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Auftraggeber: Kostal (Shanghai) Management Co.,Ltd.
Client: No. 77 Yuangao Road, Jiading District, Shanghai, P.R.China

Gegenstand der Prüfung: EV Remote
Test item:

Bezeichnung: K9499-001
Identification: FCC ID: RX8K9499-001
IC : 2795E-K9499001
Serien-Nr.: N/A
Serial No.:

Wareneingangs-Nr.: 154014165
Receipt No.: **Eingangsdatum:** 2012-11-5
Date of receipt:

Zustand des Prüfgegenstandes bei Anlieferung: Test sample(s) is/are not damaged and
Condition of test item at delivery: suitable for testing.

Prüfort: QuieTek Technology(Suzhou)Co., Ltd.
Testing location: (Detailed address refer to clause 2.1)

Prüfgrundlage: FCC 47 CFR Part 15, Subpart C, Section 15.247
Test specification: ANSI C63.10-2009
KDB558074 D01 DTS Meas Guidance v02
RSS-210 (Issue 8): 2010
RSS-Gen (Issue 3): 2010

Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).
Test Result: The test item passed the test specification(s).

Prüflaboratorium: QuieTek Technology(Suzhou)Co.,Ltd.
Testing Laboratory: No.99 Hongye RD.Suzhou Industnal Park Loufeng Hi-Tech Development Zone., Suzhou, China

geprüft/ tested by: **kontrolliert/ reviewed by:**

2013-02-27 Shili / Inspector *shi li*
Datum **Name/Stellung** **Unterschrift**
Date Name/Position Signature

2013-02-27 Jesse Huang / Reviewer *Jesse Huang*
Datum **Name/Stellung** **Unterschrift**
Date Name/Position Signature

Sonstiges/ Other Aspects:

Abkürzungen: P(ass) = entspricht Prüfgrundlage
F(ail) = entspricht nicht Prüfgrundlage
N/A = nicht anwendbar
N/T = nicht getestet

Abbreviations: P(ass) = passed
F(ail) = failed
N/A = not applicable
N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

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TEST SUMMARY

3.2.1 VOLTAGE REQUIREMENTS, FCC 15.31(E)

RESULT: PASS

3.2.2 ANTENNA REQUIREMENTS, FCC 15.203, FCC 15.204 AND RSS-GEN 7.1.4

RESULT: PASS

5.1.1 CONDUCTED OUTPUT POWER, FCC 15.247(B)(3) AND RSS-210 A8.4(4)

RESULT: PASS

5.1.2 6dB BANDWIDTH, FCC 15.247(A)(2) AND RSS-210 A8.2(A)

5.1.3 99% BANDWIDTH, RSS-GEN 4.6.1

5.1.4 CONDUCTED SPURIOUS EMISSION, FCC 15.247(c) AND RSS-210 A8.5

RESULT: PASS

5.1.5 POWER SPECTRAL DENSITY (PSD), FCC 15.247(E) AND RSS-210 A8.2

RESULT: PASS

5.1.6 BAND EDGE COMPLIANCE OF RF CONDUCTED EMISSION, FCC 15.247(c) AND RSS-210 A8.5

RESULT: PASS

6.1.1 BAND EDGE RADIATED EMISSION, FCC 15.205, FCC 15.209, FCC 15.247(c), RSS-210 2.2, RSS-210 2.6 AND RSS-210 A8.5

RESULT: PASS

6.1.2 RADIATED SPURIOUS EMISSION OF TRANSMITTER, FCC 15.205, FCC 15.209, FCC 15.247(c), RSS-210 2.2, RSS-210 2.6 AND RSS-210 A8.5

RESULT: PASS

6.2.1 RADIATED SPURIOUS EMISSION OF RECEIVER, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-GEN 7.2.3.2

RESULT: PASS

6.3.1 AC POWER LINE CONDUCTED EMISSION, FCC 15.207 AND RSS-GEN 7.2.2

RESULT: N/A

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report.

2. Test Sites

2.1 Test Facilities

QuieTek Technology(Suzhou)Co.,Ltd.
No.99 Hongye RD.Suzhou Industnal Park Loufeng Hi-Tech Development
Zone.,Suzhou,China

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 800392.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 4075B.

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equipment	Model	Serial no.	Cal. due date
EMI Test Receiver	ESCI	100573	2013.04.18
Spectrum Analyzer	N9010A	MY48030494	2013.04.18
Bilog Antenna	CBL6112D	27611	2013.10.15
Broad-Band Horn Antenna	BBHA9120D	499	2014.06.08
Preamplifier	NSP1800-25	1364185	2013.05.04
Coaxial Cable	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	ZC1-2	AC2-TH	2013.01.10
Spectrum Analyzer	FSP30	100192	2013.07.21
WIFI tester	MT8860C	1146004	2013.05.01

2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Radiated Emission	30MHz - 1GHz	±5.34dB
	> 1GHz	±5.40dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a WIFI device

3.2 System Details

Specified output power:	10.18dBm
Antenna gain:	2dBi
Antenna type:	External Antenna
Antenna mounting type:	PCB Dipole Antenna
Antenna cable length:	N/A
Number of channels:	11
Channel spacing:	5MHz
Modulation type:	DSSS(BPSK/QPSK/CCK)

Rated voltage: 13.5V

Test voltage: 13.5V

3.2.1 Voltage Requirements, FCC 15.31(e)

RESULT:

PASS

All the tests were performed using steady DC 13.5V. Hence it complies with the power supply requirements.

3.2.2 Antenna Requirements, FCC 15.203, FCC 15.204 and RSS-Gen 7.1.4

RESULT:

PASS

The EUT has an External PCB Dipole Antenna which is not user accessible. Hence it complies with the requirements.

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3.3 Independent Operation Modes

The EUT was tested on a stand-alone basis (only attached to the test jig) and the test system was configured in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4:2003. Testing was performed at the lowest operating frequency, at the operating frequency in the middle of the specified frequency band and at the highest operating frequency with different modulation types.

TEST MODE	
Radiated Mode (TX and RX)	Conducted Mode
A: 802.11b Low Channel 01_2412 MHz	A: 802.11b Low Channel 01_2412 MHz
B: 802.11b Middle Channel 06_2437 MHz	B: 802.11b Middle Channel 06_2437 MHz
C: 802.11b High Channel 11_2462 MHz	C: 802.11b High Channel 11_2462 MHz

Each mode basic operation in (BPSK/QPSK/CCK) :

- A. EUT transmits (TX mode), with full power, at lowest channel , a continuous modulated signal streaming with 100% duty cycle.
- B. EUT transmits (TX mode), with full power, at middle channel , a continuous modulated signal streaming with 100% duty cycle.
- C. EUT transmits (TX mode), with full power, at highest channel, a continuous modulated signal streaming with 100% duty cycle.
- D. EUT receives (RX mode), at lowest channel , continuously.
- E. EUT receives (RX mode), at middle channel , continuously.
- F. EUT receives (RX mode), at highest channel , continuously.

3.4 Noise Suppressing Parts

Refer to schematics and internal photos.

4. Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15, Sections 15.31, 15.33, 15.35, 15.205, 15.207, 15.209 and KDB558074 D01 DTS Meas Guidance v02, The test methods, which have been used, are based on ANSI C63.10-2009 and RSS-Gen (Issue 3).

For details, see under each test item.

4.2 Physical Configuration for Testing

The EUT was designed to get into related working mode with the control of a laptop computer through RS 232 interface.

Notes:

One test sample was available. Both for antennas conducted measurements and for radiated measurements.

For antenna conducted measurements, the antenna was replaced by a 50Ω antenna connector.

For more details, refer to section: Photographs of the Test Set-Up.

4.3 Test Operation and Test Software

Software used for testing: COM1 9600 Baud –putty Test tool by client.

This software was running on the laptop computer connected to the EUT. It was used to enable the test operation modes listed in section 3.3 as appropriate for conducted test

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with a power (supply power for the module).

4.5 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

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5. Test Results of Conducted Measurements at Antenna Port

5.1 Transmitter Parameters

5.1.1 Conducted Output Power, FCC 15.247(b)(3) and RSS-210 A8.4(4)

RESULT:

PASS

Date of testing: 2012-11-23

Ambient temperature: 20°C
Relative humidity: 39.6%
Atmospheric pressure: 101.5hPa

Requirements:

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.8 and KDB558074 D01 DTS Meas Guidance v02

The maximum peak output power (conducted) was measured at the antenna connector with a spectrum analyzer. The analyzer resolution bandwidth was set to 10MHz and the video bandwidth to 30MHz. The final measurement takes into account the loss generated by all the involved cables.

Table 3: Conducted Output Power, Mode A (Low Channel)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	RBW [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
1	10.18	0.63	10	10.18	30	19.82
2	10	0.63	10	10	30	20
5.5	9.32	0.63	10	9.32	30	20.68
11	10.06	0.69	10	10.06	30	19.94

Notes: Cable loss was included in reading as offset.

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Table 4: Conducted Output Power, Mode B (Middle Channel)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	RBW [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
1	11.26	0.63	10	11.26	30	18.74
2	-	0.63	10	-	30	-
5.5	-	0.63	10	-	30	-
11	-	0.69	10	-	30	-

Notes: Cable loss was included in reading as offset.

Table 5: Conducted Output Power, Mode C (High Channel)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	RBW [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
1	11.48	0.63	10	11.48	30	18.52
2	-	0.63	10	-	30	-
5.5	-	0.63	10	-	30	-
11	-	0.69	10	-	30	-

Notes: Cable loss was included in reading as offset.

Remark:

The above results show that the worst case output power is found at the data rate of 1Mbps. Therefore, all the other measurements for the evaluation of the radio properties of the EUT have been performed using this data rate.

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5.1.2 6dB Bandwidth, FCC 15.247(a)(2) and RSS-210 A8.2(a)

Date of testing: 2012-11-23

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

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 procedure:

ANSI C63.10-2009, RSS-Gen 4.6.2 and KDB558074 D01 DTS Meas Guidance v02.

A spectrum analyzer was connected to the antenna port of the EUT.

The resolution bandwidth of the spectrum analyzer was set to at least 1% of the EUT emission bandwidth. RBW=100 kHz, VBW=300 kHz.

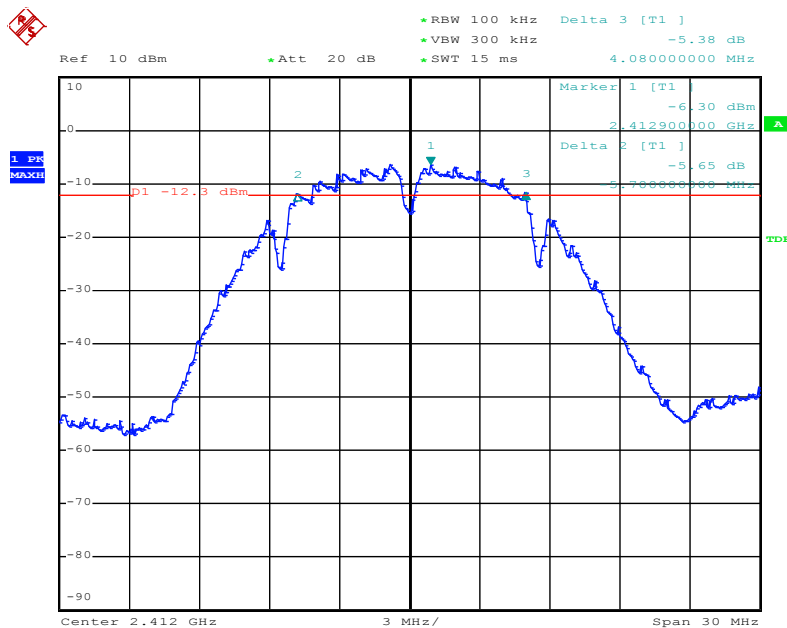
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Table 6: 6 dB Bandwidth

Operating Frequency [MHz]	6 dB Bandwidth [MHz]
Low channel	9.78
Middle channel	9.78
High channel	9.82

Figure 1: 6 dB Bandwidth, Mode A (Low Channel)

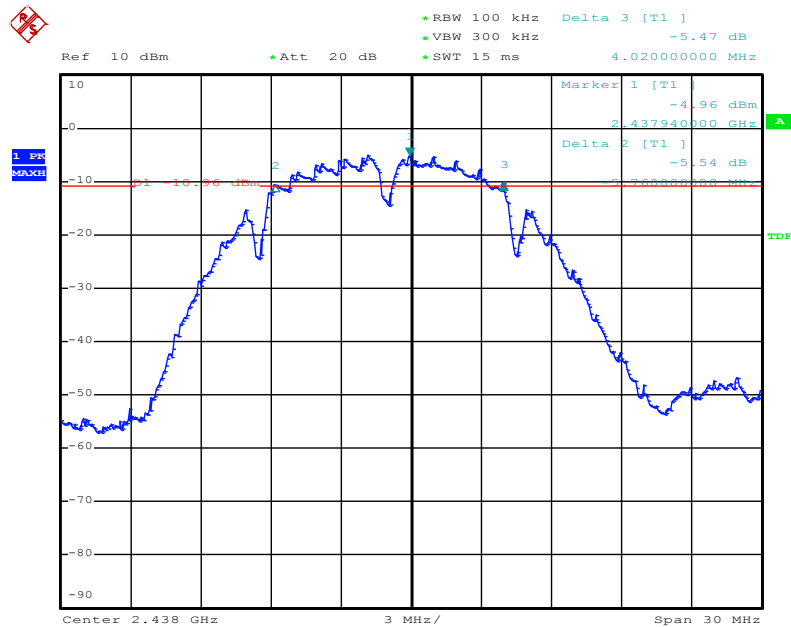


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Figure 2: 6 dB Bandwidth, Mode B (Middle Channel)

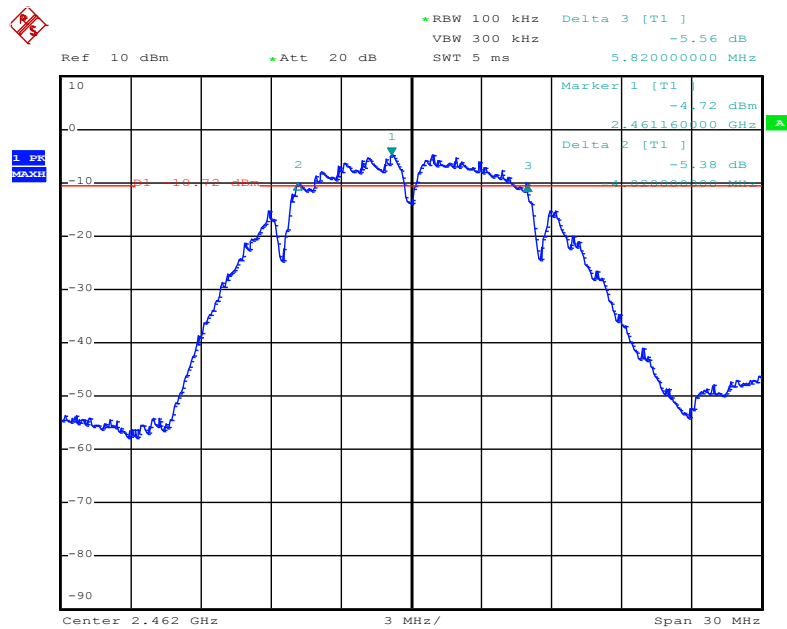


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Figure 3: 6 dB Bandwidth, Mode C (High Channel)



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5.1.3 99% Bandwidth, RSS-Gen 4.6.1

Date of testing: 2013-01-06

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

The 99% bandwidth shall be reported according to RSS-Gen 4.6.1.

Test procedure:

RSS-Gen 4.6.1.

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 1% of the span. The 99% bandwidth was measured by using the OBW function of the analyzer with a 99% coverage setting.

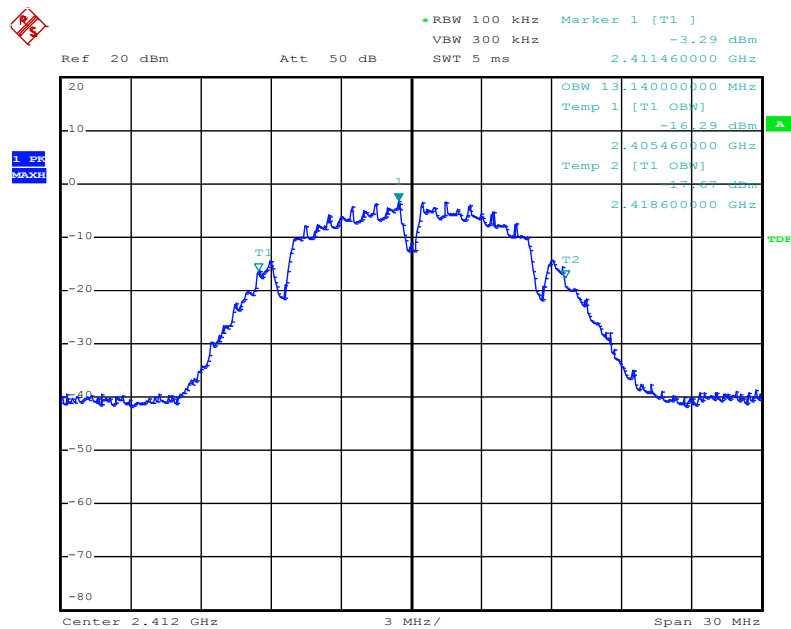
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Table 7: 99% Bandwidth

Operating Frequency	99% Bandwidth [MHz]
Low channel	13.14
Middle channel	13.02
High channel	13.08

Figure 4: 99% Bandwidth, Mode A (Low Channel)

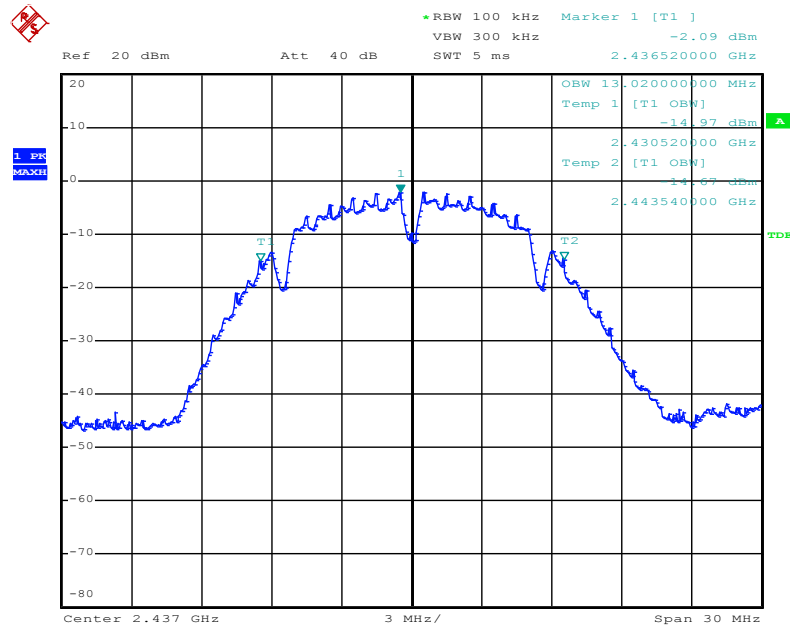


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Figure 5: 99% Bandwidth, Mode B (Middle Channel)

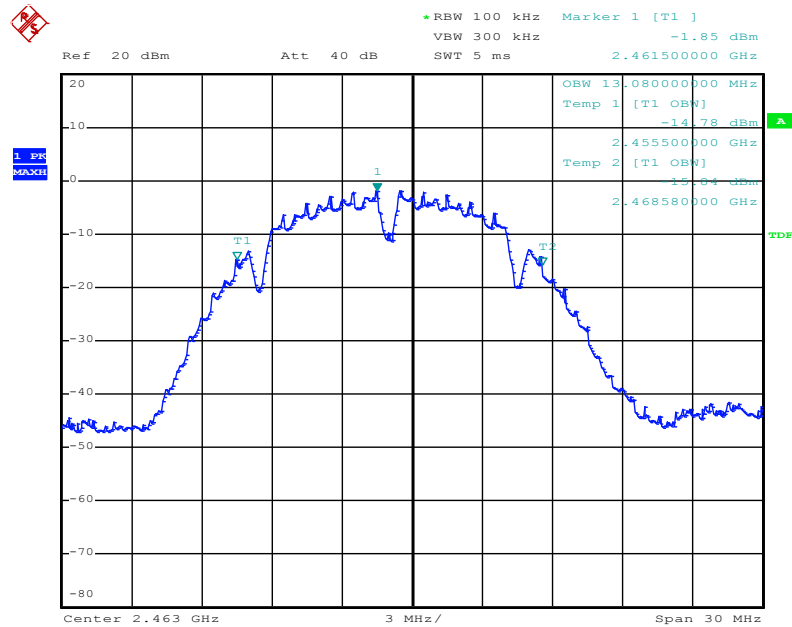


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Figure 6: 99% Bandwidth, Mode C (High Channel)



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5.1.4 Conducted Spurious Emission, FCC 15.247(c) and RSS-210 A8.5

RESULT:

PASS

Date of testing: 2012-11-26

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

In any 100kHz bandwidth outside the frequency band, the RF power shall be at least 20dB below that of the maximum in-band 100kHz emission.

Test procedure:

ANSI C63.10-2009,RSS-Gen 4.9 and KDB558074 D01 DTS Meas Guidance v02

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30MHz to 25GHz (10th harmonics).

The final measurement takes into account the loss generated by all the involved cables.

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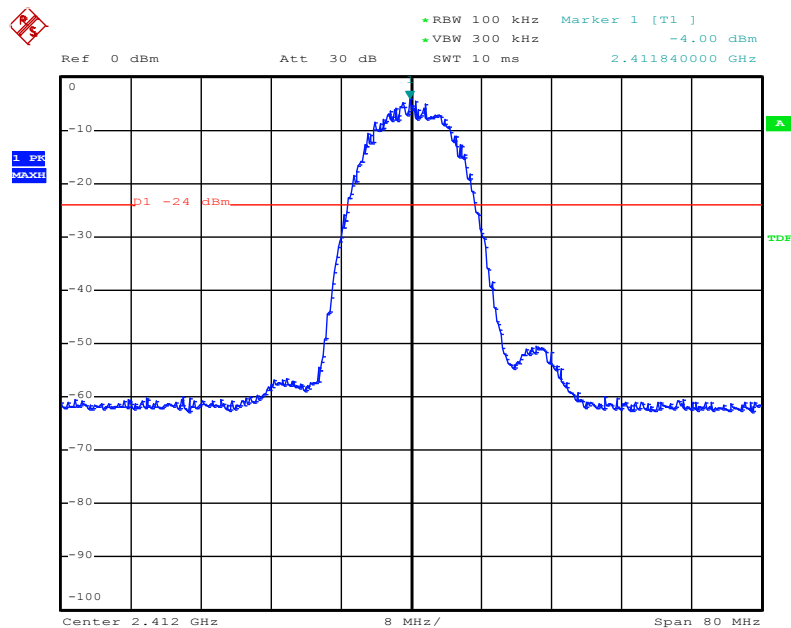
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Table 8: Conducted Spurious Emission, Mode A (Low Channel)

Frequency [MHz]	Reading [dBm]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2412	-	-4	-	-
8305	-52.65	-4	-24	28.65
25616	-37.68	-4	-24	13.68

Notes: Cable loss was included in reading as offset.
Limit = Reading of fundamental + Correction factor – 20dB

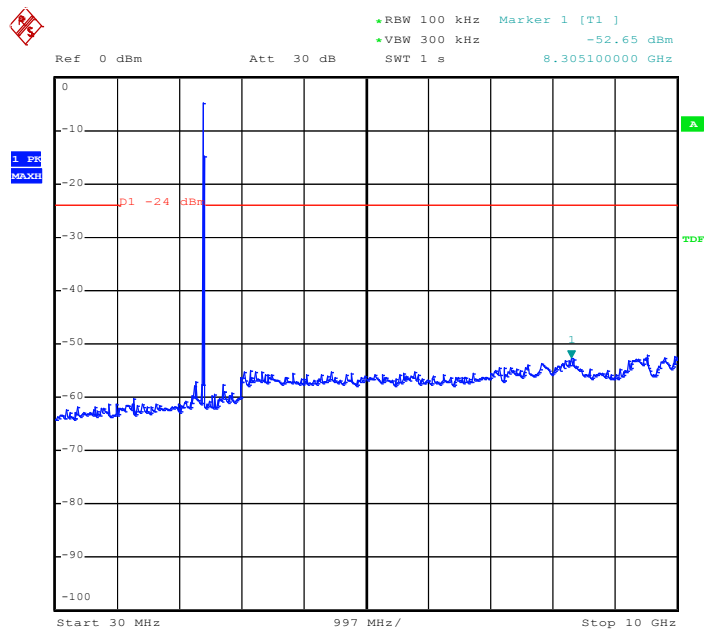
Figure 7: Conducted Spurious Emission, 30MHz – 10GHz, Mode A



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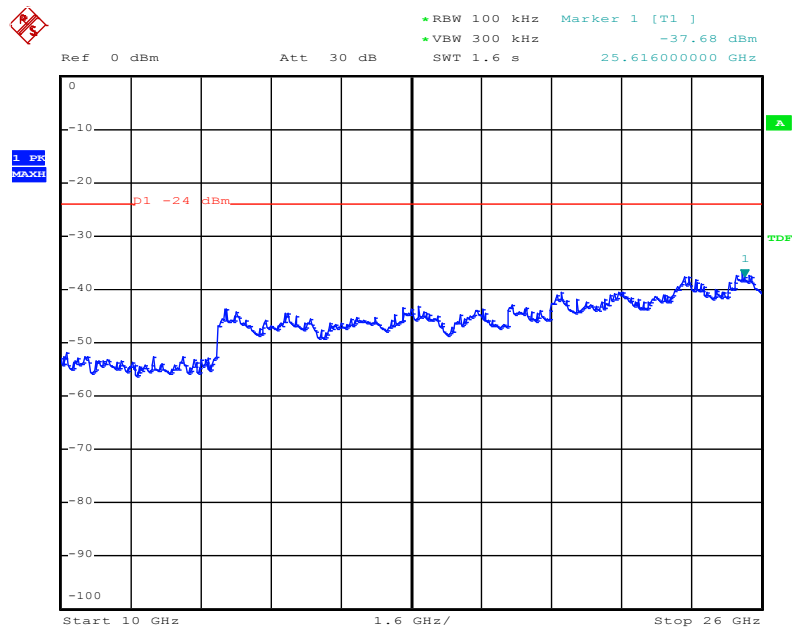
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Figure 8: Conducted Spurious Emission, 10 – 26GHz, Mode A



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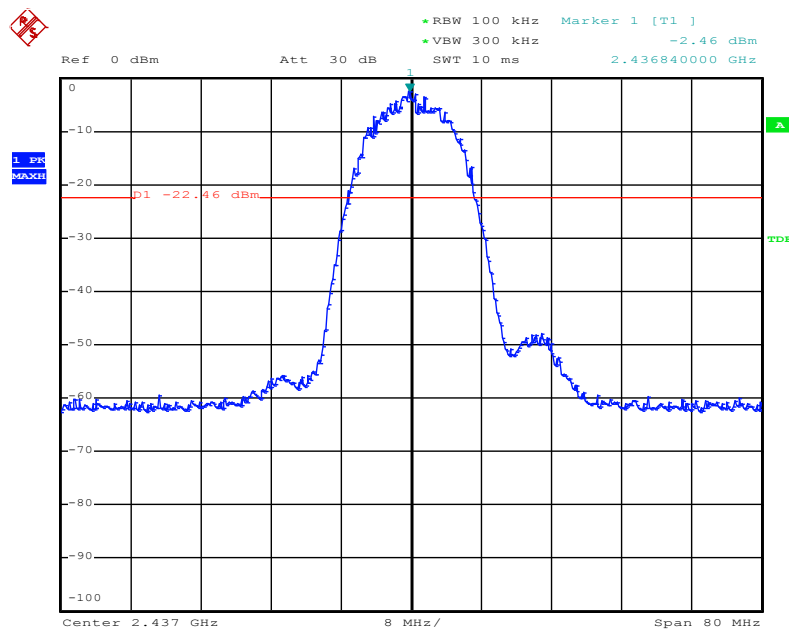
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Table 9: Conducted Spurious Emission, Mode B (Middle Channel)

Frequency [MHz]	Reading [dBm]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2437	-	-2.46	-	-
6544	-55.25	-2.46	-22.46	32.79
25552	-36.54	-2.46	-22.46	14.08

Notes: Cable loss was included in reading as offset.
Limit = Reading of fundamental + Correction factor – 20dB

Figure 9: Conducted Spurious Emission, 30MHz – 10GHz, Mode B

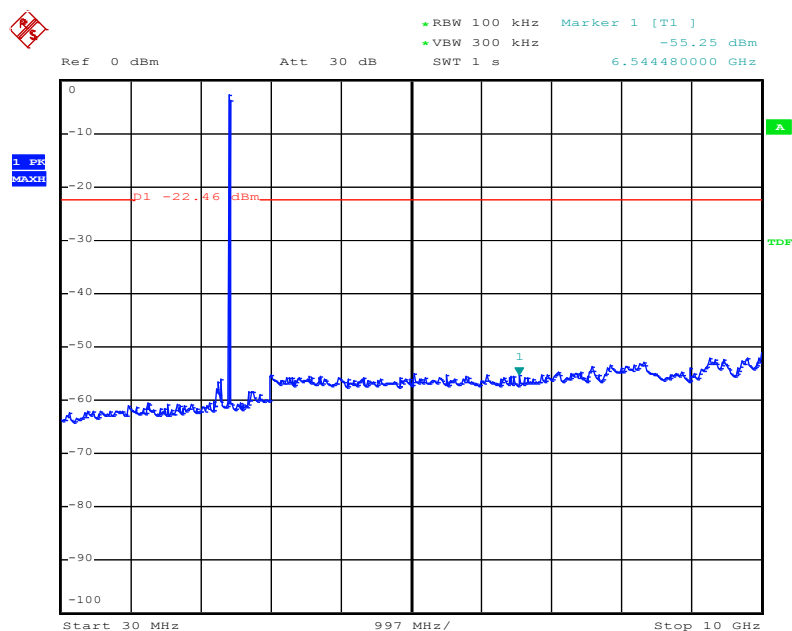


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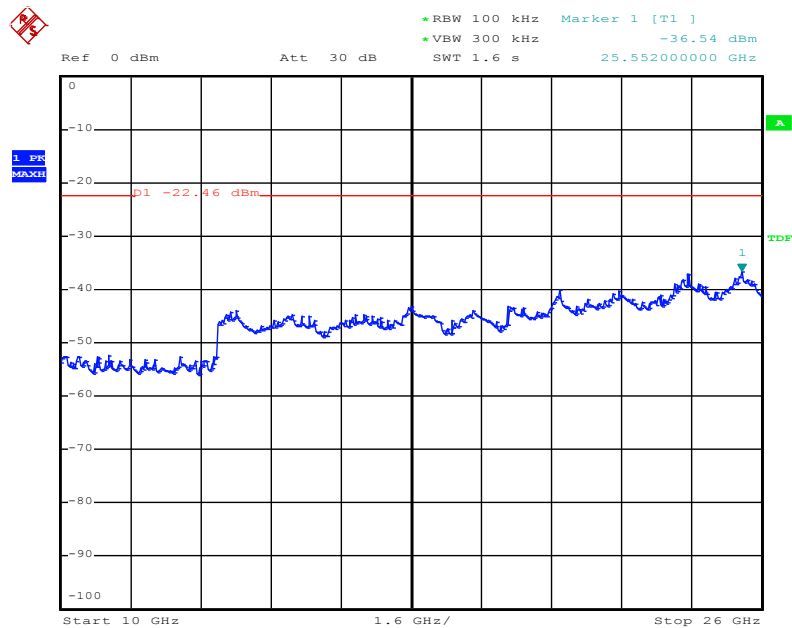
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Figure 10: Conducted Spurious Emission, 10 – 26GHz, Mode B



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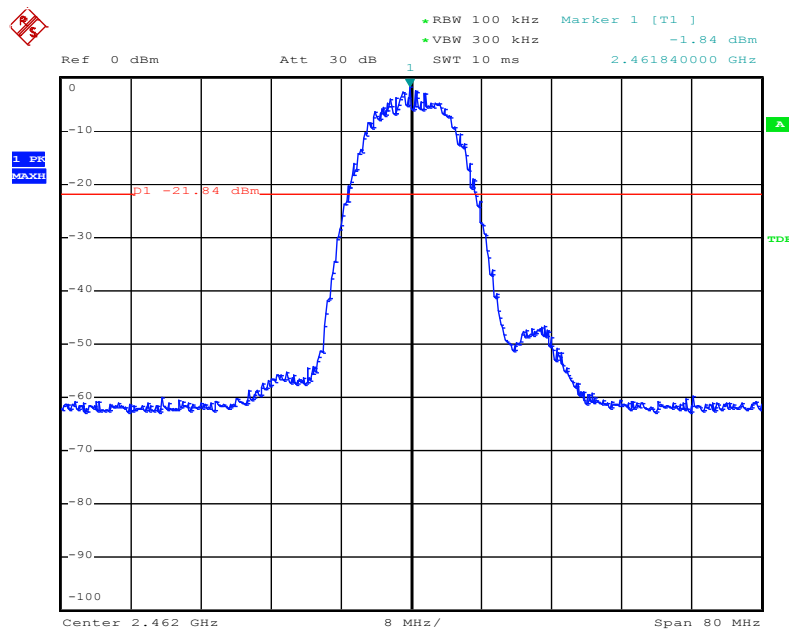
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Table 10: Conducted Spurious Emission, Mode C (High Channel)

Frequency [MHz]	Reading [dBm]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2462	-	-1.84	-	-
9341	-51.62	-1.84	-21.84	29.78
25584	-37.18	-1.84	-21.84	15.34

Notes: Cable loss was included in reading as offset.
Limit = Reading of fundamental + Correction factor – 20dB

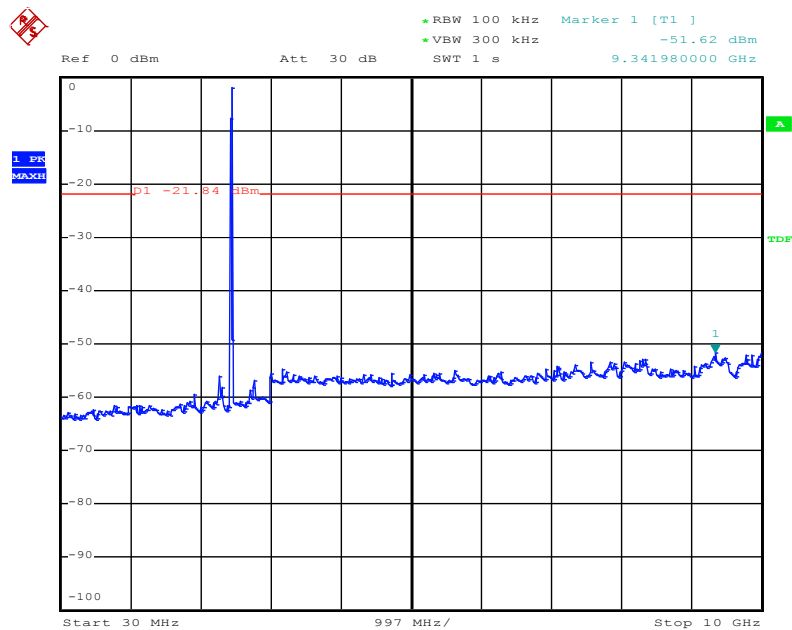
Figure 11: Conducted Spurious Emission, 30MHz – 10GHz, Mode C



Date: 26.NOV.2012 17:22:26

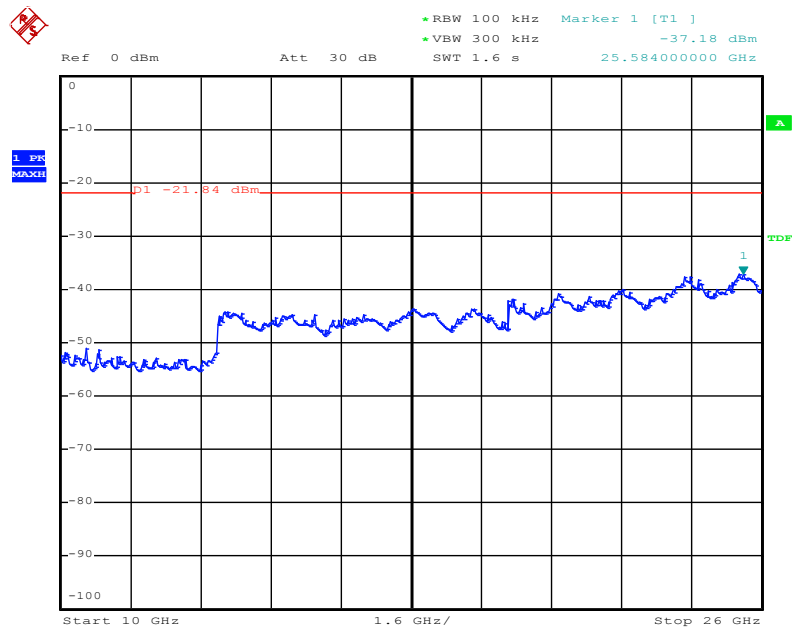
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Date: 26.NOV.2012 17:23:30

Figure 12: Conducted Spurious Emission, 10 – 25GHz, Mode C



Date: 26.NOV.2012 17:25:05

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5.1.5 Power spectral density (PSD), FCC 15.247(e) and RSS-210 A8.2

RESULT:

PASS

Date of testing: 2013-01-06

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

According to FCC section 15.247(e) and RSS-A8.2(b), the same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.9 and KDB558074 D01 DTS Meas Guidance v02

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz.

The final measurement takes into account the loss generated by all the involved cables.

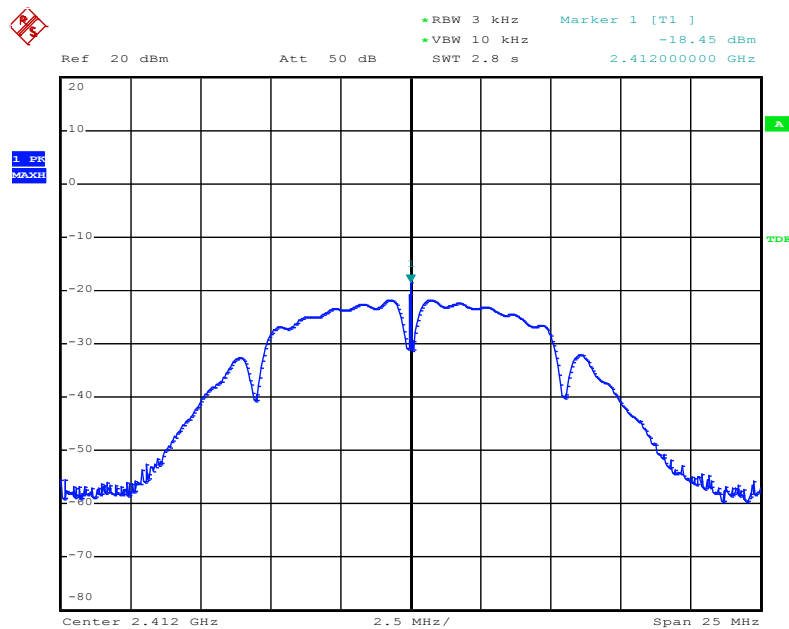
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Table 11: Power spectral density

Frequency [MHz]	Reading [dBm/3KHz]	Limit [dBm/3kHz]	Margin [dB]
Low	-18.45	8	26.45
Middle	-17.60	8	25.6
High	-17.07	8	25.07

Figure 13: Power spectral density, Mode A

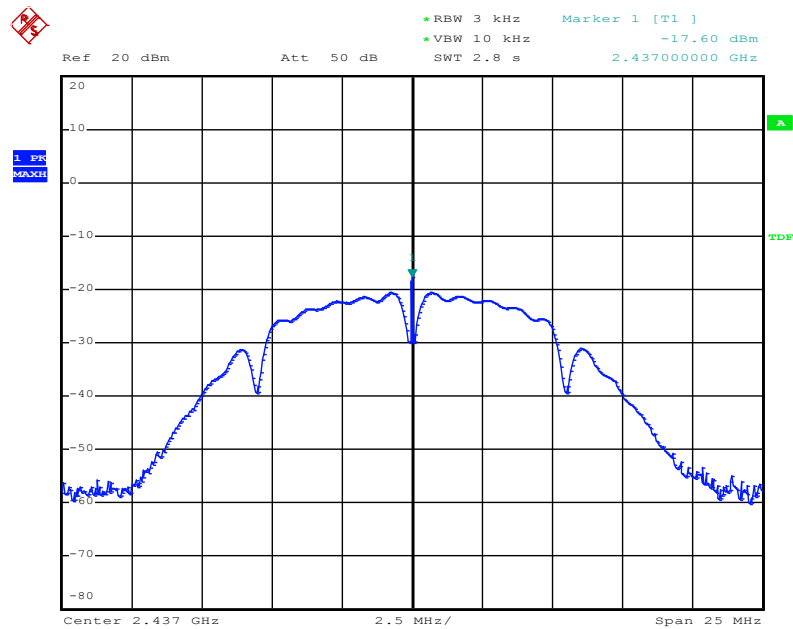


Date: 6.JAN.2013 13:26:27

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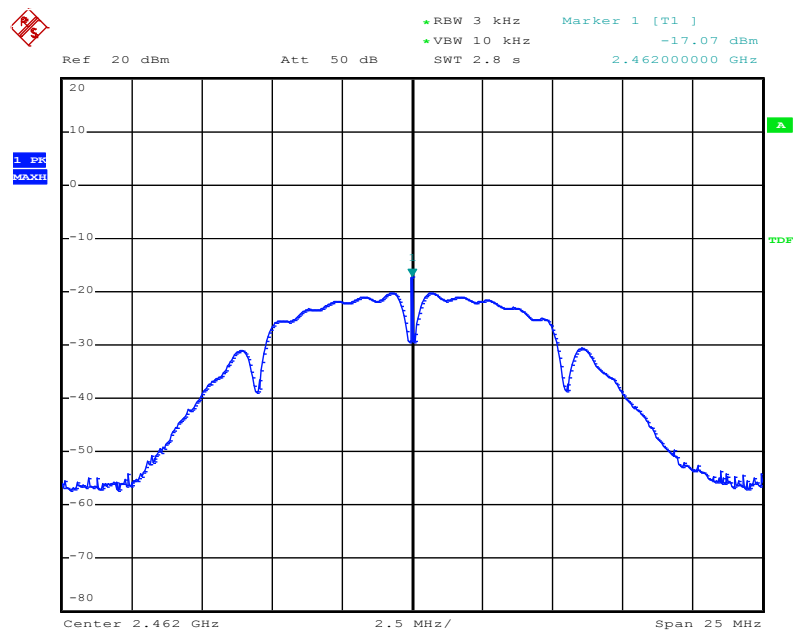
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Figure 14: Power spectral density, Mode B



Date: 6.JAN.2013 13:25:21

Figure 15: Power spectral density, Mode C



Date: 6.JAN.2013 13:24:22

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5.1.6 Band Edge Compliance of RF Conducted Emission, FCC 15.247(c) and RSS-210 A8.5

RESULT:

PASS

Date of testing: 2012-11-23 to 2013-01-06

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

In any 100kHz bandwidth outside the frequency band, the RF power shall be at least 20dB below that of the maximum in-band 100kHz emission.

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.9 and KDB558074 D01 DTS Meas Guidance v02

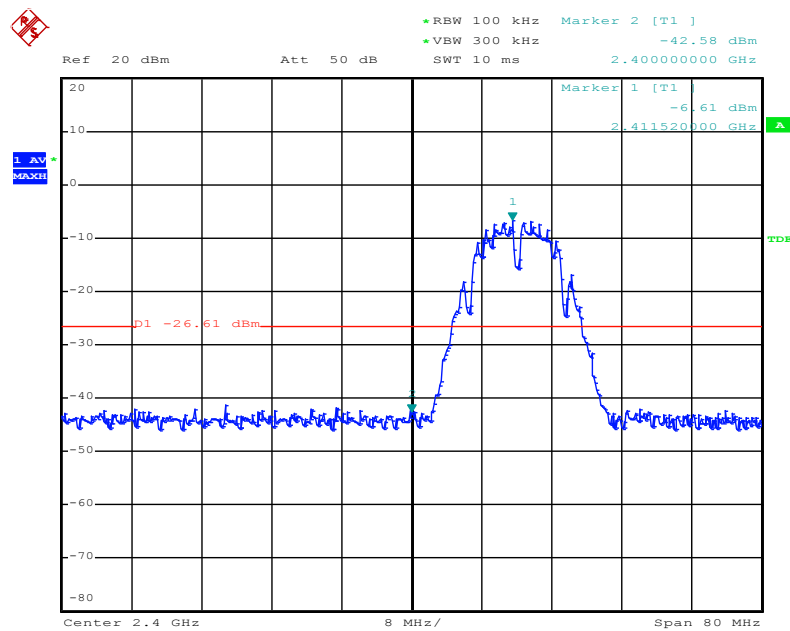
A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz and video bandwidth was set to 300kHz. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

The final measurement takes into account the loss generated by all the involved cables.

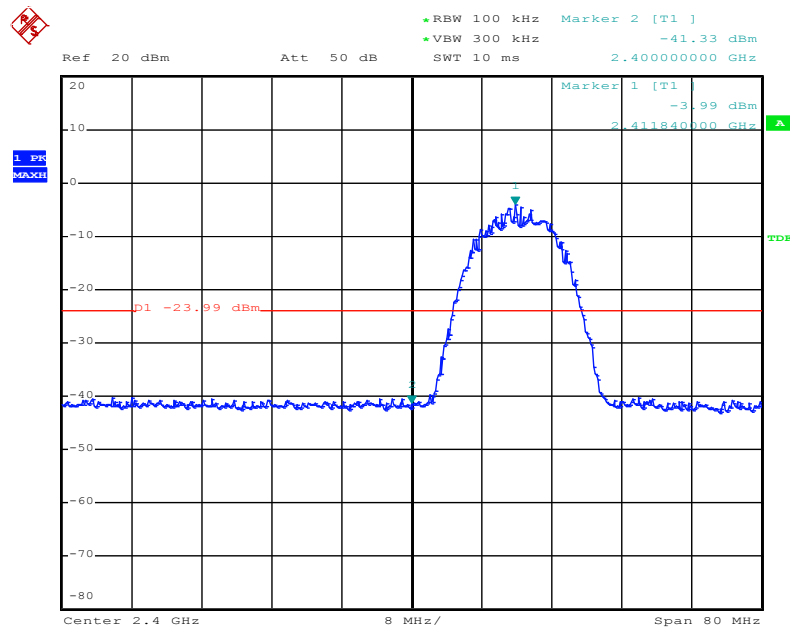
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Figure 16: Lower Band Edge Conducted (AV and PK Detector)



Date: 6.JAN.2013 14:52:30

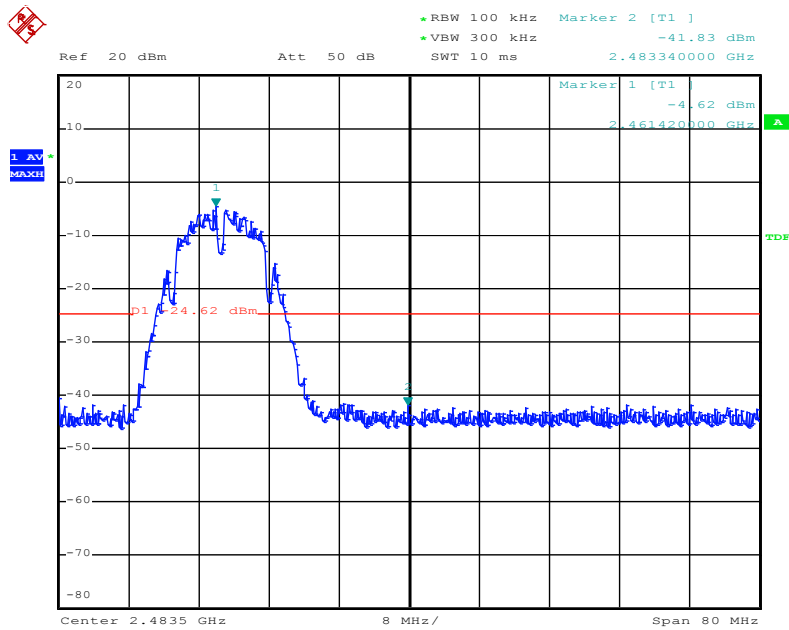


Date: 26.NOV.2012 16:49:04

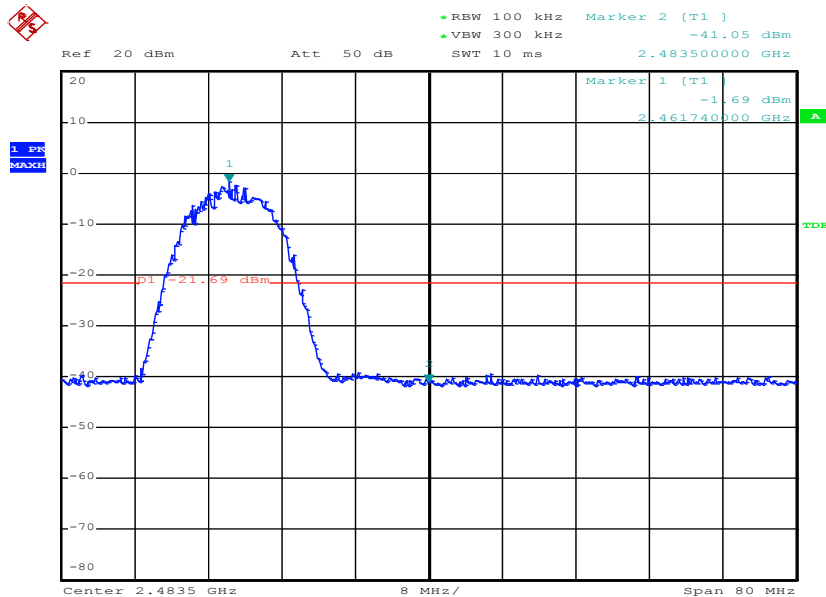
Figure 17: Upper Band Edge Conducted (AV and PK Detector)

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Date: 26.NOV.2012 16:45:36

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6. Test Results of Radiated Measurements

6.1 Transmitter Parameters

6.1.1 Band Edge Radiated Emission, FCC 15.205, FCC 15.209, FCC 15.247(c), RSS-210 2.2, RSS-210 2.6 and RSS-210 A8.5

RESULT:

PAss

Date of testing:	2012-11-23
Ambient temperature:	23.5°C
Relative humidity:	45%
Atmospheric pressure:	101.5hPa
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.9 and KDB558074 D01 DTS Meas Guidance v02

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Measurements were made at 3m distance. The EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level.

Measurements were taken using both horizontal and vertical antenna polarization. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements.

Measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

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Table 12: Band Edge Radiated Emission

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	2390.000	56.722	26.007	-17.278	74.000	30.715	PK
2	Horizontal	2399.898	56.815	26.105	-17.185	74.000	30.710	PK
3	Horizontal	2410.520	92.329	61.619	18.329	74.000	30.710	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	2390.000	43.250	12.535	-10.750	54.000	30.715	AV
2	Horizontal	2399.898	43.486	12.776	-10.514	54.000	30.710	AV
3	Horizontal	2411.248	88.229	57.519	34.229	54.000	30.710	AV

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Vertical	2390.000	56.036	25.321	-17.964	74.000	30.715	PK
2	Vertical	2399.898	56.270	25.560	-17.730	74.000	30.710	PK
3	Vertical	2411.976	94.774	64.063	20.774	74.000	30.710	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Vertical	2390.000	43.245	12.530	-10.755	54.000	30.715	AV
2	Vertical	2399.898	43.610	12.900	-10.390	54.000	30.710	AV
3	Vertical	2411.248	90.734	60.024	36.734	54.000	30.710	AV

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	2460.784	95.629	64.900	21.629	74.000	30.729	PK
2	Horizontal	2483.500	56.793	26.063	-17.207	74.000	30.730	PK
3	Horizontal	2484.900	56.683	25.953	-17.317	74.000	30.730	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	2461.360	91.673	60.943	37.673	54.000	30.730	AV
2	Horizontal	2483.500	43.740	13.010	-10.260	54.000	30.730	AV
3	Horizontal	2484.900	43.520	12.790	-10.480	54.000	30.730	AV

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Vertical	2462.032	99.431	68.701	25.431	74.000	30.730	PK
2	Vertical	2483.500	56.920	26.190	-17.080	74.000	30.730	PK
3	Vertical	2484.900	57.226	26.496	-16.774	74.000	30.730	PK

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Vertical	2461.168	94.398	63.668	40.398	54.000	30.730	AV
2	Vertical	2483.500	44.096	13.366	-9.904	54.000	30.730	AV
3	Vertical	2484.900	43.689	12.959	-10.311	54.000	30.730	AV

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
Average limit in dBuV/m is calculated as follows: Average limit = $20 \times \log(500\mu\text{V/m})$.
Peak limit in dBuV/m is calculated as follows: Peak limit = Average limit + 20dB.

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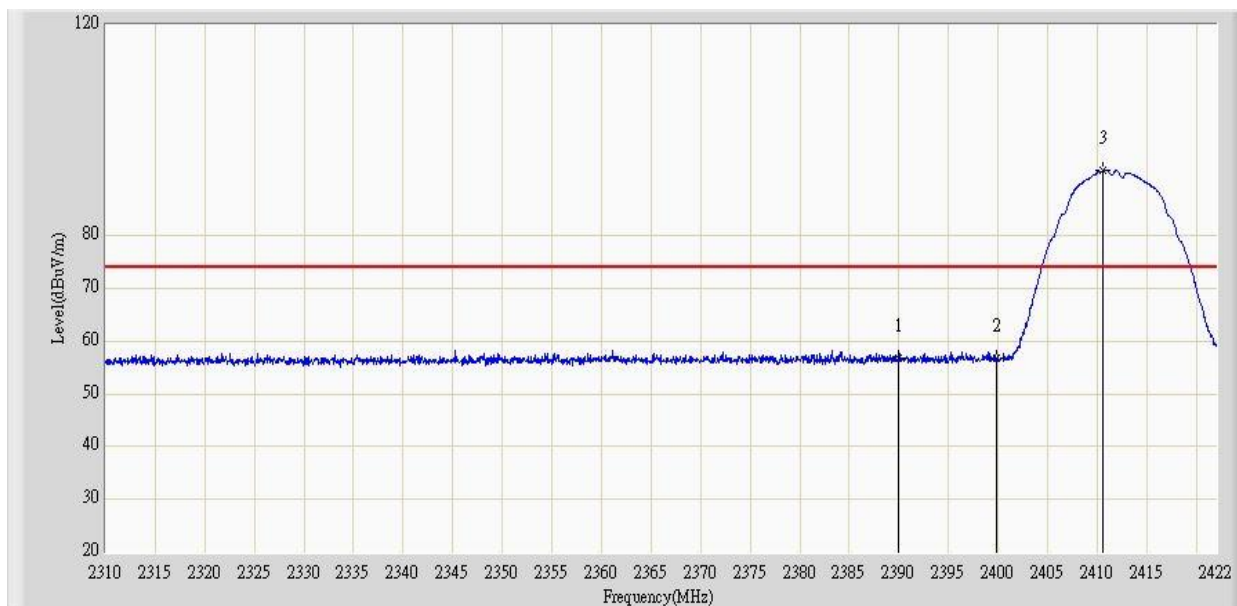
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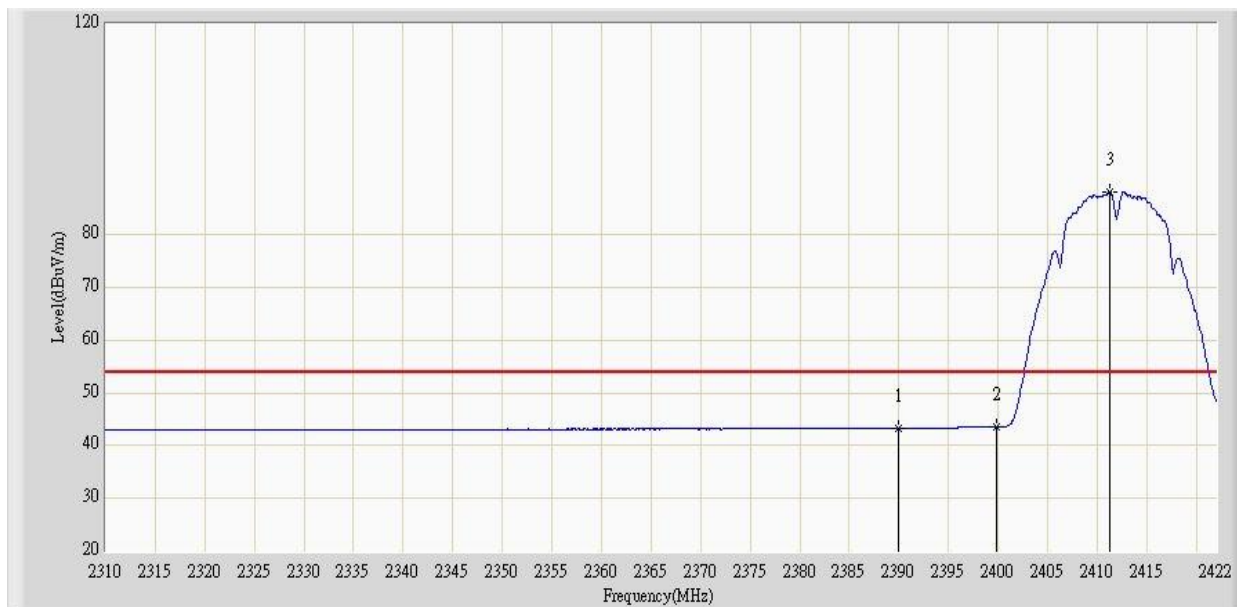
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Figure 18: Band Edge Radiated Emission, Spectral Diagram, Mode A

Horizontal-PK



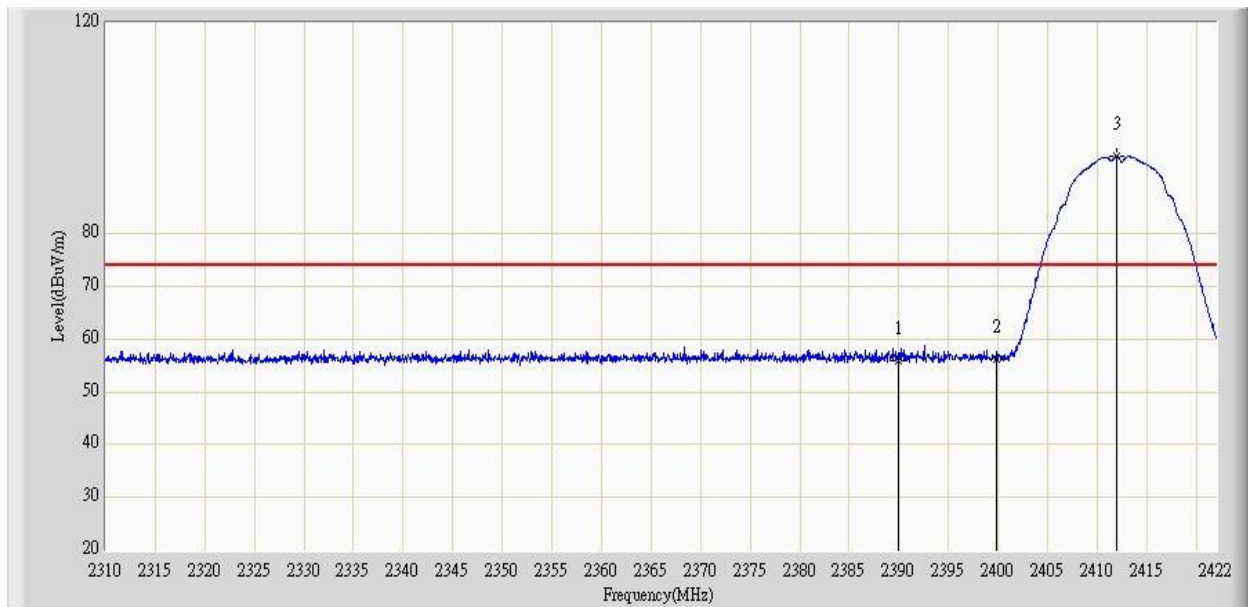
Horizontal-AV



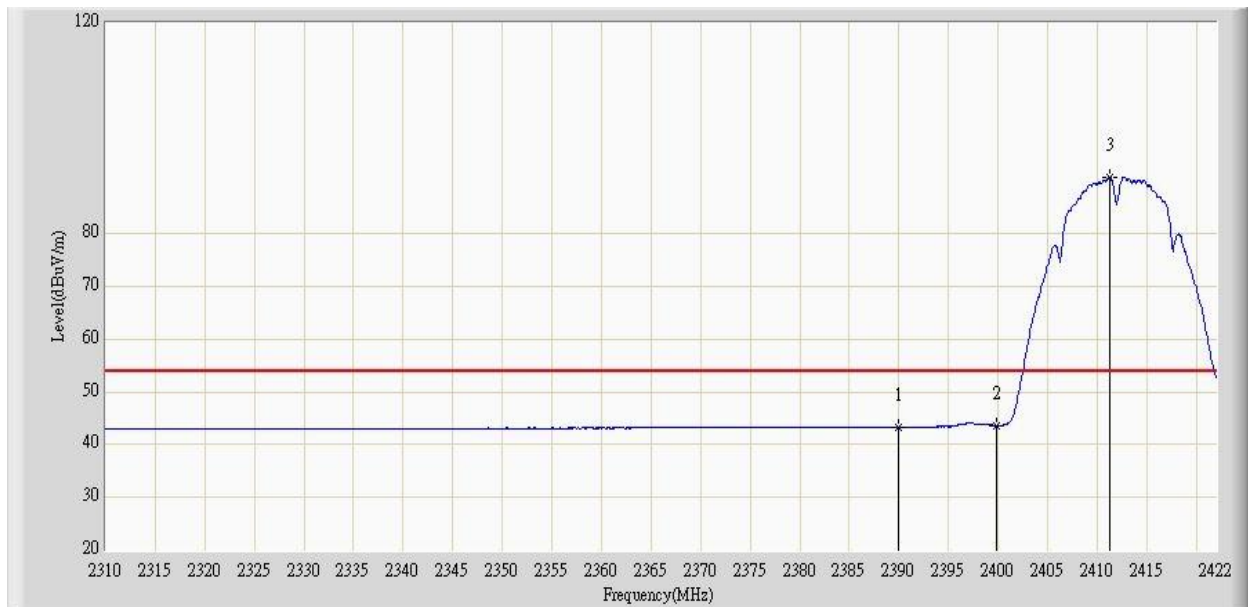
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Vertical-PK



Vertical-AV



Note: The upper diagram shows the vertical peak value and the lower diagram shows the horizontal value.

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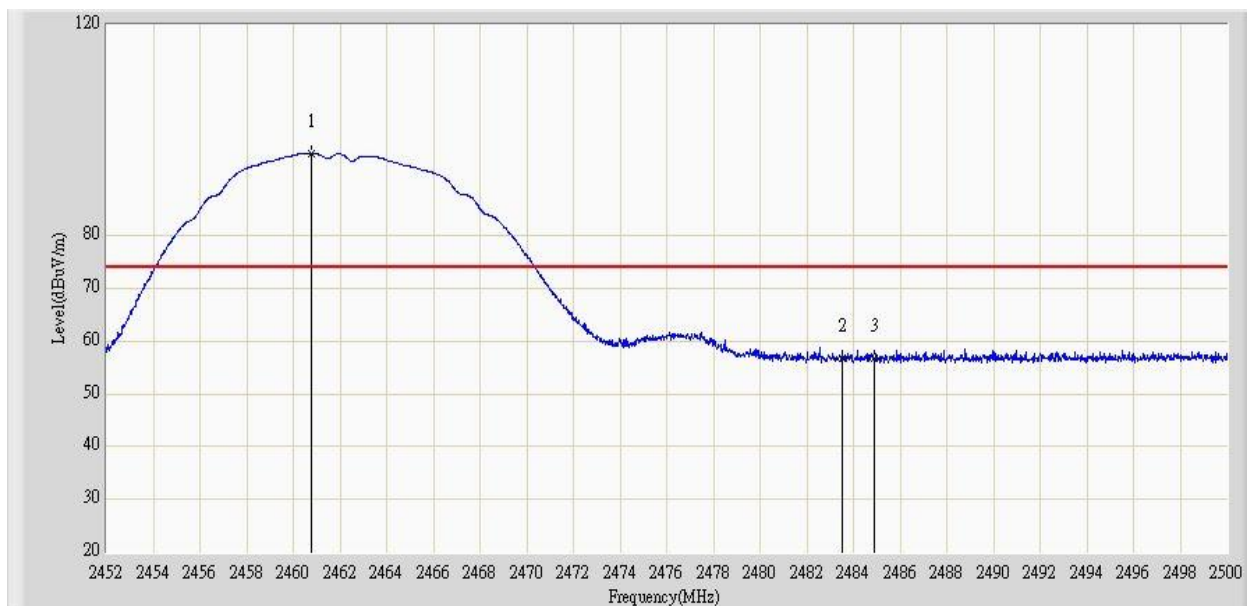
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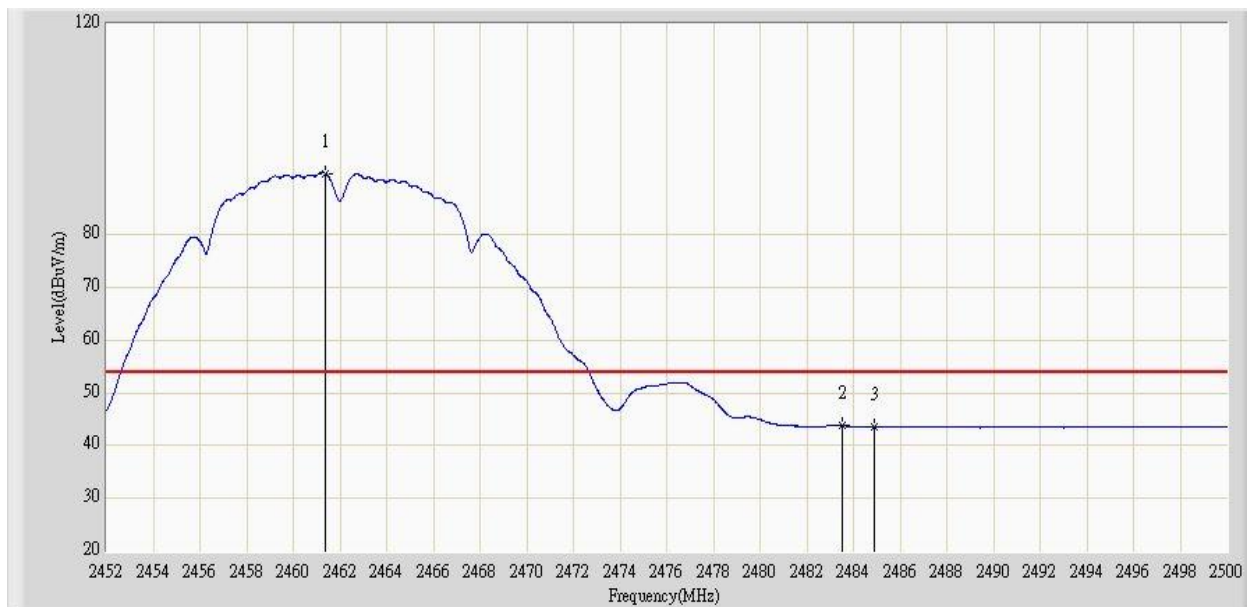
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Figure 19: Band Edge Radiated Emission, Spectral Diagram, Mode C

Horizontal-PK



Horizontal-AV

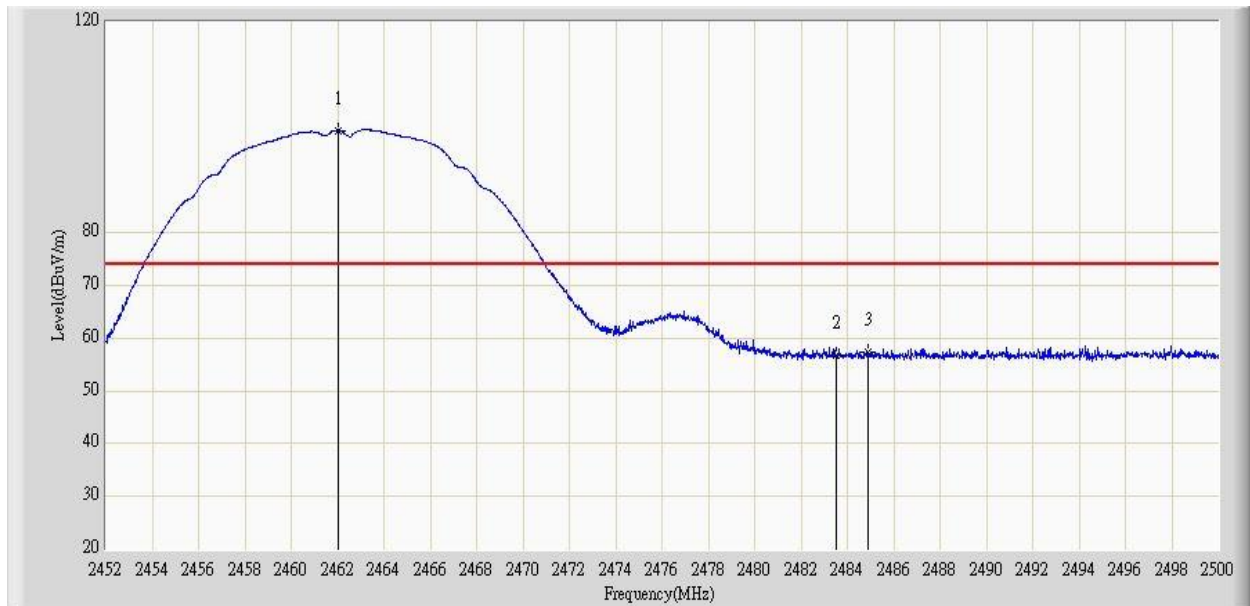


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Vertical –PK



Vertical –AV



Note: The upper diagram shows the vertical peak value and the lower diagram shows the horizontal value.

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6.1.2 Radiated Spurious Emission of Transmitter, FCC 15.205, FCC 15.209, FCC 15.247(c), RSS-210 2.2, RSS-210 2.6 and RSS-210 A8.5

RESULT:

PASS

Date of testing:	2012-11-23
Ambient temperature:	23.5°C
Relative humidity:	45%
Atmospheric pressure:	101.5hPa
Frequency range:	30MHz – 25GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.9 and KDB558074 D01 DTS Meas Guidance v02

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn.

The spectrum was examined from 30MHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, measurements were performed using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 13: Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	7236.000	48.235	51.193	-22.807	74	-2.958	PK
2	Vertical	4824.000	44.275	55.408	-18.592	74	-11.133	PK
3	Vertical	7236.000	48.863	51.821	-22.179	74	-2.958	PK
4	-	-	-	-	-	-	-	AV

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

The peak value is less than limit 10dB,so no average value data in the table.

Table 14: Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode B

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	7311.000	48.264	51.008	-22.992	74	-2.744	PK
2	Vertical	4874.000	42.146	53.207	-20.793	74	-11.061	PK
3	Vertical	7311.000	49.486	52.23	-21.77	74	-2.744	PK
4	-	-	-	-	-	-	-	AV

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

The peak value is less than limit 10dB,so no average value data in the table.

Table 17:Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	Horizontal	7386.000	48.235	50.697	-23.303	74	-2.462	PK
2	Vertical	4910.000	49.374	60.374	-13.626	74	-11	PK
3	Vertical	7386.000	47.238	49.7	-24.3	74	-2.462	PK
4	-	-	-	-	-	-	-	AV

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

The peak value is less than limit 10dB,so no average value data in the table.

6.2 Receiver Parameters

6.2.1 Radiated Spurious Emission of Receiver, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-Gen 7.2.3.2

RESULT:

PASS

Date of testing: 2012-11-23

Ambient temperature: 23.5°C

Relative humidity: 45%

Atmospheric pressure: 101.5hPa

Frequency range: 30MHz – 12.5GHz

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

The emissions from the unintentional radiator shall not exceed the field strength specified in 15.109(a) and RSS-210 Table 2 (and RSS-Gen Table 1).

Test procedure:

ANSI C63.10-2009 and RSS-Gen 4.10.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn. The spectrum was examined from 30MHz to the 5th harmonic of the highest fundamental operation frequency (12.5GHz). Final radiated emission measurements were made at 3m distance.

Measurements were taken using both horizontal and vertical antenna polarizations.

For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, measurements were performed using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. No spurious emission was found in the range 30MHz – 12500MHz. emission in mode D, E, F . all signals found in the pre-testing were more than 20 dB below the limit .

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6.3 Test Results of AC Power Line Conducted Measurements

6.3.1 AC Power Line Conducted Emission, FCC 15.207 and RSS-Gen7.2.2

RESULT:

N/A

Date of testing:	N/A
Ambient temperature:	23.5°C
Relative humidity:	45%
Atmospheric pressure:	101.5hPa
Frequency range:	0.15MHz –30MHz
Measurement distance:	N/A
Kind of test site:	Shielded Room

Requirements:

The AC power line conducted emission on any frequency within the band 150 kHz to 30MHz shall not exceed the limits specified in FCC 15.207 and RSS-Gen 7.2.2.

Test procedure:

ANSI C63.10-2009 and ANSI C63.4-2003.

The EUT was placed on a wooden table raised 80cm above the reference ground plane. A vertical conducting plane of the screened room was located 40cm to the rear of the EUT. The AC adapter of the EUT was connected to a Line Impedance Stabilization Network (LISN).

The physical arrangement of the test system and associated cabling was varied to determine the effect on the EUT's emissions in amplitude and frequency in order to ensure that maximum emission amplitudes were attained.

The measurements were performed with the receiver operating in the CISPR quasipeak and average detection modes.

Note:

This product is not request for conducted emission.

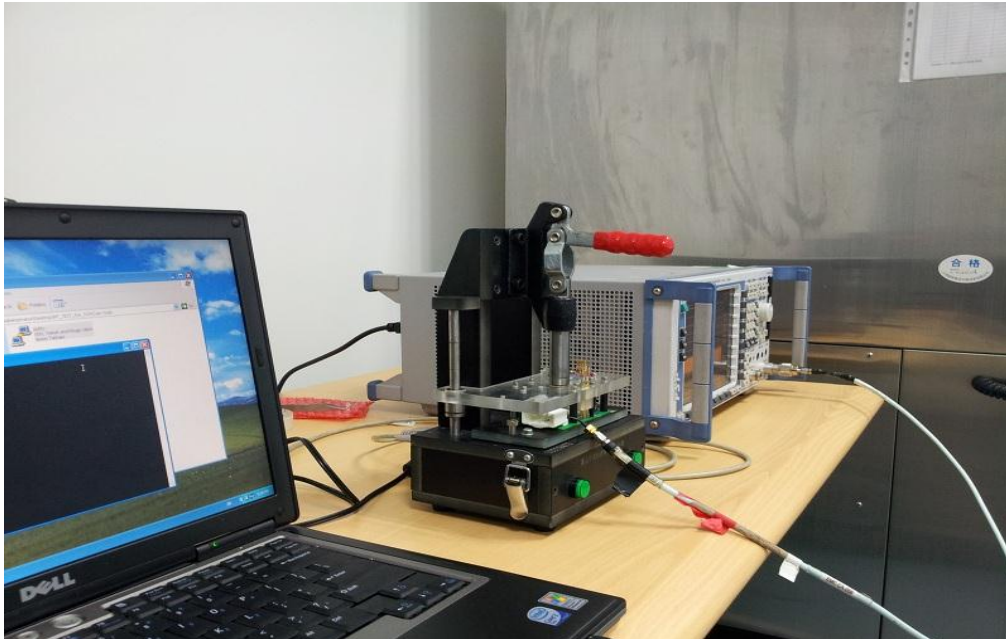
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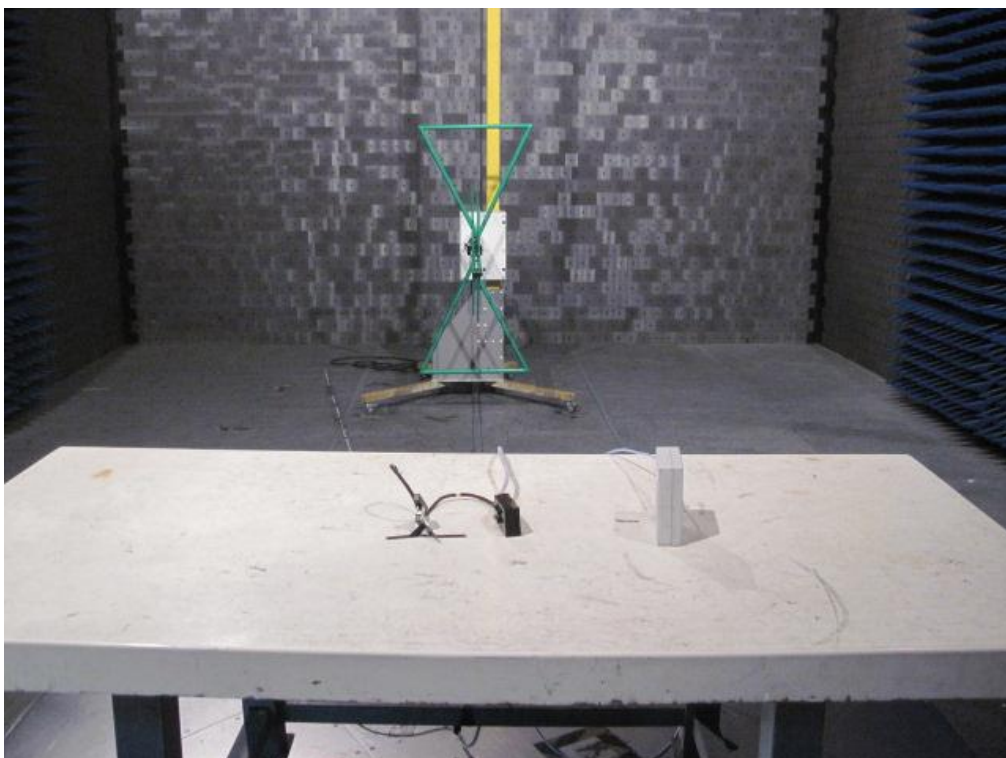
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7. Photographs of the Test Setup

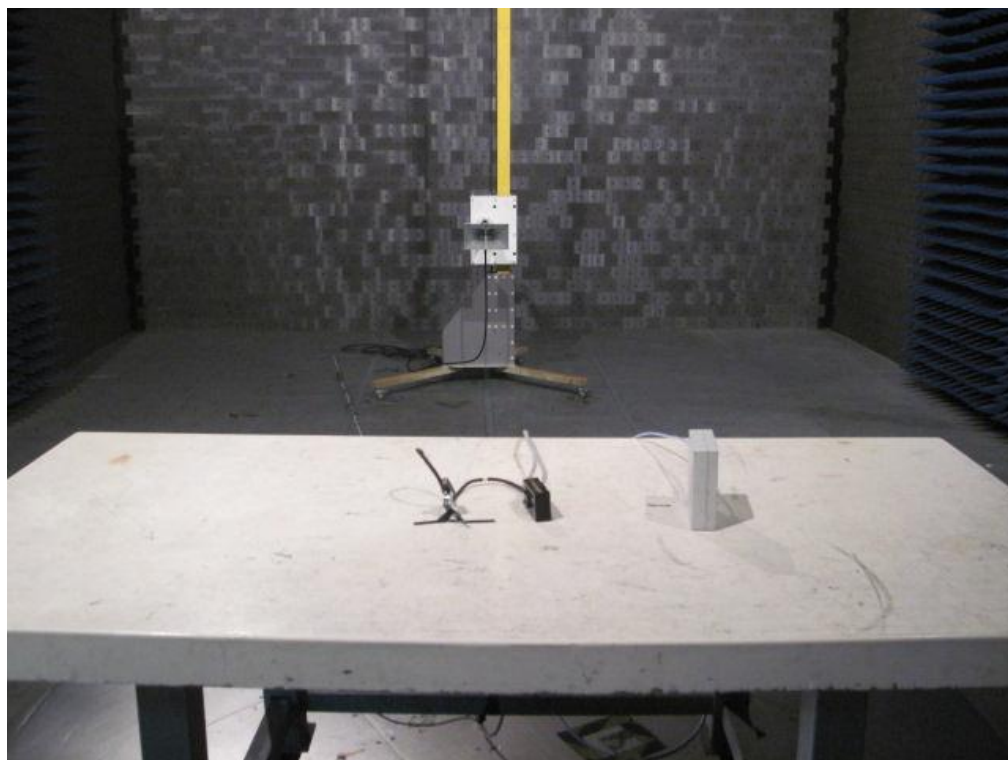
Photograph 1: Set-up for Conducted output power at Antenna Port



Photograph 2: Set-up for Radiated Emission, 30MHz-1000MHz



Photograph 3: Set-up for Radiated Emission, 1G-18GHz



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