FCC CERTIFICATION TEST REPORT

For

FCC ID: X5B-GS064018R

IC: 8814A-GS064018R

Report Reference No.	:	15FAB10001 111
FCC 2.948 No	:	923232
Date of issue	:	2015-11-03
Testing Laboratory	:	ATT Product Service Co., Ltd.
Address	:	No. 3, ChangLianShan Industrial Park, ChangAn Town, DongGuan City, GuangDong, China.
Applicant's name	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	:	14144 Ventura Blvd, Suite 200 Sherman Oaks,CA 91423 U.S.A
Manufacturer	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Test specification:		
Test item description	:	METALLICS GS WIRELESS CTRL-PS3
Trade Mark	:	--
Model/Type reference	:	064-018R
Ratings	:	5Vdc by notebook supply;

Tested by

(Lake Hu/Engineer)

Approved by

(King Wang/EMC Manger)

TABLE OF CONTENTS

TEST REPORT DECLARE

Applicant	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	:	14144 Ventura Blvd, Suite 200 Sherman Oaks,CA 91423 U.S.A
Equipment under Test	:	METALLICS GS WIRELESS CTRL-PS3
Model No	:	064-018R
FCC ID	:	X5B-GS064018R
Manufacturer	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	:	14144 Ventura Blvd, Suite 200 Sherman Oaks,CA 91423 U.S.A

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2013
RSS-247 ISSUE 1 MAY 2015; RSS-GEN ISSUE 4 NOV 2014

Test procedure used: ANSI C63.4: 2014, DA 00-705.
ANSI C63.10:2013

We Declare:

The equipment described above is tested by ATT Product Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	15FAB10001 111		
Date of Test:	2015/10/06-2015/10/20	**Date of Report**:	2015/11/03

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of ATT Product Service Co., Ltd.

1. SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
20dB Bandwidth	FCC Part 15: 15.247 DA 00-705	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247 DA 00-705	PASS
Number Of Hopping Frequency	FCC Part 15: 15.247 DA 00-705	PASS
Dwell Time Test	FCC Part 15: 15.247 DA 00-705	PASS
Maximum Output Powe	FCC Part 15: 15.247 DA 00-705	PASS
Band Edge	FCC Part 15: 15.247	PASS
Spurious Emission	FCC Part 15.205/15.209	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Conducted Emission	FCC Part 15.207	PASS

2. GENERAL TEST INFORMATION

2.1. DESCRIPTION OF EUT

EUT* Name	:	METALLICS GS WIRELESS CTRL-PS3
Model Number	:	064-018R
EUT function description	:	Please reference user manual of this device
Power supply	:	5Vdc
Radio Technology	:	
Operation frequency	:	2409-2476MHz
Modulation	:	GFSK
Antenna Type	:	built-in antenna, maximum PK gain:-1.23dBi
Date of Receipt	:	2015/08/22
Sample Type	:	Single production

Note1: EUT is the ab. of equipment under test.

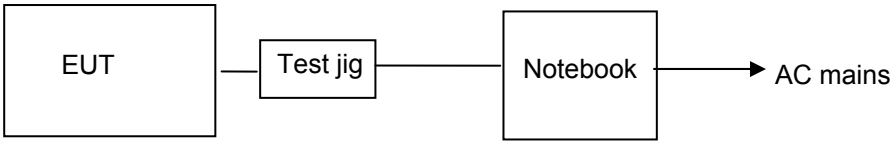
2.2. ACCESSORIES OF EUT

Description of Accessories	Manufacturer	Model number or Type	Output.
/	/	/	/

2.3. ASSISTANT EQUIPMENT USED FOR TEST

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
Notebook	acer	Aspire E1-472G	/	/

2.4. BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST



EUT was connected to control to a special test jig provided by manufacturer which has a Micro USB connector to connect to Notebook, and the Notebook will run a special test software to control EUT work in Continuous TX mode, and select test channel, wireless mode and data rate.

Remark: This product only GFSK. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. New battery is used during all test.

2.5. TEST ENVIRONMENT CONDITIONS

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

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (9KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

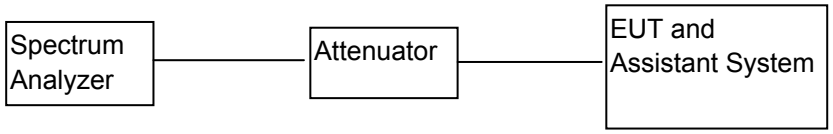
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 20dB & 99% BANDWIDTH

3.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. LIMITS

For direct sequence systems, the minimum 20dB bandwidth shall be at least 25 KHz

3.4. TEST PROCEDURE

(1) Configure EUT and assistant system according clause 2.4 and 3.2

(2) Connect EUT's antenna output to spectrum analyzer by RF cable.

(3) Configure EUT work in test mode as stated in clause 2.4.

(4) Set the spectrum analyzer as follows:

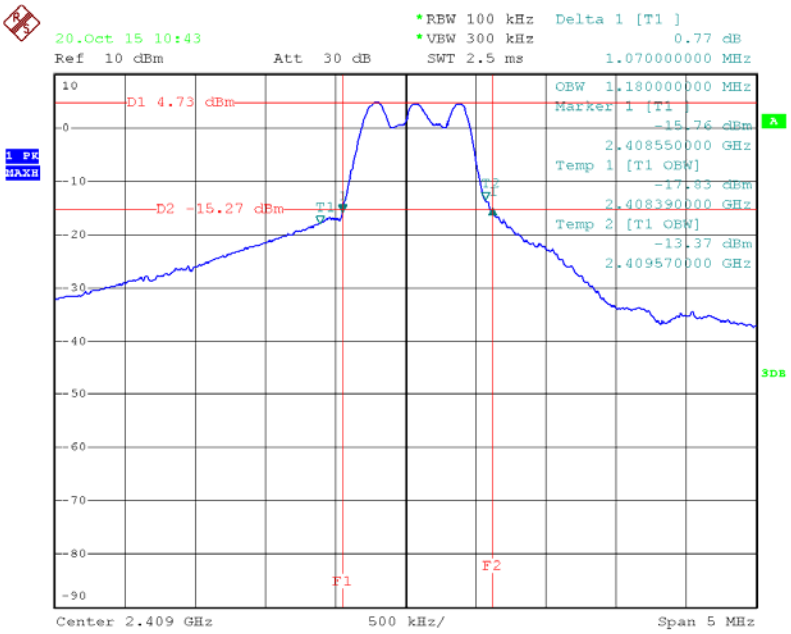
RBW:	100KHz
VBW:	300KHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode:	Max hold

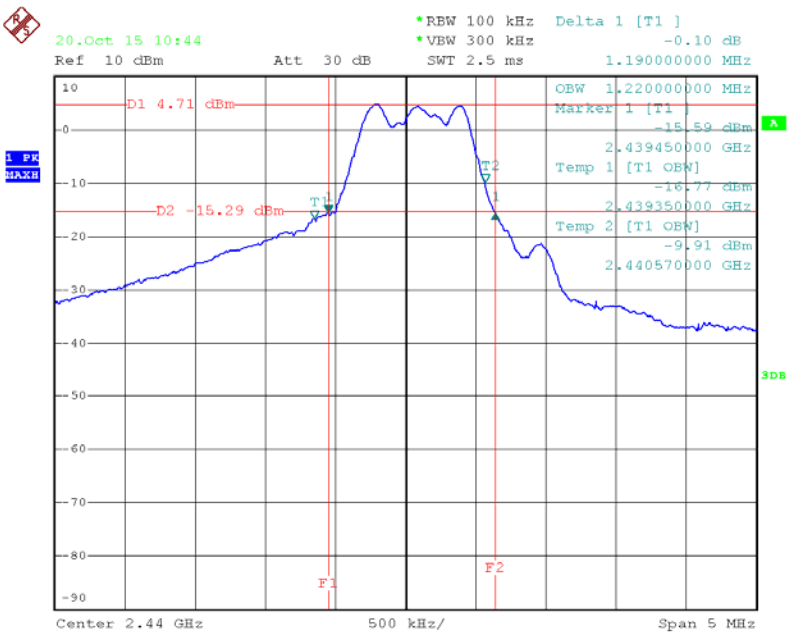
(5) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

3.5. TEST RESULT

Channel	Frequency (MHz)	GFSK 20dB Bandwidth(MHz)	GFSK 99% Bandwidth (MHz)	Result
Low	2409	1.07	1.18	Pass
Middle	2440	1.19	1.22	Pass
High	2476	1.72	1.95	Pass

3.6. ORIGINAL TEST DATA





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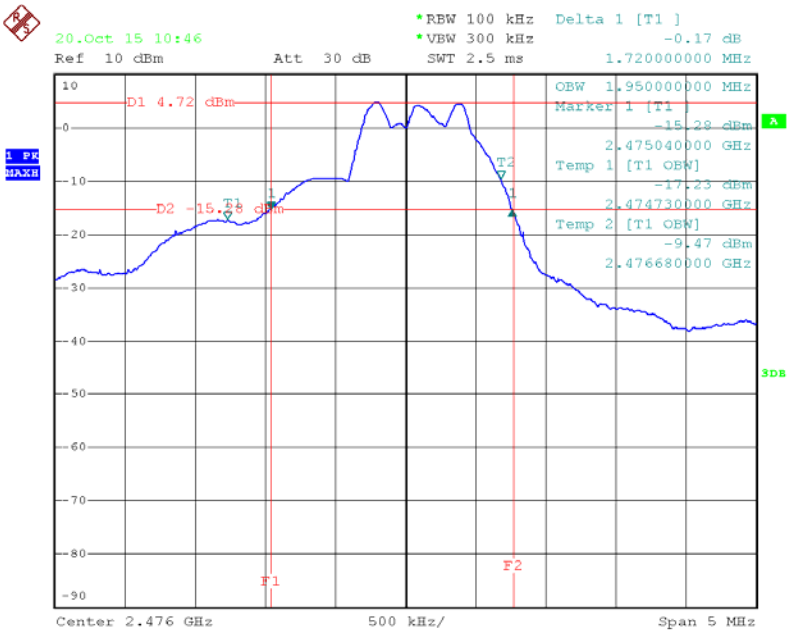

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4. CARRIER FREQUENCY SEPARATION TEST

4.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

4.2. THE REQUIREMENT FOR SECTION 15.247(A)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

4.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 6.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2409-2476MHz. We select 2409MHz, 2440MHz, and 2476MHz TX frequency to transmit.

4.5. TEST PROCEDURE

（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 3 MHz.

（3）Set the adjacent channel of the EUT maxhold another trace.

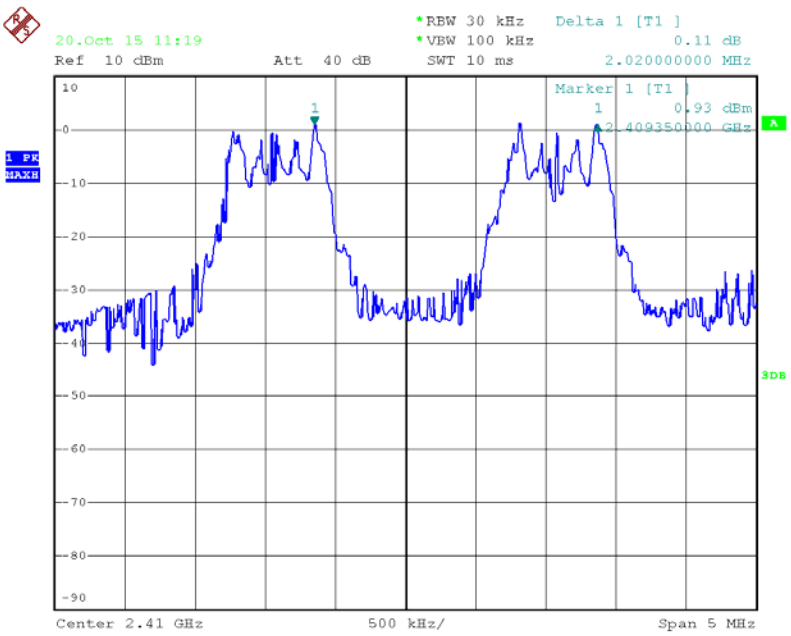
（4）Measurement the channel separation

4.6. Test Result

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2409	2.02	>(25KHz or 2/3*20dB Bandwidth)	PASS
Middle	2440	8.02	>(25KHz or 2/3*20dB Bandwidth)	PASS
High	2476	2.00	>(25KHz or 2/3*20dB Bandwidth)	PASS

The spectrum analyzer plots are attached as below.



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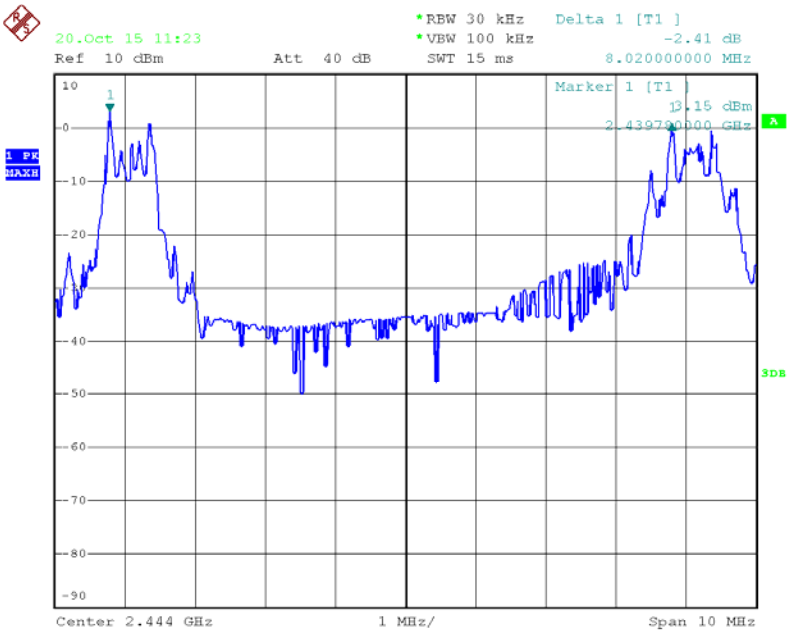

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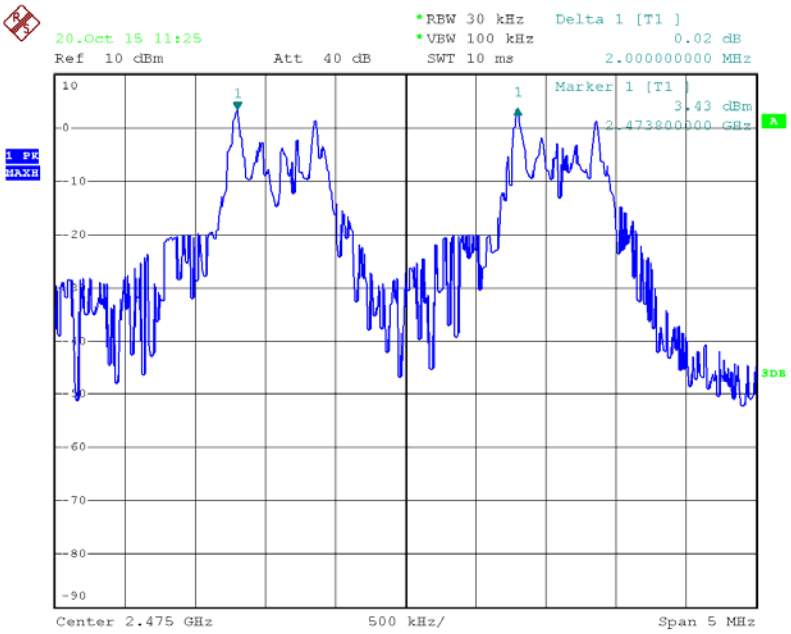

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5. NUMBER OF HOPPING FREQUENCY TEST

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

5.2. THE REQUIREMENT FOR SECTION 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

5.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 7.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it.

5.5. TEST PROCEDURE

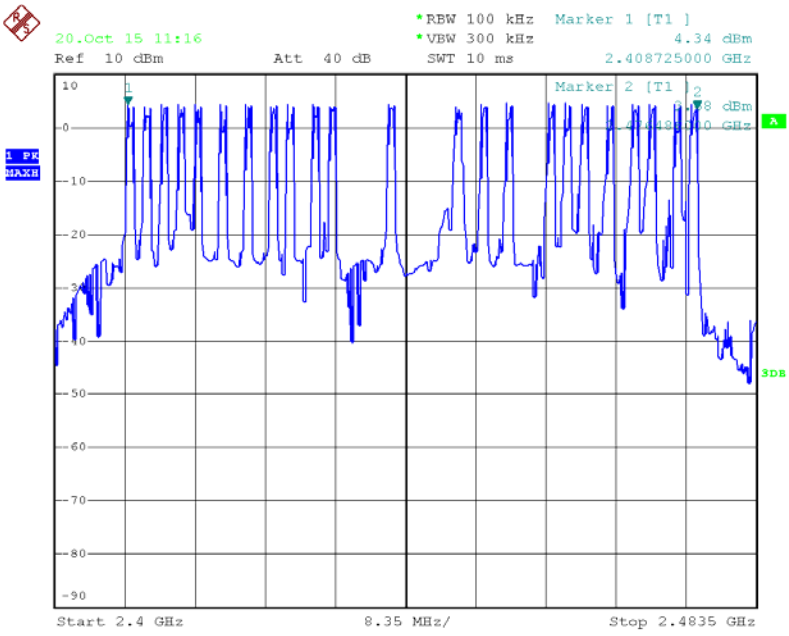
（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

（3）Max hold, view and count how many channel in the band.

5.6. TEST RESULT

Number of hopping channels



Channel information									
CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency
1	2409	6	2420	11	2433	16	2459	21	2471
2	2411	7	2423	12	2440	17	2461	22	2474
3	2413	8	2426	13	2448	18	2463	23	2476
4	2415	9	2428	14	2451	19	2466	24	--
5	2417	10	2431	15	2454	20	2469	25	--

6. DWELL TIME TEST

6.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

6.2. THE REQUIREMENT FOR SECTION 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

6.3. EUT CONFIGURATION ON MEASUREMENT

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4. OPERATING CONDITION OF EUT

（1）Setup the EUT and simulator as shown as Section 8.1.

（2）Turn on the power of all equipment.

（3）Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2409-2476MHz. We select 2409MHz, 2440MHz, and 2476MHz TX frequency to transmit.

6.5. TEST PROCEDURE

（1）The transmitter output was connected to the spectrum analyzer through a low loss cable.

（2）Set center frequency of spectrum analyzer = operating frequency.

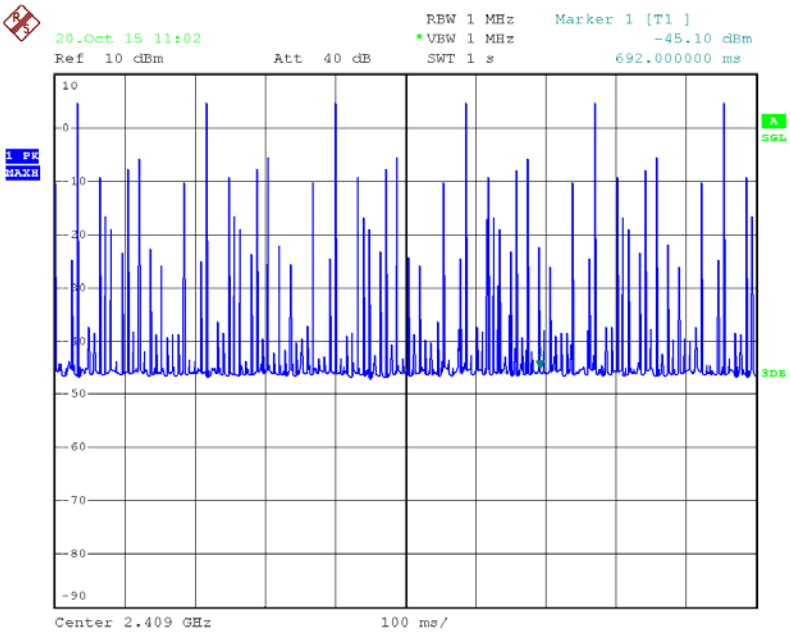
（3）Set the spectrum analyzer as RBW=1MHz, VBW=1MHz, Span=0Hz, Adjust Sweep=1s, 5ms. Get the pulse time.

6.6. TEST RESULT

(1) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = Hopping number * 0.4 * （6/1） *

pulse's on time =23*0.4*6/1*1.44=79.49<400ms

The spectrum analyzer plots are attached as below:



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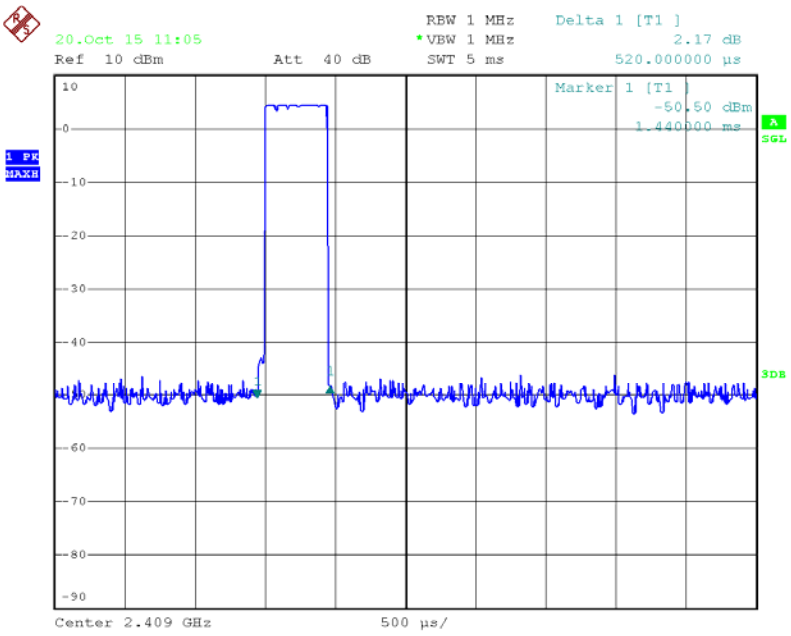

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7. MAXMUM OUTPUT POWER

7.1. TEST EQUIPMENT

Same with 3.1

7.2. BLOCK DIAGRAM OF TEST SETUP

Same with 3.2

7.3. LIMITS

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz bands: 0.125 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.4. TEST PROCEDURE

(1) Configure EUT and assistant system according clause 2.4 and 3.2

(2) Connect EUT's antenna output to spectrum analyzer by RF cable.

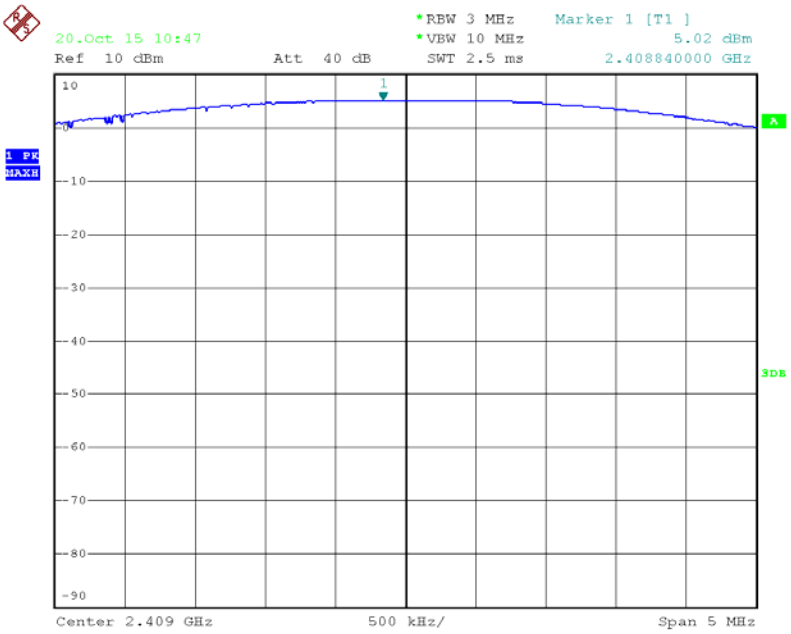
(3) Configure EUT work in test mode as stated in clause 2.4.

(4) Set the spectrum analyzer as follows:

RBW:	3MHz
VBW:	10MHz
Span	>1.5x 20dB bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

7.5. TEST RESULT

EUT Set Mode	Data Rate (Mbp/s)	Frequency (MHz)	Result(dBm)
			Peak
Tx mode (worst case:GFSK)	1	2409	5.02
		2440	5.11
		2476	5.17
Limit: 21dBm		Conclusion: PASS	



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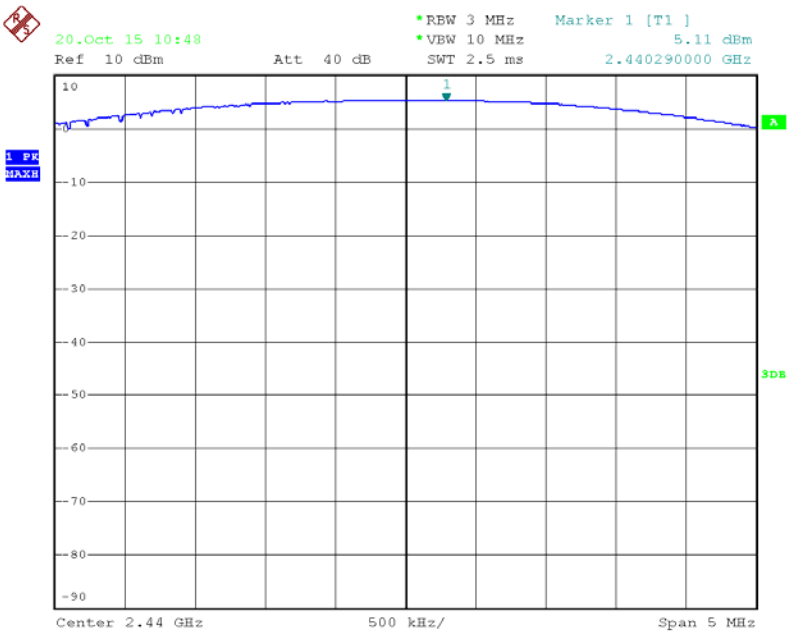

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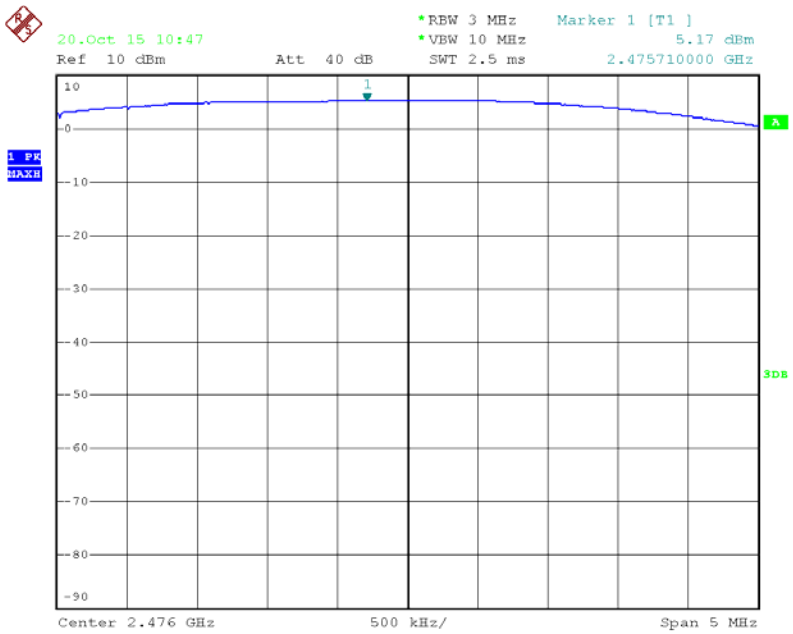

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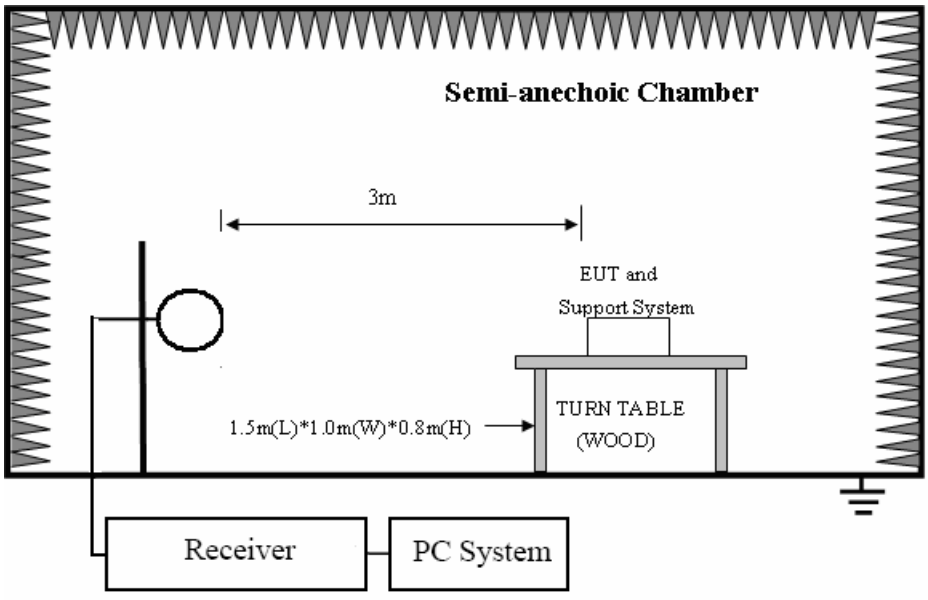
8. SPURIOUS EMISSION

8.1. TEST EQUIPMENT

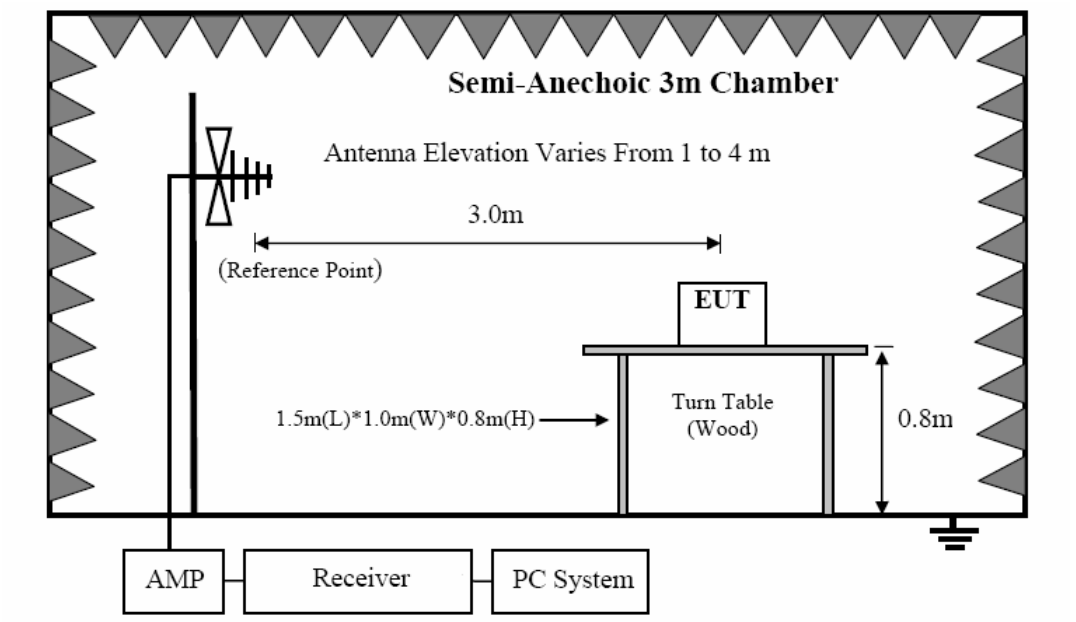
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/26	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/07/11	1 Year
3	Loop antenna	TESEQ	HLA6120	20129	2015/12/26	1 Year
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
5	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
6	Horn Antenna	EMCO	3116	00060095	2015/12/26	1 Year
7	Pre-amplifier	A.H.	PAM-1840VH	562	2015/12/26	1 Year
8	Pre-amplifier	R&S	AFS33-18002 650-30-8P-44	SEL0080	2015/12/26	1 Year
9	RF Cable	R&S	R01	10403	2015/12/26	1 Year
10	RF Cable	R&S	R02	10512	2015/12/26	1 Year

8.2. BLOCK DIAGRAM OF TEST SETUP

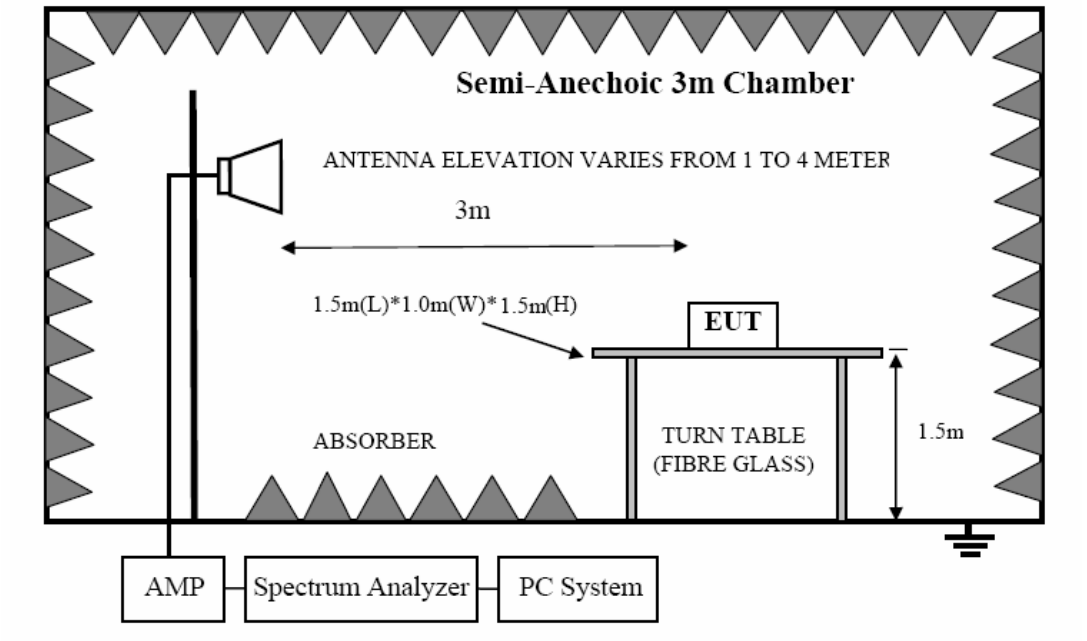
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. LIMIT

8.3.1. FCC 15.205 Restricted frequency band

MHz	MHz	MHz	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	8.025 - 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 - 156.52525	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])

8.3.2. FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$Limit_{3m}$ (dBuV/m)= $Limit_{30m}$(dBuV/m) + 40Log(30m/3m)

8.3.3. Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

8.4. TEST PROCEDURE

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and assistant system according clause 2.4 and 7.2

(3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9KHz to 18GHz.

(5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(6) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz,110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(7) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

（8）For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure(according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure). Peak detector is used for Peak and AV measurement both.

8.5. TEST RESULT

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9KHz to 25GHz were comply with 15.209 limit.

Note1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note2: For below test data, when the limit tabular marked "/" means this frequency point is the fundamental emission and no need comply with this limit.

Test Result

Test Site	: 3m Chamber		
EUT	: METALLICS GS WIRELESS CTRL-PS3	**Tested By**	: Lake Hu
Power Supply	: 5Vdc by notebook supply;	**Model Number**	: 064-018R
Condition	: Temp:24.5'C,Humi:55%, Press:100.1kPa	**Test Mode**	: Tx mode
Memo	:	**Antenna/Distance**	: VULB 9163 /3m

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	PK/QP/AV	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel (2409)									
4818	45.24	PK	H	32.3	5.91	31.78	51.67	74	-22.33
4818	34.68	AV	H	32.3	5.91	31.78	41.11	54	-12.89
4818	48.21	PK	V	32.3	5.91	31.78	54.64	74	-19.36
4818	37.19	AV	V	32.3	5.91	31.78	43.62	54	-10.38
7227	34.78	PK	H	36.3	6.34	30.97	46.45	74	-27.55
7227	23.16	AV	H	36.3	6.34	30.97	34.83	54	-19.17
7227	35.08	PK	V	36.3	6.34	30.97	46.75	74	-27.25
7227	21.46	AV	V	36.3	6.34	30.97	33.13	54	-20.87
9636	30.02	PK	H	37.9	8.01	30.86	45.07	74	-28.93
9636	17.44	AV	H	37.9	8.01	30.86	32.49	54	-21.51
9636	29.73	PK	V	37.9	8.01	30.86	44.78	74	-29.22
9636	18.85	AV	V	37.9	8.01	30.86	33.9	54	-20.1
517.32	38.28	QP	H	14.2	2.74	27.6	27.62	46	-18.38
547.28	39.07	QP	V	14.2	2.74	27.6	28.41	46	-17.59
Middle Channel (2440)									
4880	43.58	PK	H	32.9	6.34	31.78	51.04	74	-22.96
4880	35.21	AV	H	32.9	6.34	31.78	42.67	54	-11.33
4880	47.85	PK	V	32.9	6.34	31.78	55.31	74	-18.69
4880	37.16	AV	V	32.9	6.34	31.78	44.62	54	-9.38
7320	32.28	PK	H	37.1	6.72	30.97	45.13	74	-28.87
7320	20.47	AV	H	37.1	6.72	30.97	33.32	54	-20.68
7320	32.29	PK	V	37.1	6.72	30.97	45.14	74	-28.86
7320	20.12	AV	V	37.1	6.72	30.97	32.97	54	-21.03
9760	29.87	PK	H	38.6	8.43	30.86	46.04	74	-27.96
9760	17.56	AV	H	38.6	8.43	30.86	33.73	54	-20.27
9760	30.05	PK	V	38.6	8.43	30.86	46.22	74	-27.78

9760	16.32	AV	V	38.6	8.43	30.86	32.49	54	-21.51
509.45	37.44	QP	H	14.2	2.74	27.6	26.78	46	-19.22
559.23	39.89	QP	V	14.2	2.74	27.6	29.23	46	-16.77
High Channel (2476)									
4952	45.18	PK	H	33.1	6.39	31.78	52.89	74	-21.11
4952	35.29	AV	H	33.1	6.39	31.78	43	54	-11
4952	47.75	PK	V	33.1	6.39	31.78	55.46	74	-18.54
4952	36.52	AV	V	33.1	6.39	31.78	44.23	54	-9.77
7428	32.29	PK	H	37.2	6.77	30.97	45.29	74	-28.71
7428	19.45	AV	H	37.2	6.77	30.97	32.45	54	-21.55
7428	31.79	PK	V	37.2	6.77	30.97	44.79	74	-29.21
7428	19.85	AV	V	37.2	6.77	30.97	32.85	54	-21.15
9904	28.59	PK	H	38.7	8.48	30.86	44.91	74	-29.09
9904	16.47	AV	H	38.7	8.48	30.86	32.79	54	-21.21
9904	29.51	PK	V	38.7	8.48	30.86	45.83	74	-28.17
9904	15.82	AV	V	38.7	8.48	30.86	32.14	54	-21.86
516.86	37.56	QP	H	14.2	2.74	27.6	26.9	46	-19.1
568.12	39.17	QP	V	14.2	2.74	27.6	28.51	46	-17.49

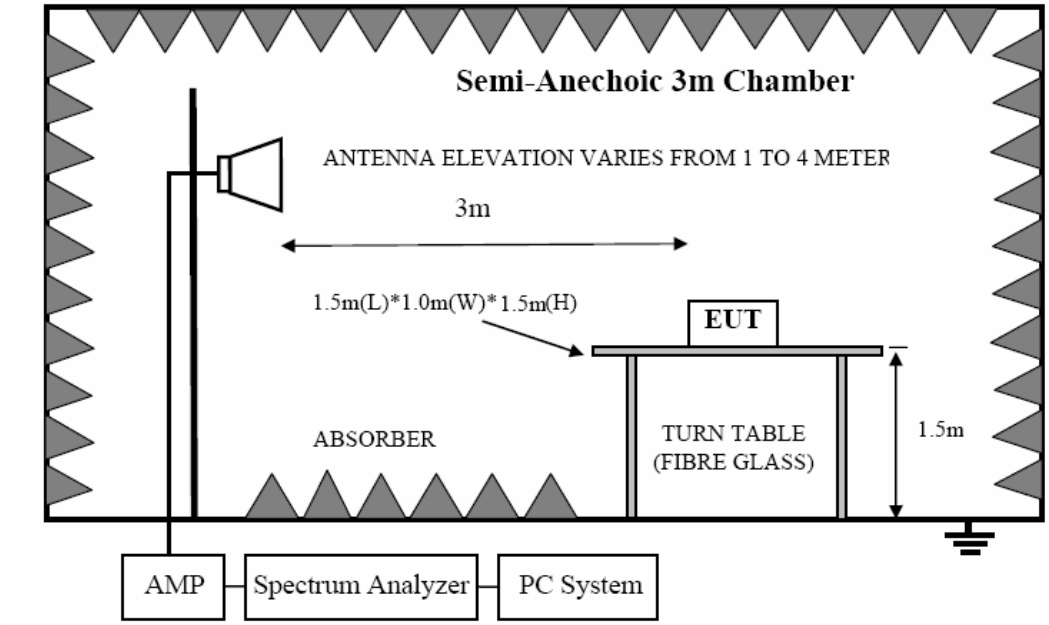
Note: 1. Result Level = Read Level + Antenna Factor + Cable Loss-Amp Gain
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

9. BAND EDGE

9.1. TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/26	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/07/11	1 Year
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
4	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
5	Pre-amplifier	A.H.	PAM0-0118	360	2015/12/26	1 Year
6	RF Cable	R&S	R01	10403	2015/12/26	1 Year
7	RF Cable	R&S	R02	10512	2015/12/26	1 Year

9.2. BLOCK DIAGRAM OF TEST SETUP



9.3. LIMIT

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.4. TEST PROCEDURE

Same with clause 8.4 except change investigated frequency range from 2100MHz to 2450MHz and 2450MHz to 2500MHz.

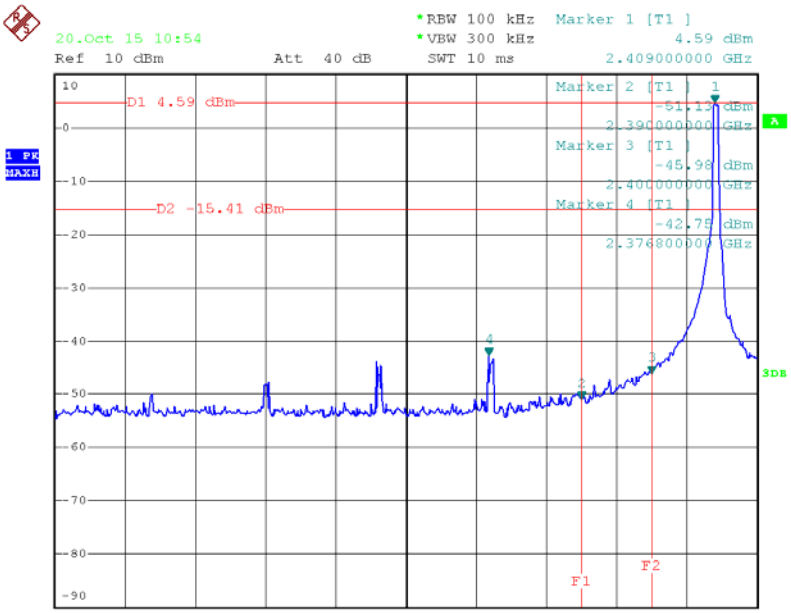
Remark: All restriction band have been tested, and only the worse case is shown in report.

9.5. TEST RESULT

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.205	
(MHz)	Reading (dBμV)	PK/QP/AV	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Lowest Channel (GFSK)									
2390	27.44	PK	H	27.9	3.57	0	58.91	74	-15.09
2390	10.74	AV	H	27.9	3.57	0	42.21	54	-11.79
2390	26.51	PK	V	27.9	3.57	0	57.98	74	-16.02
2390	10.12	AV	V	27.9	3.57	0	41.59	54	-12.41
2400	27.52	PK	H	28	3.57	0	59.09	74	-14.91
2400	10.68	AV	H	28	3.57	0	42.25	54	-11.75
2400	26.45	PK	V	28	3.57	0	58.02	74	-15.98
2400	10.09	AV	V	28	3.57	0	41.66	54	-12.34
Highest Channel (GFSK)									
2483.5	25.37	PK	H	28.7	3.72	0	57.79	74	-16.21
2483.5	9.64	AV	H	28.7	3.72	0	42.06	54	-11.94
2483.5	26.09	PK	V	28.7	3.72	0	58.51	74	-15.49
2483.5	10.02	AV	V	28.7	3.72	0	42.44	54	-11.56

Note: 1. Result Level = Read Level + Antenna Factor + Cable Loss- Amplifier Gain

2. After test and evaluation hopping off mode and hopping on mode, will record worst case (hopping off mode) in this report.



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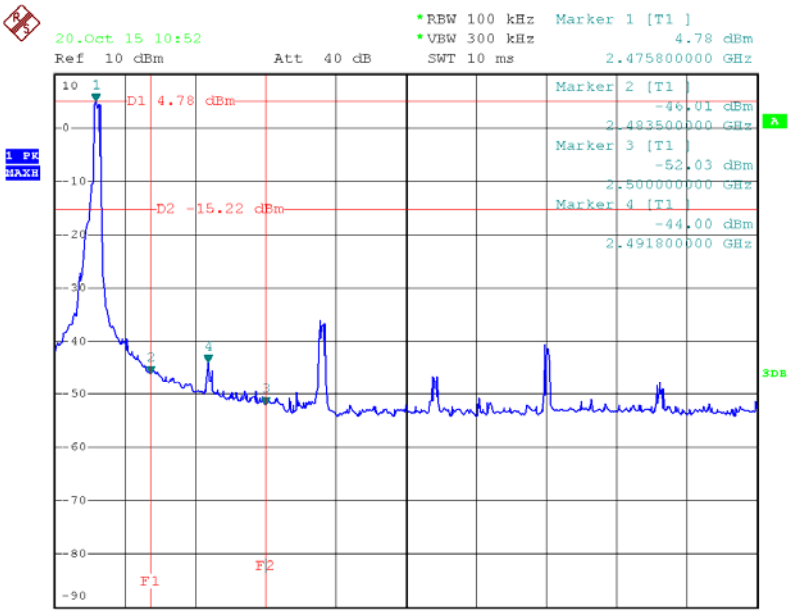


Date: 20.OCT.2015 10:52:46

10. Conducted Spurious Emissions

10.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

10.2. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

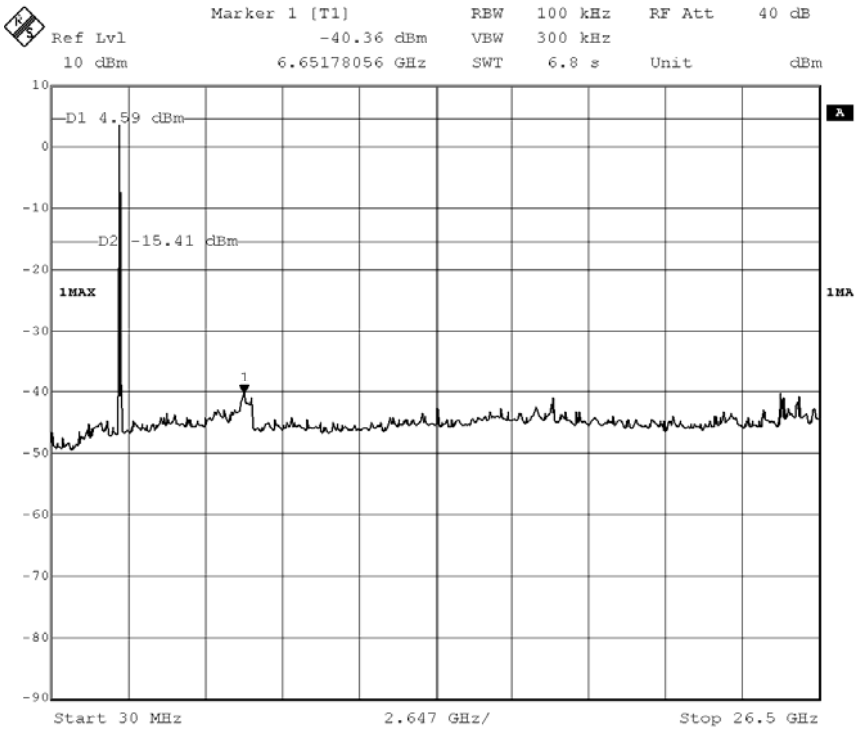
10.3. Test Procedure

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

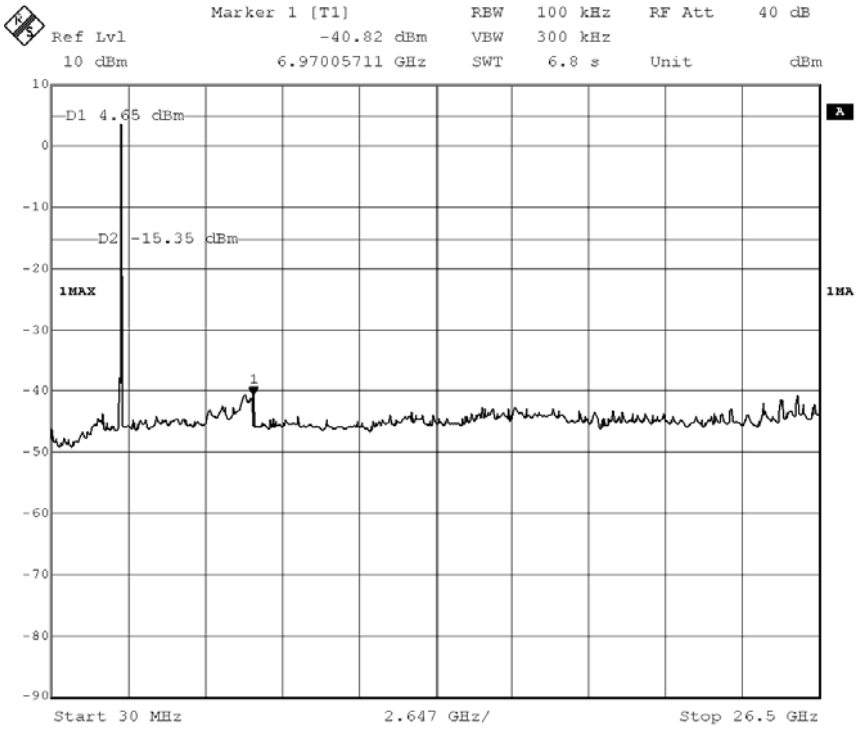
10.4. Test result

PASS (**See below detailed test result**.)

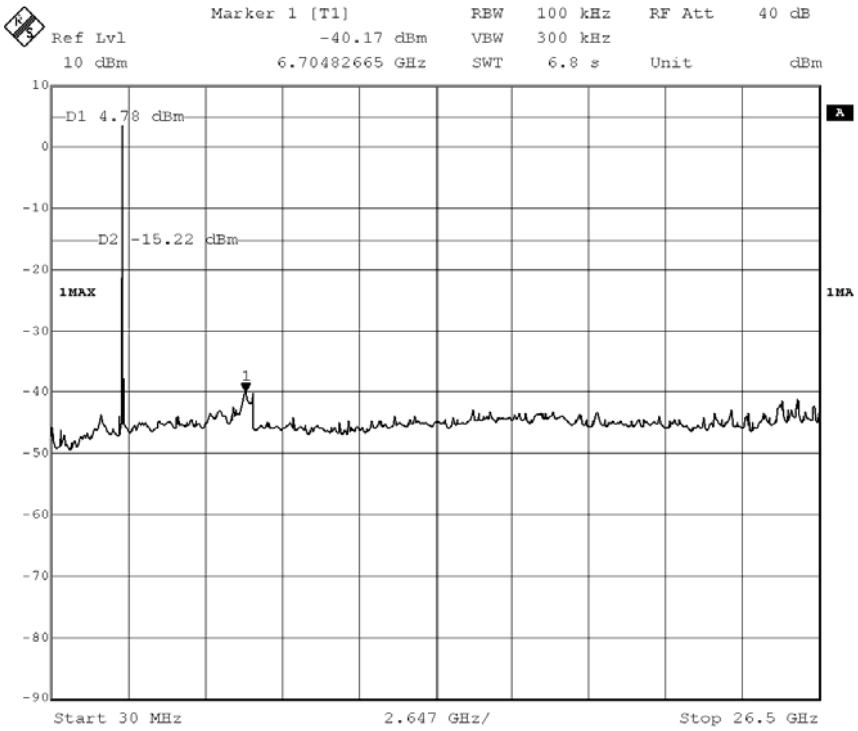
2409MHz



2440MHz



2476MHz

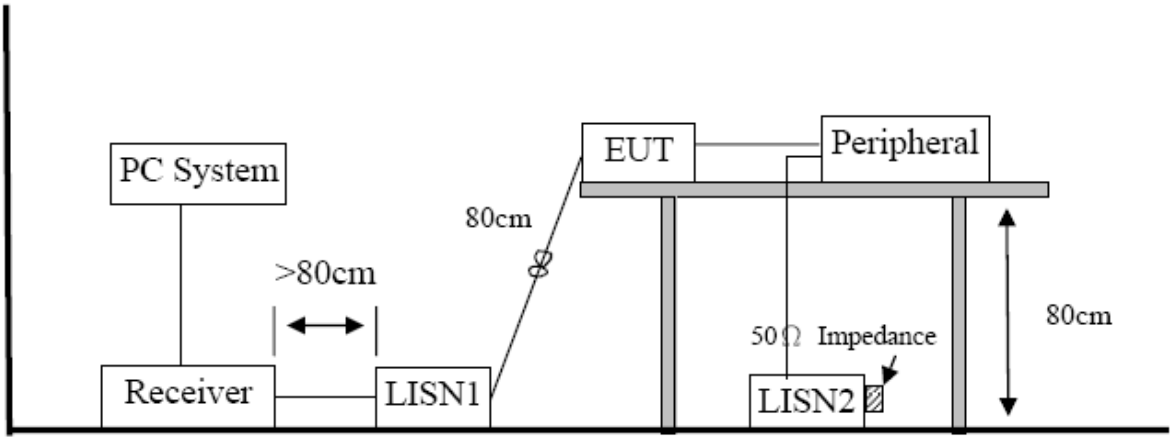

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-40.17 dBm
VBW 300 kHz
10 dBm
6.70482665 GHz
SWT 6.8 s
Unit dBm
D1 4.78 dBm
D2 -15.22 dBm
1MAX
1MA
A
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 30 MHz
2.647 GHz/
Stop 26.5 GHz

11. Power Line Conducted Emission

11.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Test Receiver	R&S	ESCI	101308	2015/12/26	1 Year
2	LISN 1	AFJ	LS16	16011103219	2015/12/26	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2015/12/26	1 Year
4	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	2015/12/26	1 Year

11.2. Block diagram of test setup



11.3. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

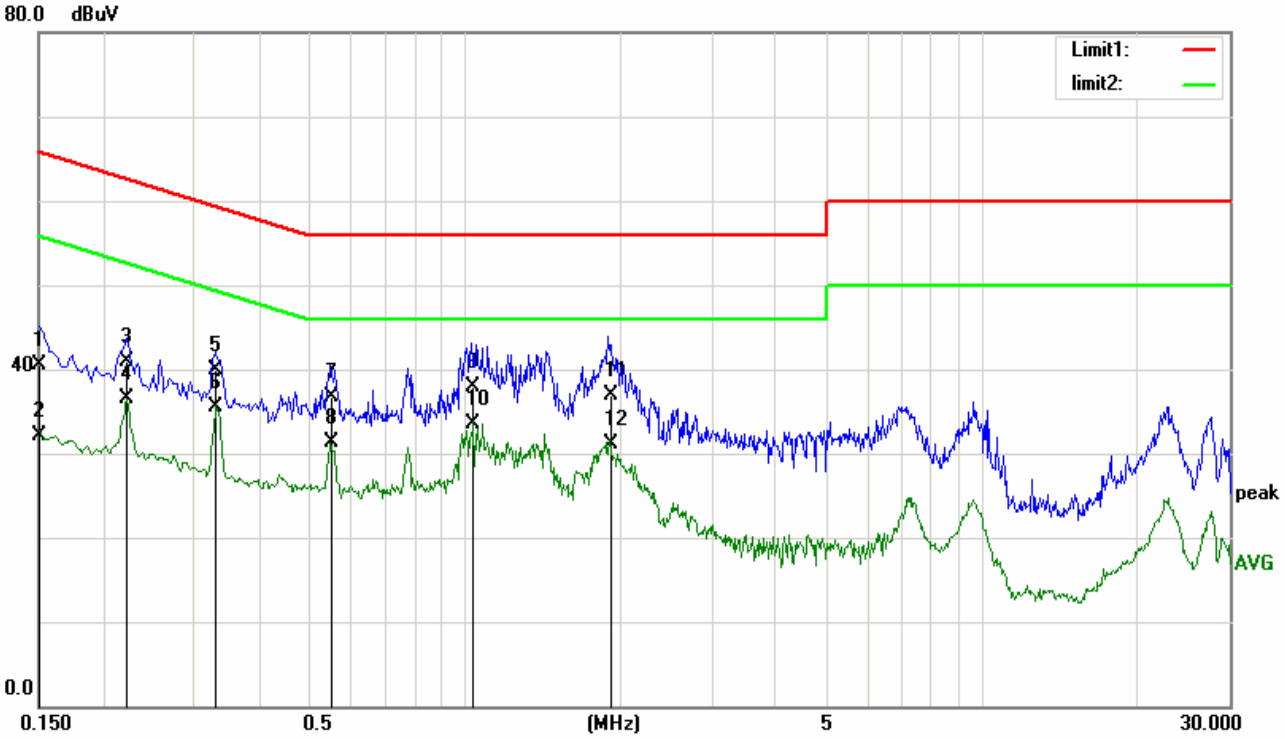
Note 2: The lower limit shall apply at the transition frequencies

11.4. TEST PROCEDURE

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane. Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4: 2009. All support equipment power received from a second LISN. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT. The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes. During the above scans, the emissions were maximized by cable manipulation. The test mode(s) described in clause 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode producing the highest emission level. The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded. The bandwidth of test receiver is set at 9 KHz.

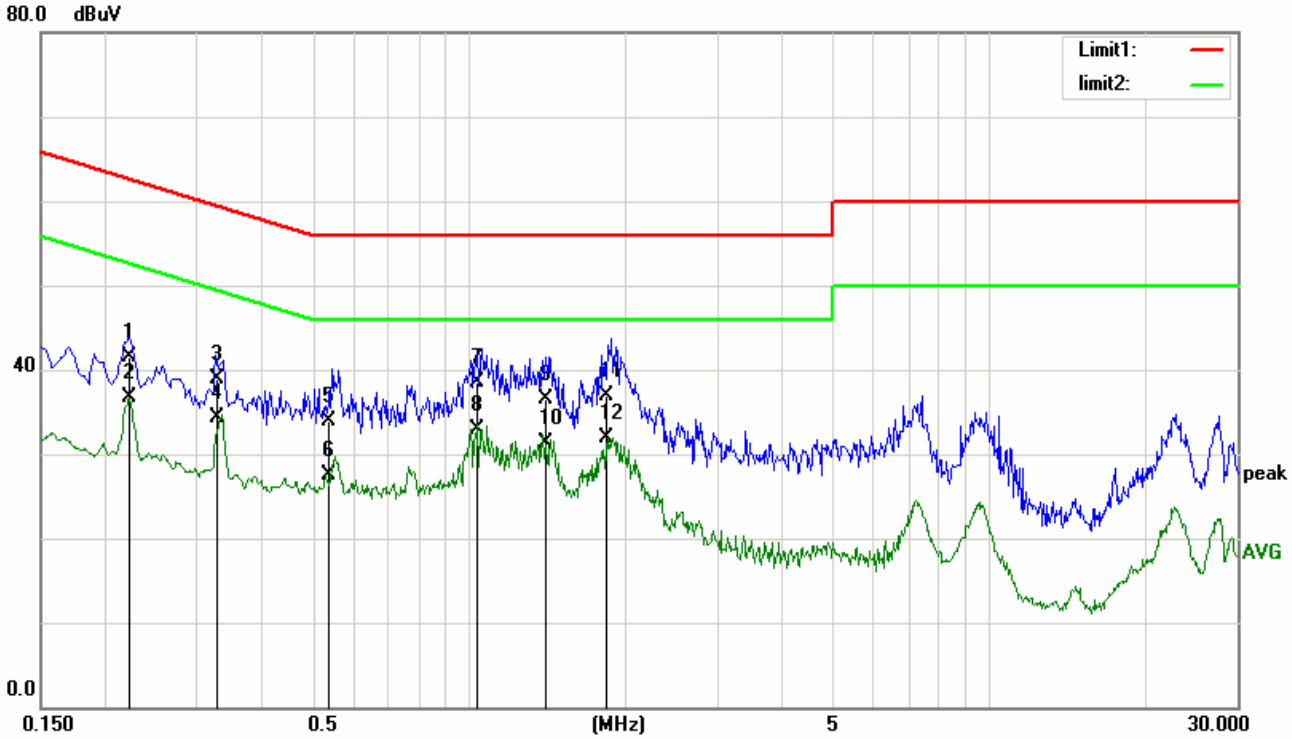
11.5. Test Result

EUT:	AG WIRELELL CONTROLLER FOR PS3	Model No.:	064-018R
Temperature:	24℃	Relative Humidity:	55%
Probe:	L1	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15_B	Test Result:	Pass
Test Mode:	Tx	Test By:	Lake
Note:	2409MHz		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1515	28.71	11.80	40.51	65.91	-25.40	QP
2	0.1515	20.38	11.80	32.18	55.91	-23.73	AVG
3	0.2226	29.72	11.15	40.87	62.72	-21.85	QP
4	0.2226	25.44	11.15	36.59	52.72	-16.13	AVG
5	0.3277	29.44	10.40	39.84	59.51	-19.67	QP
6	0.3277	25.03	10.40	35.43	49.51	-14.08	AVG
7	0.5549	26.58	10.16	36.74	56.00	-19.26	QP
8	0.5549	21.24	10.16	31.40	46.00	-14.60	AVG
9	1.0343	27.86	10.09	37.95	56.00	-18.05	QP
10	1.0343	23.47	10.09	33.56	46.00	-12.44	AVG
11	1.9048	26.74	10.19	36.93	56.00	-19.07	QP
12	1.9048	20.90	10.19	31.09	46.00	-14.91	AVG

EUT:	AG WIRELELL CONTROLLER FOR PS3	Model No.:	064-018R
Temperature:	24℃	Relative Humidity:	55%
Probe:	N	Test Power:	AC 120V/60Hz
Standard:	(CE)FCC PART 15_B	Test Result:	Pass
Test Mode:	Tx	Test By:	Lake
Note:	2409MHz		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.2224	30.29	11.15	41.44	62.73	-21.29	QP
2	0.2224	25.65	11.15	36.80	52.73	-15.93	AVG
3	0.3274	28.43	10.40	38.83	59.51	-20.68	QP
4	0.3274	23.86	10.40	34.26	49.51	-15.25	AVG
5	0.5355	23.73	10.17	33.90	56.00	-22.10	QP
6	0.5355	17.38	10.17	27.55	46.00	-18.45	AVG
7	1.0342	28.36	10.09	38.45	56.00	-17.55	QP
8	1.0342	22.84	10.09	32.93	46.00	-13.07	AVG
9	1.4070	26.30	10.14	36.44	56.00	-19.56	QP
10	1.4070	21.13	10.14	31.27	46.00	-14.73	AVG
11	1.8387	26.76	10.18	36.94	56.00	-19.06	QP
12	1.8387	21.79	10.18	31.97	46.00	-14.03	AVG

12. ANTENNA REQUIREMENTS

12.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2. RESULT

The antennas used for this product are dipole antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only -1.23dBi. The EUT has an internal antenna, the directional gain of antenna is -1.23dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision."

END OF REPORT