



中国认可
国际互认
检测
TESTING
CNAS L5313



Test Report

FCC Part15 Subpart C (Class II Permissive Change)

Product Name : Virtual Reality Controller

Model No. : B0-S8A526053-BZ

FCC ID : 2AI3GS8A526053

Applicant : Pico Technology Inc.

Address : 20th Floor, Shining Tower, No.35 Xueyuan Road,
HaiDian District, Beijing, The People ' s Republic of
China

Date of Receipt : Jul. 18, 2016

Test Date : Aug. 02, 2016~Aug. 17, 2016

Issued Date : Aug. 23, 2016

Report No. : 1672084R -RF-US-P06V02

Report Version : V 1.0

Note : This report is based on ADT No. RF140808E04, it changes the MIMO Antenna to SISO Antenna, we re-evaluate the items are bandedge, radiated emission, and output power.

pThe test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF, CNAS or any agency of the government.

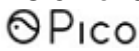
The test report shall not be reproduced without the written approval of QuieTek Corporation.


Test Report Certification


Issued Date : Aug. 23, 2016


Report No. : 1672084R-RF-US-P06V02



Product Name : Virtual Reality Controller
Applicant : Pico Technology Inc.
Address : 20th Floor, Shining Tower, No.35 Xueyuan Road, HaiDian
District, Beijing, The People ' s Republic of China
Manufacturer : Pico Technology Inc.
Address : 20th Floor, Shining Tower, No.35 Xueyuan Road, HaiDian
District, Beijing, The People ' s Republic of China
Model No. : B0-S8A526053-BZ
FCC ID : 2A13GS8A526053
EUT Voltage : DC 5V or 9V
Brand Name : 
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2015
KDB DA 00-705 Released March 30, 2000
ANSI C63.4: 2014; ANSI C63.10: 2013
Test Result : Complied
Performed Location : Quietek Corporation - Suzhou EMC Laboratory
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006,
Jiangsu, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098
FCC Registration Number: 800392

Documented By : 
(Adm. Specialist: Kathy Feng)

Reviewed By : 
(Senior Engineer: Jack Zhang)

Approved By : 
(Engineering Manager: Harry Zhao)

Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	:	BSMI, NCC, TAF
USA	:	FCC
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/english/about/certificates.aspx?bval=5>
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/index_en.aspx

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory :

No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory :

No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

Suzhou Testing Laboratory :

No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
TEL : +86-512-6251-5088 / FAX : 86-512-6251-5098 E-Mail : service@quietek.com

TABLE OF CONTENTS

Description	Page
1. General Information.....	6
1.1. EUT Description	6
1.2. Mode of Operation	8
1.3. Tested System Details.....	9
1.4. Configuration of Tested System	10
1.5. EUT Exercise Software	11
2. Technical Test.....	12
2.1. Summary of Test Result	12
2.2. Test Environment	13
3. Emissions in restricted frequency bands	14
3.1. Test Equipment	14
3.2. Test Setup	15
3.3. Limit.....	16
3.4. Test Procedure	16
3.5. Uncertainty	18
3.6. Test Result	19
4. Peak Output Power	24
4.1. Test Equipment	24
4.2. Test Setup	24
4.3. Limit.....	24
4.4. Test Procedure	25
4.5. Uncertainty	25
4.6. Test Result	26
5. Radiated Emission Band Edge.....	29
5.1. Test Equipment	29
5.2. Test Setup	30
5.3. Limit.....	30
5.4. Test Procedure	30
5.5. Uncertainty	31
5.6. Test Result	32

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1672084R-RF-US-P06V02	V1.0	Initial Issued Report	Aug. 23, 2016

1. General Information

1.1. EUT Description

Product Name	Virtual Reality Controller
Model No.	B0-S8A526053-BZ
Working Voltage	DC 5V or 9V
Bluetooth Specification	V3.0
Frequency Range	2402- 2480 MHz
Channel Number	V3.0: 79
Channel Separation	V3.0: 1MHz
Type of Modulation	V3.0: GFSK, Pi/4 DQPSK, 8DPSK
Data Rate	V3.0: 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK)
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Bluetooth Working Frequency of Each Channel: (For V3.0)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

Bluetooth Antenna List

Antenna	Manufacturer	Model No.	Peak Gain
Ceramic Chip Antenna	Unictron	AA077	1.4dBi for 2.4GHz

1.2 Mode of Operation

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter-1Mbps(GFSK_DH5)
Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Note:

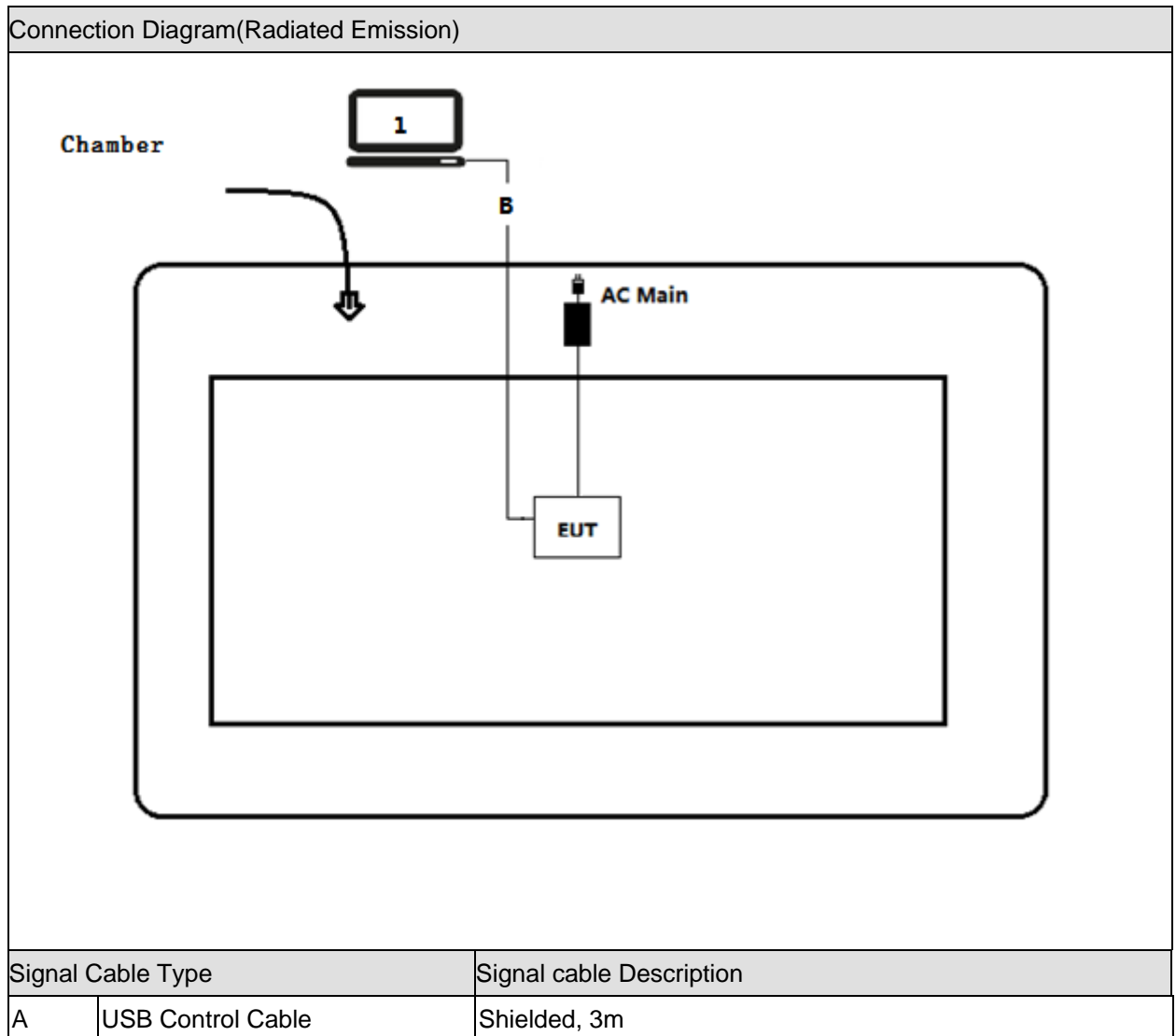
1. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
2. Regards to the frequency band operation for systems using FHSS modulation: normal operation (hopping) was selected to test for conducted, and the lowest, highest frequency channel for radiation spurious test.
3. The extreme test condition for voltage and temperature were declared by the manufacturer.
4. The reading values of all the test items contain cable loss.

1.3 Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter

1.4 Configuration of Tested System



1.5 EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run the RF test software, and set the test mode and channel, then press OK to start continue Transmit.

2. Technical Test

2.1. Summary of Test Result

- ☒ No deviations from the test standards
- ☐ Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(b)(1)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2015 15.247(d)	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

3. Emissions in restricted frequency bands

3.1. Test Equipment

Emissions in restricted frequency bands / AC-2

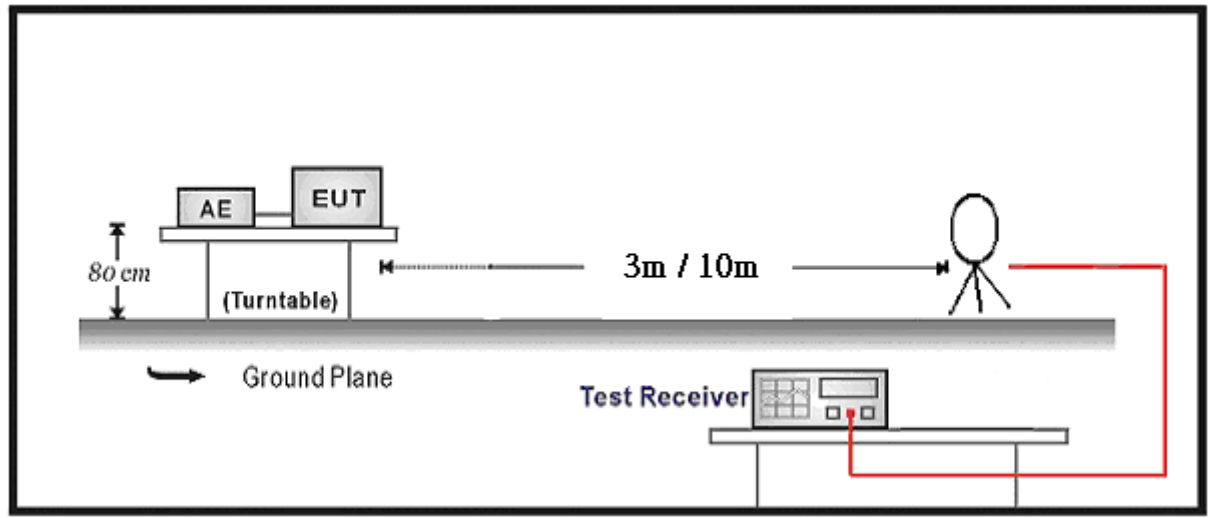
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2017.03.05
Loop Antenna	R&S	HFH2-Z2	833799/003	2016.11.25
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2016.10.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2017.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2017.01.04

Emissions in restricted frequency bands / AC-5

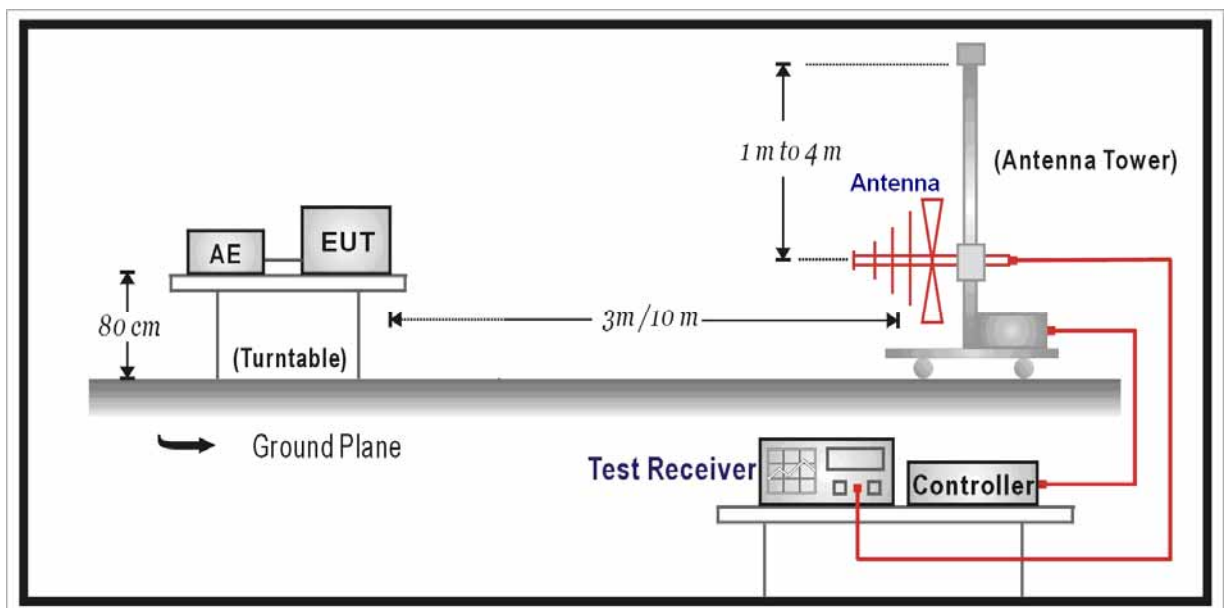
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Preamplifier	Miteq	NSP1800-25	1364185	2017.05.03
Preamplifier	Quietek	AP-040G	CHM-0906001	2017.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2016.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2017.03.06
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2016.09.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2017.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2017.01.04

3.2. Test Setup

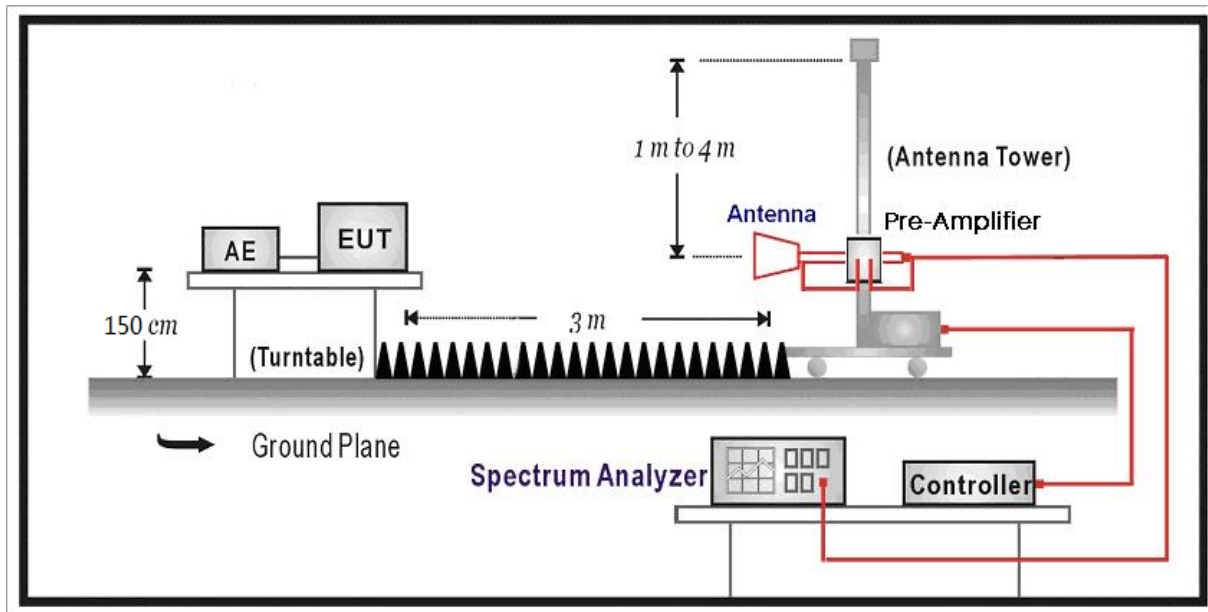
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

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

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

3.4. Test Procedure

According to ANSI C63.4: 2014; ANSI C63.10: 2013.

The EUT is placed on a turn table which is 1.5 meter for above 1G and 0.8 meter for below 1G above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2014 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

According to ANSI C63.10: 2013& ANSI C63.4: 2014

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW = RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

3.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

3.6. Test Result

Mode 1: Transmitter-1Mbps(GFSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.00	37.33	5.56	42.89	54(Note3)	11.11	PK
	V	7206.00	34.77	9.63	44.40	54(Note3)	9.60	PK
	H	9608.00	32.96	12.81	45.77	54(Note3)	8.23	PK
	V	4804.00	36.64	5.57	42.21	54(Note3)	11.79	PK
	H	7206.00	35.31	9.62	44.93	54(Note3)	9.07	PK
	V	9608.00	33.15	12.81	45.96	54(Note3)	8.04	PK
39	H	4882.00	37.96	5.60	43.56	54(Note3)	10.44	PK
	V	7323.00	34.80	9.78	44.58	54(Note3)	9.42	PK
	H	9764.00	32.84	13.06	45.90	54(Note3)	8.10	PK
	V	4882.00	37.97	5.61	43.58	54(Note3)	10.42	PK
	H	7323.00	34.45	9.77	44.22	54(Note3)	9.78	PK
	V	9764.00	31.87	13.06	44.93	54(Note3)	9.07	PK
78	H	4960.00	36.60	5.79	42.39	54(Note3)	11.61	PK
	V	7440.00	35.25	10.16	45.41	54(Note3)	8.59	PK
	H	9920.00	31.15	12.96	44.11	54(Note3)	9.89	PK
	V	4960.00	35.92	5.79	41.71	54(Note3)	12.29	PK
	H	7440.00	34.10	10.16	44.26	54(Note3)	9.74	PK
	V	9920.00	31.32	12.95	44.27	54(Note3)	9.73	PK

Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

Mode 2: Transmitter-2Mbps(Pi/4 DQPSK _DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.00	37.24	5.57	42.81	54(Note3)	11.19	PK
	V	7206.00	35.51	9.63	45.14	54(Note3)	8.86	PK
	H	9608.00	32.60	12.81	45.41	54(Note3)	8.59	PK
	V	4804.00	36.75	5.57	42.32	54(Note3)	11.68	PK
	H	7206.00	34.33	9.62	43.95	54(Note3)	10.05	PK
	V	9608.00	32.97	12.80	45.77	54(Note3)	8.23	PK
39	H	4882.00	36.55	5.60	42.15	54(Note3)	11.85	PK
	V	7323.00	34.45	9.77	44.22	54(Note3)	9.78	PK
	H	9764.00	32.18	13.06	45.24	54(Note3)	8.76	PK
	V	4882.00	36.93	5.60	42.53	54(Note3)	11.47	PK
	H	7323.00	34.30	9.78	44.08	54(Note3)	9.92	PK
	V	9764.00	33.26	13.06	46.32	54(Note3)	7.68	PK
78	H	4960.00	36.73	5.79	42.52	54(Note3)	11.48	PK
	V	7440.00	34.47	10.16	44.63	54(Note3)	9.37	PK
	H	9920.00	31.28	12.96	44.24	54(Note3)	9.76	PK
	V	4960.00	36.22	5.79	42.01	54(Note3)	11.99	PK
	H	7440.00	35.59	10.16	45.75	54(Note3)	8.25	PK
	V	9920.00	31.96	12.95	44.91	54(Note3)	9.09	PK

Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

Mode 3: Transmitter-3Mbps(8DPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.00	36.84	5.57	42.41	54(Note3)	11.59	PK
	V	7206.00	34.41	9.62	44.03	54(Note3)	9.97	PK
	H	9608.00	33.00	12.81	45.81	54(Note3)	8.19	PK
	V	4804.00	37.97	5.57	43.54	54(Note3)	10.46	PK
	H	7206.00	35.53	9.62	45.15	54(Note3)	8.85	PK
	V	9608.00	33.73	12.81	46.54	54(Note3)	7.46	PK
39	H	4882.00	37.63	5.60	43.23	54(Note3)	10.77	PK
	V	7323.00	34.33	9.77	44.10	54(Note3)	9.9	PK
	H	9764.00	32.64	13.06	45.70	54(Note3)	8.3	PK
	V	4882.00	37.38	5.61	42.99	54(Note3)	11.01	PK
	H	7323.00	34.46	9.78	44.24	54(Note3)	9.76	PK
	V	9764.00	32.43	13.06	45.49	54(Note3)	8.51	PK
78	H	4960.00	37.52	5.79	43.31	54(Note3)	10.69	PK
	V	7440.00	34.44	10.16	44.60	54(Note3)	9.4	PK
	H	9920.00	31.57	12.95	44.52	54(Note3)	9.48	PK
	V	4960.00	36.39	5.79	42.18	54(Note3)	11.82	PK
	H	7440.00	34.50	10.16	44.66	54(Note3)	9.34	PK
	V	9920.00	30.55	12.96	43.51	54(Note3)	10.49	PK

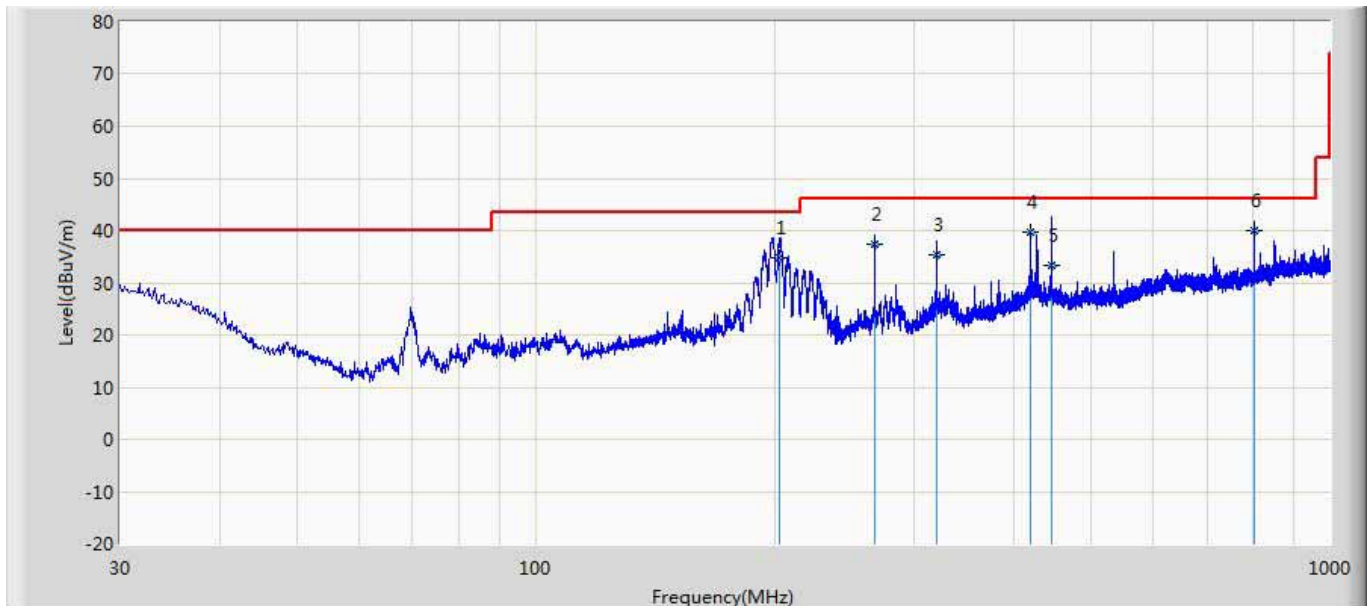
Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2016/08/18
Limit: FCC_Part15.109_RE(3m)_ClassB	Margin: 0
Probe: CB7_CBL6112_0726	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1	

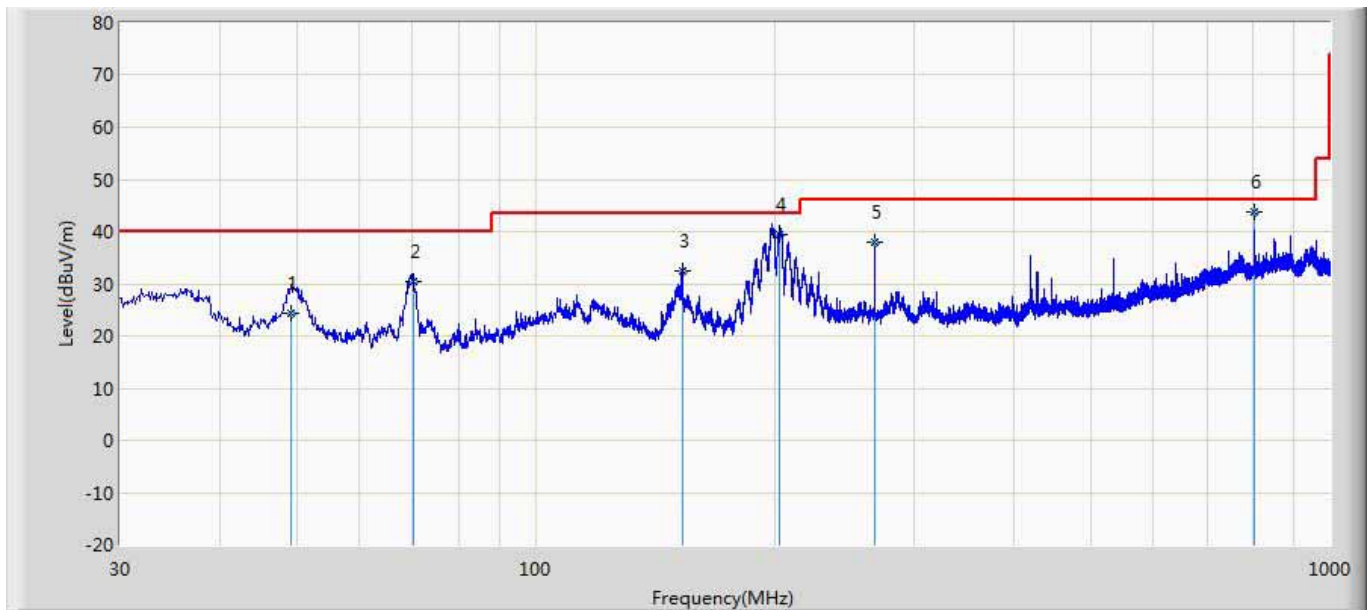


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		203.197	34.728	46.964	-8.772	43.500	9.404	1.550	23.190	100	360	QP
2		267.610	37.463	45.794	-8.537	46.000	13.110	1.760	23.200	100	50	QP
3		319.497	35.222	42.339	-10.778	46.000	13.907	1.930	22.955	100	278	QP
4		420.532	39.635	43.894	-6.365	46.000	16.411	2.260	22.930	100	355	QP
5		445.988	33.476	37.046	-12.524	46.000	16.920	2.310	22.800	100	145	QP
6	*	802.790	39.935	39.109	-6.065	46.000	20.023	3.120	22.317	200	250	QP

Note:

- " * ", means this data is the worst emission level.
- Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Site: AC2	Time: 2016/08/18
Limit: FCC_Part15.109_RE(3m)_ClassB	Margin: 0
Probe: CB7_CBL6112_0726	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		49.184	24.372	38.165	-15.628	40.000	8.526	0.768	23.087	100	44	QP
2		70.064	30.322	46.173	-9.678	40.000	6.319	0.900	23.070	200	316	QP
3		152.937	32.373	43.716	-11.127	43.500	10.324	1.340	23.007	100	337	QP
4		203.025	39.335	51.566	-4.165	43.500	9.409	1.550	23.190	100	154	QP
5		267.599	37.952	46.281	-8.048	46.000	13.112	1.759	23.201	100	59	QP
6	*	802.793	43.629	42.803	-2.371	46.000	20.023	3.120	22.317	100	27	QP

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4. Peak Output Power

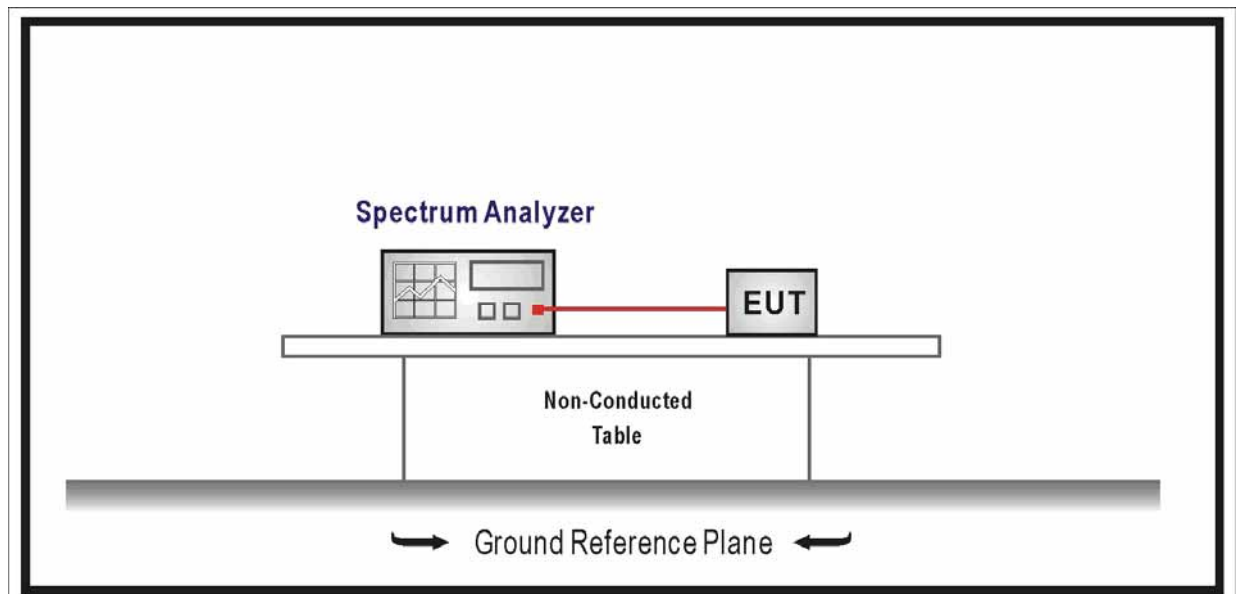
4.1. Test Equipment

Peak Output Power / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

4.2. Test Setup



4.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Note: the conducted output power limit specified above is based on the use the antennas with

directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

4.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured.

VBW = RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

4.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

4.6. Test Result

Product	:	Virtual Reality Controller
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps (GFSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.94	21.00	Pass
39	2441	2.54	21.00	Pass
78	2480	3.23	21.00	Pass

Product	:	Virtual Reality Controller
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps (Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.93	21.00	Pass
39	2441	2.52	21.00	Pass
78	2480	3.21	21.00	Pass

Product	:	Virtual Reality Controller
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps (8DPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.91	21.00	Pass
39	2441	2.53	21.00	Pass
78	2480	3.19	21.00	Pass

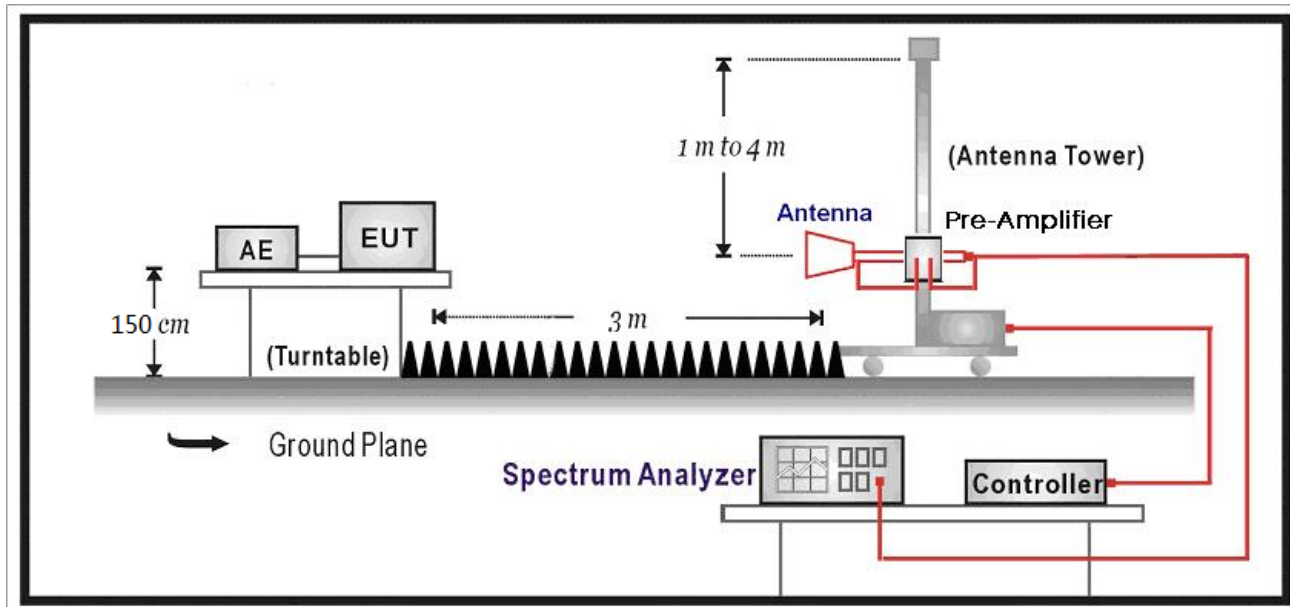
5. Radiated Emission Band Edge

5.1. Test Equipment

☒ Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Preamplifier	Miteq	NSP1800-25	1364185	2017.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2017.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2016.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2017.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2016.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2017.08.07
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2017.01.04

5.2. Test Setup



5.3. Limit

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) of FCC part 15.

5.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW = RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with

sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

5.5. Uncertainty

The measurement uncertainty above 1G is defined as $\pm 3.9 \text{ dB}$

below 1G is defined as $\pm 3.8 \text{ dB}$

5.6. Test Result

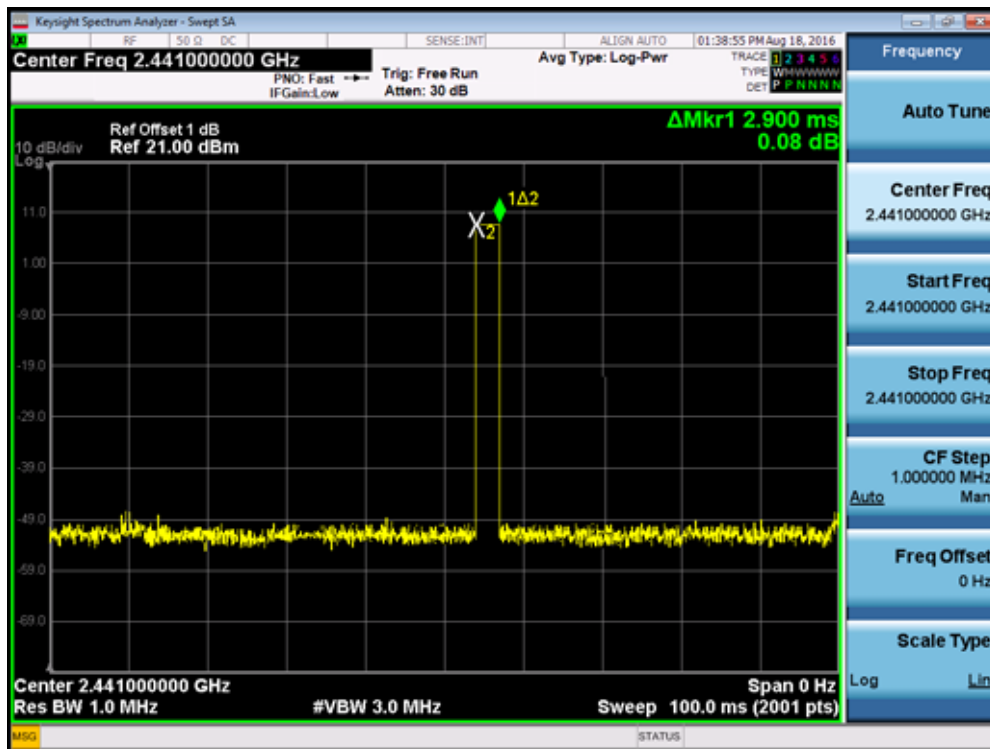
All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

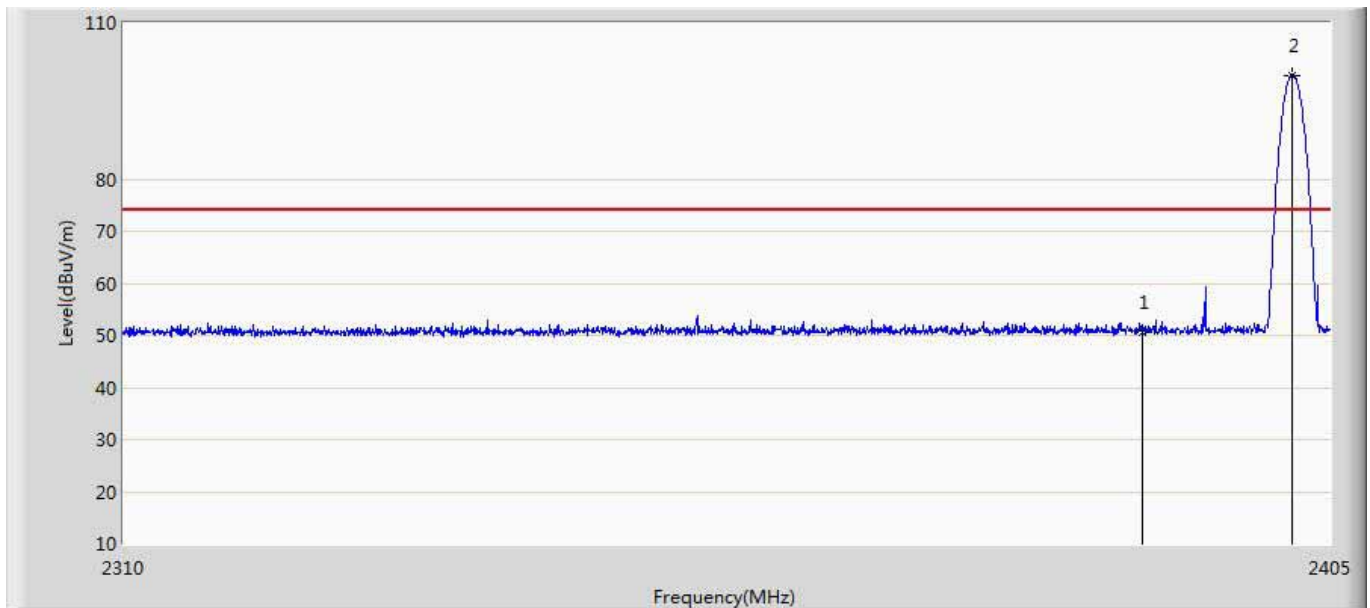
Average = Peak Measure Level+ Duty Factor

Duty Factor= $20 \cdot \text{LOG}(\text{Pulse Number} \cdot \text{On Time} / 100) = -30.75\text{dB}$ in worst condition in normal use.

Pulse Number



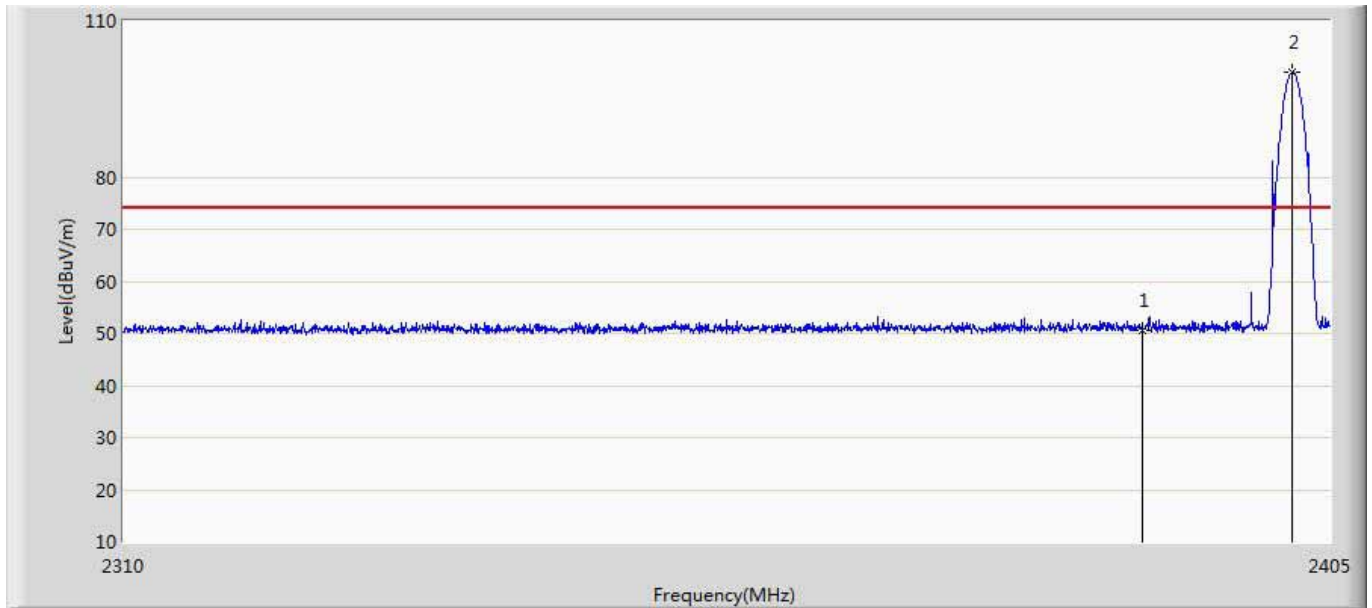
Engineer: Simon	
Site: AC5	Time: 2016/07/30 - 18:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by BT DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.652	14.566	-23.348	74.000	36.086	PK
2	*	2401.913	99.969	63.845	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	50.652	14.566	-23.348	54.000	-30.750	AV
2	*	2401.913	99.969	63.845	N/A	N/A	-30.750	AV

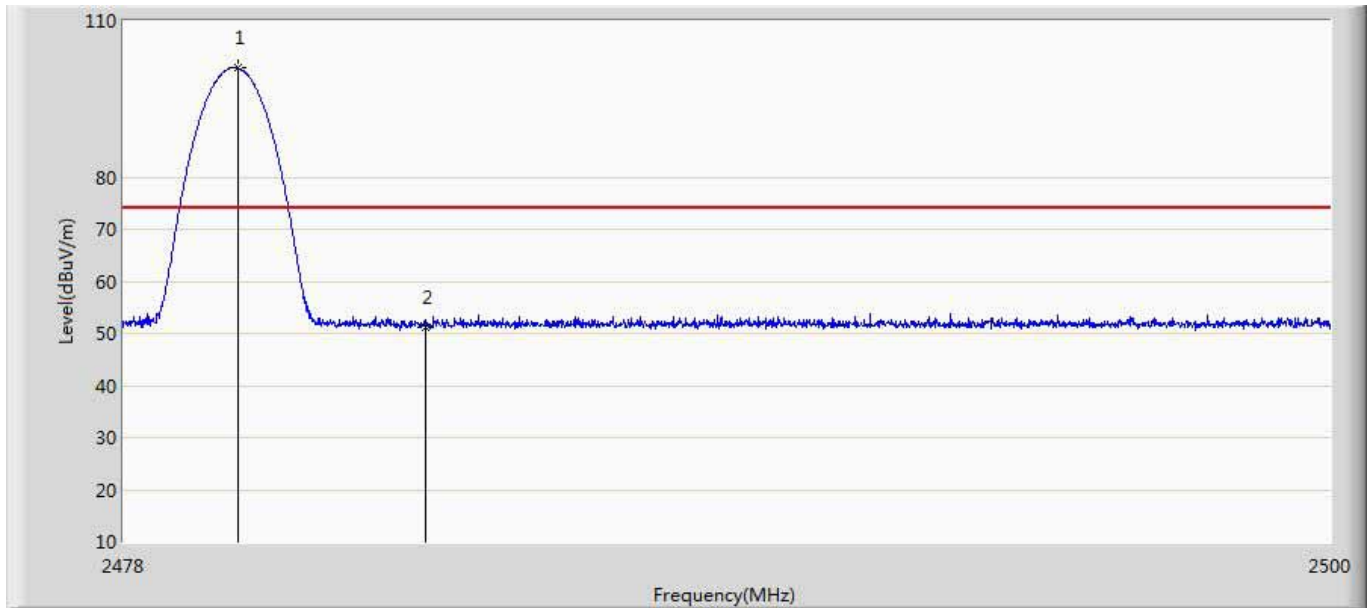
Engineer: Simon	
Site: AC5	Time: 2016/07/30 - 18:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by BT DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.706	14.620	-23.294	74.000	36.086	PK
2	*	2401.913	100.033	63.909	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	50.706	19.956	-34.044	54.000	-30.750	AV
2	*	2401.913	100.033	69.283	N/A	N/A	-30.750	AV

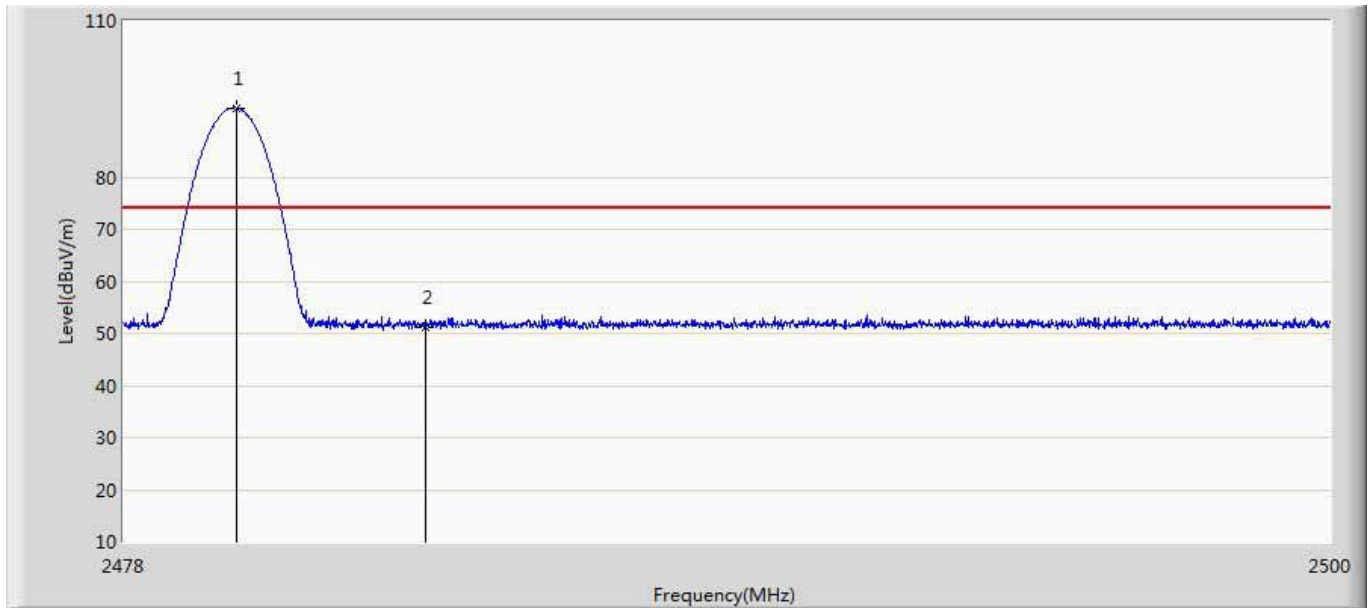
Engineer: Simon	
Site: AC5	Time: 2016/07/30 - 18:32
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by BT DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.079	100.951	64.700	N/A	N/A	36.251	PK
2		2483.500	51.188	14.927	-22.812	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2480.079	100.951	70.201	N/A	N/A	-30.750	AV
2		2483.500	51.188	20.438	-33.562	54.000	-30.750	AV

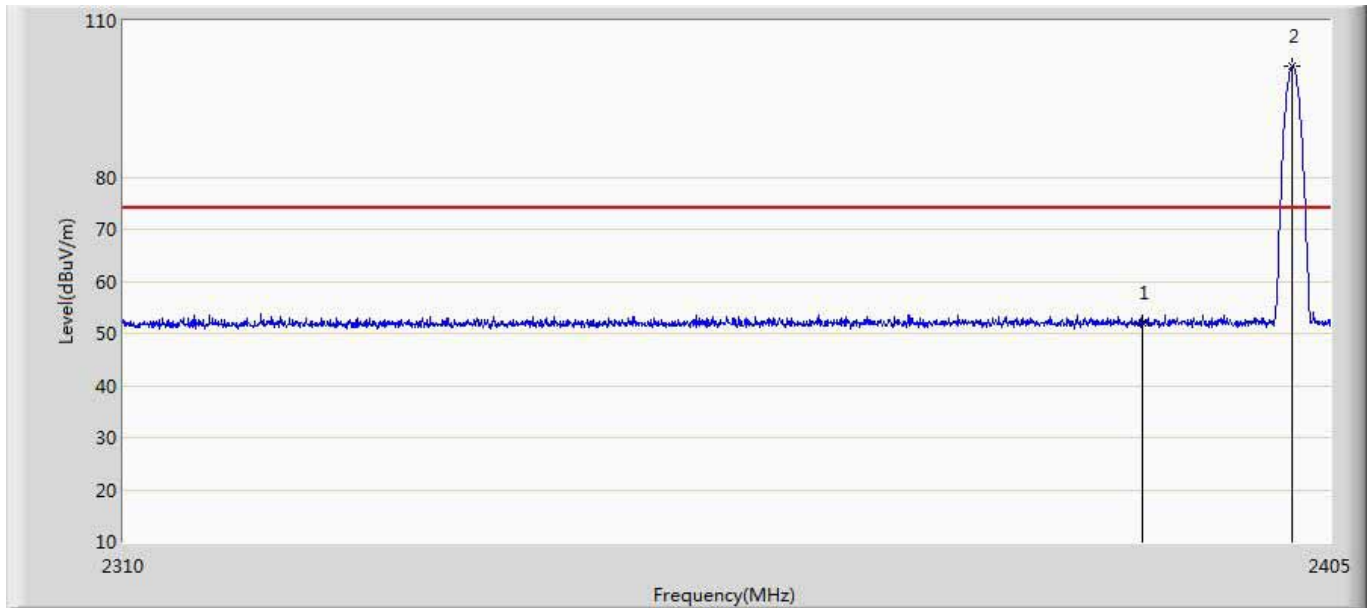
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 09:19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by BT DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.046	93.317	57.066	N/A	N/A	36.251	PK
2		2483.500	51.239	14.977	-22.761	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2480.079	93.317	62.567	N/A	N/A	-30.750	AV
2		2483.500	51.239	20.489	-33.511	54.000	-30.750	AV

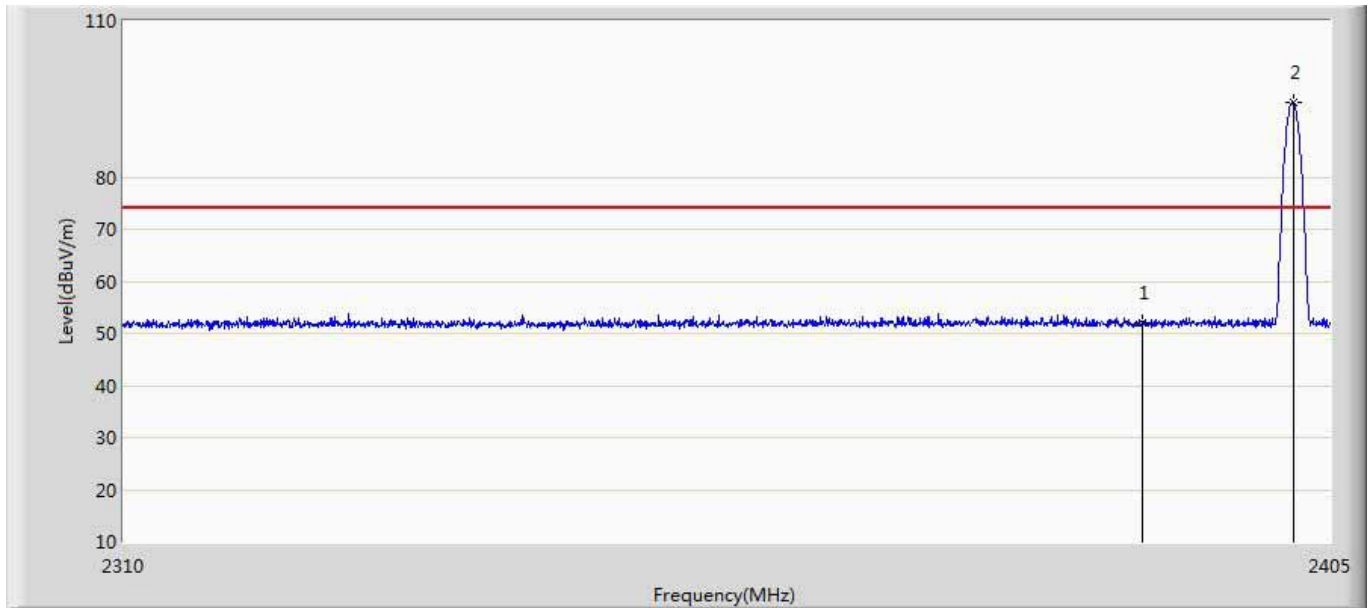
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 09:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by BT 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	51.944	15.858	-22.056	74.000	36.086	PK
2	*	2401.960	101.171	65.047	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	51.944	21.194	-32.806	54.000	-30.750	AV
2	*	2401.960	101.171	70.421	N/A	N/A	-30.750	AV

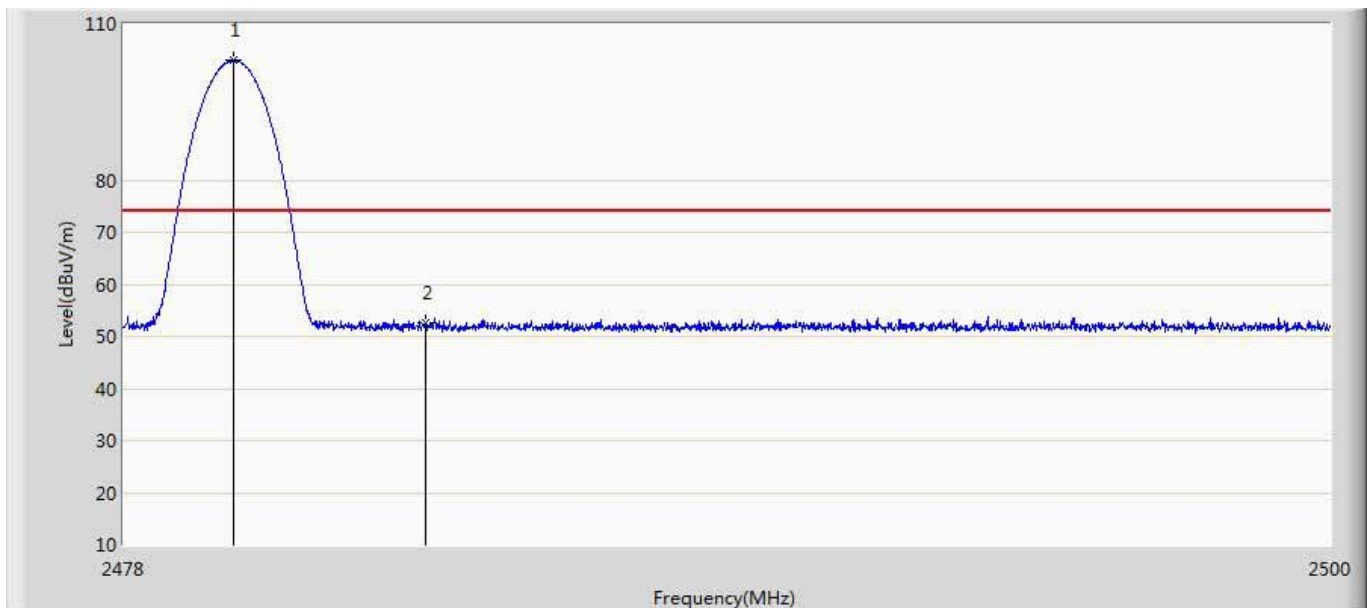
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 10:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by BT 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	52.147	16.061	-21.853	74.000	36.086	PK
2	*	2402.055	94.397	58.272	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	52.147	21.397	-32.603	54.000	-30.750	AV
2	*	2402.055	94.397	63.647	N/A	N/A	-30.750	AV

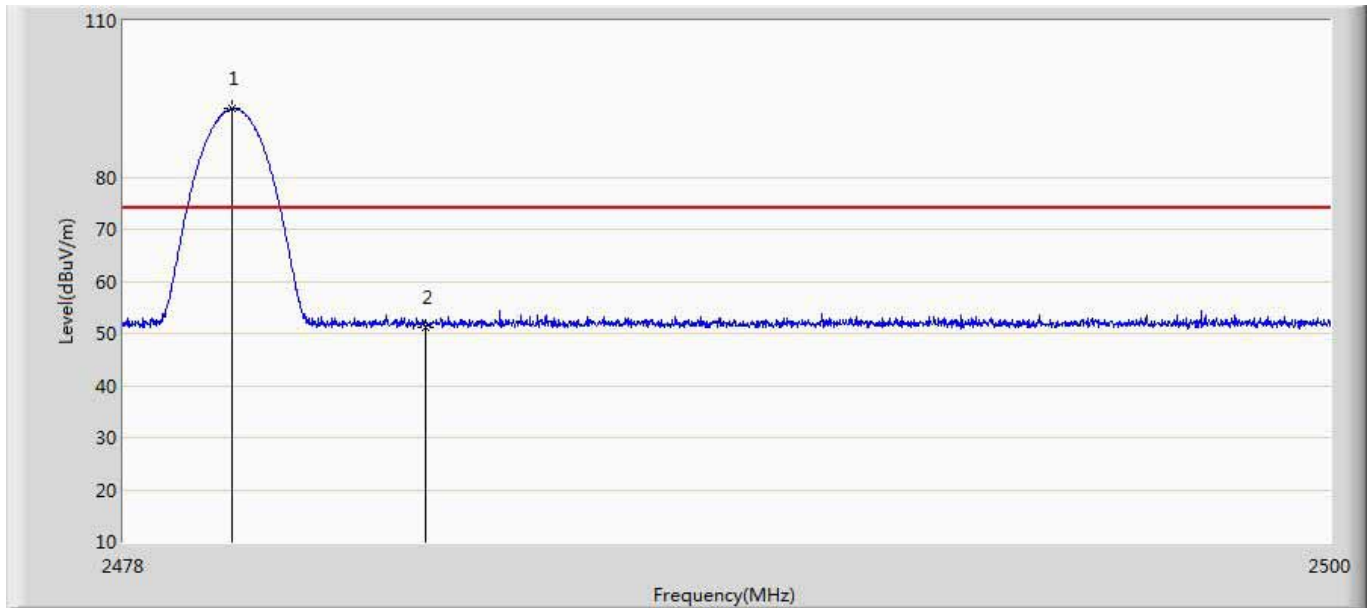
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 10:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by BT 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.013	102.969	66.718	N/A	N/A	36.251	PK
2		2483.500	52.686	16.425	-21.314	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2480.013	102.969	72.219	N/A	N/A	-30.750	AV
2		2483.500	52.686	21.936	-32.064	54.000	-30.750	AV

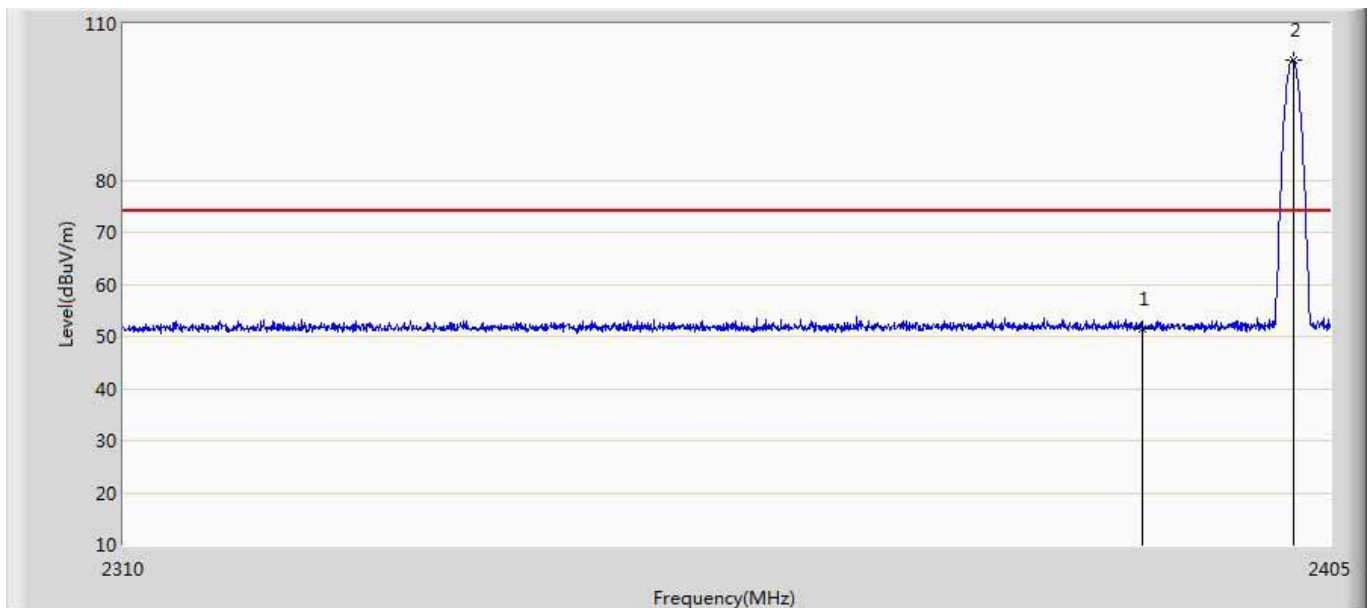
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 10:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by BT 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.980	93.141	56.890	N/A	N/A	36.251	PK
2		2483.500	51.254	14.992	-22.746	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.980	93.141	62.391	N/A	N/A	-30.750	AV
2		2483.500	51.254	20.504	-33.496	54.000	-30.750	AV

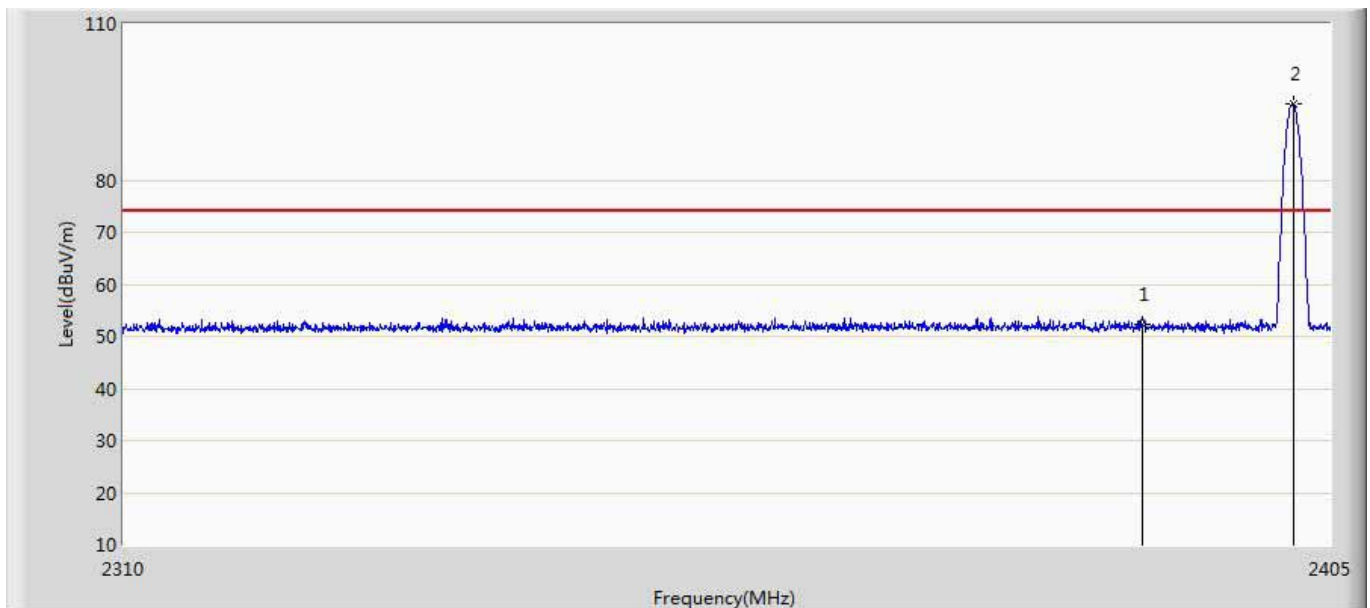
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 11:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by BT 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	51.530	15.444	-22.470	74.000	36.086	PK
2	*	2402.055	103.168	67.043	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	51.530	20.78	-33.22	54.000	-30.750	AV
2	*	2402.055	103.168	72.418	N/A	N/A	-30.750	AV

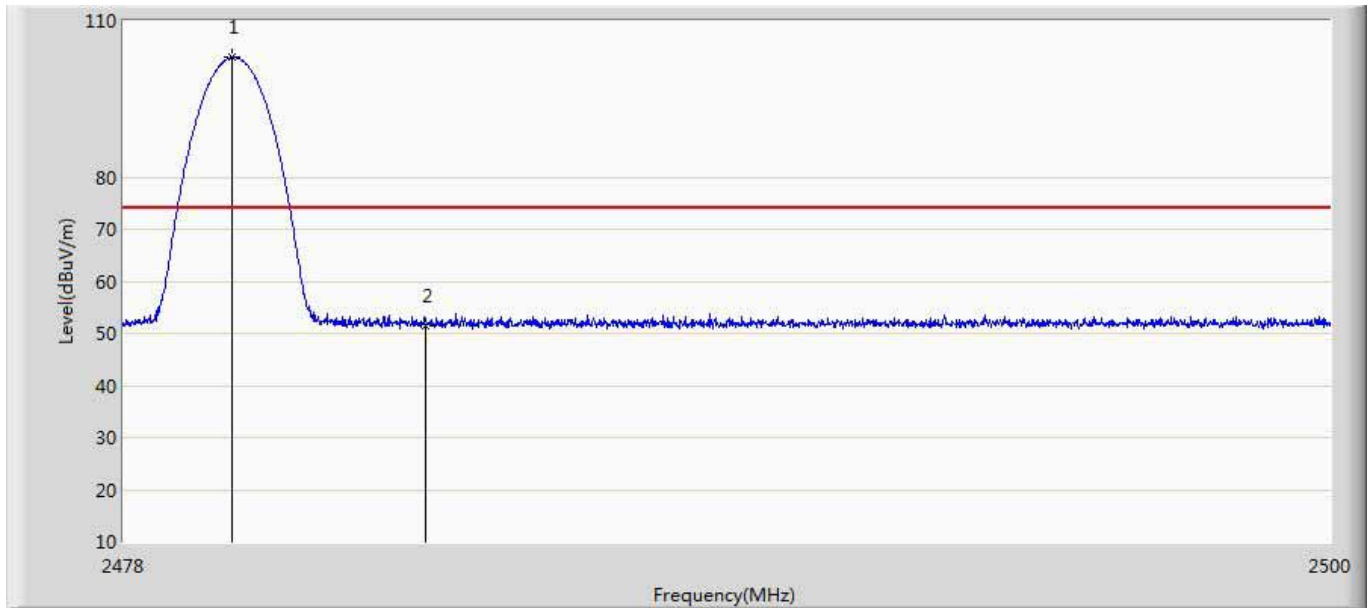
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 11:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by BT 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	52.258	16.172	-21.742	74.000	36.086	PK
2	*	2402.055	94.660	58.535	N/A	N/A	36.124	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	52.258	21.508	-32.492	54.000	-30.750	AV
2	*	2402.055	94.660	63.91	N/A	N/A	-30.750	AV

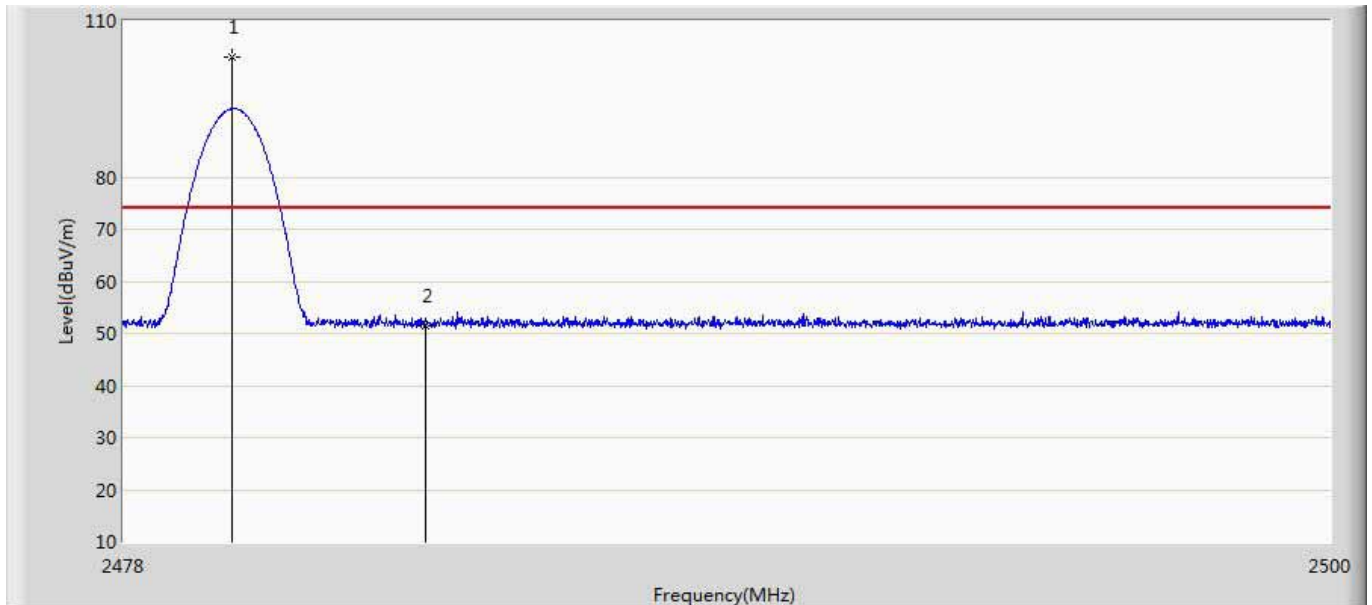
Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 11:07
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by BT 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.980	102.960	66.709	N/A	N/A	36.251	PK
2		2483.500	51.576	15.315	-22.424	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.980	102.960	72.21	N/A	N/A	-30.750	AV
2		2483.500	51.576	20.826	-33.174	54.000	-30.750	AV

Engineer: Simon	
Site: AC5	Time: 2016/08/01 - 11:09
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Virtual Reality Controller	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by BT 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.980	102.960	66.709	N/A	N/A	36.251	PK
2		2483.500	51.358	15.097	-22.642	74.000	36.261	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Average Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.980	102.960	72.21	N/A	N/A	-30.750	AV
2		2483.500	51.358	20.608	-33.392	54.000	-30.750	AV

————— The End —————