FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

ZigBee Water Sensor

Model: SZ-WTD01xxxxxxxx(The "x" in model name can be 0 to 9, A to Z, blank or "- " for marking purpose)

Trade Name: SerComm, iControl, AT&T, Securifi

Issued to

SerComm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,
Taoyuan County 33841, Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235
http://www.ccsrf.com
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Testing Laboratory
0363

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		September 16, 2013		Initial Issue	All	Angel Hu

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1. TEST RESULT CERTIFICATION

Applicant:	**SerComm Corporation** 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Manufacturer:	**SerComm Corporation** 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Equipment Under Test:	ZigBee Water Sensor
Trade Name:	SerComm, iControl, AT&T, Securifi
Model:	SZ-WTD01xxxxxxxx(The "x" in model name can be 0 to 9, A to Z, blank or "- " for marking purpose)
Date of Test:	August 29, 2013

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. 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 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

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

Approved by: ***Reviewed by:***

Stan Lin
Section Manager

Angel Hu
Section Manager

2. EUT DESCRIPTION

Product	ZigBee Water Sensor		
Trade Name	SerComm, iControl, AT&＝T, Securifi		
Model Number	SZ-WTD01xxxxxxxx(The “x” in model name can be 0 to 9, A to Z, blank or “- “ for marking purpose)		
Model Discrepancy	1. The mean of “x” (x= 0~9, A~Z, Blank or any Character) on model number just for marketing purpose only. 2. Client consigns only one model sample to test (model number: SZ-WTD01). Therefore, the testing Lab. just guarantees the unit, which has been tested.		
EUT Power Rating	3VDC from Battery (1.5VDC x 2)		
RF Module Manufacturer	ARM	**Model**	EM357
Operating Frequency Range	2405 ~ 2480MHz		
Transmit Power	18.01 dBm (0.0632 W)		
Modulation Technique	OPQSK (Offset Quadrature Phase Shift Keyed)		
Number of Channels	16 Channels		
Antenna Specification	PCB Antenna / Gain: 2.18dBi		

Remark:

1. The sample selected for test was production product and was provided by manufacturer.

*2. This submittal(s) (test report) is intended for FCC ID: **P27SZWTD01** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 2, Part 15.207, 15.209 and 15.247.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (model: SZ-WTD01) had been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in transmitting mode only.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the worst case was recorded.

Channel Low (2405MHz), Channel Mid (2445MHz) and Channel High (2480MHz) were chosen for the final testing.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
N/A				

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/13/2014
Pre-Amplifier	EMEC	EM01M26G	060570	07/25/2014
Pre-Amplifier	MITEQ	AMF-6F-26040 0-40-8P	985646	08/08/2014
Horn Antenna	EMCO	3115	9602-4659	06/16/2014
Horn Antenna	EMCO	3116	00026370	01/07/2014
Low Loss Cable	Huber+Suhner	104PEA	24815/4PEA	04/26/2014
Low Loss Cable	Huber+Suhner	104PEA	30956/4PEA	04/26/2014
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Bore-Sight Antenna Tower	CCS	CCS-BORESIG HT	001	N.C.R
Test S/W	EZ-EMC			

Remark: *Each piece of equipment is scheduled for calibration once a year.*

4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	±2.2408
3M Semi Anechoic Chamber / 30MHz ~ 200MHz	±3.5921
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	±3.5657
3M Semi Anechoic Chamber / 1 ~ 8GHz	±2.5873
3M Semi Anechoic Chamber / 8 ~ 18GHz	±2.6646
3M Semi Anechoic Chamber / 18 ~ 26GHz	±2.9617
3M Semi Anechoic Chamber / 26 ~ 40GHz	±3.4250

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILTIES

All measurement facilities used to collect the measurement data are located at

☐ No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☐ No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, Taiwan (R.O.C) Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841,Taiwan, R.O.C. Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	ACCREDITED TESTING CERT #0824.01
USA	FCC MRA	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	TW1026
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	ilac-MRA TAF Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS-Gen Issue 3	Canada IC 2324C-5

Note: *No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

For Conducted Emission and Radiated Emission (Above 1GHz)measurement:							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	Notebook PC	DELL	D400	0932RY	E2K24GBRL	LAN Cable: Unshielded, 1.0m x 2	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2	Test Jig	Ember	ISA3	N/A	N/A	Unshielded, 0.5m	N/A

For Radiated Emission (Below 1GHz) measurement:							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
	N/A						

****No any support equipment during the test.**

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

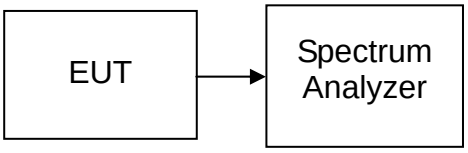
7. FCC PART 15.247 REQUIREMENTS

7.1 6dB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in the 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 the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Span = 30MHz or 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

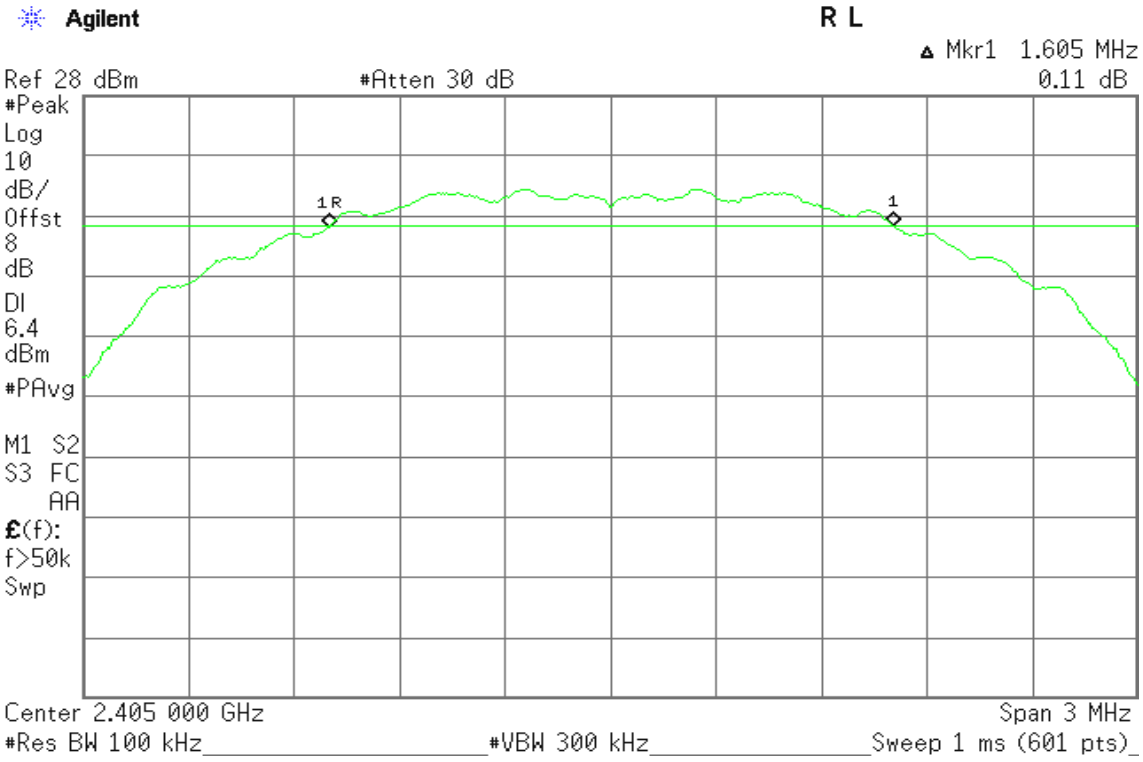
No non-compliance noted

TEST DATA

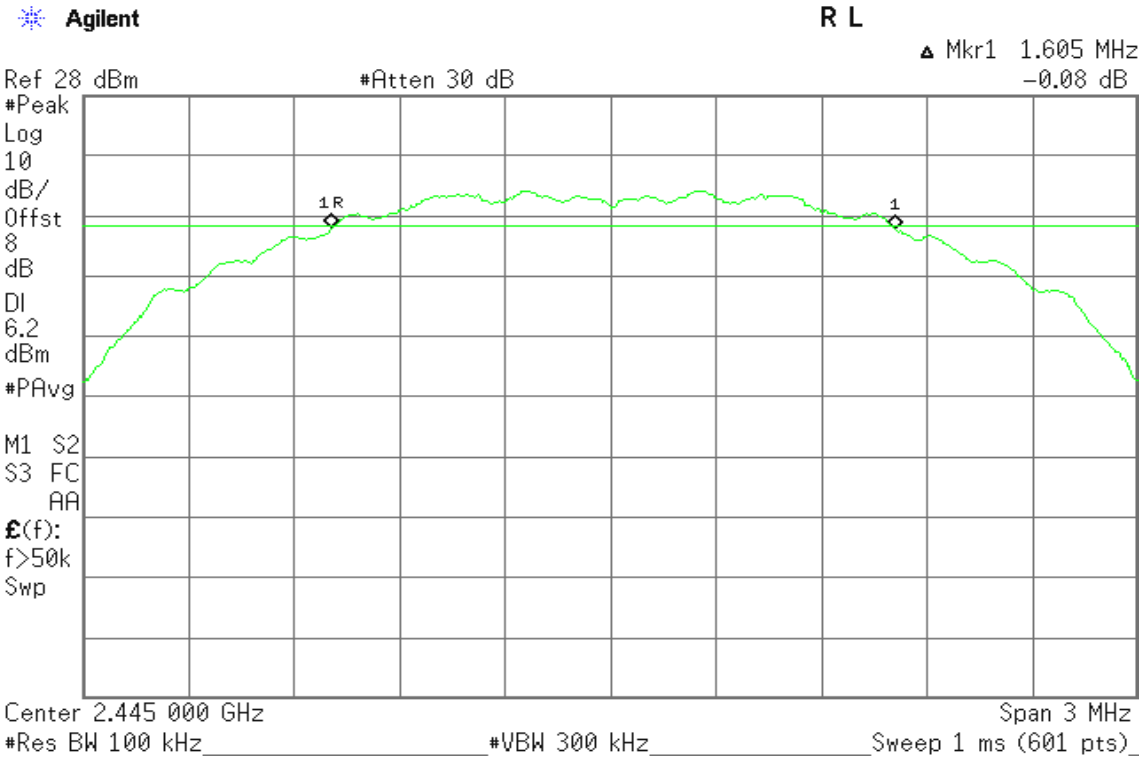
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2405	1.605	>500	PASS
Mid	2445	1.605		PASS
High	2480	1.645		PASS

Test Plot

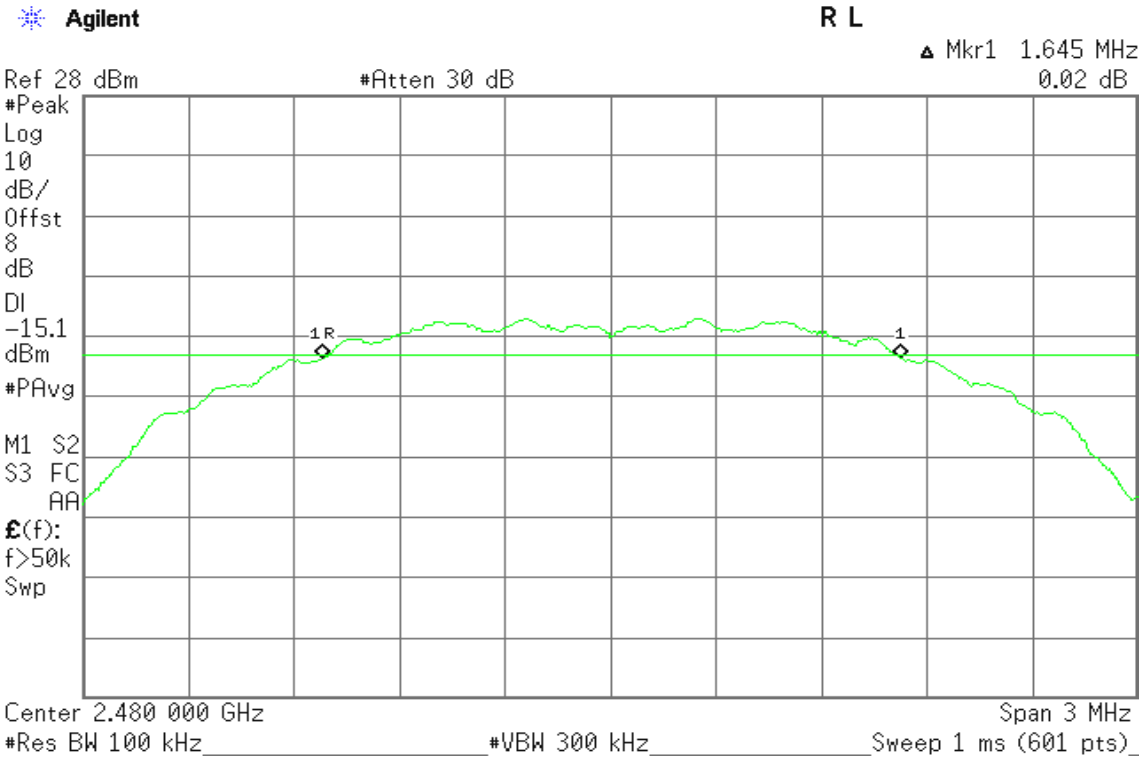
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



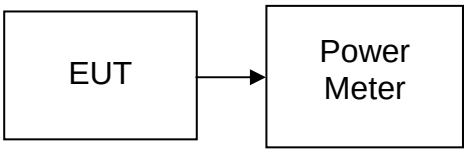
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, 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 in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST CONFIGURATION



TEST PROCEDURE

Per KDB 558074 5.2.1.2/ or 5.2.2.1.

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

TEST DATA

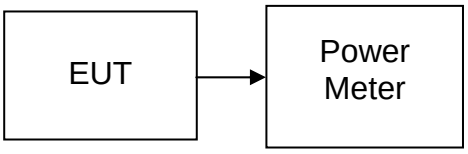
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2405	18.01	0.0632	1	PASS
Mid	2445	18.01	0.0632		PASS
High	2480	-1.29	0.0007		PASS

7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST CONFIGURATION



TEST PROCEDURE

Per KDB 558074 5.2.1.2/ or 5.2.2.1.

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

TEST DATA

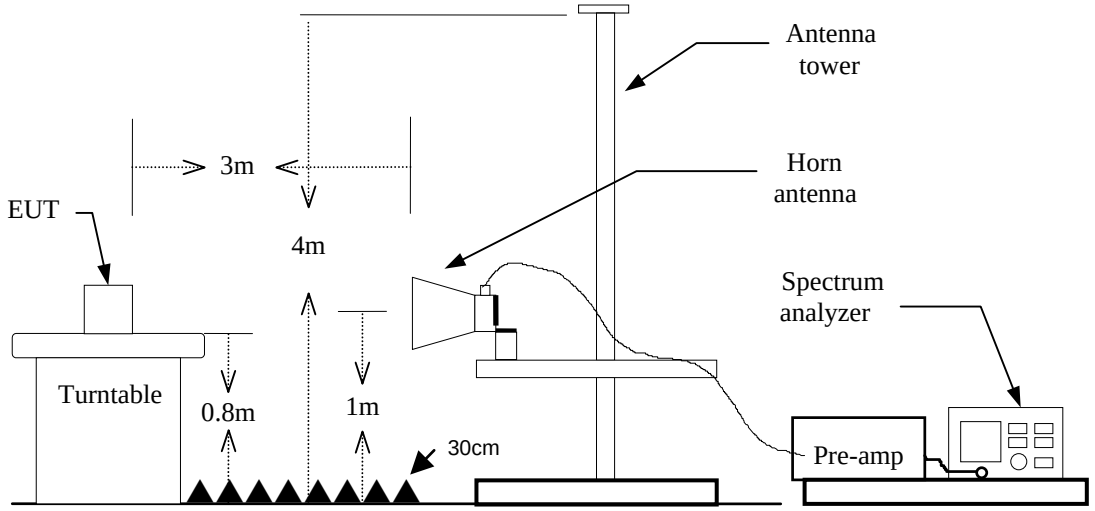
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2405	17.87	0.0612
Mid	2445	17.92	0.0619
High	2480	-3.60	0.0004

7.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz 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 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. 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) (see Section 15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=VBW=1MHz / Sweep=100ms
   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

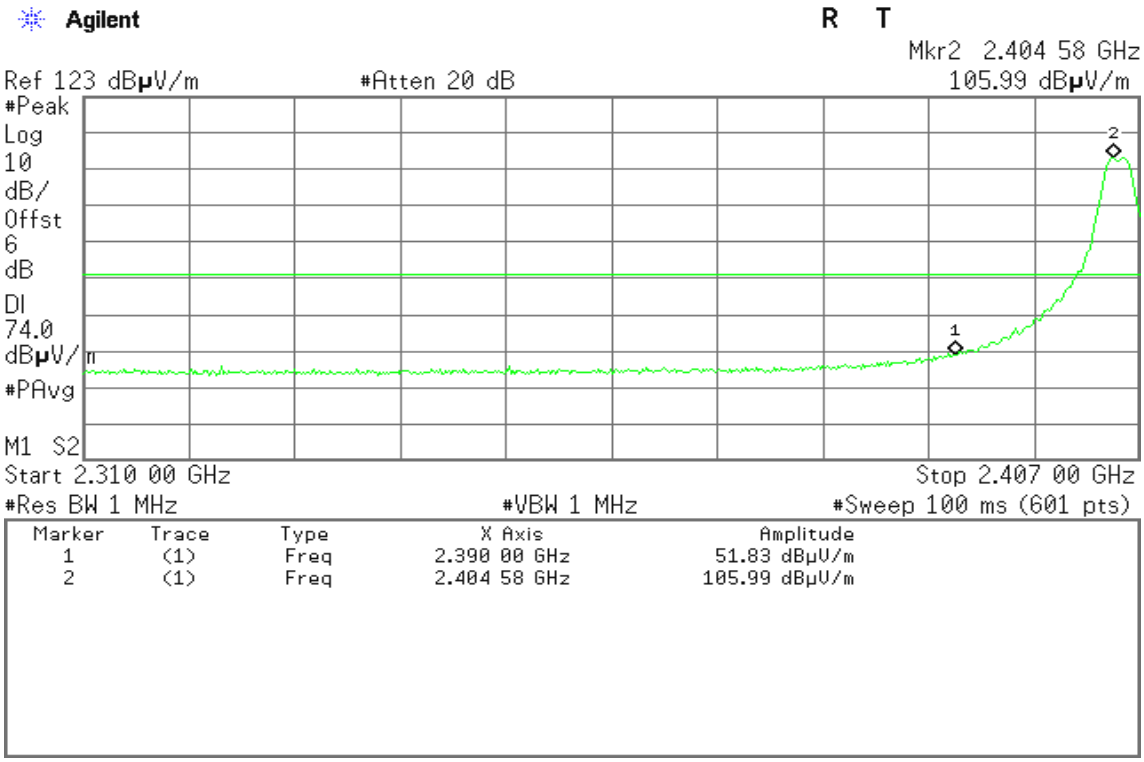
TEST RESULTS

Refer to attach spectrum analyzer data chart.

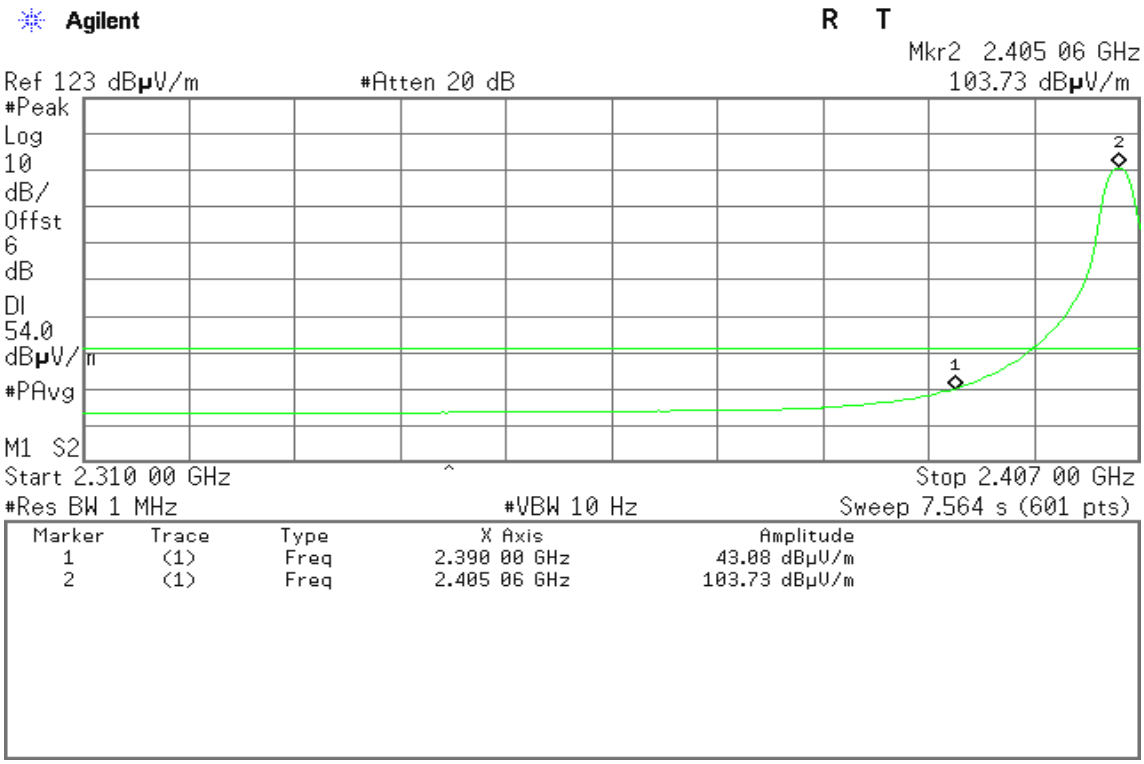
Test Plot

Band Edges (CH Low)

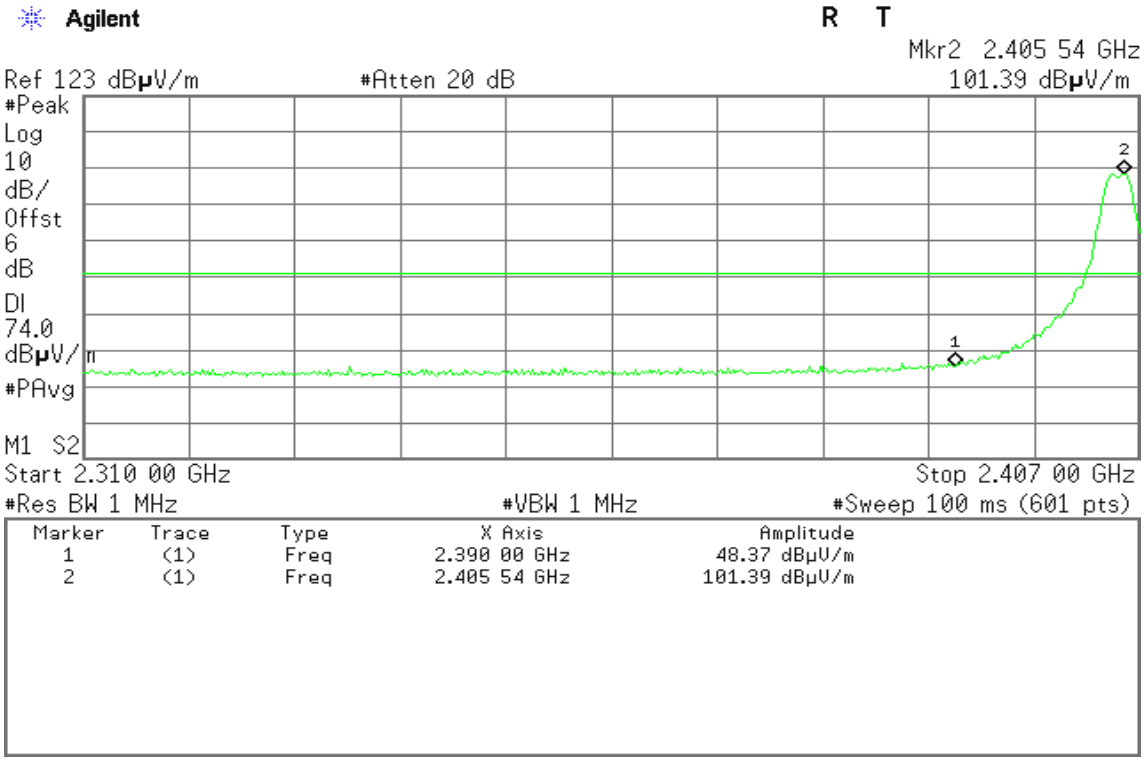
Detector mode: Peak Polarity: Vertical



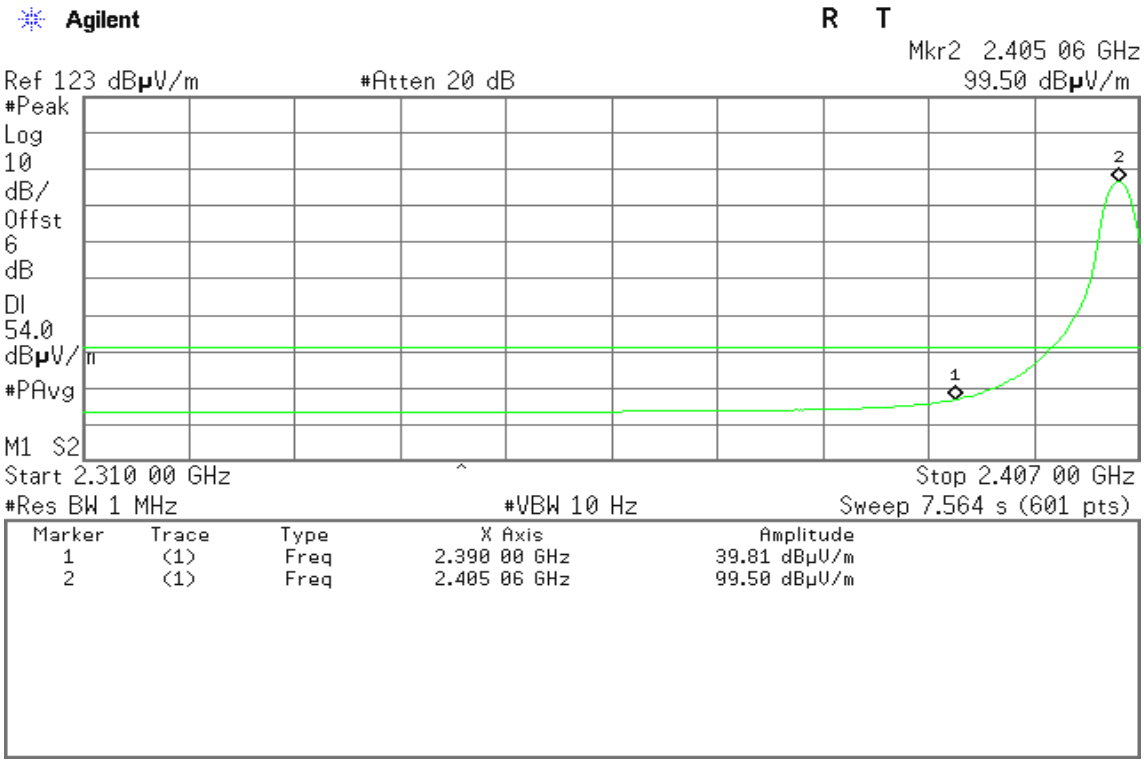
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal

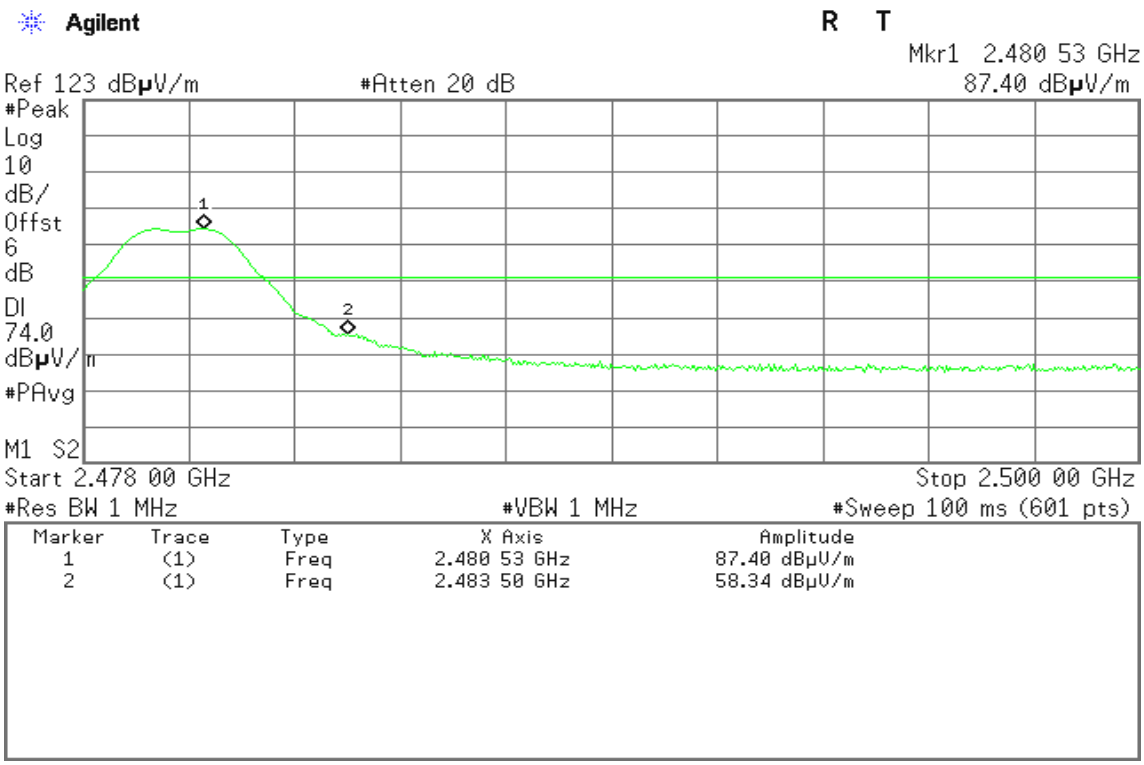


Detector mode: Average Polarity: Horizontal

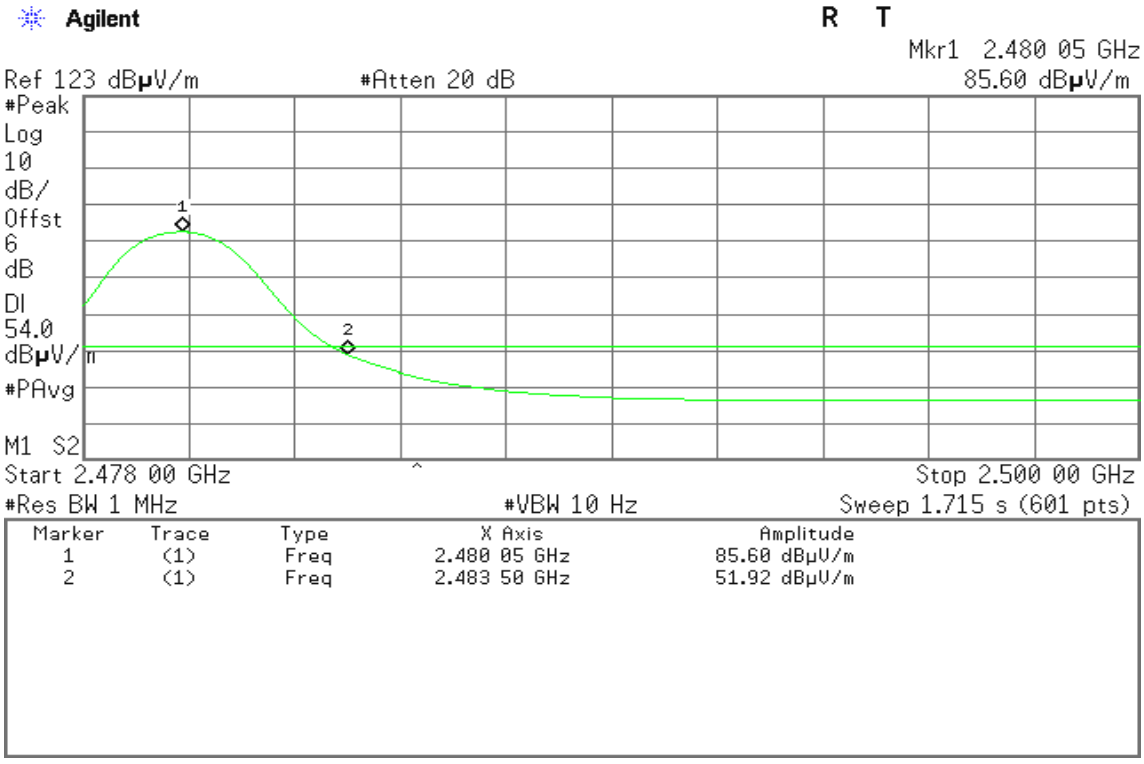


Band Edges (CH High)

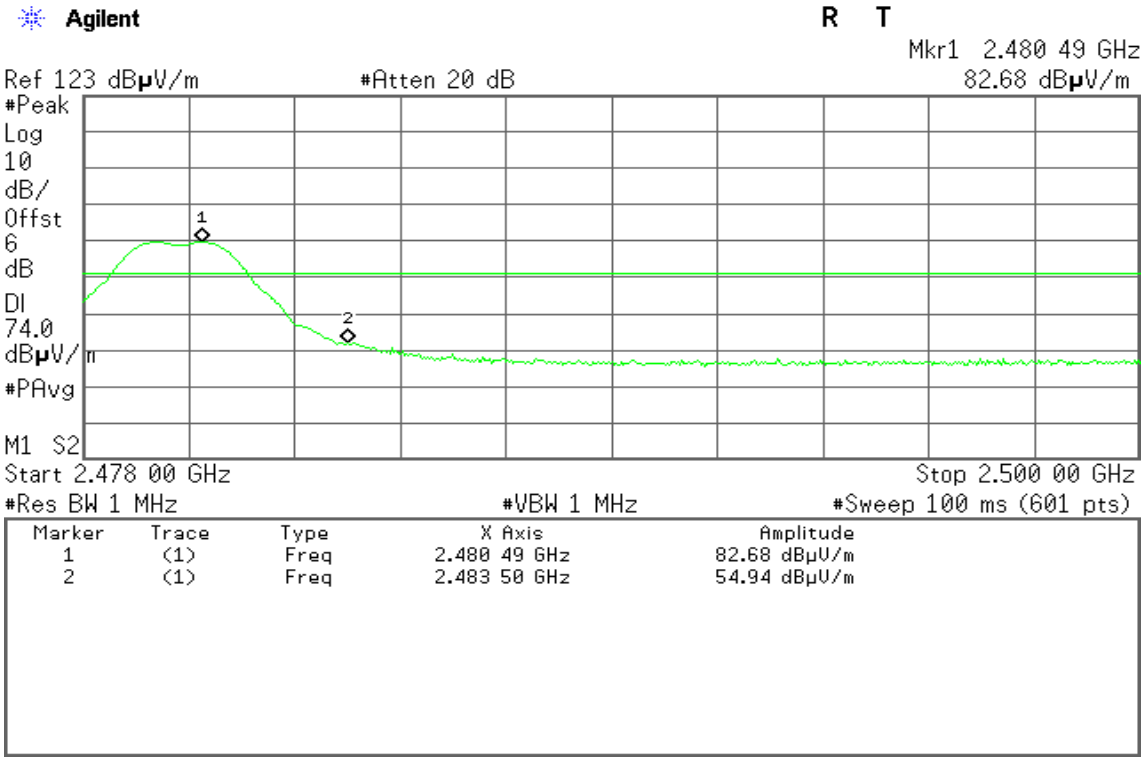
Detector mode: Peak Polarity: Vertical



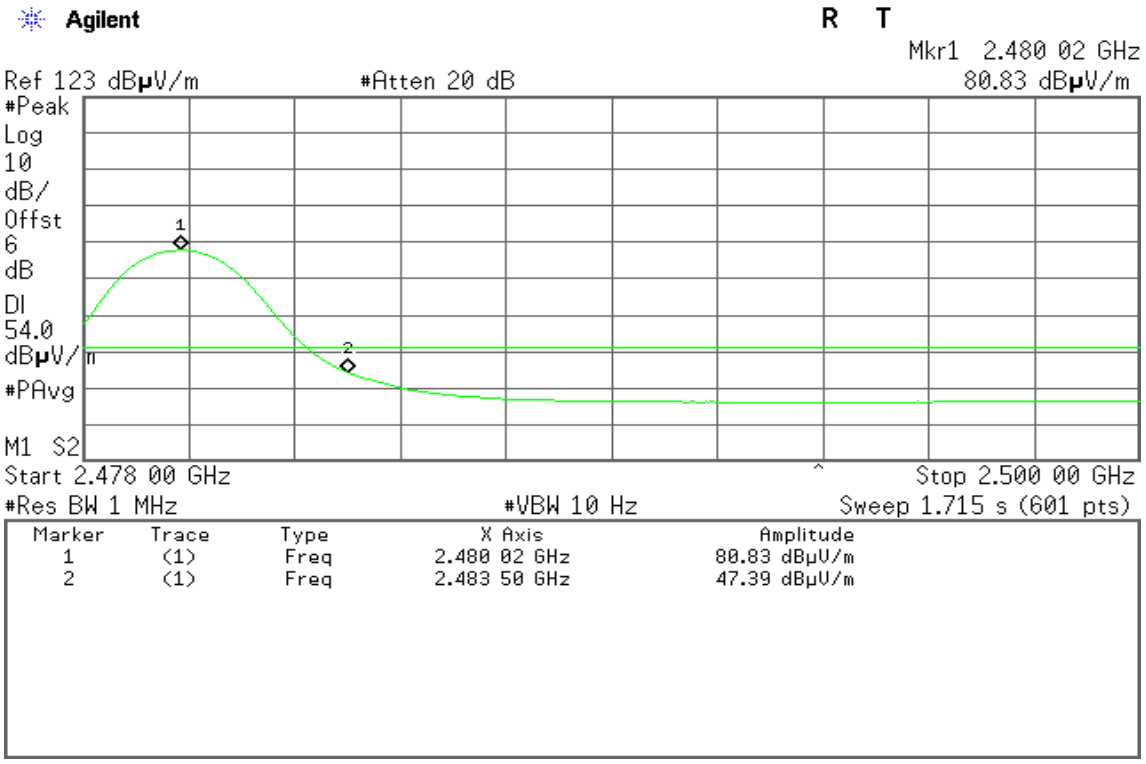
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal

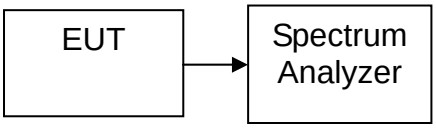


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

TEST CONFIGURATION



TEST PROCEDURE

Per KDB 558074 V02

1. Place the EUT on the table and set it in transmitting mode.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 3MHz, Sweep= auto.
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

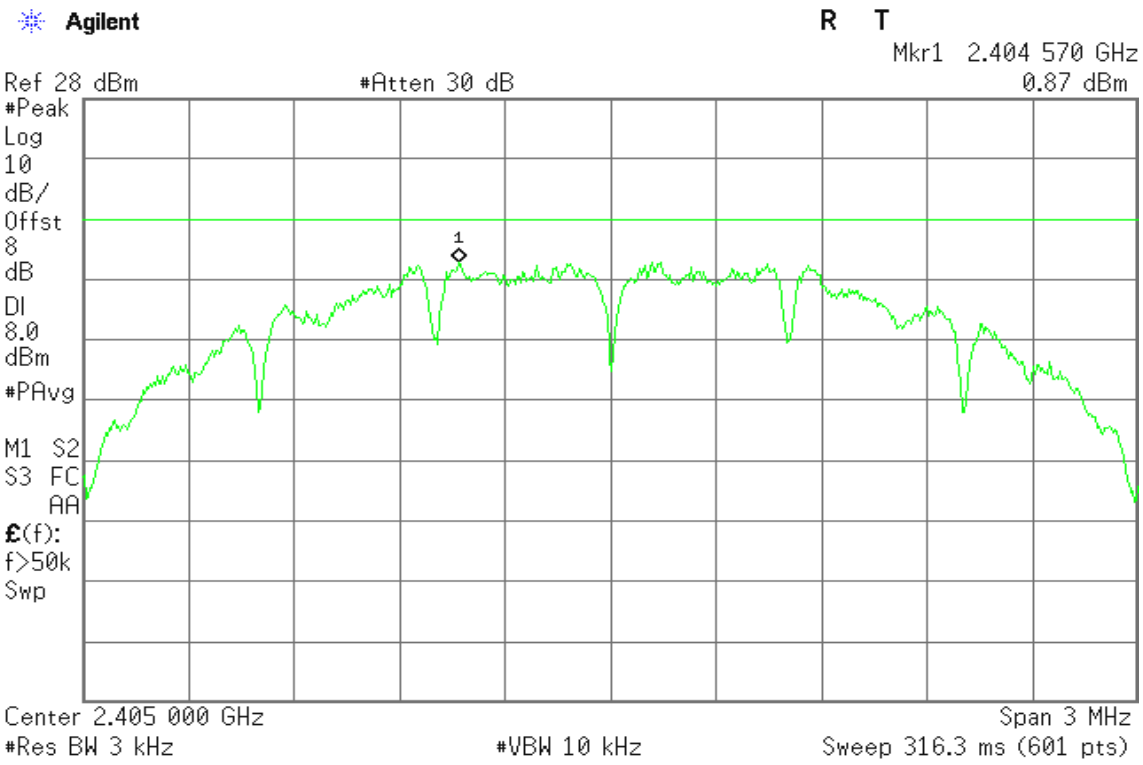
No non-compliance noted

TEST DATA

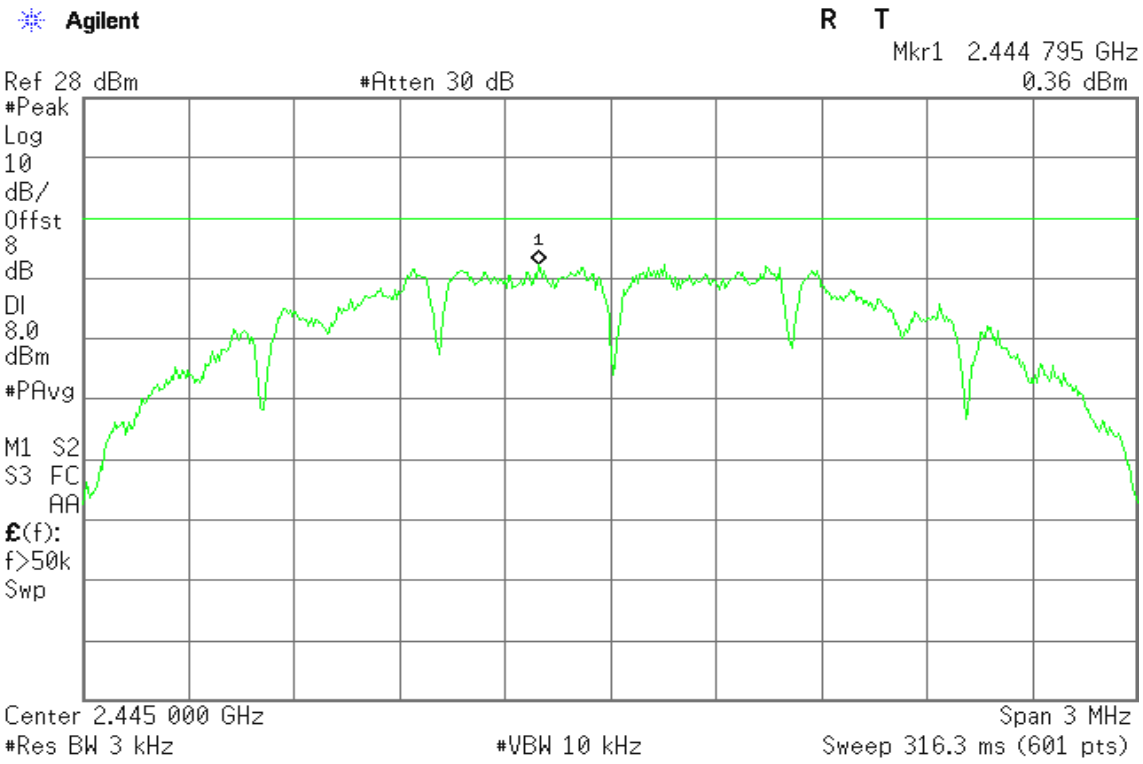
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2405	0.87	8.00	PASS
Mid	2445	0.36		PASS
High	2480	-20.93		PASS

Test Plot

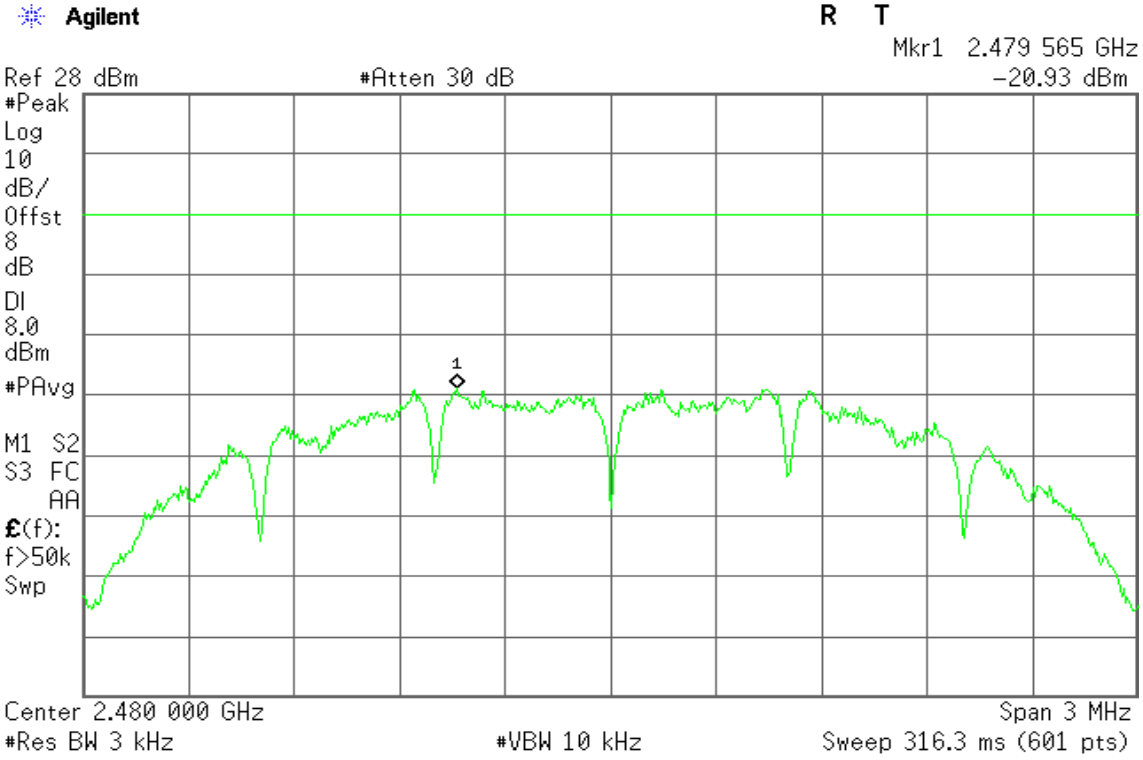
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



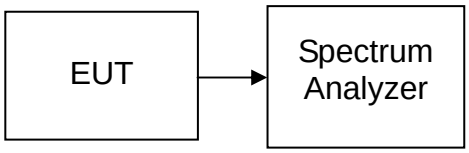
7.6 SPURIOUS EMISSIONS

7.6.1 CONDUCTED MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz 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 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. 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) (see Section 15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

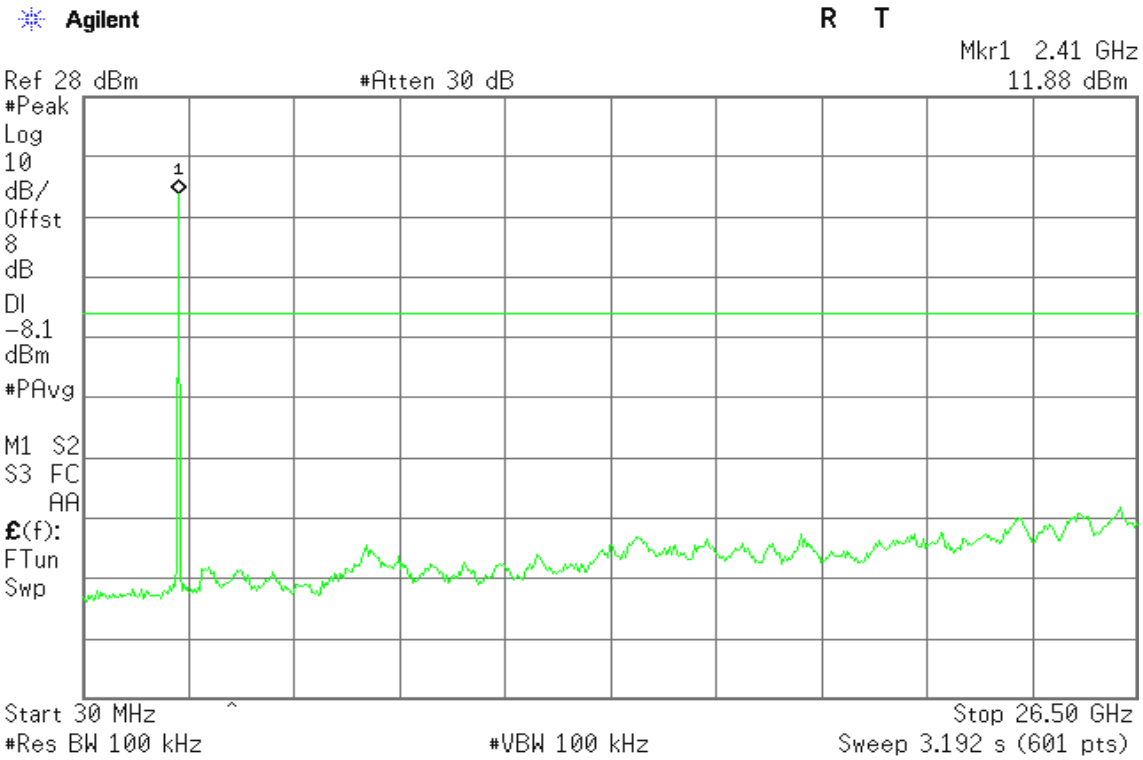
TEST RESULTS

No non-compliance noted.

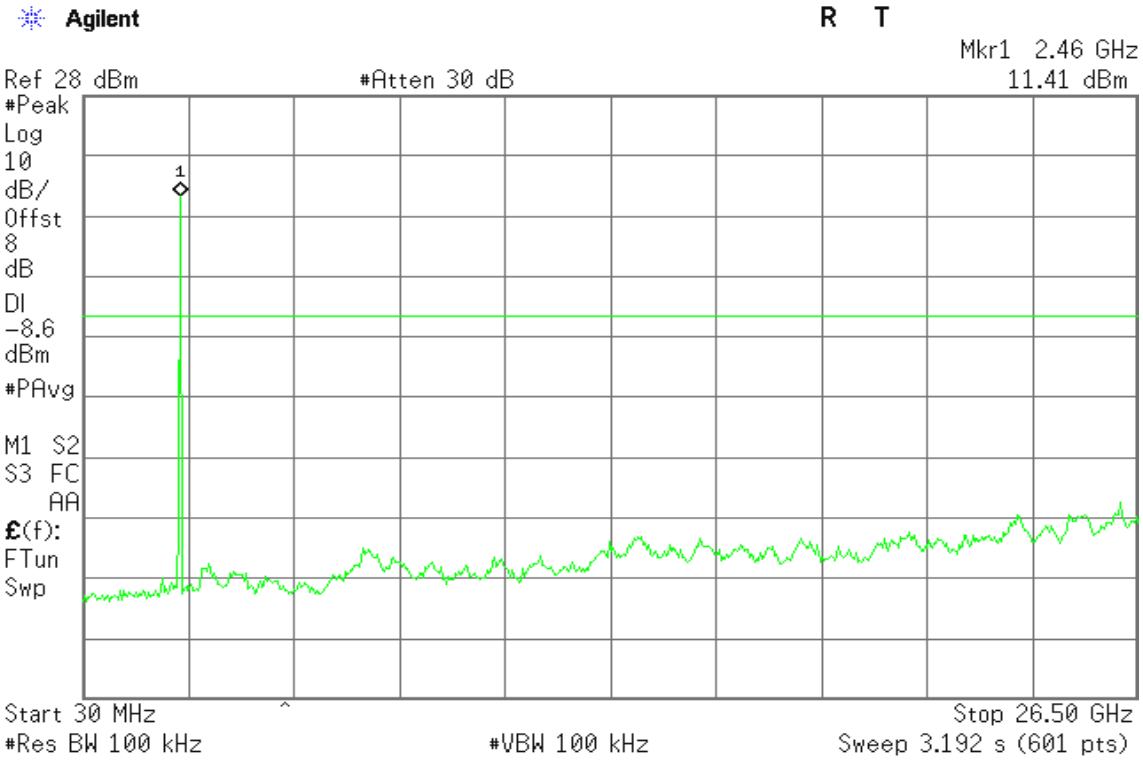
Test Plot

Spurious Emissions

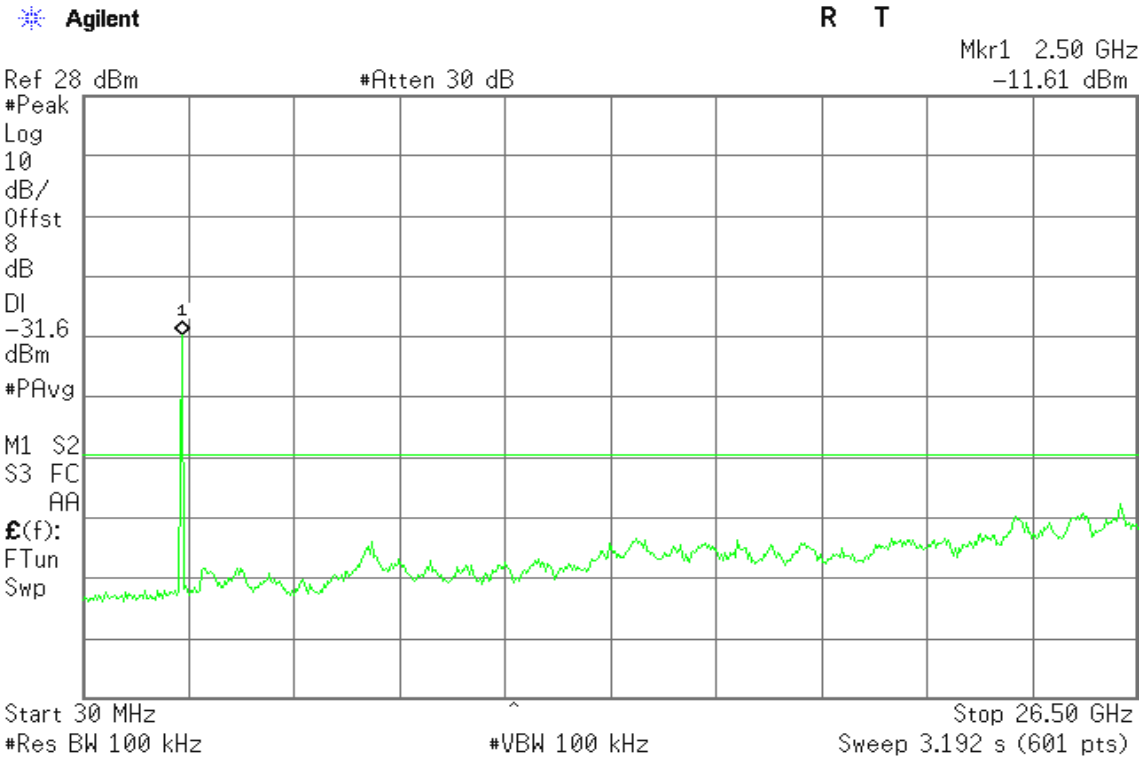
CH Low



CH Mid

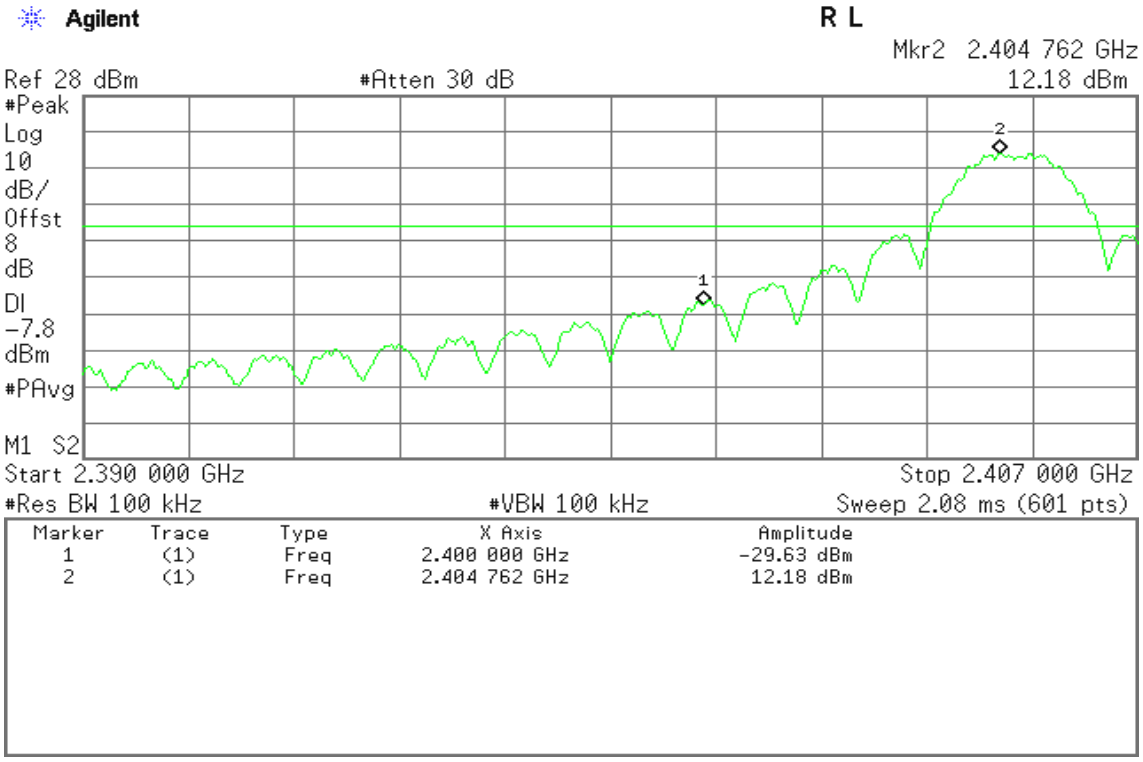


CH High

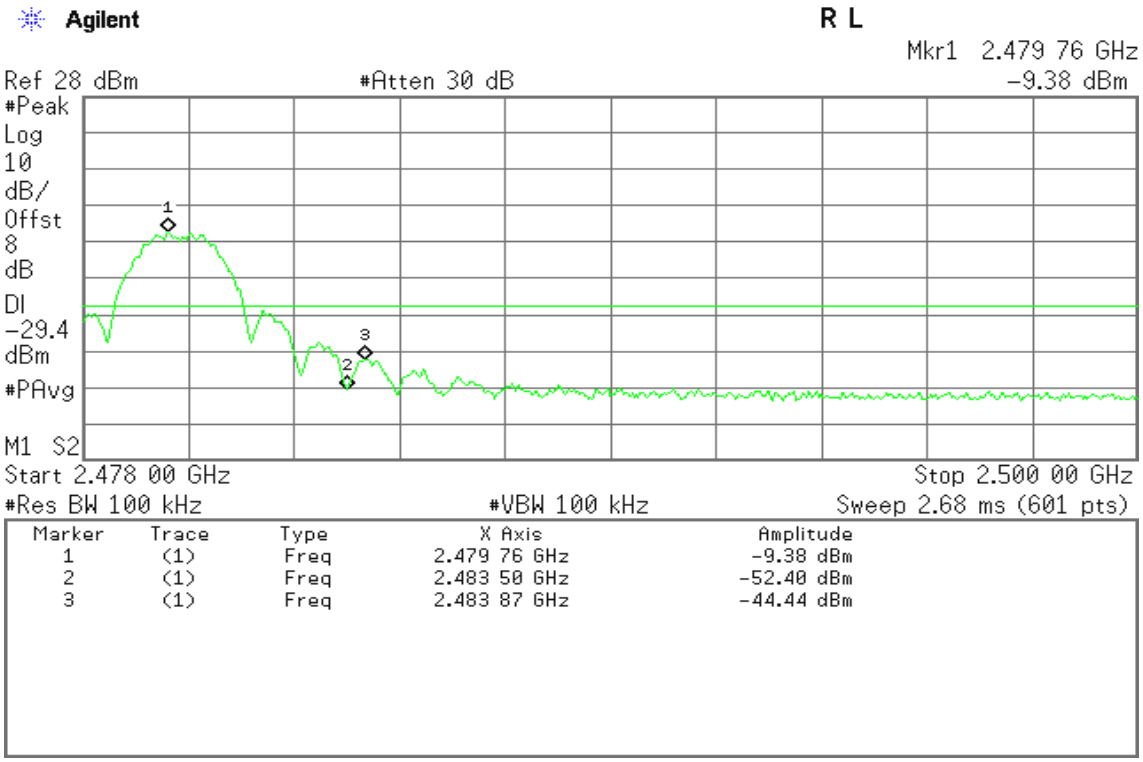


Conducted band-edge

CH Low



CH High



7.6.2 RADIATED EMISSIONS

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

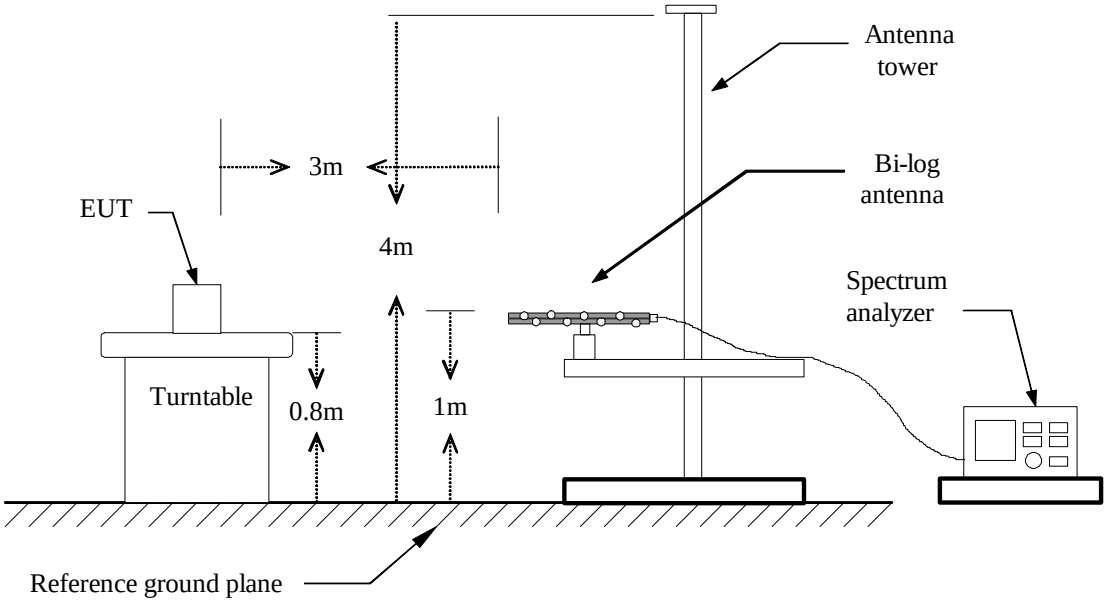
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the emission table above, the tighter limit applies at the band edges.

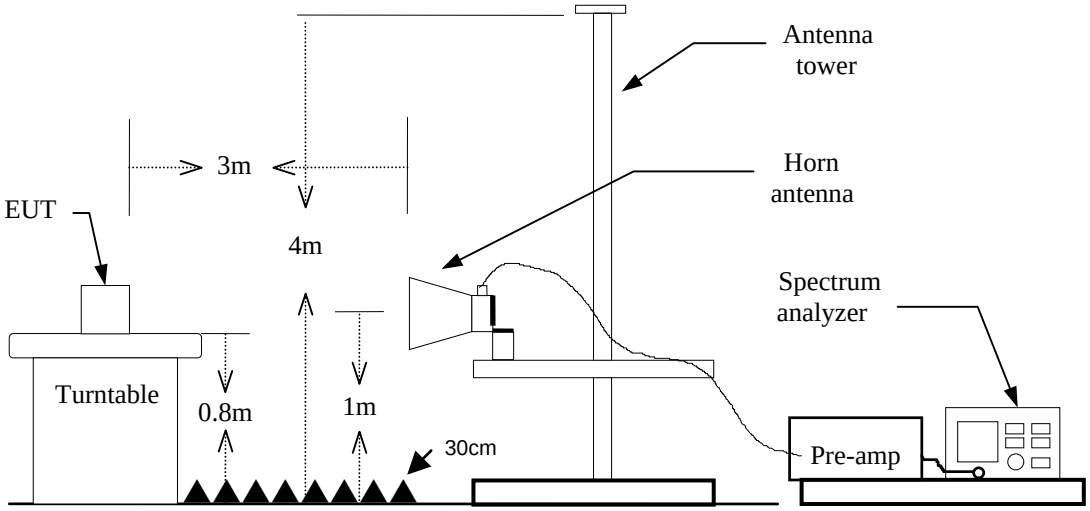
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

TEST CONFIGURATION

Below 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 30MHz

   RBW=9kHz / VBW=30kHz / Sweep=AUTO

   30 ~ 1000MHz (QP):

   RBW=VBW=120kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

No non-compliance noted.

TEST DATA

Below 1GHz

Operation Mode: Transmitting **Test Date:** 2013/8/29

Temperature: 26°C **Tested by:** Louis Shen

Humidity: 56% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
94.0200	38.58	-17.46	21.12	43.50	-22.38	V	QP
157.0700	36.98	-16.12	20.86	43.50	-22.64	V	QP
359.8000	28.40	-10.63	17.77	46.00	-28.23	V	QP
524.7000	30.58	-8.57	22.01	46.00	-23.99	V	QP
753.6200	30.75	-5.75	25.00	46.00	-21.00	V	QP
902.0300	29.89	-3.42	26.47	46.00	-19.53	V	QP
110.5100	28.73	-15.09	13.64	43.50	-29.86	H	QP
375.3200	29.27	-10.31	18.96	46.00	-27.04	H	QP
494.6300	30.05	-8.97	21.08	46.00	-24.92	H	QP
659.5300	30.24	-6.95	23.29	46.00	-22.71	H	QP
736.1600	29.88	-6.05	23.83	46.00	-22.17	H	QP
960.2300	29.72	-2.82	26.90	54.00	-27.10	H	QP

Remark:

1. *No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)*
2. *Measuring frequencies from 9 kHz to the 1GHz.*
3. *Radiated emissions measured in the measured frequency range were made with an instrument using peak detector or quasi-peak detector mode.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Above 1 GHz

Operation Mode: TX / CH Low **Test Date:** 2013/8/29

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1738.000	54.55	-5.48	49.07	74.00	-24.93	V	Peak
2216.000	49.72	-1.37	48.35	74.00	-25.65	V	Peak
2900.000	47.67	-0.66	47.01	74.00	-26.99	V	Peak
3725.000	40.46	2.78	43.24	74.00	-30.76	V	peak
4810.000	50.18	2.35	52.53	74.00	-21.47	V	peak
4810.000	43.29	2.35	45.64	54.00	-8.36	V	AVG
7215.000	46.88	10.12	57.00	74.00	-17.00	V	peak
7215.000	39.14	10.12	49.26	54.00	-4.74	V	AVG
1426.000	50.56	-7.45	43.11	74.00	-30.89	H	peak
2150.000	48.78	-3.67	45.11	74.00	-28.89	H	peak
2738.000	48.82	-3.03	45.79	74.00	-28.21	H	peak
3910.000	39.66	5.18	44.84	74.00	-29.16	H	peak
4810.000	49.28	5.62	54.90	74.00	-19.10	H	peak
4810.000	42.29	5.62	47.91	54.00	-6.09	H	AVG
7215.000	45.03	10.69	55.72	74.00	-18.28	H	peak
7215.000	37.52	10.69	48.21	54.00	-5.79	H	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode: TX / CH Mid **Test Date:** 2013/8/29

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1454.000	50.91	-5.89	45.02	74.00	-28.98	V	peak
2192.000	49.54	-1.51	48.03	74.00	-25.97	V	peak
2722.000	48.09	-1.61	46.48	74.00	-27.52	V	peak
3740.000	40.77	2.96	43.73	74.00	-30.27	V	peak
4890.000	53.00	4.15	57.15	74.00	-16.85	V	peak
4890.000	45.71	4.15	49.86	54.00	-4.14	V	AVG
7335.000	43.90	10.77	54.67	74.00	-19.33	V	peak
7335.000	37.21	10.77	47.98	54.00	-6.02	V	AVG
1400.000	50.17	-6.90	43.27	74.00	-30.73	H	peak
2164.000	48.62	-3.64	44.98	74.00	-29.02	H	peak
2896.000	47.57	-1.76	45.81	74.00	-28.19	H	peak
4290.000	39.39	7.49	46.88	74.00	-27.12	H	peak
4890.000	49.61	6.98	56.59	74.00	-17.41	H	peak
4890.000	42.70	6.98	49.68	54.00	-4.32	H	AVG
7335.000	41.59	11.64	53.23	74.00	-20.77	H	peak
7335.000	35.13	11.64	46.77	54.00	-7.23	H	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

Operation Mode: TX / CH High **Test Date:** 2013/8/29

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1574.000	50.01	-4.91	45.10	74.00	-28.90	V	peak
2218.000	49.49	-1.37	48.12	74.00	-25.88	V	peak
2944.000	48.28	-0.94	47.34	74.00	-26.66	V	peak
3660.000	40.41	2.65	43.06	74.00	-30.94	V	Peak
5920.000	38.17	6.05	44.22	74.00	-29.78	V	peak
7575.000	37.95	11.82	49.77	74.00	-24.23	V	Peak
1404.000	49.82	-6.98	42.84	74.00	-31.16	H	peak
2170.000	49.80	-3.63	46.17	74.00	-27.83	H	peak
2826.000	48.73	-2.28	46.45	74.00	-27.55	H	peak
4300.000	39.30	7.66	46.96	74.00	-27.04	H	peak
5570.000	37.92	9.10	47.02	74.00	-26.98	H	Peak
7485.000	37.97	10.95	48.92	74.00	-25.08	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

***** *Decreases with the logarithm of the frequency.*

TEST CONFIGURATION

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

TEST 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.

TEST RESULTS

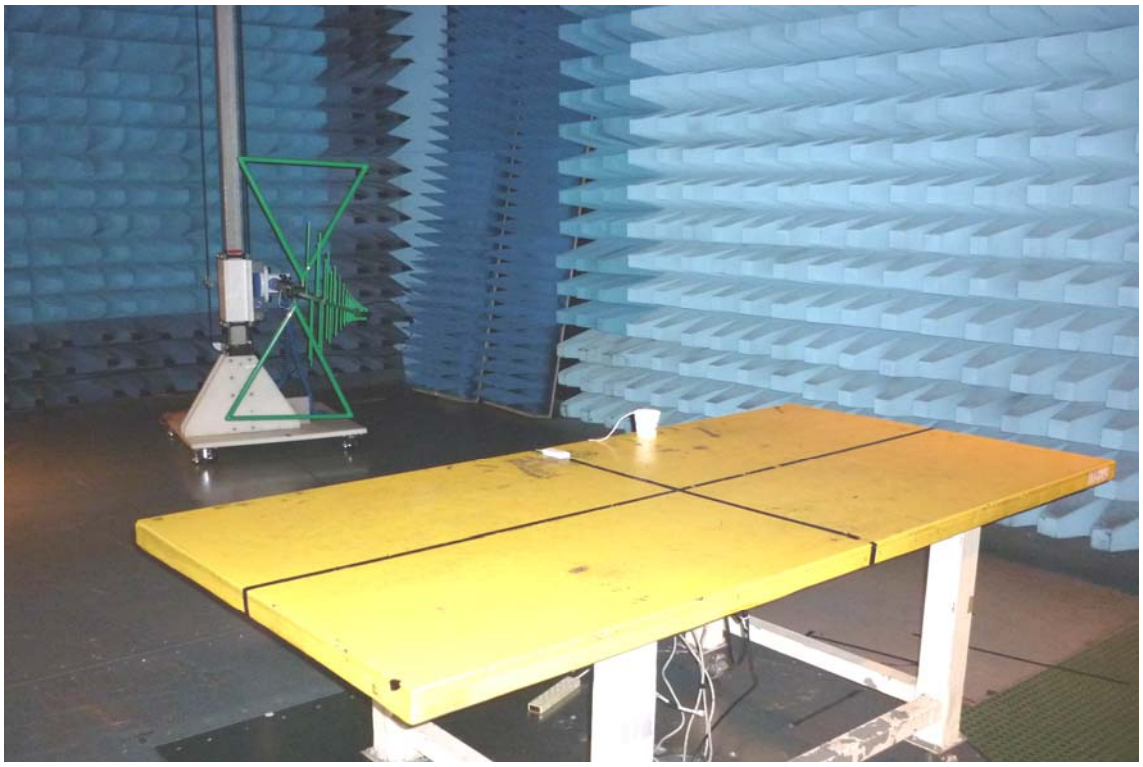
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

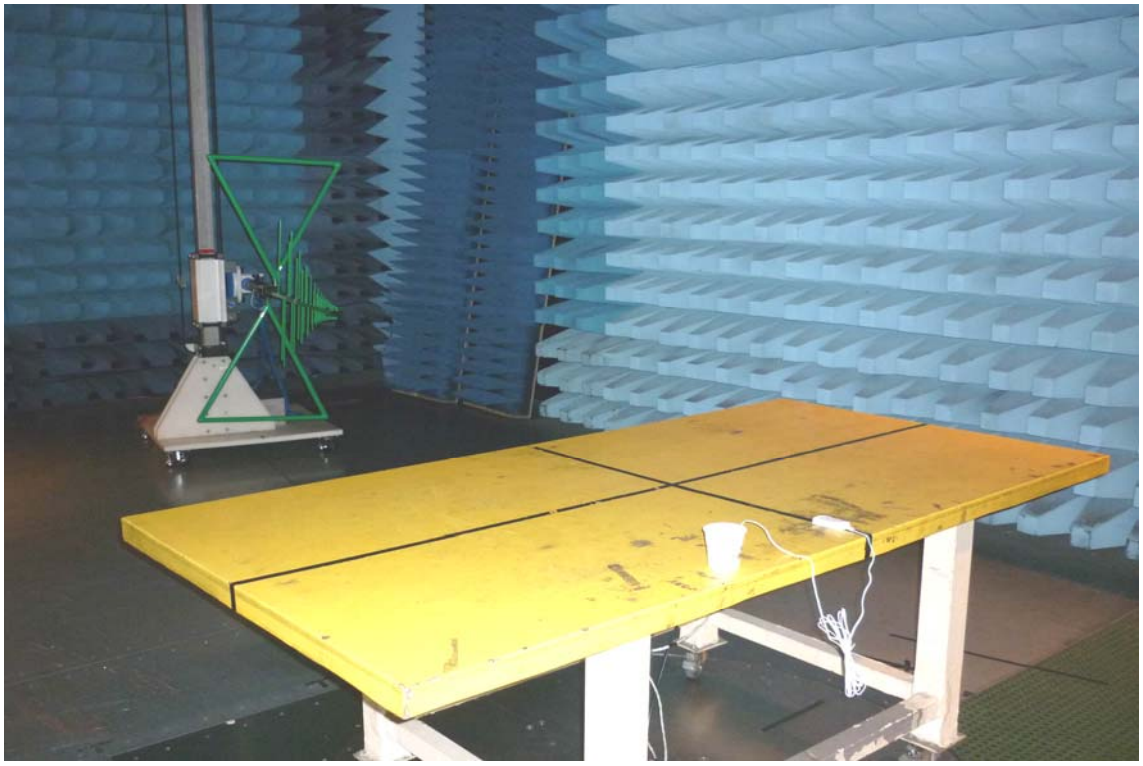
TEST DATA

Not applicable (Since the EUT is powered by battery)

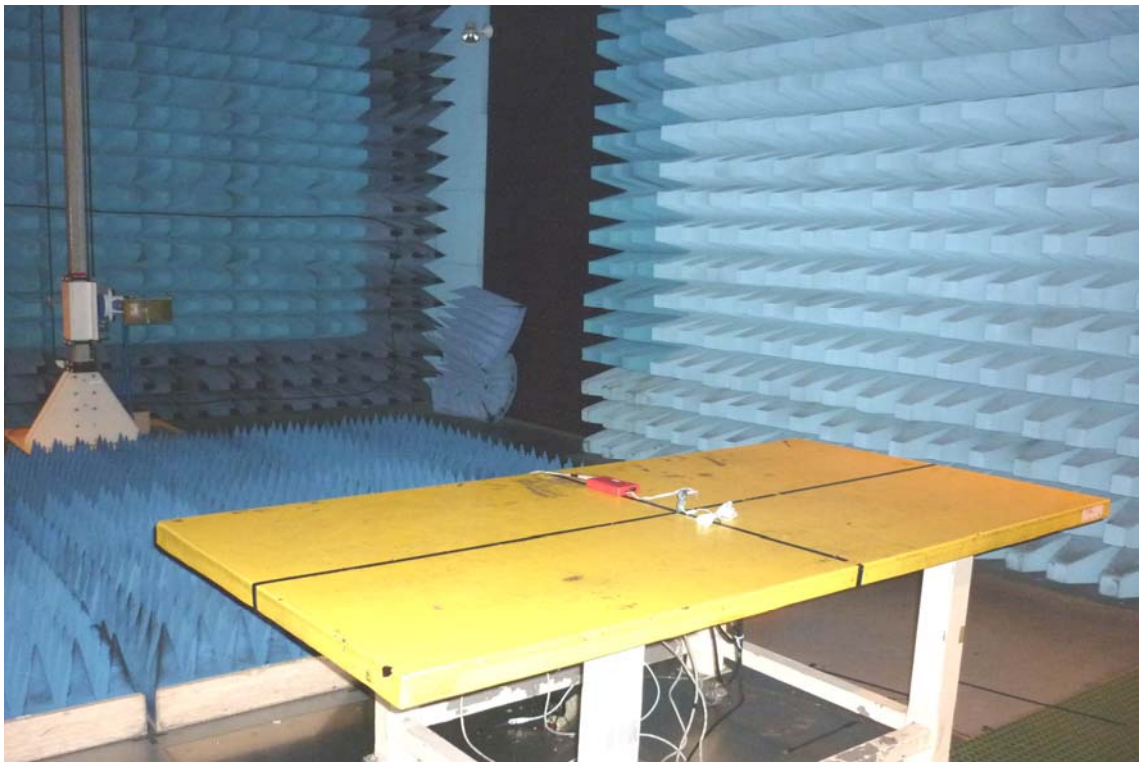
8. APPENDIX I
PHOTOGRAPHS OF TEST SETUP

Radiated Emission Set up Photos
Below 1GHz





Above 1GHz



Conducted Emission Setup Photos