

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: THRUST E Pedals

Brand Name: XPEDO

Model No.: XRF12

Model Difference: N/A

FCC ID: 2ADSN531001001

Report No.: E2/2014/C0007

Issue Date: Dec. 24, 2014

FCC Rule Part: §15.249

Prepared for: WELLGO PEDAL'S CORP.
NO.3 Gong 7th Road, Youth Ind.Park, Dajia Dist.,
Taichung City 437 , Taiwan.

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No.2, Keji 1st Rd., Guishan Township, Taoyuan
County, Taiwan 333



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VERIFICATION OF COMPLIANCE

Applicant: WELLGO PEDAL'S CORP.
NO.3 Gong 7th Road, Youth Ind.Park, Dajia Dist., Taichung City 437 , Taiwan.

Product Name: THRUST E Pedals

Brand Name: XPEDO

Model No.: XRF12

Model Difference: N/A

FCC ID: 2ADSN531001001

File Number: E2/2014/C0007

Date of test: Dec. 02, 2014 ~ Dec. 26, 2014

Date of EUT Received: Dec. 02, 2014

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

Test By:

Jazz Huang

Date:

Dec. 26, 2014

Jazz Huang / Sr. Engineer

Prepared By:

Allen Tsai

Date:

Dec. 26, 2014

Allen Tsai / Engineer

Approved By:

Jim Chang

Date:

Dec. 26, 2014

Jim Chang / Supervisor

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Version

Version No.	Date	Description
00	Dec. 26, 2014	Initial creation of document

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1. GENERAL INFORMATION

1.1 Product Description

Product Name:	THRUST E Pedals	
Brand Name:	XPEDO	
Model No.:	XRF12	
Model Difference:	N/A	
Transmit Power	90.57 dBuV/m	
Operation Frequency:	2402 & 2457MHz	
Channel number:	2 channels	
Channel space:	55MHz	
Modulation Type:	ASK & FSK	
Hardware Version:	(PCB) Ver.1.2.4	
Software Version:	N/A	
USB Cable:	Model No.: N/A, Supplier: N/A	
Cradle:	Model No.: GAT-C01, Supplier: Mobile Energy Technology Co., Ltd.	
Power Supply:	3.6 Vdc from rechargeable battery *1	
	Battery:	Model No.: 52-GAT-01, Supplier: Mobile Energy Technology Co., Ltd.
Antenna Designation:	PCB Antenna, Antenna Gain: 3dBi	

This report complies with FCC 15.249

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ADSN531001001 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009. FCC Registration Number: 990257. The address of SGS Taiwan Ltd. Electronics & Communication Laboratory 1F, No.134, Wukung Road New Taipei City TAIWAN 24803, Canada Registration Number: 4620A-5.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. FCC Registration Number: 455997. The address of SGS Taiwan Ltd. Electronics & Communication Laboratory 1F, No.134, Wukung Road New Taipei City TAIWAN 24803, IC Registration Number: 4620A-6..

1.5 Special Accessories

There is no special accessory used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the engineering operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7.3.1 of ANSI C63.4-2009, conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009.

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2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

(2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 – 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
24.0 – 24.25 GHz	250 mV/m (107.95dBuV/m)	2500 uV/m (67.95dBuV/m)	3

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(3) Radiated Emission 15.249 (d)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

(4) Radiated Emission 15.249(e)

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

- Remark: 1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$
- Measurement was performed at an antenna to the closed point of EUT distance of meters.
 - Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
 - Emission spurious frequency which appearing within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.

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2.5 Configuration of Tested System

Fig. 2-1 Configuration

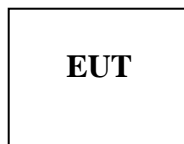


Table 2-2 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.
1.	Test Software	N/A	N/A	N/A

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

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3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	N/A
§15.249(a)(e)	Radiated Emission	Compliant
§15.249(d)	20dB bandwidth Measurement	Compliant

4. Description of test modes

The EUT has been tested under operating condition.

The EUT is staying in continuous transmitting mode.

Channel lowest (2402MHz), Highest (2457MHz) and Standby modes were chosen for full testing.

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
20dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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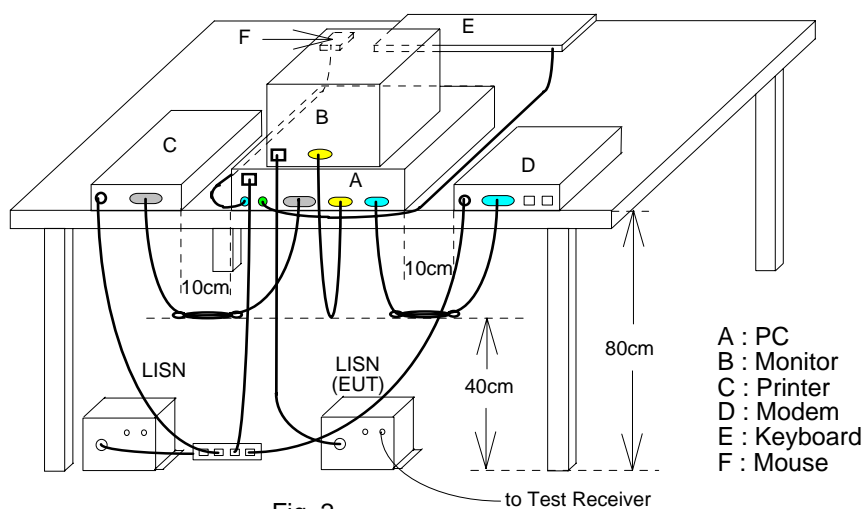
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6. Conducted Emissions Test

6.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

SGS Conducted Emission Test Site No.A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI 3	101311	2014/06/20	2015/06/19
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	2014/02/07	2015/02/06
LISN	Schwarzbeck	NSLK 8127	8127-648	2014/06/10	2015/06/09
LISN	Rolf-Heine	NNB-2/16Z	99012	2014/03/26	2015/03/25
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

6.4 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Result: N/A, this device is powered by battery.

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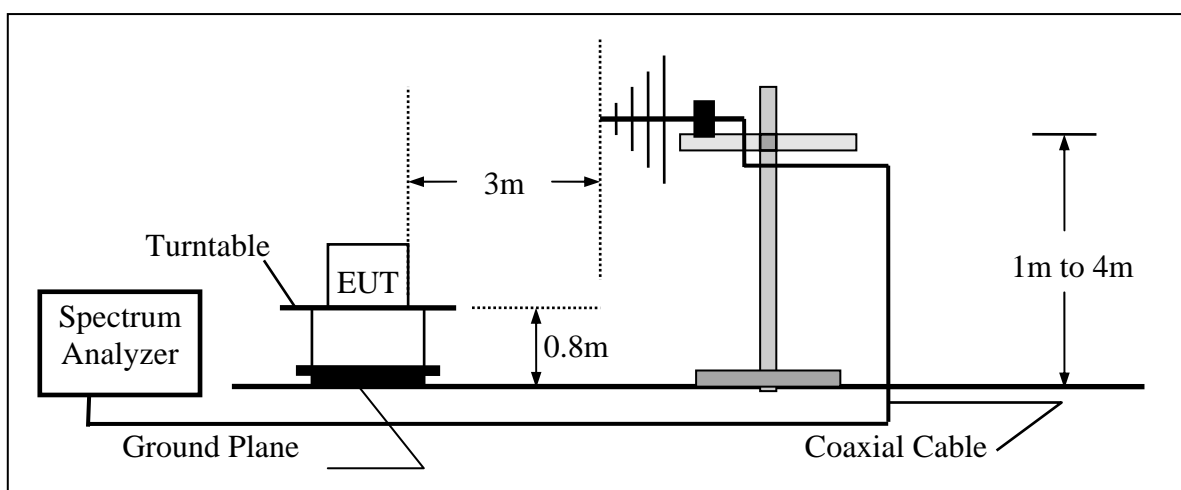
7. Radiated Emission Test

7.1 Measurement Procedure

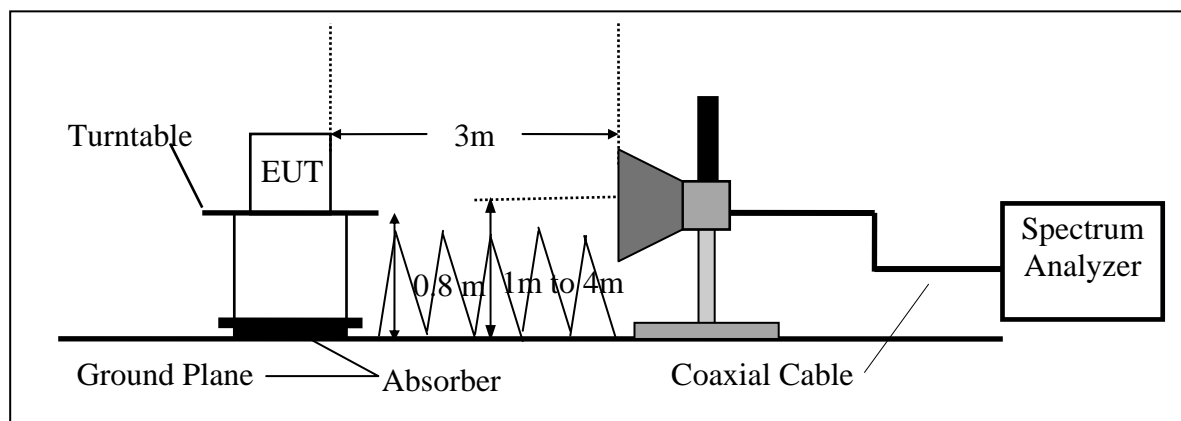
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

7.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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7.4 Measurement Equipment Used:

SGS SAC Chamber No.C (FCC)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	2014/04/12	2015/04/11
Loop Antenna	ETS-Lindgren	6502	00143303	2014/01/16	2015/01/15
Broadband Antenna	TESEQ	CBL 6112D	35240	2014/01/17	2015/01/16
Horn Antenna	ETS-Lindgren	3117	00143272	2014/01/27	2015/01/26
Pre Amplifier	EMC Instruments	EMC330	980096	2014/03/26	2015/03/25
Pre Amplifier	R&S	SCU-18	10204	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	RG 214/U	W21.03	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	RG 214/U	W22.03	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104	MY17413/4	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104	MY17404/4	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104	MY17394/4	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104	MY17386/4	2014/03/26	2015/03/25
Coaxial Cable	Huber+Suhner	SUCCOFLEX 104	MY17388/4	2014/03/26	2015/03/25
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Site NSA	SGS	966 Chamber C	SAC-C	2014/03/05	2015/03/04
Site VSWR	SGS	966 Chamber C	SAC-C	2014/04/10	2015/04/09
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

7.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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7.6 Measurement Result

Radiated Spurious Emission Measurement Result (MAIN)

Operation Band	:2.4G	Test Date	:2014-12-17
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:MAIN LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
2402.00	F	Peak	89.88	3.17	93.05	114.00	-20.95
2402.00	F	Average	89.61	3.17	92.78	94.00	-1.22

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Operation Band	:2.4G	Test Date	:2014-12-17
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:MAIN LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	Margin
		PK/QP/AV	dBμV/m		dBμV/m	dBμV/m	dB
2402.00	F	Peak	90.57	3.17	93.75	114.00	-20.25
2402.00	F	Average	90.41	3.17	93.58	94.00	-0.42

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Operation Band	:2.4G	Test Date	:2014-12-17
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:MAIN HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2457.00	F	Peak	88.60	3.30	91.90	114.00	-22.10
2457.00	F	Average	88.46	3.30	91.76	94.00	-2.24

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Operation Band	:2.4G	Test Date	:2014-12-17
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:MAIN HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	Margin
		PK/QP/AV	dBμV/m		dBμV/m	dBμV/m	dB
2457.00	F	Peak	87.86	3.30	91.15	114.00	-22.85
2457.00	F	Average	87.70	3.30	91.00	94.00	-3.00

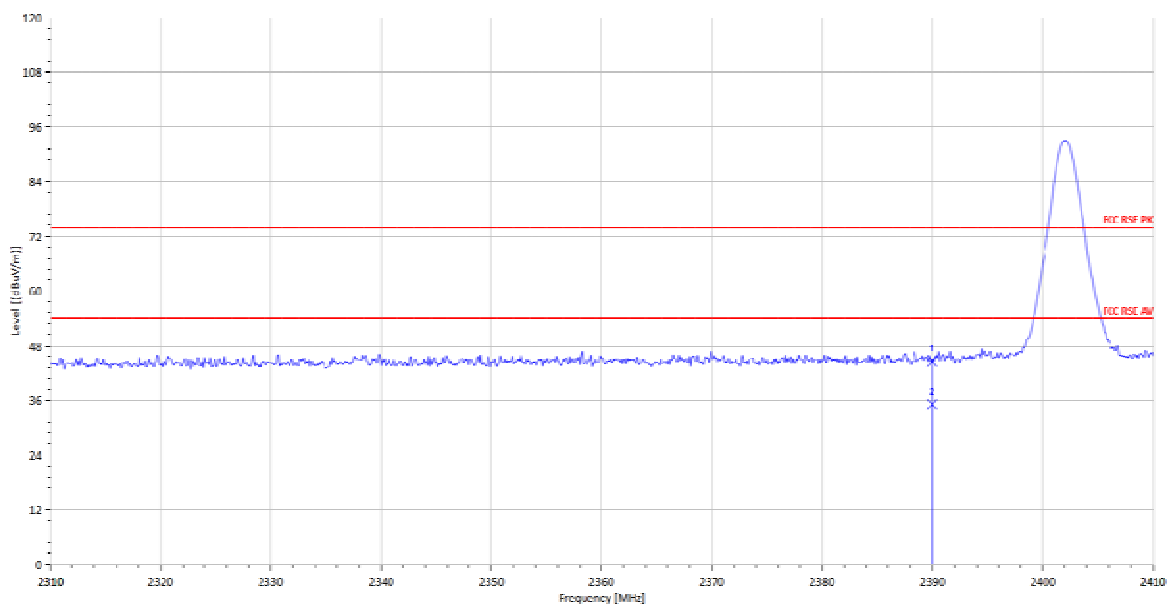
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Radiated Spurious Emission Measurement Result

Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:BANDEDGE LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE (radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

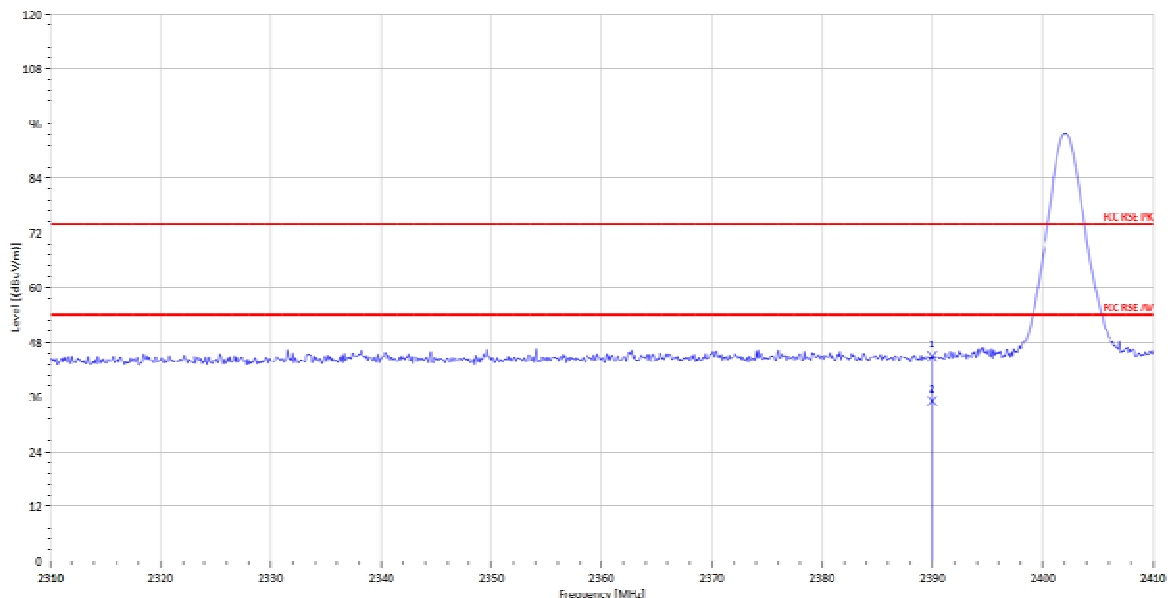
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
2390.00	E	Peak	41.50	3.14	44.63	74.00	-29.37
2390.00	E	Average	31.99	3.14	35.13	54.00	-18.87

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:BANDEDGE LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE (radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

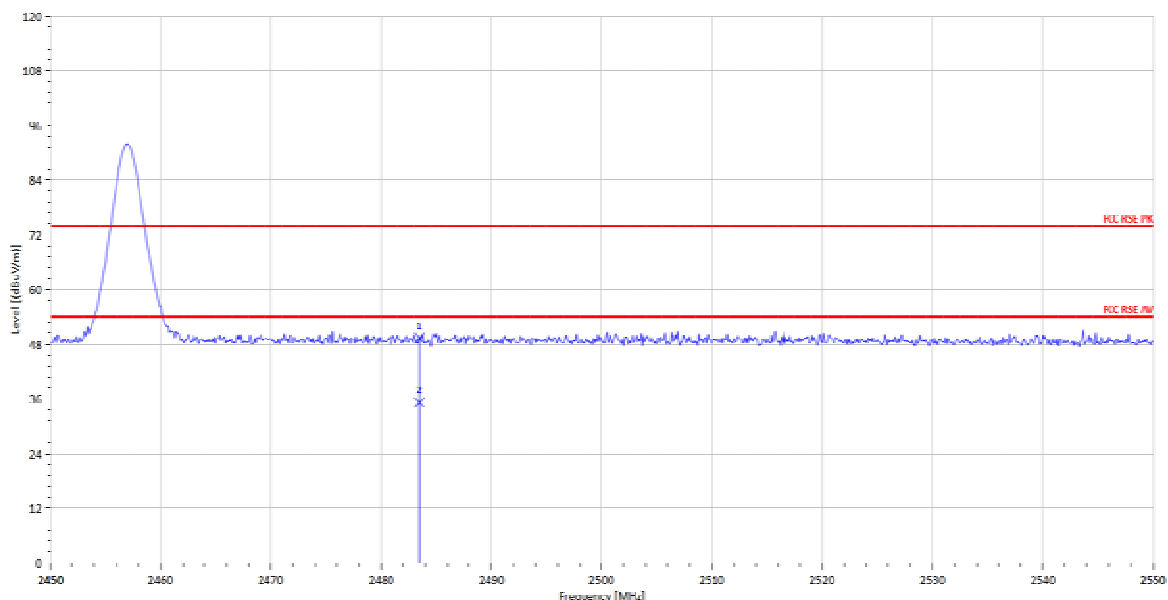
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	
		PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
2390.00	E	Peak	41.73	3.14	44.87	74.00	-29.13
2390.00	E	Average	31.93	3.14	35.07	54.00	-18.93

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:BANDEDGE HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE (radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

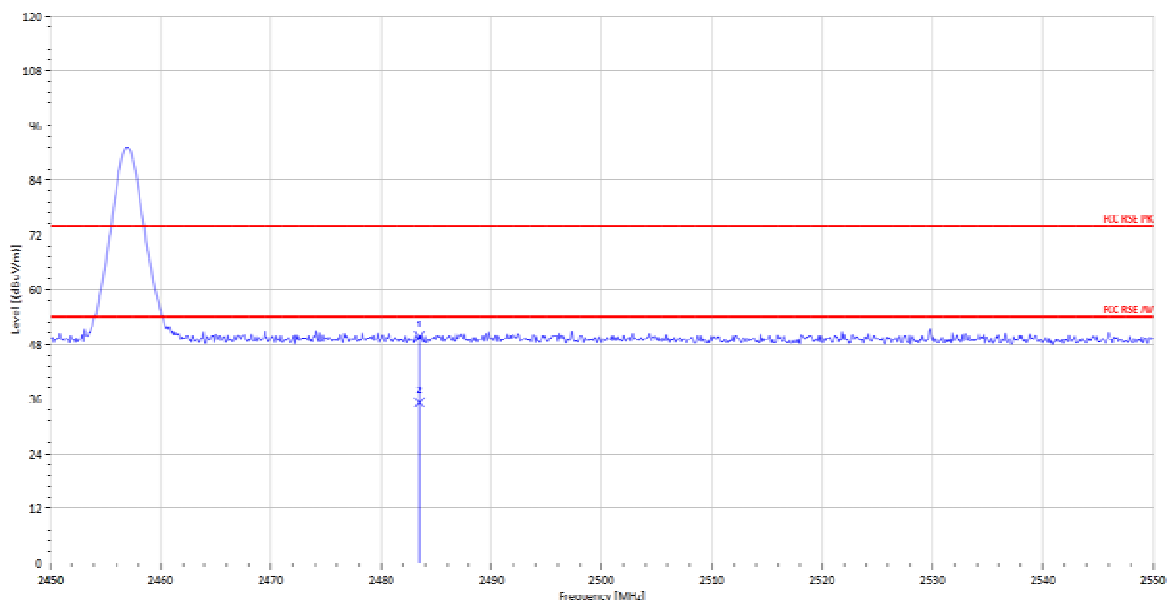
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
Mode			Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	E	46.01	3.35	49.36	74.00
2483.50	E	Average	E	31.86	3.35	35.21	54.00

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:BANDEDGE HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL



Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

The trace on RE (radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
Mode			Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
2483.50	E	Peak	46.31	3.35	49.66	74.00	-24.34
2483.50	E	Average	31.86	3.35	35.21	54.00	-18.79

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Radiated Spurious Emission Measurement Result

Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:TX LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dB μ V/m	dB	dB μ V/m	dB μ V/m	dB
31.94	S	Peak	63.35	-28.85	34.51	40.00	-5.49
125.06	S	Peak	44.75	-23.57	21.18	43.50	-22.32
344.28	S	Peak	32.74	-14.43	18.32	46.00	-27.68
554.77	S	Peak	32.42	-11.69	20.73	46.00	-25.27
744.89	S	Peak	32.40	-10.35	22.05	46.00	-23.95
993.21	S	Peak	31.16	-8.13	23.02	54.00	-30.98
4804.00	H	Peak	50.31	0.37	50.68	74.00	-23.32
4804.00	H	Average	49.22	0.37	49.59	54.00	-4.41
7206.00	H	Peak	50.40	4.69	55.09	74.00	-18.91
7206.00	H	Average	48.83	4.69	53.52	54.00	-0.48
9608.00	H	Peak	---				
12010.00	H	Peak	43.62	10.84	54.46	74.00	-19.54
12010.00	H	Average	38.10	10.84	48.94	54.00	-5.06
14412.00	H	Peak					
16814.00	H	Peak					
19216.00	H	Peak					
21618.00	H	Peak					
24020.00	H	Peak	---				

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2402 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:TX LOW	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	31.17	-16.84	14.33	40.00	-25.67
125.06	S	Peak	32.45	-21.59	10.86	43.50	-32.64
344.28	S	Peak	31.32	-17.55	13.77	46.00	-32.23
554.77	S	Peak	31.85	-12.36	19.48	46.00	-26.52
744.89	S	Peak	31.32	-10.60	20.72	46.00	-25.28
993.21	S	Peak	30.82	-8.15	22.67	54.00	-31.33
4804.00	H	Peak	49.35	0.37	49.72	74.00	-24.28
4804.00	H	Average	48.47	0.37	48.84	54.00	-5.16
7206.00	H	Peak	44.55	4.69	49.24	74.00	-24.76
7206.00	H	Average	40.60	4.69	45.29	54.00	-8.71
9608.00	H	Peak	---				
12010.00	H	Peak	40.20	10.84	51.04	74.00	-22.96
12010.00	H	Average	31.04	10.84	41.88	54.00	-12.12
14412.00	H	Peak	-	-	-	-	-
16814.00	H	Peak	-	-	-	-	-
19216.00	H	Peak	-	-	-	-	-
21618.00	H	Peak	-	-	-	-	-
24020.00	H	Peak	---				

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:TX HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
36.79	Peak	S	43.45	-19.45	23.99	40.00	-16.01
112.45	Peak	S	39.00	-22.00	17.00	43.50	-26.50
427.70	Peak	S	31.28	-15.03	16.25	46.00	-29.75
624.61	Peak	S	31.34	-12.05	19.29	46.00	-26.71
806.97	Peak	S	30.88	-9.71	21.17	46.00	-24.83
998.06	Peak	S	30.19	-8.13	22.06	54.00	-31.94
4914.00	Peak	H	50.28	0.46	50.75	74.00	-23.25
4914.00	Average	H	47.64	0.46	48.10	54.00	-5.90
7371.00	Peak	H	45.04	4.98	50.02	74.00	-23.98
7371.00	Average	H	43.41	4.98	48.39	54.00	-5.61
9828.00	Peak	H	---				
12285.00	Peak	H	40.56	11.33	51.89	74.00	-22.11
12285.00	Average	H	29.67	11.33	41.00	54.00	-13.00
14742.00	Peak	H	---				
17199.00	Peak	H	---				
19656.00	Peak	H	---				
22113.00	Peak	H	---				
24570.00	Peak	H	---				

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Operation Band	:2.4G	Test Date	:2014-12-16
Fundamental Frequency	:2457 MHz	Temp./Humi.	:24.6deg_C/53RH
Operation Mode	:TX HIGH	Engineer	:Tai
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV/m	dB	dBμV/m	dBμV/m	dB
33.88	Peak	S	33.04	-17.83	15.21	40.00	-24.79
125.06	Peak	S	32.66	-21.59	11.07	43.50	-32.43
377.26	Peak	S	32.44	-16.58	15.86	46.00	-30.14
565.44	Peak	S	31.92	-12.39	19.53	46.00	-26.47
737.13	Peak	S	30.40	-10.66	19.74	46.00	-26.26
966.05	Peak	S	31.67	-8.81	22.87	54.00	-31.13
4914.00	Peak	H	51.17	0.46	51.63	74.00	-22.37
4914.00	Average	H	48.79	0.46	49.25	54.00	-4.75
7371.00	Peak	H	---				
9828.00	Peak	H	---				
12285.00	Peak	H	---				
14742.00	Peak	H	---				
17199.00	Peak	H	---				
19656.00	Peak	H	---				
22113.00	Peak	H	---				
24570.00	Peak	H	---				

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8. 20 dB Bandwidth Measurement

8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span = 5MHz.
4. Set SPA Max hold. Mark peak, -20dB.

8.2 Test SET-UP (Block Diagram of Configuration)

Refer to section 7.2 for the plot.

8.3 Measurement Equipment Used:

SGS Conducted Room(ALL)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2014/10/15	2015/10/14
Power Meter	Anritsu	ML2496A	1326001	2014/06/20	2015/06/19
Power Sensor	Anritsu	MA2411B	1315048	2014/06/20	2015/06/19
Power Sensor	Anritsu	MA2411B	1315049	2014/06/20	2015/06/19
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	2	2014/01/06	2015/01/05
DC Block	Mini-Circuits	BLK-18-S+	4	2014/01/06	2015/01/05
Splitter	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-019	2014/01/06	2015/01/05
Attenuator	WOKEN	218FS-10	7	2014/01/06	2015/01/05
Bluetooth Test Set	Anritsu	8852B	1329002	2014/07/16	2015/07/15

8.4 Measurement Results:

2.402GHz = 285.3 KHz

2.457GHz = 288.5 KHz

Refer to attached data chart.

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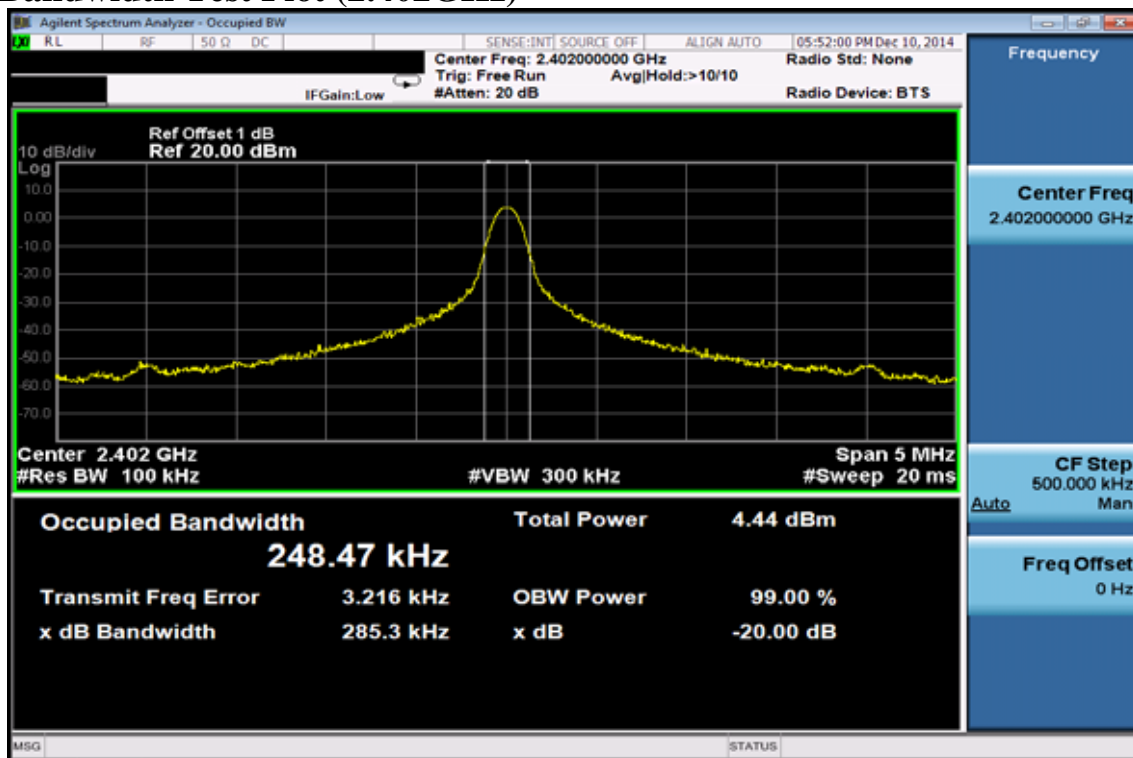
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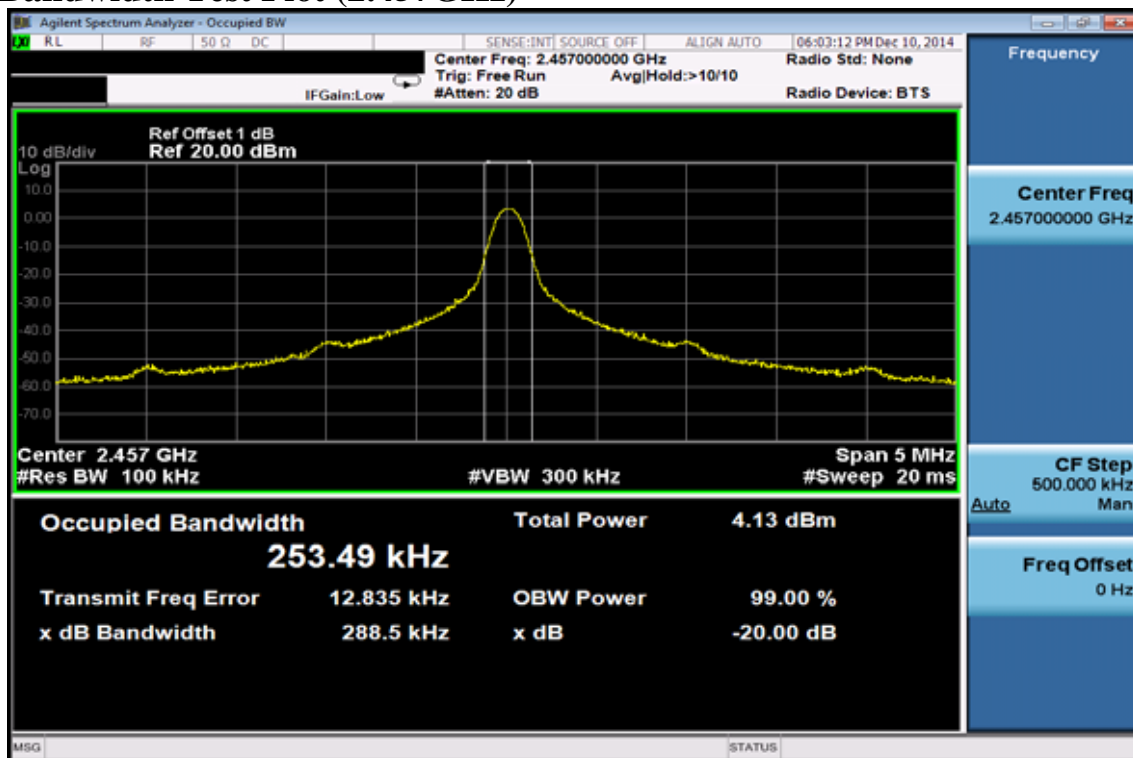
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20dB Bandwidth Test Plot (2.402GHz)



20dB Bandwidth Test Plot (2.457GHz)



~ End of Report ~

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