

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT
AND INDUSTRY CANADA RSS-210
CLASS II PC REPORT**

OF

Product Name: Phonak TVLink II base
Marketing Name: Phonak TVLink II base
Brand Name: Phonak
Model No.: Phonak TVLink II base
Model Difference: N/A
IC: 2262A-TVLINKII
FCC ID: KWC-TVLINKII
Report No.: ER/2014/90014-03
Issue Date: Sep. 21, 2015
Rule Part: §15.247, Cat: DSS
RSS-210 issue 8:2010, Annex 8

Prepared by: SGS Taiwan Ltd.
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FCC Prepared for: Phonak Inc.
4520 Weaver Parkway, Warrentville 60555,
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IC Prepared for: Phonak Canada Ltd.
80 Courtneypark Dr W, Unit 1 Mississauga,
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CERTIFICATION OF COMPLIANCE

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4520 Weaver Parkway, Warrenville 60555,
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IC Applicant for: Phonak Canada Ltd.
80 Courtneypark Dr W, Unit 1 Mississauga,
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IC: 2262A-TVLINKII

FCC ID: KWC-TVLINKII

Model No.: Phonak TVLink II base

Model Difference: N/A

File Number: ER/2014/90014-03

Date of test: Sep. 03, 2014 ~ Sep. 21, 2015

Date of EUT Received: Sep. 03, 2014

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. 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 RSS-Gen. issue 3:2010, 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 15C:2007, §15.247 and RSS-210 issue 8: 2010 Annex 8.

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

Test By:

Nick Lin

Date:

Sep. 21, 2015

Prepared By:

Nick Lin / Engineer
Karen Huang

Date:

Sep. 21, 2015

Approved By:

Karen Huang / Clerk
Jim Chang

Date:

Sep. 21, 2015

Jim Chang / Asst. Manager

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Version

Version No.	Date	Description
00	Sep. 21, 2015	Initial creation of document Please refer to original report no.: ER/2014/90014. Compared to previously approved product the following technical changes have been evaluated: 1. Change RF amplifier Spot check on RF power output & Radiated Emission.

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Table of Contents

1. GENERAL INFORMATION.....	6
1.1. Product Description.....	6
1.2. Related Submittal(s) / Grant (s)	7
1.3. Test Methodology.....	7
1.4. Test Facility	7
1.5. Special Accessories	7
1.6. Equipment Modifications.....	7
2. SYSTEM TEST CONFIGURATION.....	8
2.1. EUT Configuration.....	8
2.2. EUT Exercise	8
2.3. Test Procedure	8
2.4. Configuration of Tested System	9
3. SUMMARY OF TEST RESULTS	10
4. DESCRIPTION OF TEST MODES	10
5 MEASUREMENT UNCERTAINTY	11
6. PEAK OUTPUT POWER MEASUREMENT	12
6.1. Standard Applicable:	12
6.2. Measurement Equipment Used:	12
6.3. Test Set-up:.....	13
6.4. Measurement Procedure:.....	13
6.5. Measurement Result:.....	14
7. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT	15
7.1. Standard Applicable:	15
7.2. Measurement Equipment Used:	16
7.3. Test SET-UP:.....	17
7.4. Measurement Procedure:.....	18
7.5. Field Strength Calculation.....	18
7.6. Measurement Result:.....	18

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8. SPURIOUS EMISSION TEST.....	23
8.1. Standard Applicable:	23
8.2. Measurement Equipment Used:	23
8.3. Test SET-UP:.....	23
8.4. Measurement Procedure:.....	24
8.5. Field Strength Calculation.....	24
8.6. Measurement Result:.....	24

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1. GENERAL INFORMATION

1.1. Product Description

General:

Product Name:	Phonak TVLink II base
Marketing Name:	Phonak TVLink II base
Brand Name:	Phonak
Model No.:	Phonak TVLink II base
Model Difference:	N/A
Hardware Version:	R2
Software Version:	V1
Power Supply:	5.0Vdc from Mini USB port

Bluetooth:

Bluetooth Version:	V3.0
Frequency Range:	2402 – 2480MHz
Channel number:	79 channels
Rated Power:	14.83dBm (Peak)
Modulation type:	GFSK
Antenna Designation:	Printed PCB Antenna; Gain:2.5dBi
Type of Emission:	871KF7D (refer to test report ER/2014/90014)

The EUT is compliance with Bluetooth V3.0 standard.

This test report applies for Bluetooth.

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1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: KWC-TVLINKII filing to comply with Section 15.247 of the FCC Part 15C, Subpart C Rules. And IC: 2262A-TVLINKII filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8.

1.3. Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009. Radiated testing was performed at an antenna to EUT distance 3 meters. Tested in accordance with FCC Public Notice DA 00-705 – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

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. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, 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

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

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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 EUT (Transmitter) was tested with a test program to fix the Tx/RX frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

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 and RSS-Gen: 2010. 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. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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 and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 of ANSI C63.4-2009 and DA 00-705.

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2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

EUT

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A

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3. SUMMARY OF TEST RESULTS

FCC / IC Rules	Description Of Test	Result
§15.247(b)(1)/ RSS-210 issue 8,§A8.4(2)	Peak Output Power	Compliant
§15.247(d) RSS-210 issue 8,§A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c) RSS-Gen §7.2.3 RSS-210 issue 8,§A2.9	TX/RX Spurious Emission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low (2402MHz)、mid (2441MHz) and high (2480MHz) with BR mode and DH5 highest data rate are chosen for full testing.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55 dB
20dB Bandwidth & 99% Power Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Frequency Separation	+/- 123.36 Hz
Number of hopping frequency	+/- 123.36 Hz
Time of Occupancy	+/- 123.36 Hz
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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6. PEAK OUTPUT POWER MEASUREMENT

6.1. Standard Applicable:

According to §15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: 0.125 Watts.

According to RSS-210 issue 8,§A8.4(2), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum conducted output power shall not exceed 1 W. For all other frequency hopping systems, the maximum peak conducted output power shall not exceed 0.125 W.

6.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/20/2014	12/19/2015
Power Sensor	Anritsu	MA2411B	917032	12/20/2014	12/19/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/02/2015	01/01/2016
Spectrum Analyzer	Agilent	E4440A	MY45304525	05/05/2015	05/04/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016

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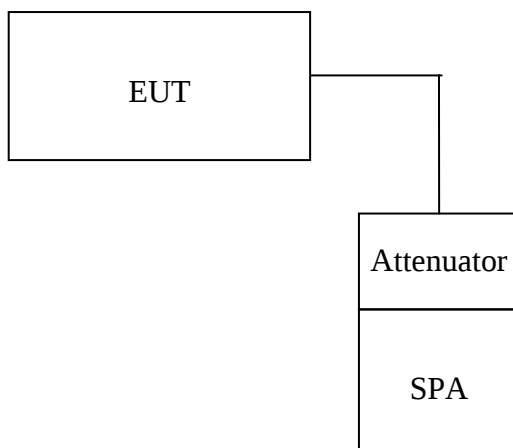
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6.3. Test Set-up:



6.4. Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Max peak function, RBW> 20dB bandwidth, VBW>RBW)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

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6.5. Measurement Result:

BR mode (GFSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	14.83	0.03041	1
2441.00	13.33	0.02153	1
2480.00	11.93	0.01560	1

*Offset: 1dB

*Note: Measured by power meter

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7. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

7.1. Standard Applicable:

According to §15.247(d), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

According to RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

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7.2. Measurement Equipment Used:

7.2.1. Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015
Loop Antenna	ETS.LINDGREN	6502	00143303	12/9/2014	12/08/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/05/2015	05/04/2016
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2015	01/01/2016
Pre-Amplifier	Agilent	8449B	3008A00578	01/02/2015	01/01/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	060776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/02/2015	01/01/2016
3m Site NSA	SGS	966 chamber	N/A	07/01/2015	06/30/2016

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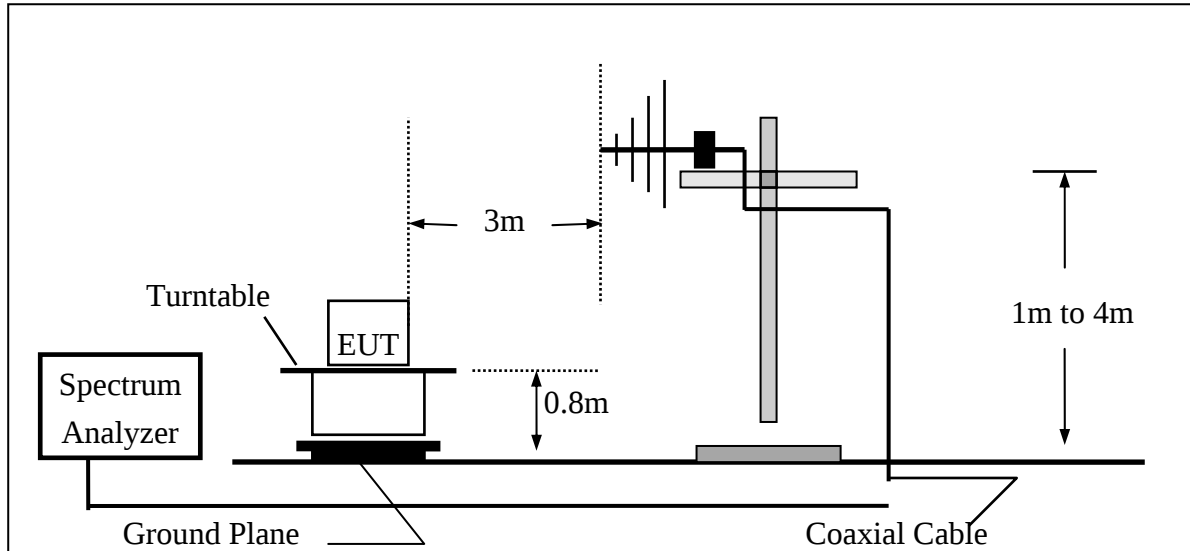
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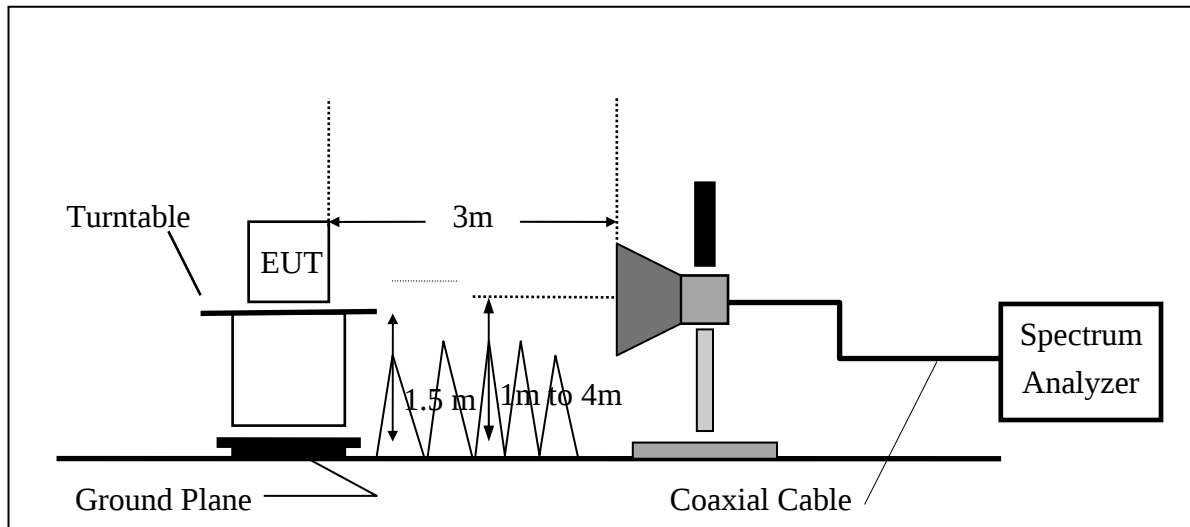
7.3. Test SET-UP:

7.3.1. Radiated emission:

(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 Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

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	

7.6. Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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Radiated Emission: (BR mode) (Hopping Mode)

Operation Band	:BR+Hopping	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge LOW	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	28.74	5.16	33.90	54.00	-20.10
2390.00	E	Peak	46.95	5.16	52.11	74.00	-21.89

Operation Band	:BR+Hopping	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge LOW	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	28.54	5.16	33.70	54.00	-20.30
2390.00	E	Peak	44.92	5.16	50.08	74.00	-23.92

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.

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Operation Band	:BR+Hopping	Test Date	:2014-09-12
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge HIGH	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	28.90	6.01	34.91	54.00	-19.09
2483.50	E	Peak	49.04	6.01	55.05	74.00	-18.95

Operation Band	:BR+Hopping	Test Date	:2014-09-12
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge HIGH	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	29.14	6.01	35.15	54.00	-18.85
2483.50	E	Peak	50.58	6.01	56.59	74.00	-17.41

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.

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Radiated Emission: (BR mode) (Non-Hopping Mode)

Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge LOW	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2375.70	S	Average	31.92	5.13	37.05	54.00	-16.95
2375.70	S	Peak	50.46	5.13	55.59	74.00	-18.41
2390.00	E	Average	29.77	5.16	34.93	54.00	-19.07
2390.00	E	Peak	48.16	5.16	53.32	74.00	-20.68

Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge LOW	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2375.80	S	Average	31.98	5.13	37.11	54.00	-16.89
2375.80	S	Peak	51.52	5.13	56.65	74.00	-17.35
2390.00	E	Average	29.16	5.16	34.32	54.00	-19.68
2390.00	E	Peak	48.73	5.16	53.89	74.00	-20.11

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.

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Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge HIGH	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2483.50	E	Average	33.26	6.01	39.27	54.00	-14.73
2483.50	E	Peak	56.47	6.01	62.48	74.00	-11.52

Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:Bandedge HIGH	Engineer	:Tin
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2483.50	E	Average	33.69	6.01	39.70	54.00	-14.30
2483.50	E	Peak	59.12	6.01	65.13	74.00	-8.87

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.

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8. SPURIOUS EMISSION TEST

8.1. Standard Applicable:

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-Gen §7.2.3 and RSS-210 issue 8, §A2.9, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

8.2. Measurement Equipment Used:

8.2.1. Radiated emission:

Refer to section 7.2.1 for details.

8.3. Test SET-UP:

8.3.1. Radiated emission:

Refer to section 8.3.1 for details.

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8.4. Measurement Procedure:

1. The EUT was placed on a turn table which is 1.5m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

8.5. 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	

8.6. Measurement Result:

Note: Refer to next page.

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Radiated Spurious Emission Measurement Result
(For frequency 30~1000MHz)

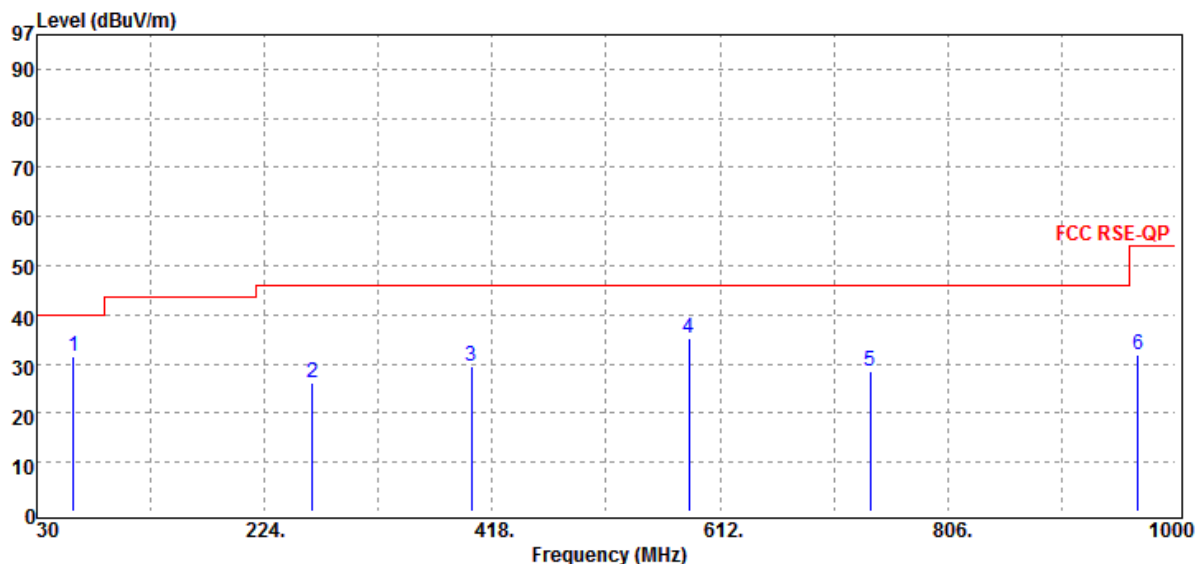
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX LOW	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
Mode			Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
61.04	S	Peak	41.79	-10.33	31.46	40.00	-8.54
264.74	S	Peak	35.39	-9.30	26.09	46.00	-19.91
400.54	S	Peak	35.52	-6.00	29.52	46.00	-16.48
585.81	S	Peak	36.93	-1.68	35.25	46.00	-10.75
740.04	S	Peak	28.89	-0.41	28.48	46.00	-17.52
967.99	S	Peak	28.21	3.66	31.87	54.00	-22.13

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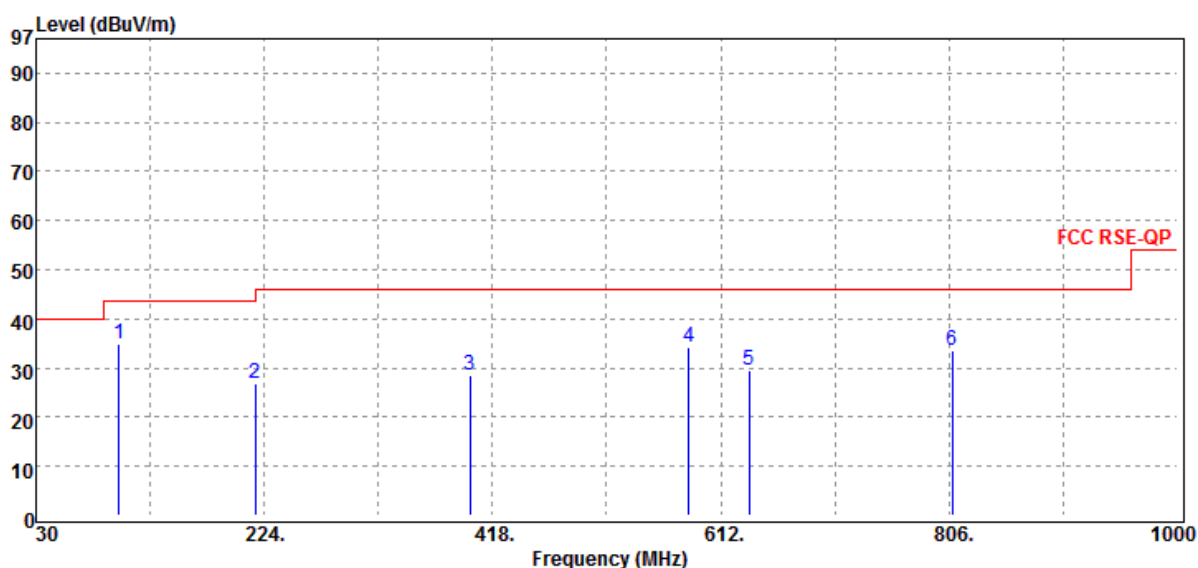
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX LOW	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
Mode			Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
100.81	S	Peak	48.95	-14.13	34.82	43.50	-8.68
216.24	S	Peak	38.10	-11.13	26.97	46.00	-19.03
398.60	S	Peak	34.60	-6.03	28.57	46.00	-17.43
584.84	S	Peak	35.99	-1.75	34.24	46.00	-11.76
636.25	S	Peak	31.79	-2.20	29.59	46.00	-16.41
808.91	S	Peak	33.14	0.36	33.50	46.00	-12.50

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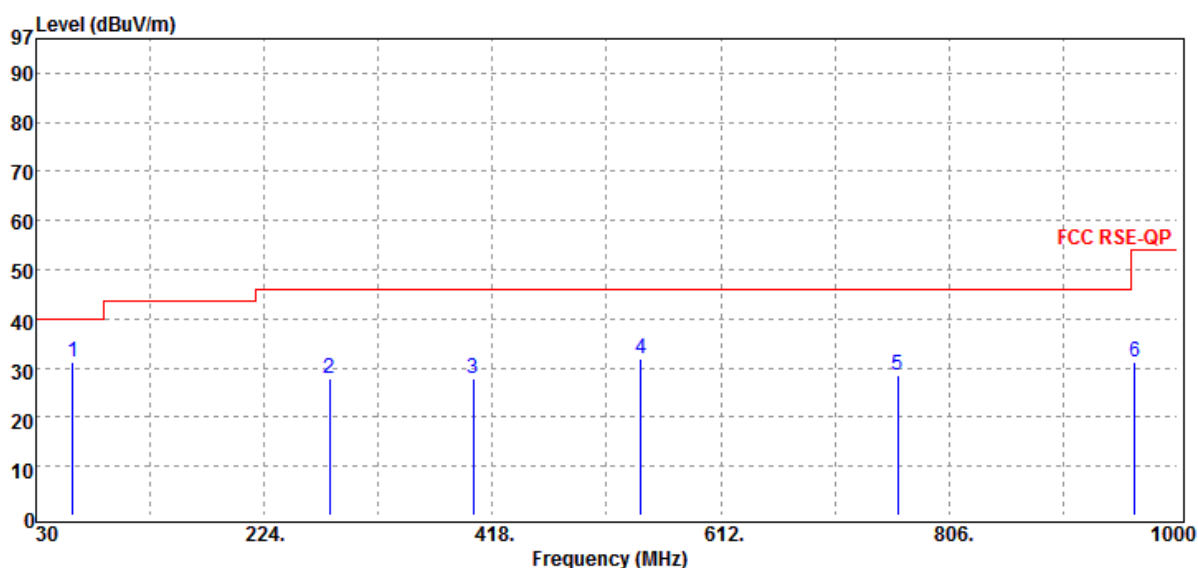
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX MID	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
61.04	S	Peak	41.63	-10.33	31.30	40.00	-8.70
279.29	S	Peak	36.44	-8.42	28.02	46.00	-17.98
401.51	S	Peak	33.88	-5.98	27.90	46.00	-18.10
544.10	S	Peak	35.84	-4.01	31.83	46.00	-14.17
762.35	S	Peak	27.53	1.14	28.67	46.00	-17.33
964.11	S	Peak	27.65	3.69	31.34	54.00	-22.66

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Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX MID	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

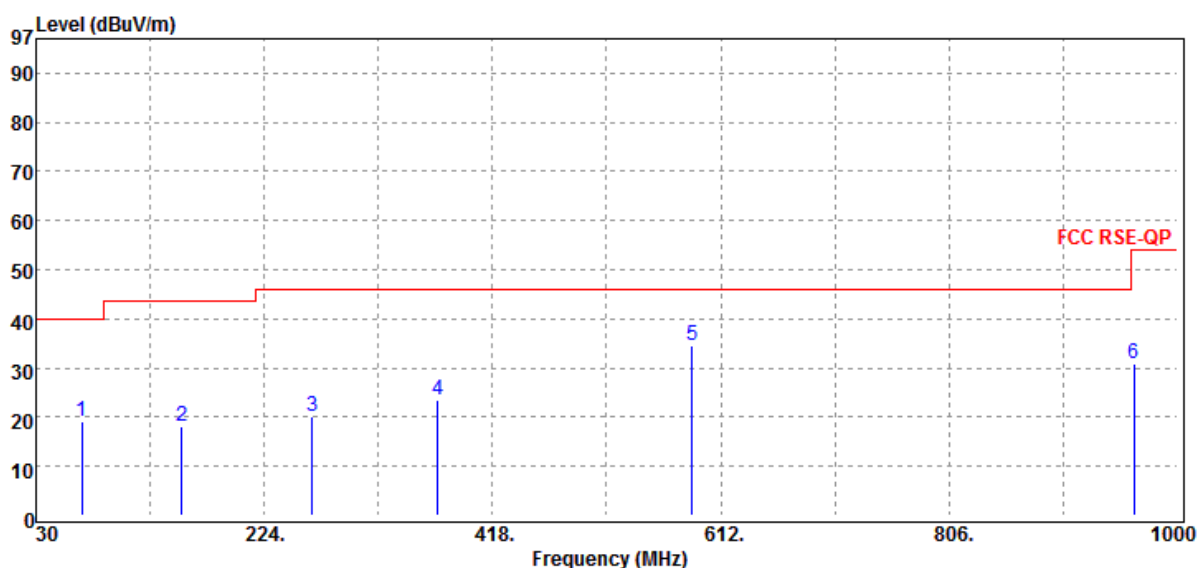
Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
68.80	S	Peak	30.72	-11.50	19.22	40.00	-20.78
154.16	S	Peak	27.04	-9.07	17.97	43.50	-25.53
264.74	S	Peak	29.49	-9.30	20.19	46.00	-25.81
371.44	S	Peak	30.34	-6.76	23.58	46.00	-22.42
587.75	S	Peak	36.16	-1.60	34.56	46.00	-11.44
963.14	S	Peak	27.24	3.70	30.94	54.00	-23.06

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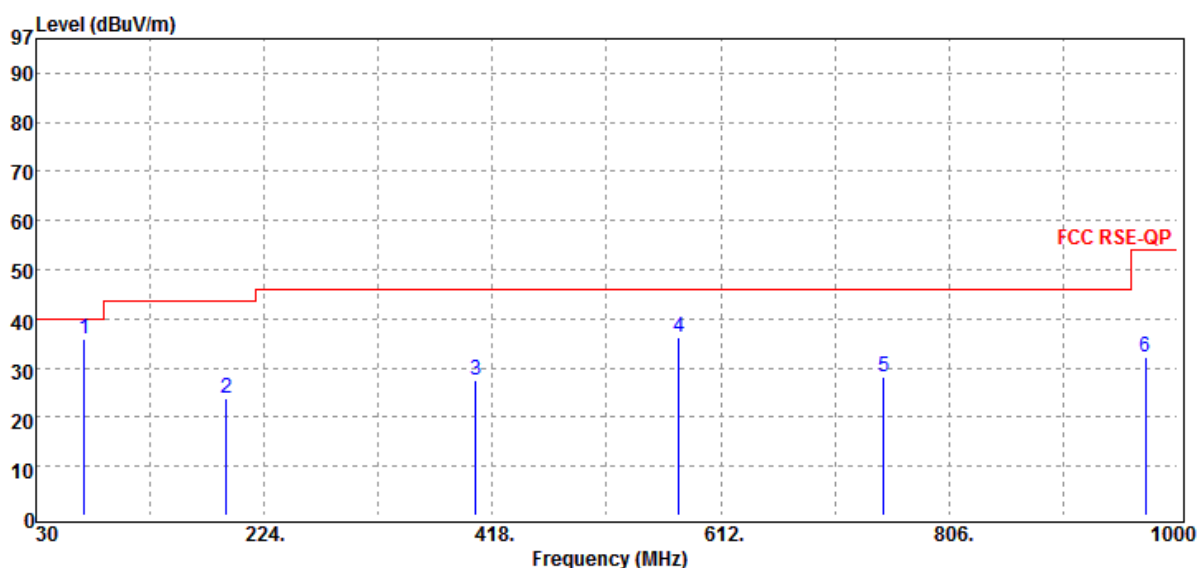
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX HIGH	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
70.74	S	Peak	47.79	-11.79	36.00	40.00	-4.00
191.99	S	Peak	35.34	-11.65	23.69	43.50	-19.81
403.45	S	Peak	33.39	-5.96	27.43	46.00	-18.57
576.11	S	Peak	38.76	-2.49	36.27	46.00	-9.73
750.71	S	Peak	27.71	0.34	28.05	46.00	-17.95
972.84	S	Peak	28.60	3.56	32.16	54.00	-21.84

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Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX HIGH	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

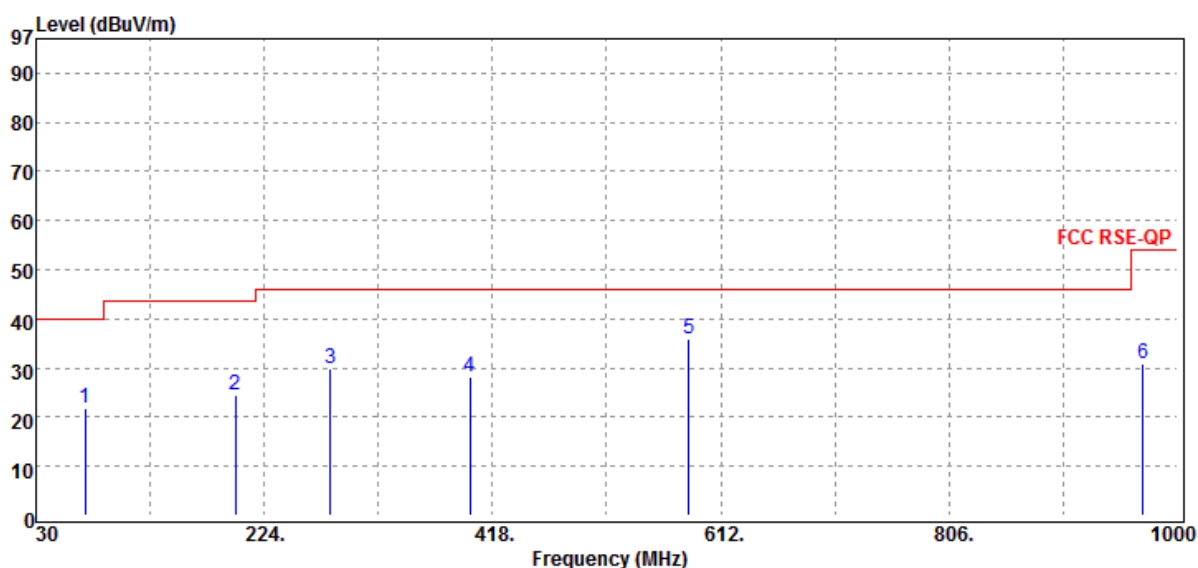
Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
71.71	S	Peak	33.72	-11.95	21.77	40.00	-18.23
199.75	S	Peak	36.24	-11.79	24.45	43.50	-19.05
280.26	S	Peak	38.14	-8.38	29.76	46.00	-16.24
398.60	S	Peak	34.12	-6.03	28.09	46.00	-17.91
584.84	S	Peak	37.56	-1.75	35.81	46.00	-10.19
970.90	S	Peak	27.31	3.60	30.91	54.00	-23.09

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(For frequency above 1000MHz)

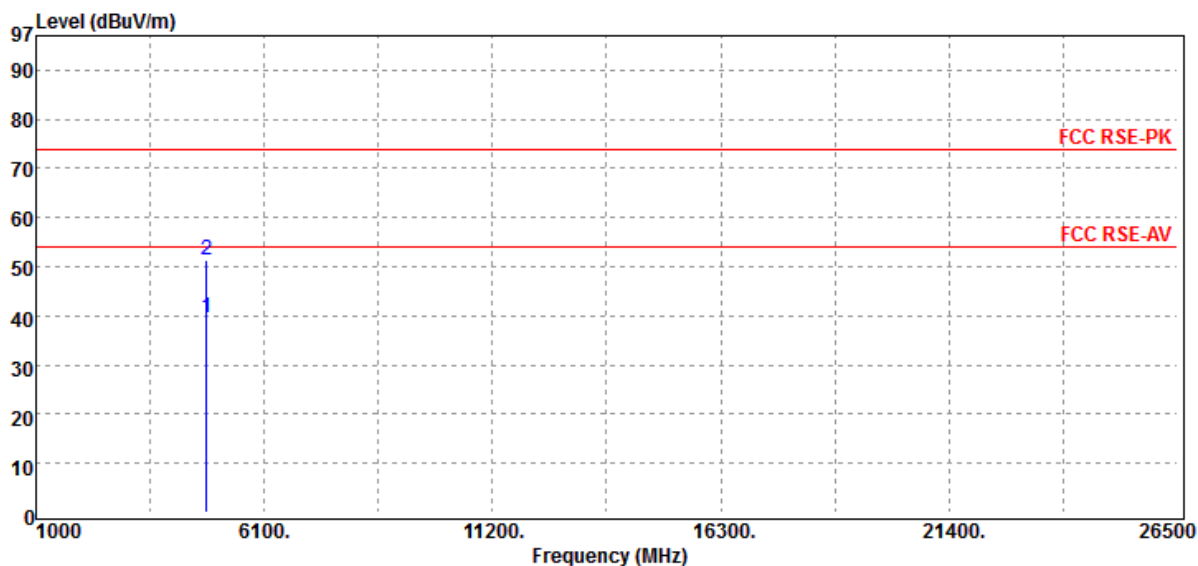
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX LOW	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4804.00	H	Average	30.17	9.56	39.73	54.00	-14.27
4804.00	H	Peak	41.84	9.56	51.40	74.00	-22.60

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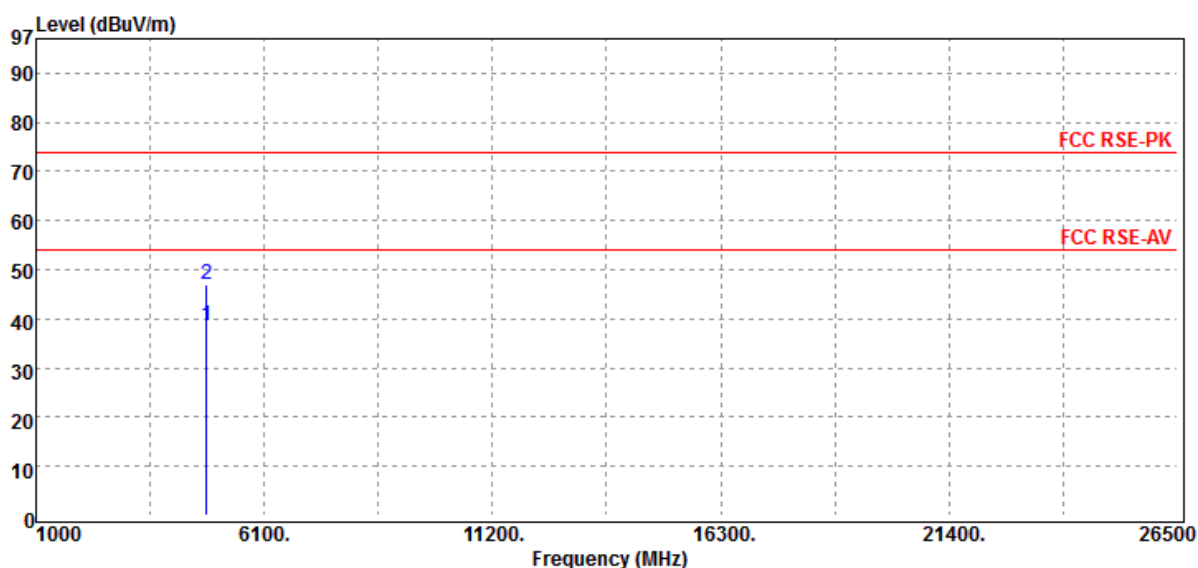
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2402 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX LOW	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
Mode			Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4804.00	H	Average	28.97	9.56	38.53	54.00	-15.47
4804.00	H	Peak	37.35	9.56	46.91	74.00	-27.09

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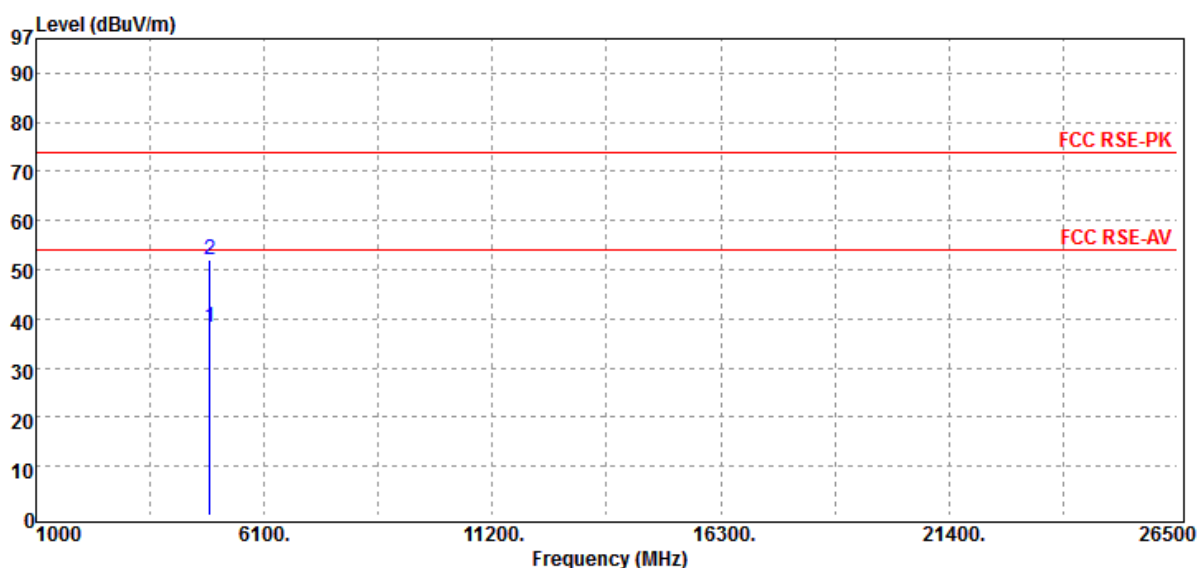
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX MID	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4882.00	H	Average	28.56	9.85	38.41	54.00	-15.59
4882.00	H	Peak	42.14	9.85	51.99	74.00	-22.01

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Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX MID	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

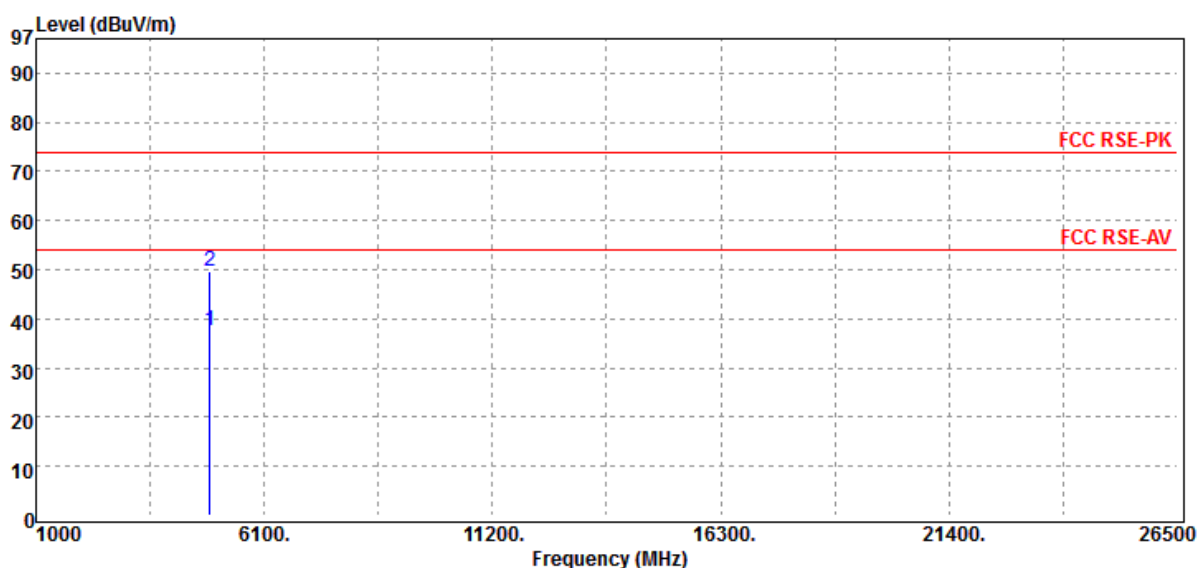
Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4882.00	H	Average	27.74	9.85	37.59	54.00	-16.41
4882.00	H	Peak	39.81	9.85	49.66	74.00	-24.34

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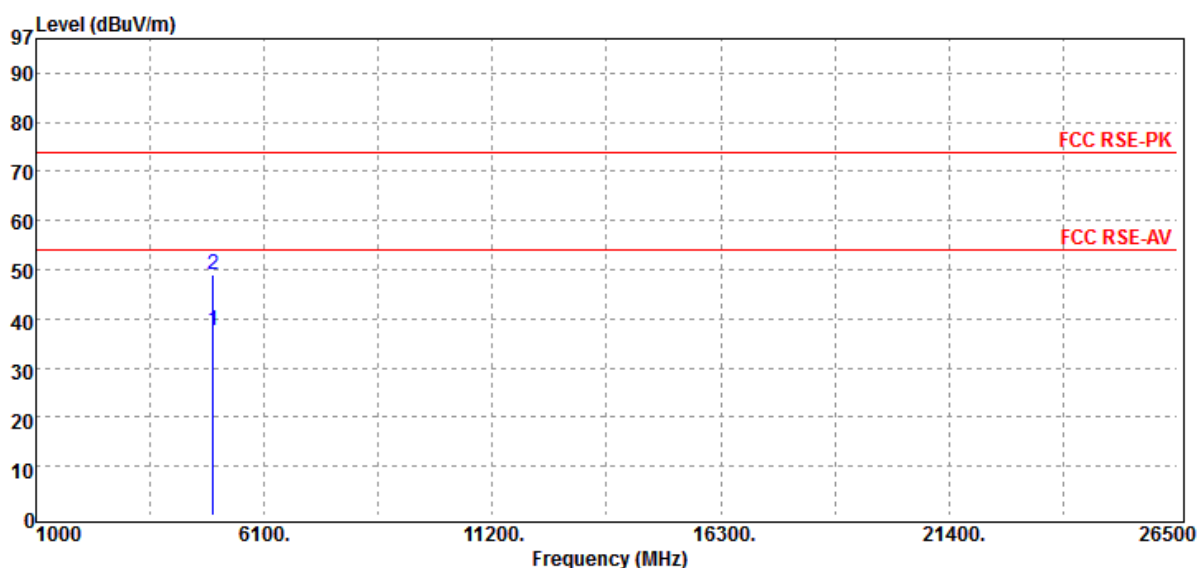
Operation Band	:BR	Test Date	:2015-09-02
Fundamental Frequency	:2480 MHz	Temp./Humi.	:23 deg_C/62RH
Operation Mode	:TX HIGH	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4960.00	H	Average	27.81	9.86	37.67	54.00	-16.33
4960.00	H	Peak	39.15	9.86	49.01	74.00	-24.99

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Operation Mode	:TX MID	Engineer	: Jerry
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

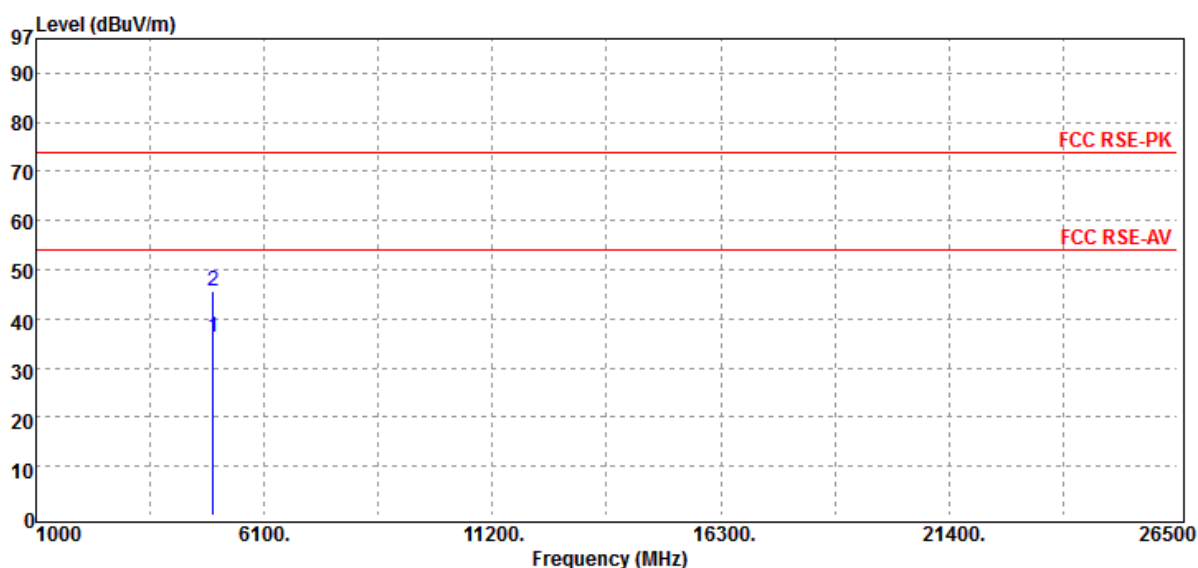
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“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

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Freq.	Detector	Note	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode		Reading Level		FS	@3m	
MHz	PK/QP/AV	F/H/E/S	dBμV	dB	dBμV/m	dBμV/m	dB
4960.00	H	Average	26.25	9.86	36.11	54.00	-17.89
4960.00	H	Peak	35.91	9.86	45.77	74.00	-28.23

~ End of Report ~

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