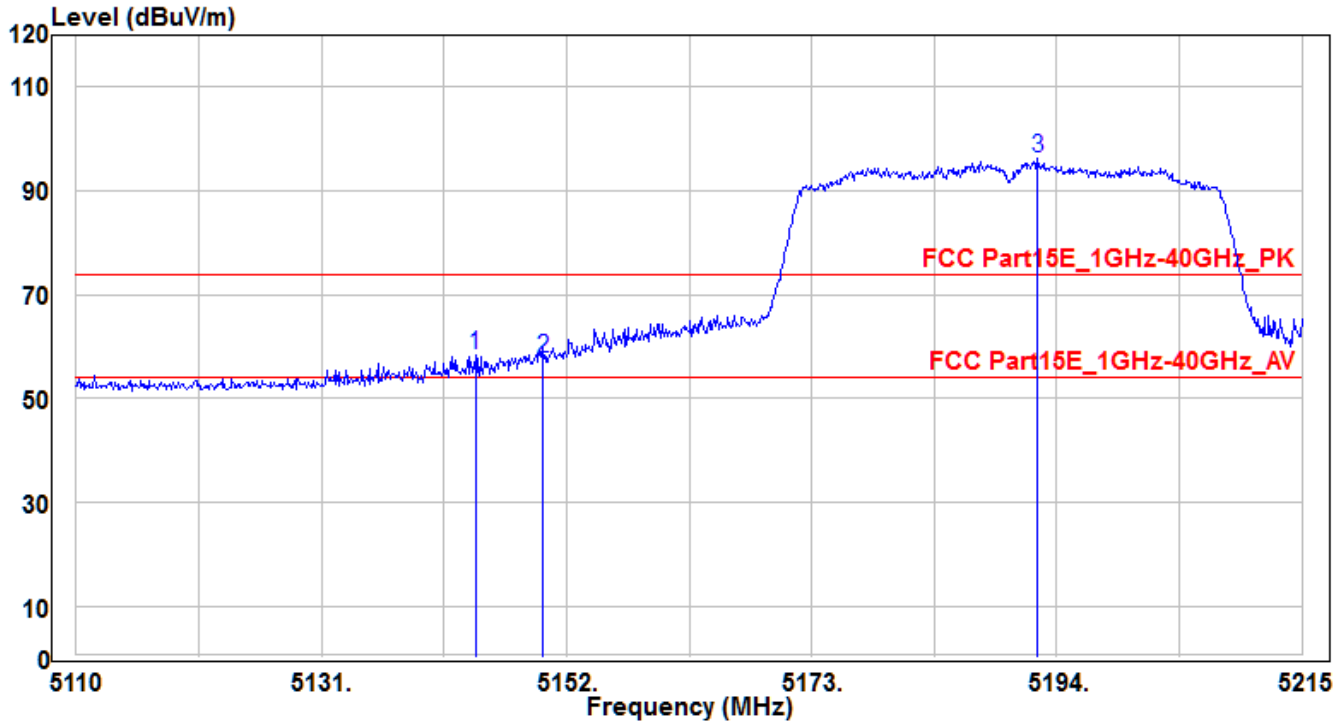


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5825.085	99.97	5.32	105.29	-16.91	122.2	215	310	Peak
2		5850	62.32	5.41	67.73	-54.47	122.2	215	310	Peak
3		5855	57.98	5.44	63.42	-47.38	110.8	215	310	Peak
4		5875	53.42	5.51	58.93	-46.27	105.2	215	310	Peak
5		5925	51.96	5.7	57.66	-10.54	68.2	215	310	Peak
6	*	5944.035	52.69	5.77	58.46	-9.74	68.2	215	310	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH38	Test Voltage	AC 120V/60Hz

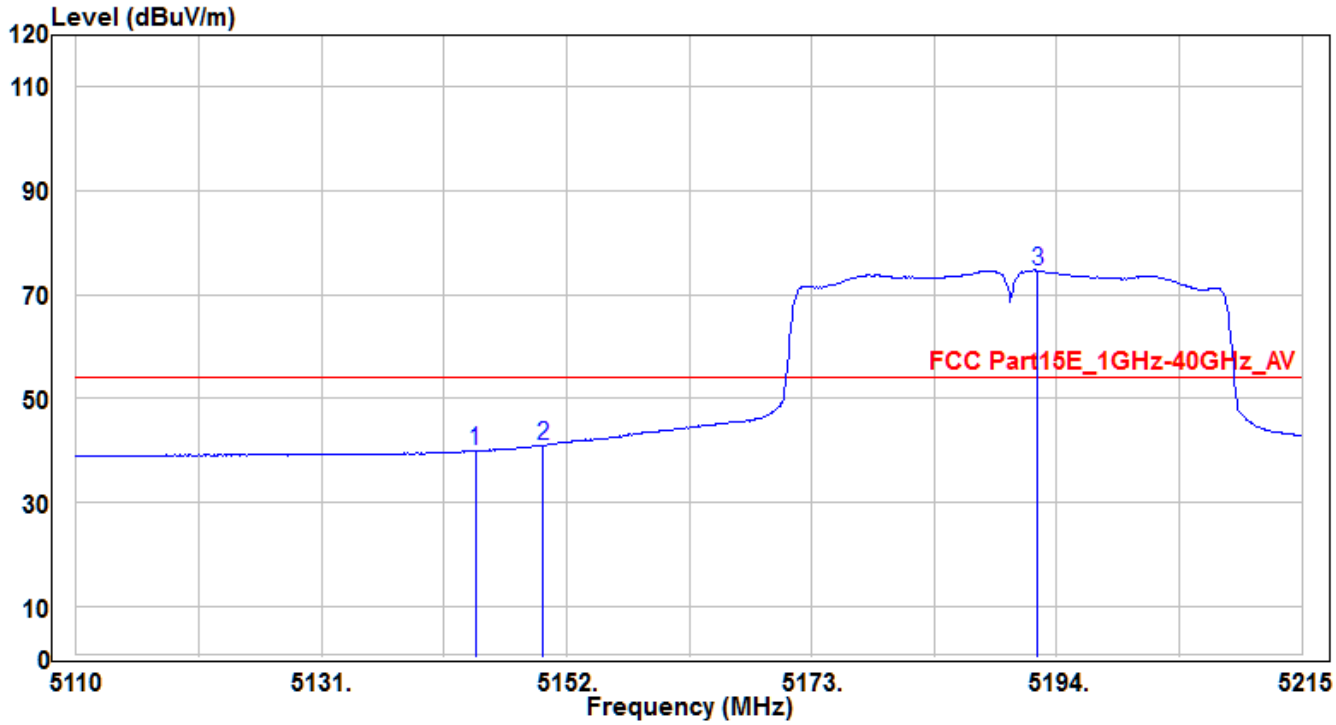


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5144.23	54.87	3.34	58.21	-15.79	74	150	-20	Peak
2		5150	54.27	3.36	57.63	-16.37	74	150	-20	Peak
3		5192.32	92.74	3.44	96.18	22.18	74	150	-20	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH38	Test Voltage	AC 120V/60Hz

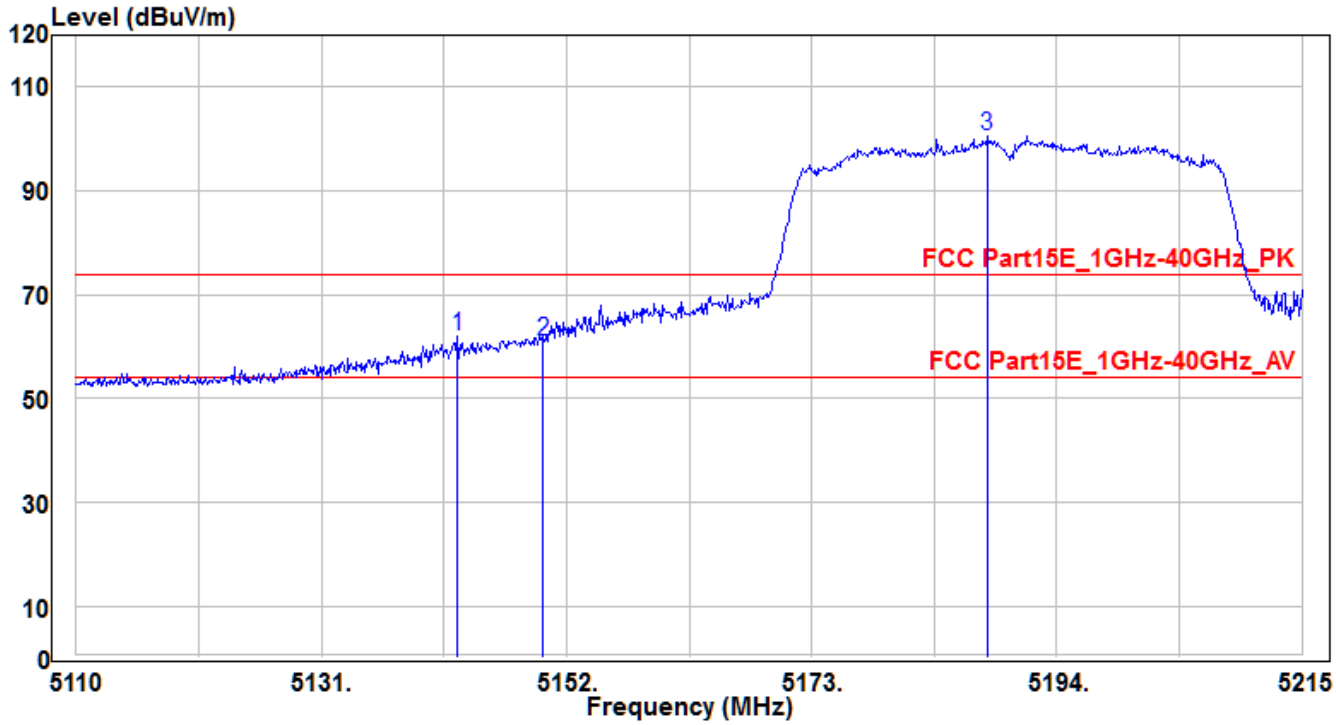


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5144.23	36.52	3.34	39.86	-14.14	54	150	-20	Average
2	*	5150	37.55	3.36	40.91	-13.09	54	150	-20	Average
3		5192.32	71.22	3.44	74.66	20.66	54	150	-20	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH38	Test Voltage	AC 120V/60Hz

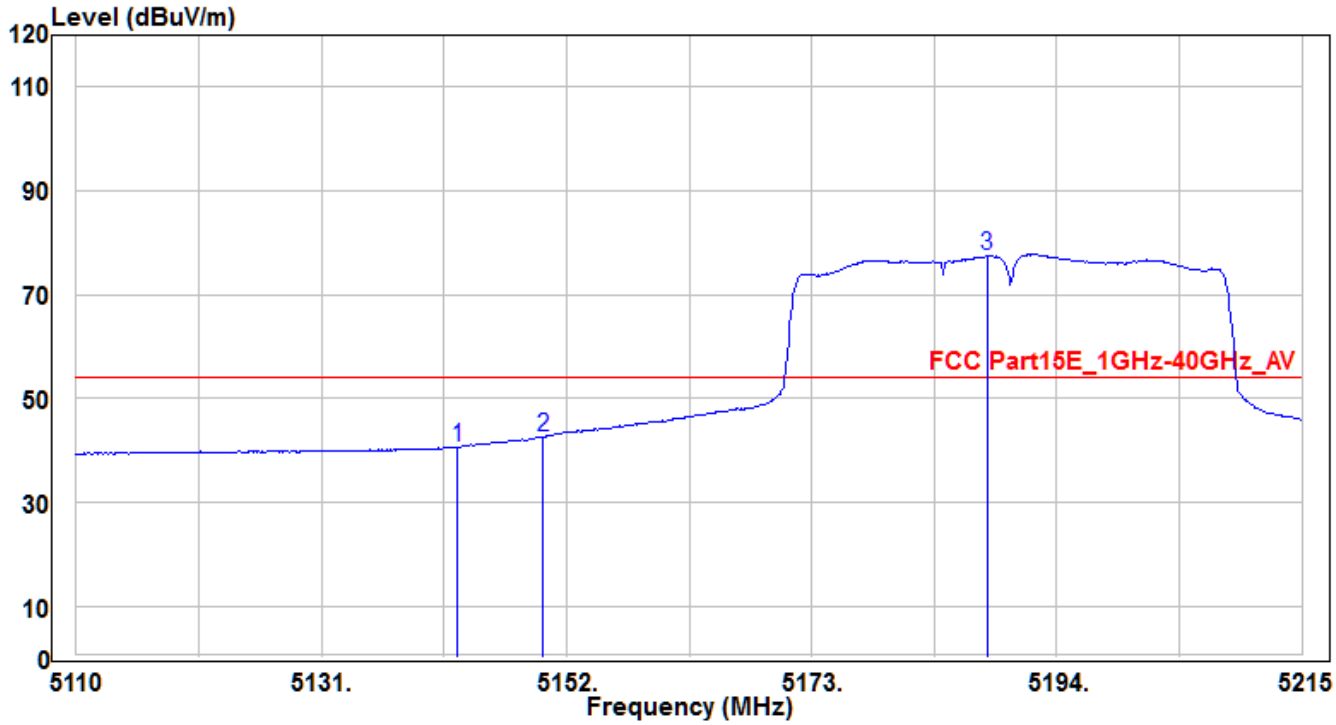


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5142.655	58.54	3.34	61.88	-12.12	74	150	300	Peak
2		5150	57.75	3.36	61.11	-12.89	74	150	300	Peak
3		5188.015	97.19	3.43	100.62	26.62	74	150	300	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH38	Test Voltage	AC 120V/60Hz

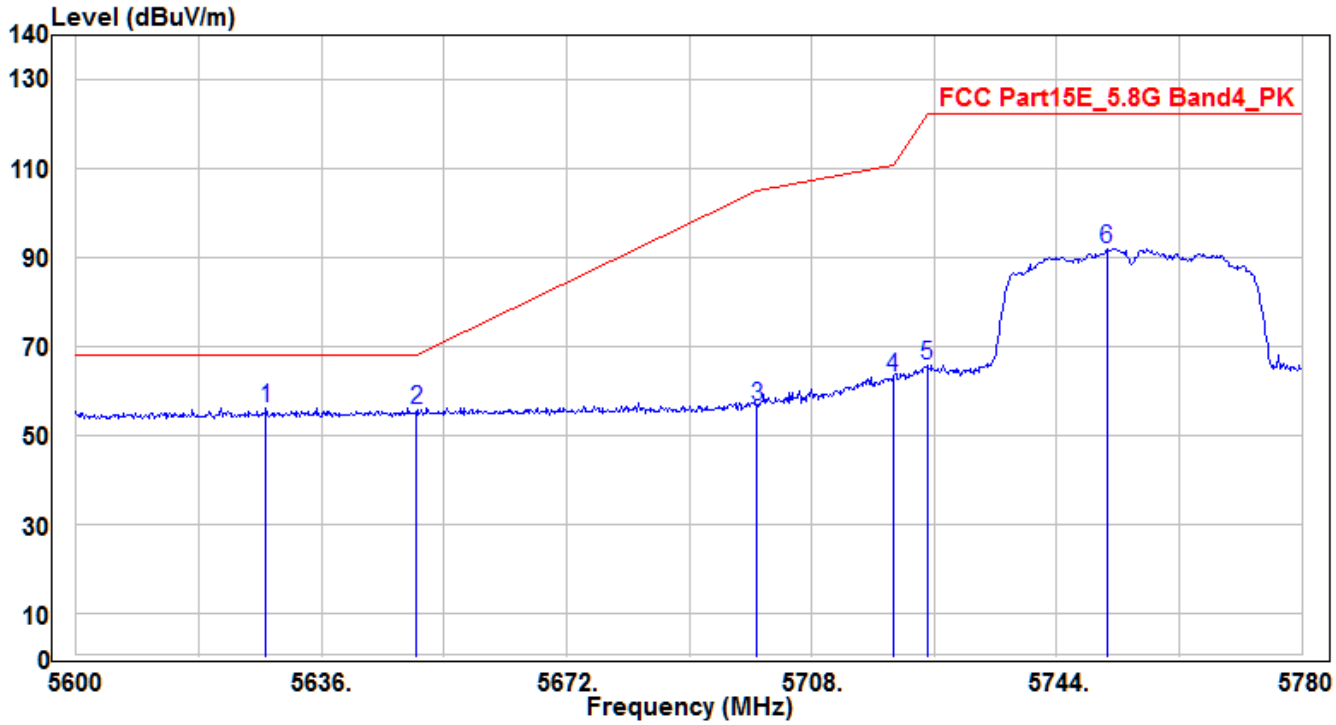


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5142.655	37.32	3.34	40.66	-13.34	54	150	300	Average
2	*	5150	39.3	3.36	42.66	-11.34	54	150	300	Average
3		5188.015	74.04	3.43	77.47	23.47	54	150	300	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH151	Test Voltage	AC 120V/60Hz

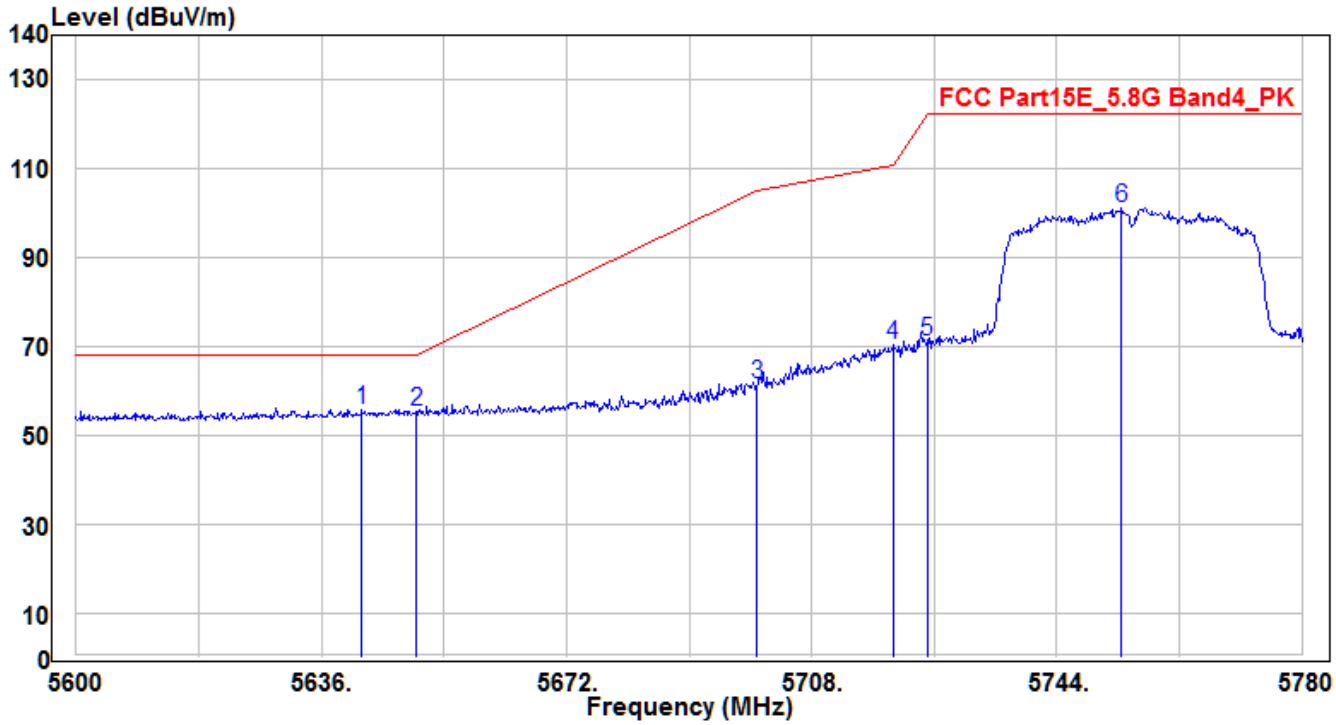


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5627.9	51.57	4.56	56.13	-12.07	68.2	150	335	Peak
2		5650	51.07	4.65	55.72	-12.48	68.2	150	335	Peak
3		5700	51.85	4.84	56.69	-48.51	105.2	150	335	Peak
4		5720	58.14	4.91	63.05	-47.75	110.8	150	335	Peak
5		5725	60.69	4.93	65.62	-56.58	122.2	150	335	Peak
6		5751.38	87.05	5.03	92.08	-30.12	122.2	150	335	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH151	Test Voltage	AC 120V/60Hz

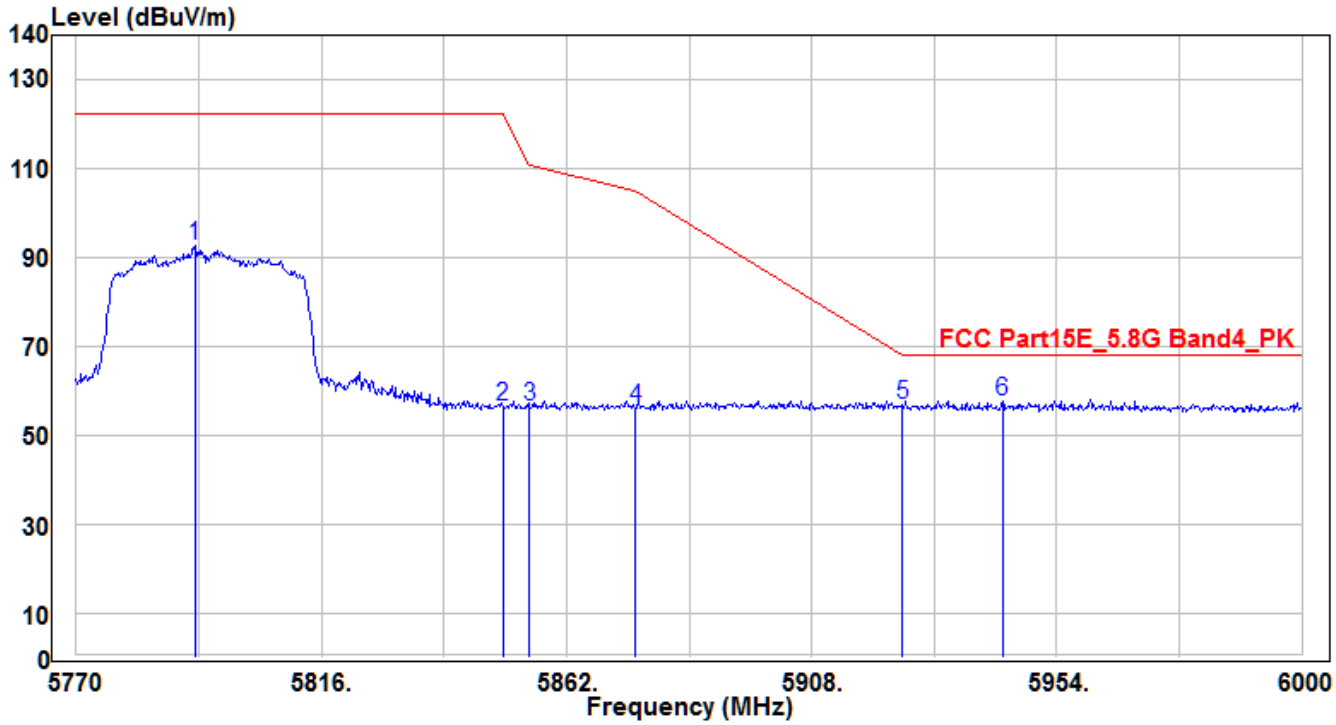


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	5641.94	51.16	4.62	55.78	-12.42	68.2	190	275	Peak
2		5650	50.88	4.65	55.53	-12.67	68.2	190	275	Peak
3		5700	56.62	4.84	61.46	-43.74	105.2	190	275	Peak
4		5720	65.68	4.91	70.59	-40.21	110.8	190	275	Peak
5		5725	66.09	4.93	71.02	-51.18	122.2	190	275	Peak
6		5753.54	95.99	5.04	101.03	-21.17	122.2	190	275	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Horizontal	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH159	Test Voltage	AC 120V/60Hz

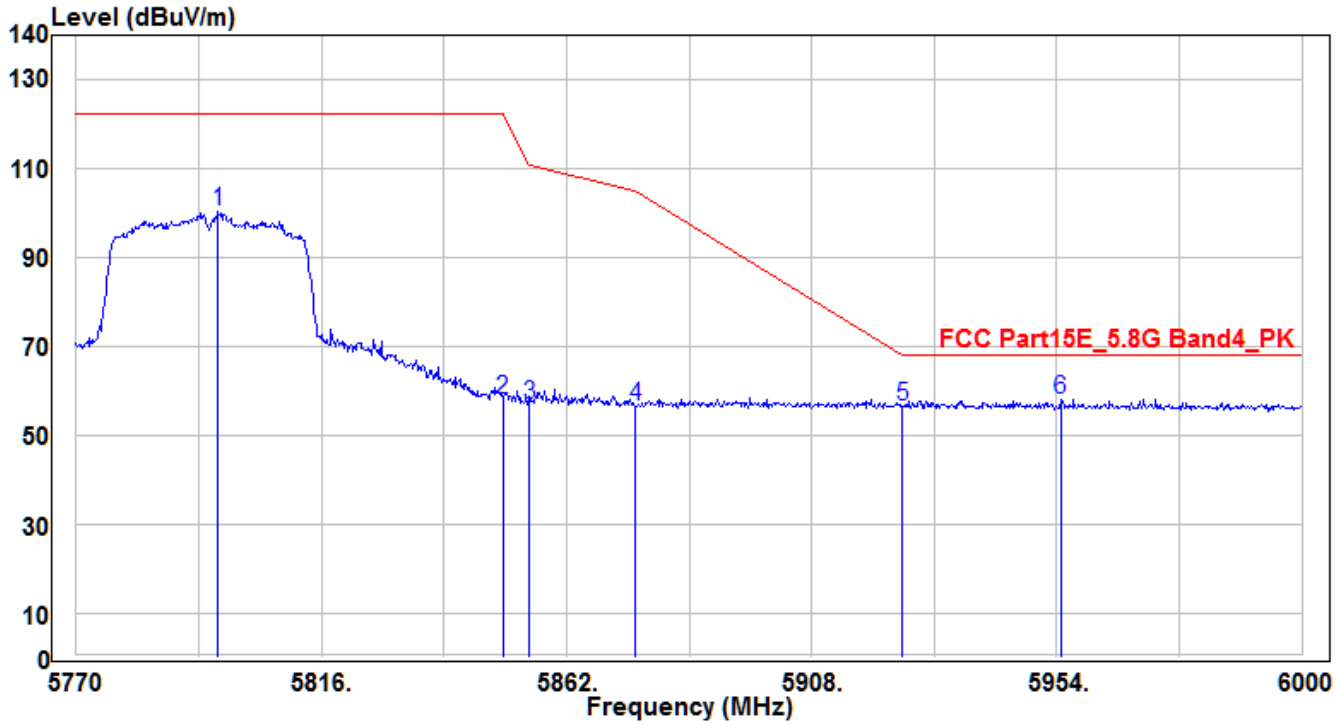


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5792.31	87.46	5.2	92.66	-29.54	122.2	155	325	Peak
2		5850	51.18	5.41	56.59	-65.61	122.2	155	325	Peak
3		5855	51.2	5.44	56.64	-54.16	110.8	155	325	Peak
4		5875	50.67	5.51	56.18	-49.02	105.2	155	325	Peak
5		5925	51.43	5.7	57.13	-11.07	68.2	155	325	Peak
6	*	5943.88	52.03	5.77	57.8	-10.4	68.2	155	325	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

EUT	Gateway	Test Date	2018/4/12
Factor	BBHA 9120D (1GHz~18GHz)	Temp. / Humidity	21°C / 57%
Polarity	Vertical	Site / Engineer	AC1 / Peter
Test Mode	MODE3-CH159	Test Voltage	AC 120V/60Hz



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		5796.68	95.09	5.21	100.3	-21.9	122.2	185	255	Peak
2		5850	52.7	5.41	58.11	-64.09	122.2	185	255	Peak
3		5855	51.63	5.44	57.07	-53.73	110.8	185	255	Peak
4		5875	51.08	5.51	56.59	-48.61	105.2	185	255	Peak
5		5925	50.79	5.7	56.49	-11.71	68.2	185	255	Peak
6	*	5954.69	52.35	5.82	58.17	-10.03	68.2	185	255	Peak

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB)
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor)

7.9. AC Conducted Emissions Measurement

7.9.1. Test Limit

FCC Part 15.207 Limits		
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.

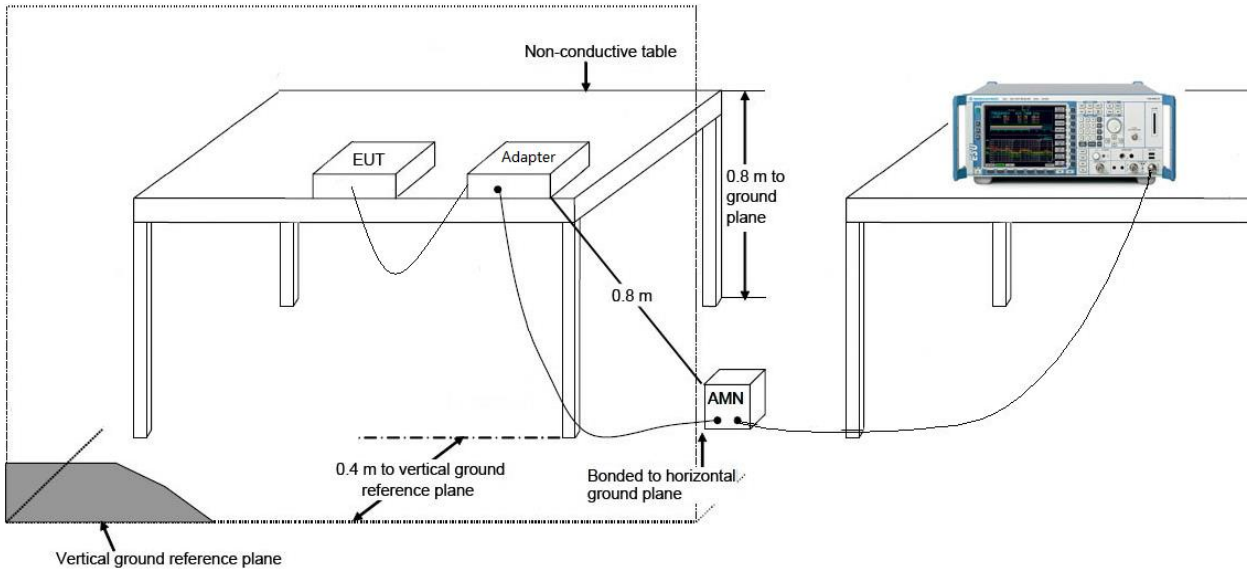
7.9.2. Test Procedure

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.

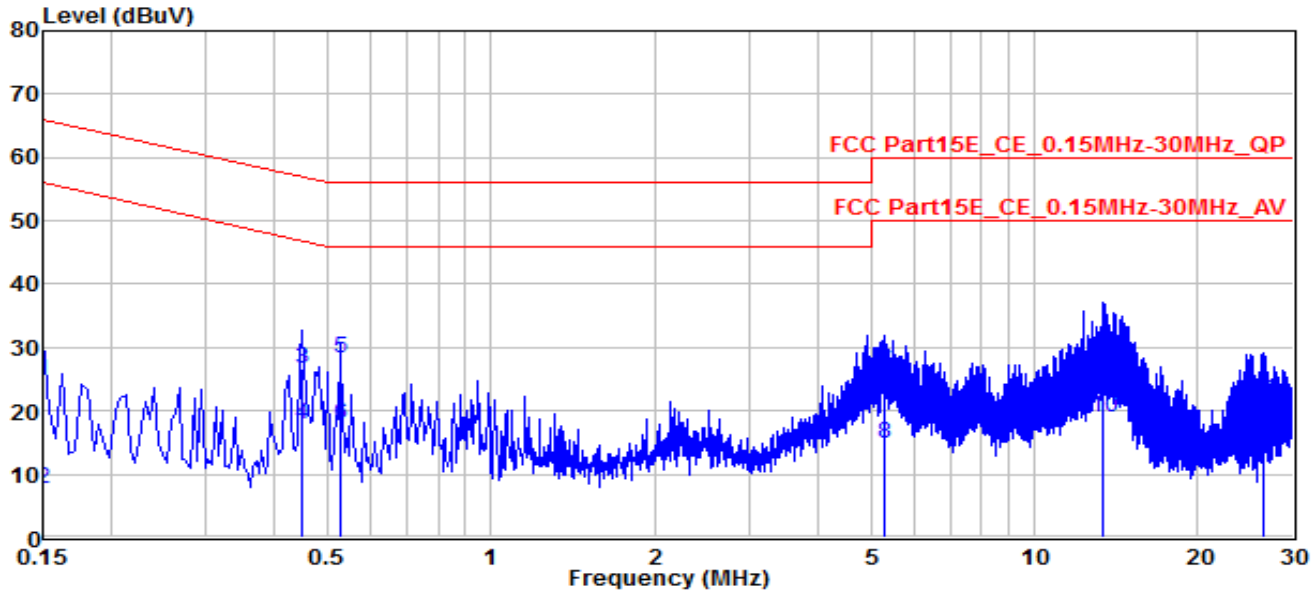
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

7.9.3. Test Setup



7.9.4. Test Result

EUT	Gateway	Test Date	2018/4/16
Factor	CE_ENV216-L1 (Filter ON)	Temp. / Humidity	24°C / 55%
Polarity	Line1	Site / Engineer	SR2 / Peter
Test Mode	MODE2	Test Voltage	AC120V/60Hz

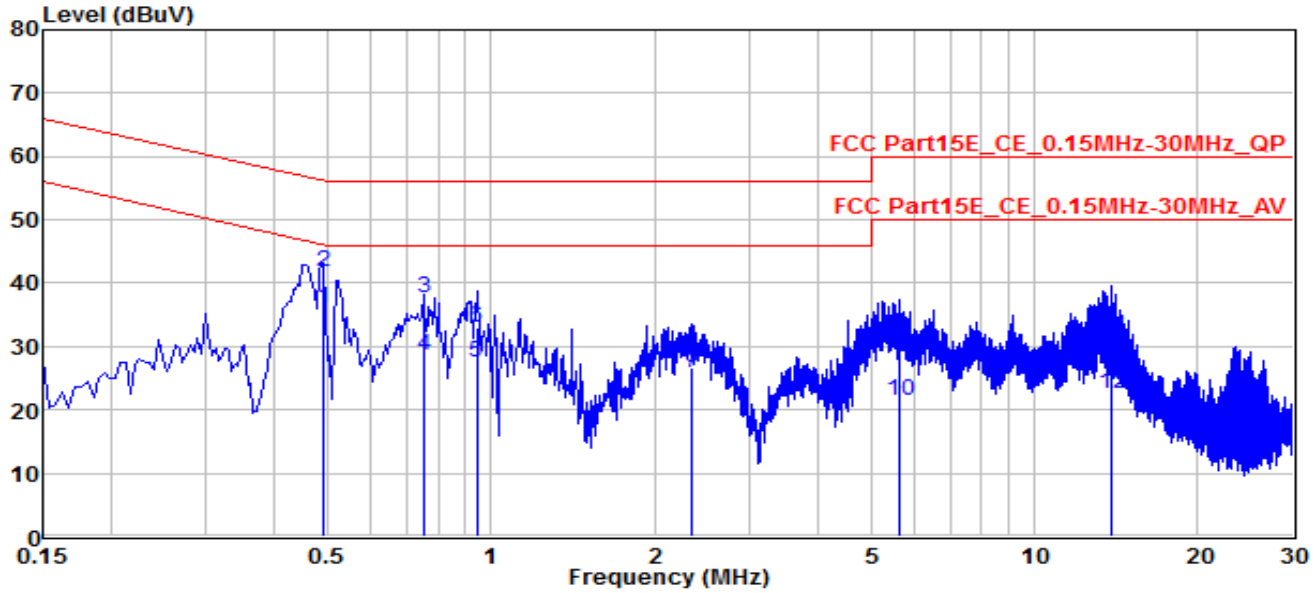


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV)	Margin (dB)	Limit (dBuV)	Remark (QP/PK/AV)
1		0.15	14.9	9.77	24.67	-41.33	66	QP
2		0.15	-1.99	9.77	7.78	-48.22	56	Average
3		0.45147	16.49	10.07	26.56	-30.29	56.85	QP
4		0.45147	7.93	10.07	18	-28.85	46.85	Average
5	*	0.52796	18.24	10.08	28.32	-27.68	56	QP
6	*	0.52796	7.8	10.08	17.88	-28.12	46	Average
7		5.288	16.46	9.76	26.22	-33.78	60	QP
8		5.288	5.1	9.76	14.86	-35.14	50	Average
9		13.388	17.75	9.93	27.68	-32.32	60	QP
10		13.388	9.1	9.93	19.03	-30.97	50	Average
11		26.391	11.66	10.02	21.68	-38.32	60	QP
12		26.391	4.44	10.02	14.46	-35.54	50	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Factor (dB)+ Cable Loss (dB)
3. Measurement (dBuV) = Reading(dBuV)+ C.F (Correction Factor)
4. Other mode was also verified. The test results shown represent the worst case emissions.

EUT	Gateway	Test Date	2018/4/16
Factor	CE_ENV216-N (Filter ON)	Temp. / Humidity	24°C / 55%
Polarity	Neutral	Site / Engineer	SR2 / Peter
Test Mode	MODE2	Test Voltage	AC120V/60Hz



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV)	Margin (dB)	Limit (dBuV)	Remark (QP/PK/AV)
1	*	0.49197	25.78	10.12	35.9	-20.23	56.13	QP
2	*	0.49197	31.78	10.12	41.9	-4.23	46.13	Average
3		0.75294	27.55	10	37.55	-18.45	56	QP
4		0.75294	18.61	10	28.61	-17.39	46	Average
5		0.94192	17.64	9.91	27.55	-28.45	56	QP
6		0.94192	23.12	9.91	33.03	-12.97	46	Average
7		2.35	15.97	9.85	25.82	-30.18	56	QP
8		2.35	16.95	9.85	26.8	-19.2	46	Average
9		5.662	21.96	9.78	31.74	-28.26	60	QP
10		5.662	11.78	9.78	21.56	-28.44	50	Average
11		13.905	21.69	9.96	31.65	-28.35	60	QP
12		13.905	12.46	9.96	22.42	-27.58	50	Average

Note:

1. " * " means the worst value in this measurement data.
2. C.F (Correction Factor) = Factor (dB)+ Cable Loss (dB)
3. Measurement (dBuV) = Reading(dBuV)+ C.F (Correction Factor)
4. Other channel was also verified. The test results shown represent the worst case emissions.

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Gateway ,Model Number:**

REN-CB is in compliance with Part 15E of the FCC Rules & IC Rules.

The End