



FCC TEST REPORT

According to

FCC Rules and Regulations Part 15 Subpart C

Applicant	: Rosonix Technology, Inc.
Address	: 10F, No.235, Sec. 4, Chengde Rd., Shihlin District, Taipei, Taiwan
Equipment	: RX-357x ZigBee Module
Model No.	: RX-357x (x=0-9)
FCC ID.	: YUDRX357X
Trade Name	: Rosonix

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Cerpass Technology Corp.**, the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



Contents

1. Report of Measurements and Examinations	6
1.1 List of Measurements and Examinations	6
2. Test Configuration of Equipment under Test	7
2.1 Feature of Equipment under Test	7
2.2 Carrier Frequency of Channels	7
2.3 Test Mode and Test Software	8
2.4 Description of Test System	8
2.5 General Information of Test	9
2.6 Measurement Uncertainty	9
3. Antenna Requirements	10
3.1 Standard Applicable	10
3.2 Antenna Construction and Directional Gain	10
4. Test of Conducted Emission	11
4.1 Test Limit	11
4.2 Test Procedures	11
4.3 Typical Test Setup	12
4.4 Measurement Equipment	12
4.5 Test Result and Data	13
4.6 Test Photographs	15
5. Test of Radiated Emission	16
5.1 Test Limit	16
5.2 Test Procedures	16
5.3 Typical Test Setup	17
5.4 Measurement Equipment	17
5.5 Test Result and Data (9kHz ~ 30MHz)	17
5.6 Test Result and Data (30MHz ~ 1GHz)	18
5.7 Test Result and Data (1GHz ~ 25GHz)	22
5.8 Test Photographs (30MHz ~ 1GHz)	28
5.9 Test Photographs (1GHz ~ 25GHz)	29
6. 6dB Bandwidth Measurement Data	30
6.1 Test Limit	30
6.2 Test Procedures	30
6.3 Test Setup Layout	30
6.4 Measurement Equipment	30
6.5 Test Result and Data	30
7. Maximum Peak Output Power	33
7.1 Test Limit	33
7.2 Test Procedures	33
7.3 Test Setup Layout	33
7.4 Measurement Equipment	33
7.5 Test Result and Data	33
8. Power Spectral Density	34



8.1	Test Limit	34
8.2	Test Procedures	34
8.3	Test Setup Layout	34
8.4	Measurement Equipment.....	34
8.5	Test Result and Data	34
9.	Band Edges Measurement	37
9.1	Test Limit	37
9.2	Test Procedure	37
9.3	Test Setup Layout	37
9.4	Measurement Equipment.....	37
9.5	Test Result and Data	37
10.	Restrict Band Emission Measurement Data	40
11.	Restricted Bands of Operation	41
11.1	Labeling Requirement	41
Appendix A. Photographs of EUT.....		A1 ~ A6



☐ Additional attachment as following record:

[illegible]



CERTIFICATE OF COMPLIANCE

According to

FCC Rules and Regulations Part 15 Subpart C

Applicant : Rosonix Technology, Inc.

Address : 10F, No.235, Sec. 4, Chengde Rd.,
Shihlin District, Taipei, Taiwan

Equipment : RX-357x ZigBee Module

Model No. : RX-357x (x=0-9)

FCC ID. : YUDRX357X

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was **passed** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)**.

The test was carried out on Sep. 16, 2013 at Cerpass Technology Corp.

Approved by:

Tested by:

Hill Chen
EMC/RF B.U. Assistant Manager

Tom Tai
Engineer



1. Report of Measurements and Examinations

1.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209 15.247(d)	. Radiated Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak Output Power	Pass
15.247(d)	. 100kHz Bandwidth of Frequency Band Edges	Pass
15.247(e)	. Power Spectral Density	Pass
1.1307 1.1310 2.1091 2.1093	. RF Exposure Compliance	Pass



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

- Silicon Labs™ EM357 platform
- 192KB Flash memory
- 12KB SRAM
- 32-bit ARM Cortex M3 microprocessor
- 17 general purpose I/O ports
- DMA-SPI, I2C and UART interfaces
- Integrated 14-bit resolution ADC
- Designed for EmberZNet ZigBee Pro compliant networks
- Miniature footprint: 2cm x 3cm
- Integrated PCB trace antenna and U.FL external antenna connector
- 16 RF channels
- Over indoor 30m and outdoor visual contact 300m of range
- Non-intrusive debug interface (SIF)
- AES 128-bit encryption
- Low power consumption
- Constant RF out power over 2.1~3.6 V voltage range
- FCC and NCC under certification
- RoHS compliant

2.2 Carrier Frequency of Channels

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*01	2405	*09	2445
02	2410	10	2450
03	2415	11	2455
04	2420	12	2460
05	2425	13	2465
06	2430	14	2470
07	2435	15	2475
08	2440	*16	2480

Note: Channels remarked * are selected to perform test.



2.3 Test Mode and Test Software


- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included Notebook, Mouse and EUT for the RF test.
- c. An executive program, "Tera Term" which transmits and receives data through Wireless.
- d. The following test modes was performed for RF test:
CH01: 2405MHz, CH09: 2445MHz, CH16: 2480MHz

2.4 Description of Test System

Device	Manufacturer	Model No.	Description
Notebook	DELL	INSPIRON 510m	Power Cable, Non-Shielded, 1.8m
Mouse	Logitech	OF-2854	PS2 Cable, Shielded, 1.85m
Printer	HP	D2660	Power Cable, Non-Shielded, 1.8m USB Cable, Shielded, 1.6m



2.5 General Information of Test

Test Site :	CerpPASS Technology Corp. 2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location (OATS2-SD) :	No.68-1, Shihbachongsi, Shihding Township, Taipei City 223, Taiwan, R.O.C.
FCC Registration Number:	TW1049, TW1061, 390316, 488071
IC Registration Number :	4934B-1, 4934D-1
VCCI Registration Number:	T-1173 for Telecommunication Test C-4139 for Conducted emission test R-3428 for Radiated emission test G-97 for Radiated emission test above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30MHz Radiation: from 30MHz to 25,000MHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.
Laboratory Accreditation	

2.6 Measurement Uncertainty

Measurement Item	Uncertainty
Radiated emission	$\pm 4.11\text{dB}$
Peak Output Power(conducted)	$\pm 1.38\text{dB}$
Peak Output Power(Radiated)	$\pm 1.70\text{dB}$
Power Spectral Density	$\pm 1.39\text{dB}$
Radiated emission(3m)	$\pm 4.11\text{dB}$
Radiated emission(10m)	$\pm 3.89\text{dB}$



3. Antenna Requirements

3.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2 Antenna Construction and Directional Gain

Antenna Type: PCB Antenna

Antenna Gain: 3.74 dBi



4. Test of Conducted Emission

4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

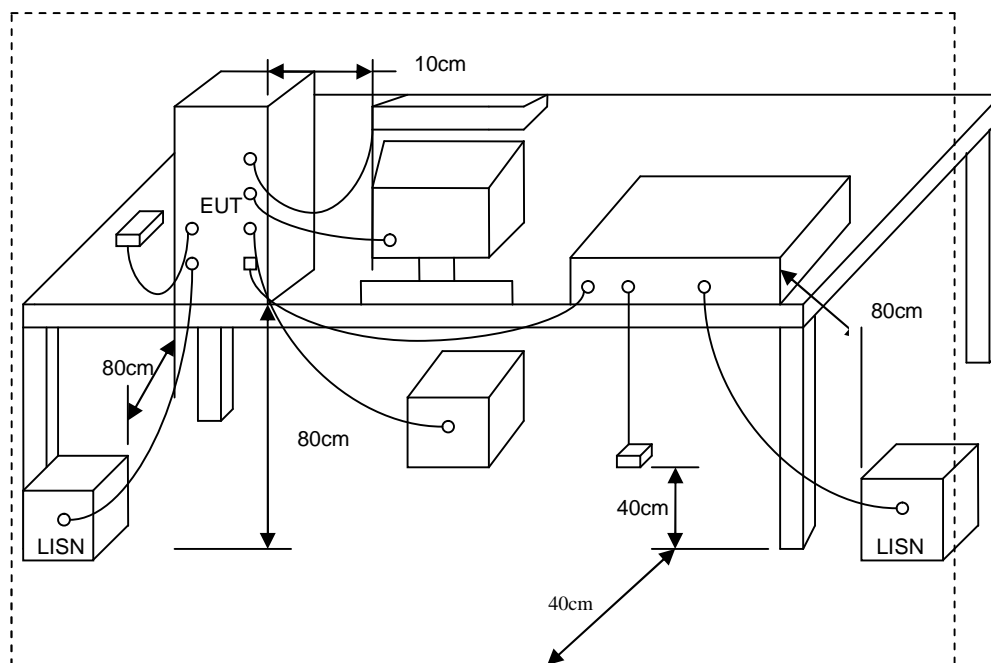
*Decreases with the logarithm of the frequency.

4.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



4.3 Typical Test Setup



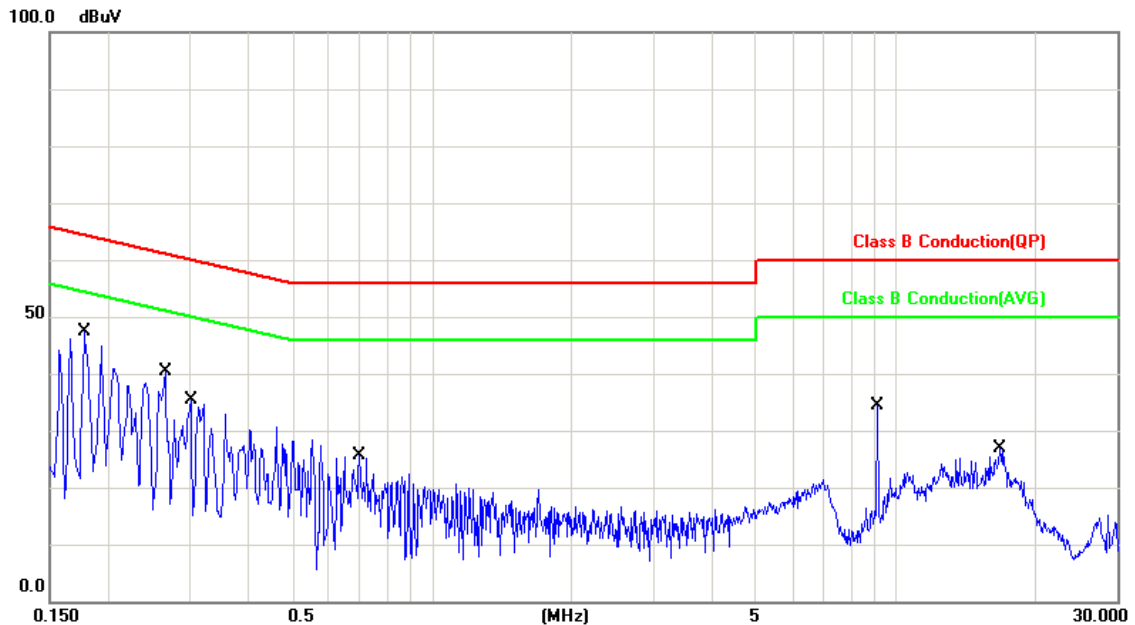
4.4 Measurement Equipment

Instrument/ Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100821	2012/12/24	2013/12/23
LISN	Schwarzbeck	NSLK 8127	8127-516	2013/03/08	2014/03/07
LISN	Schwarzbeck	NSLK 8127	8127-568	2013/08/26	2014/08/25
Attenuator	HAMEG	HZ560	-----	2013/03/07	2014/03/06



4.5 Test Result and Data

Power	:	From System	Pol/Phase	:	LINE
Test Mode	:	O-QPSK, CH1	Temperature	:	26 °C
Test Date	:	Sep. 16, 2013	Humidity	:	46 %

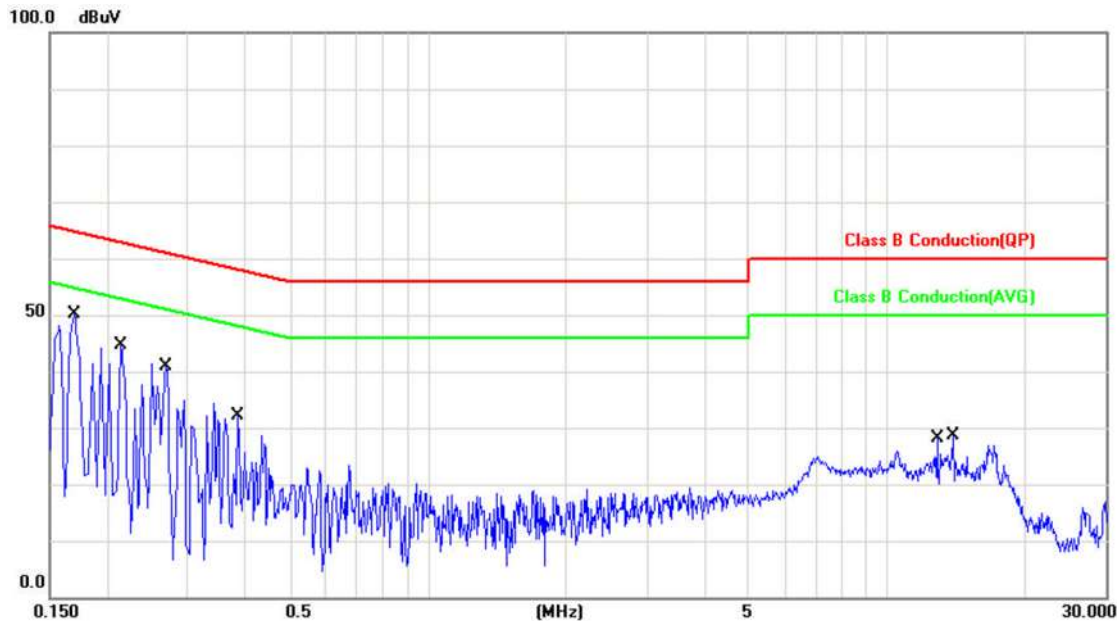


No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	0.12	40.51	40.63	64.57	-23.94	QP	P
2	0.1780	0.12	23.35	23.47	54.57	-31.10	AVG	P
3	0.2660	0.12	42.88	43.00	61.24	-18.24	QP	P
4	0.2660	0.12	36.57	36.69	51.24	-14.55	AVG	P
5	0.3020	0.12	28.42	28.54	60.19	-31.65	QP	P
6	0.3020	0.12	15.55	15.67	50.19	-34.52	AVG	P
7	0.6980	0.16	26.36	26.52	56.00	-29.48	QP	P
8	0.6980	0.16	20.27	20.43	46.00	-25.57	AVG	P
9	9.1220	0.55	15.59	16.14	60.00	-43.86	QP	P
10	9.1220	0.55	10.61	11.16	50.00	-38.84	AVG	P
11	16.7860	0.86	21.37	22.23	60.00	-37.77	QP	P
12	16.7860	0.86	15.25	16.11	50.00	-33.89	AVG	P

Note: Level = Reading + Factor
Margin = Level – Limit



Power	: From System	Pol/Phase	: NEUTRAL
Test Mode	: O-QPSK, CH1	Temperature	: 26 °C
Test Date	: Sep. 16, 2013	Humidity	: 46 %



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	0.12	48.41	48.53	64.96	-16.43	QP	P
2	0.1700	0.12	32.56	32.68	54.96	-22.28	AVG	P
3	0.2140	0.12	40.32	40.44	63.04	-22.60	QP	P
4	0.2140	0.12	28.28	28.40	53.04	-24.64	AVG	P
5	0.2700	0.12	35.84	35.96	61.12	-25.16	QP	P
6	0.2700	0.12	22.42	22.54	51.12	-28.58	AVG	P
7	0.3860	0.13	26.52	26.65	58.15	-31.50	QP	P
8	0.3860	0.13	19.73	19.86	48.15	-28.29	AVG	P
9	12.8940	0.70	19.31	20.01	60.00	-39.99	QP	P
10	12.8940	0.70	14.87	15.57	50.00	-34.43	AVG	P
11	13.9580	0.74	19.56	20.30	60.00	-39.70	QP	P
12	13.9580	0.74	14.69	15.43	50.00	-34.57	AVG	P

Note: Level = Reading + Factor
Margin = Level – Limit



4.6 Test Photographs

Front View



Rear View





5. Test of Radiated Emission

5.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions for unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated ($\mu V / M$)	Radiated (dB $\mu V / M$)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

Frequency (MHz)	Distance Meters	Radiated (dB $\mu V / M$)
30-230	10	30
230-1000	10	37

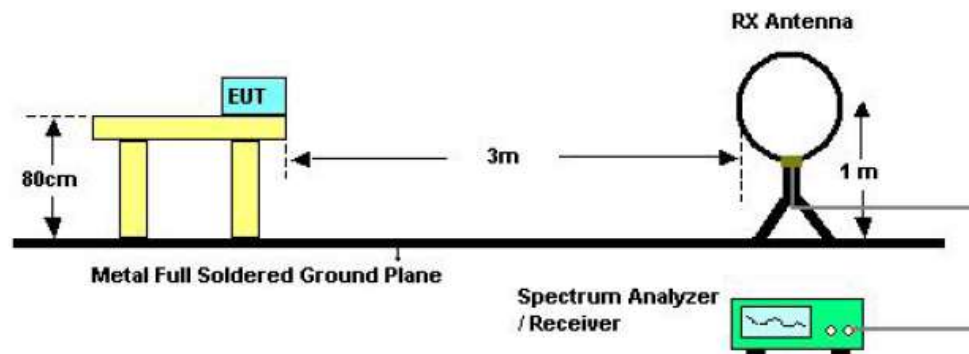
5.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

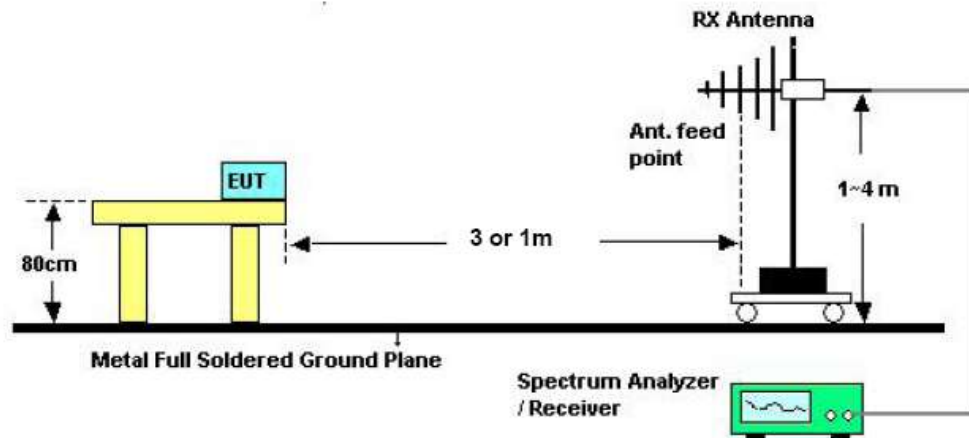


5.3 Typical Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

5.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100443	2013/01/15	2014/01/14
Bilog Antenna	Schwarzbeck	VULB 9168	369	2013/03/06	2014/03/05
Amplifier	QuieTek	AP/0100A	CHM090607 5	2013/01/15	2014/01/14
SPECTRUM ANALYZER	R&S	FSP40	100219	2012/09/13	2013/09/12
HORN ANTENNA	EMCO	3115	31601	2012/09/13	2013/09/12
PREAMPLIFIER	AGILENT	8449B	3008A01954	2013/03/07	2014/03/06

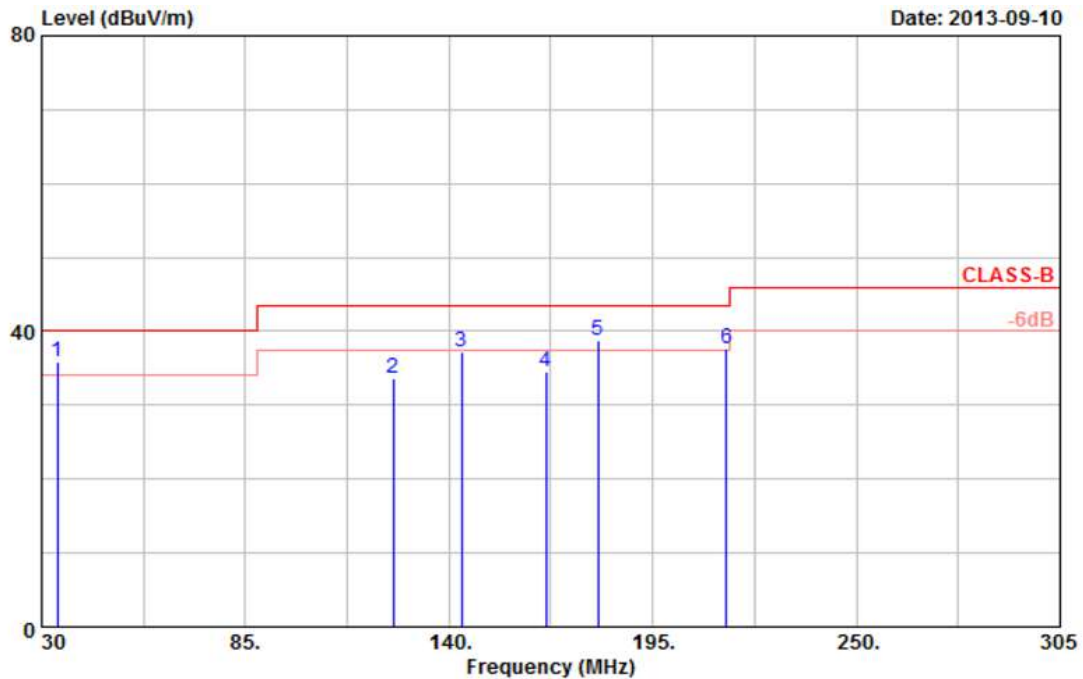
5.5 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.



5.6 Test Result and Data (30MHz ~ 1GHz)

Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: O-QPSK, CH1	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



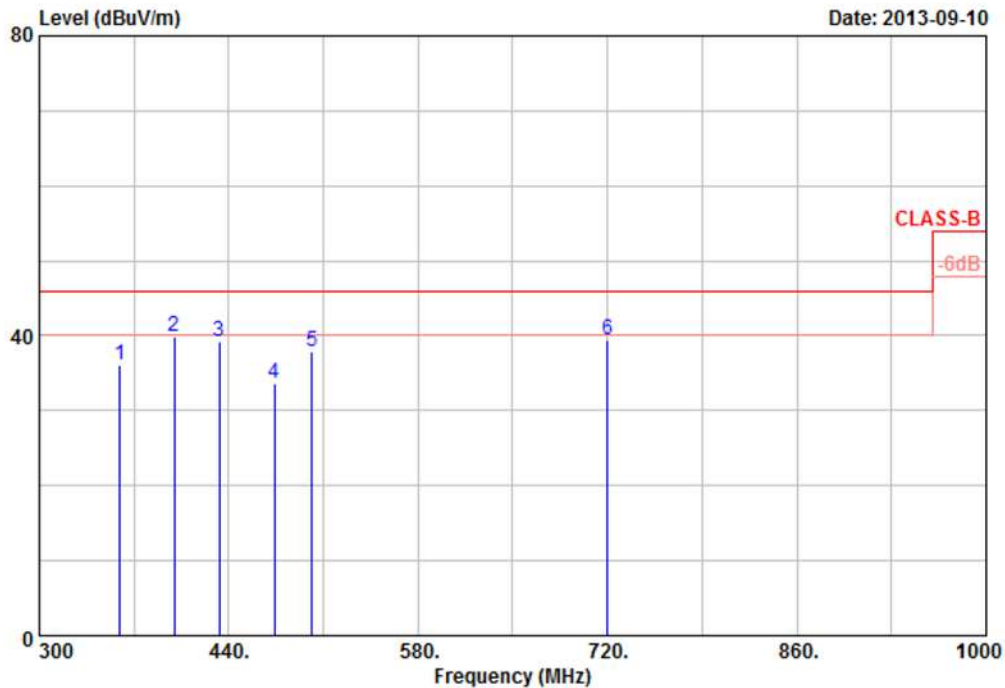
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	34.13	38.02	-2.12	35.90	40.00	-4.10	QP	100	0
2	124.88	38.48	-4.91	33.57	43.50	-9.93	Peak	100	0
3	143.30	45.75	-8.50	37.25	43.50	-6.25	Peak	100	0
4	166.13	44.79	-10.34	34.45	43.50	-9.05	Peak	100	0
5	180.15	43.83	-5.15	38.68	43.50	-4.82	QP	100	0
6	214.80	44.65	-6.99	37.66	43.50	-5.84	QP	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	:	From System	Pol/Phase	:	VERTICAL
Test Mode	:	O-QPSK, CH1	Temperature	:	26 °C
Test Date	:	Sep. 10, 2013	Humidity	:	47 %
Memo	:		Atmospheric Pressure	:	1018 hPa



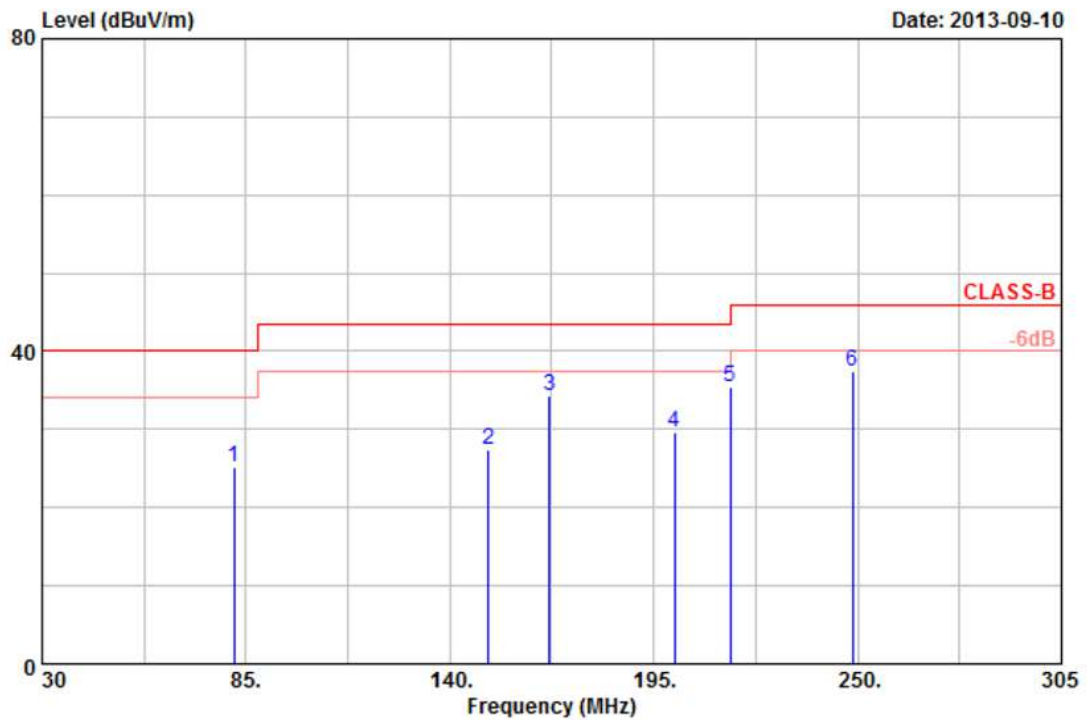
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	359.50	43.60	-7.58	36.02	46.00	-9.98	Peak	100	360
2	399.40	45.50	-5.59	39.91	46.00	-6.09	Peak	100	360
3	433.00	44.90	-5.68	39.22	46.00	-6.78	Peak	100	360
4	473.60	41.44	-7.70	33.74	46.00	-12.26	Peak	100	360
5	501.60	42.89	-4.99	37.90	46.00	-8.10	Peak	100	360
6	720.00	32.98	6.41	39.39	46.00	-6.61	Peak	100	360

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: From System	Pol/Phase	: HORIZONTAL
Test Mode	: O-QPSK, CH1	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



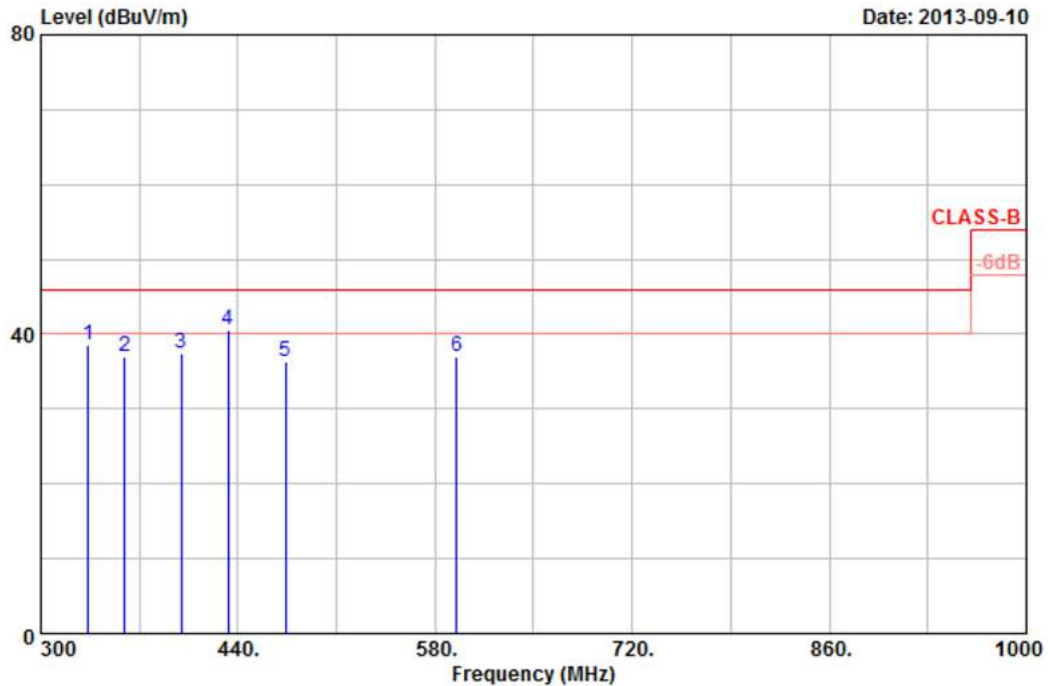
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	81.70	43.63	-18.51	25.12	40.00	-14.88	Peak	100	0
2	150.45	42.11	-14.79	27.32	43.50	-16.18	Peak	100	0
3	166.95	48.50	-14.28	34.22	43.50	-9.28	Peak	100	0
4	200.50	48.43	-18.72	29.71	43.50	-13.79	Peak	100	0
5	215.63	51.67	-16.31	35.36	43.50	-8.14	Peak	100	0
6	248.63	50.86	-13.46	37.40	46.00	-8.60	Peak	100	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: From System	Pol/Phase	: HORIZONTAL
Test Mode	: O-QPSK, CH1	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	333.60	48.47	-9.90	38.57	46.00	-7.43	Peak	100	360
2	359.50	47.84	-10.91	36.93	46.00	-9.07	Peak	100	360
3	399.40	46.67	-9.28	37.39	46.00	-8.61	Peak	100	360
4	433.00	47.41	-6.94	40.47	46.00	-5.53	QP	100	360
5	473.60	41.67	-5.30	36.37	46.00	-9.63	Peak	100	360
6	595.40	33.62	3.39	37.01	46.00	-8.99	Peak	100	360

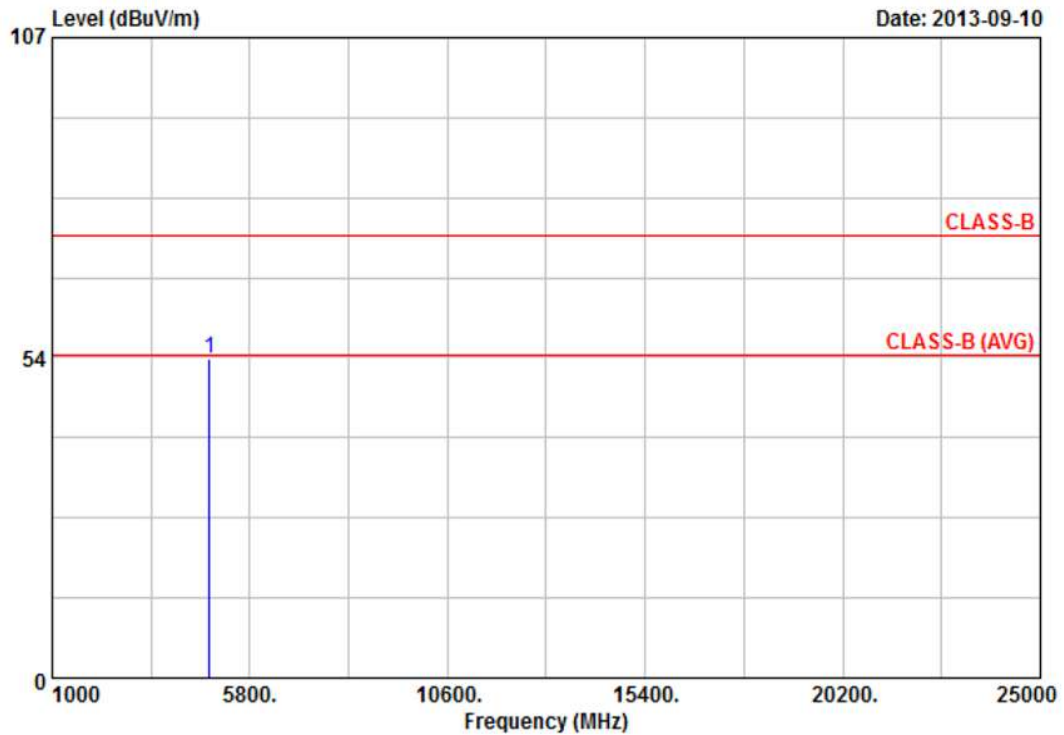
Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



5.7 Test Result and Data (1GHz ~ 25GHz)

Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: O-QPSK, CH1	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



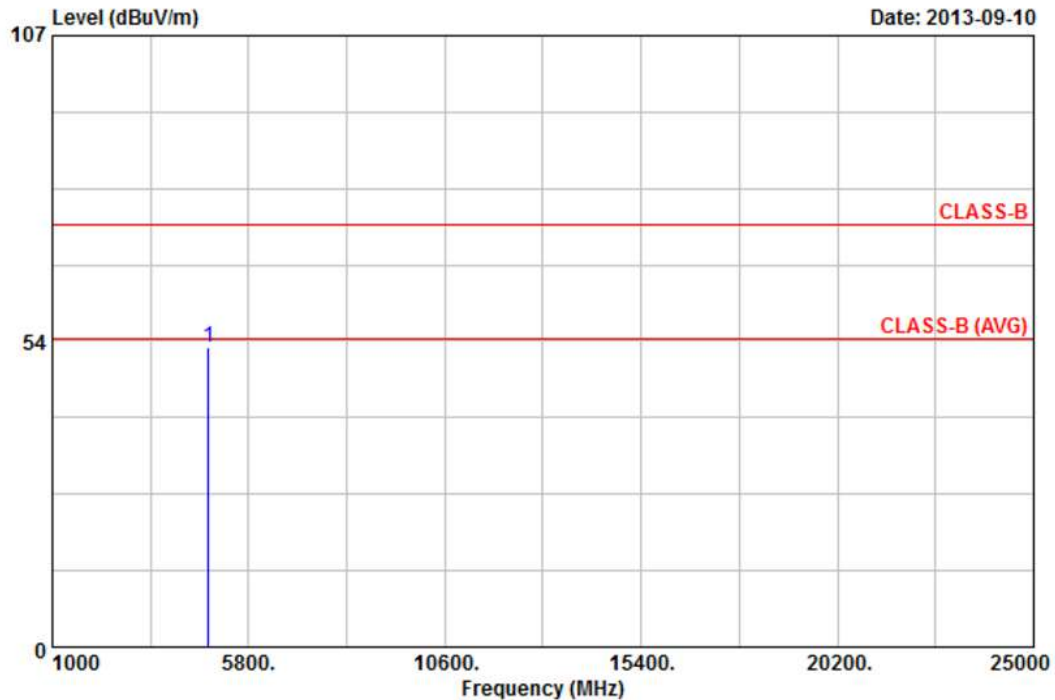
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4810.97	47.87	5.42	53.29	74.00	-20.71	Peak	100	172

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	:	From System	Pol/Phase	:	HORIZONTAL
Test Mode	:	O-QPSK, CH1	Temperature	:	26 °C
Test Date	:	Sep. 10, 2013	Humidity	:	47 %
Memo	:		Atmospheric Pressure	:	1018 hPa



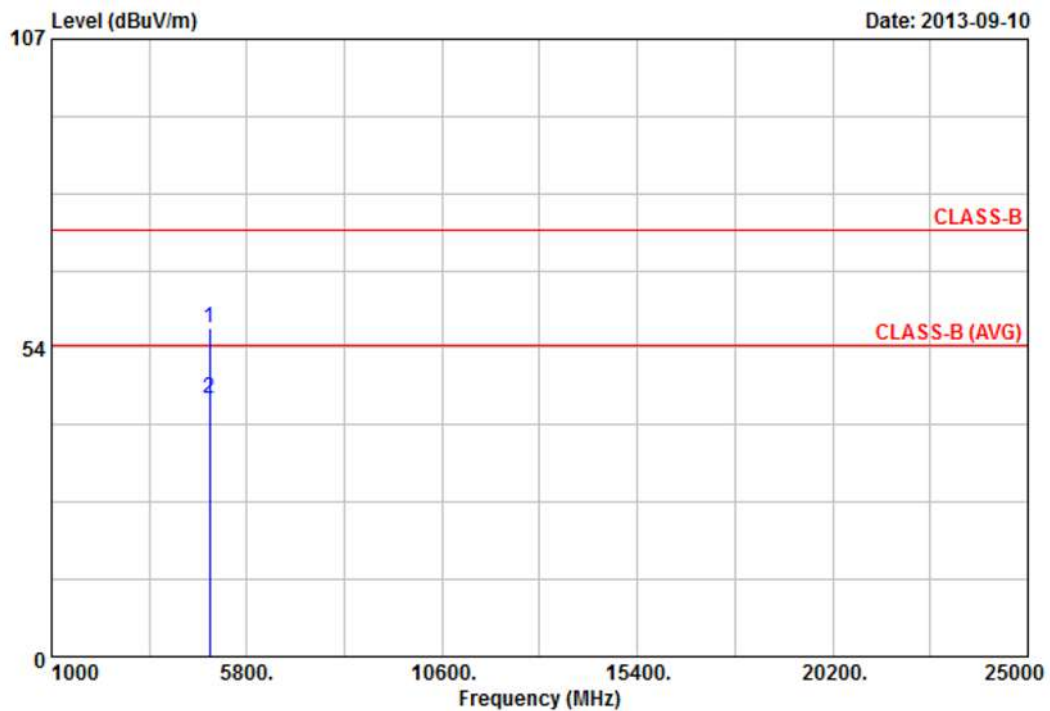
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4810.97	48.80	3.80	52.60	74.00	-21.40	Peak	100	207

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: O-QPSK, CH9	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



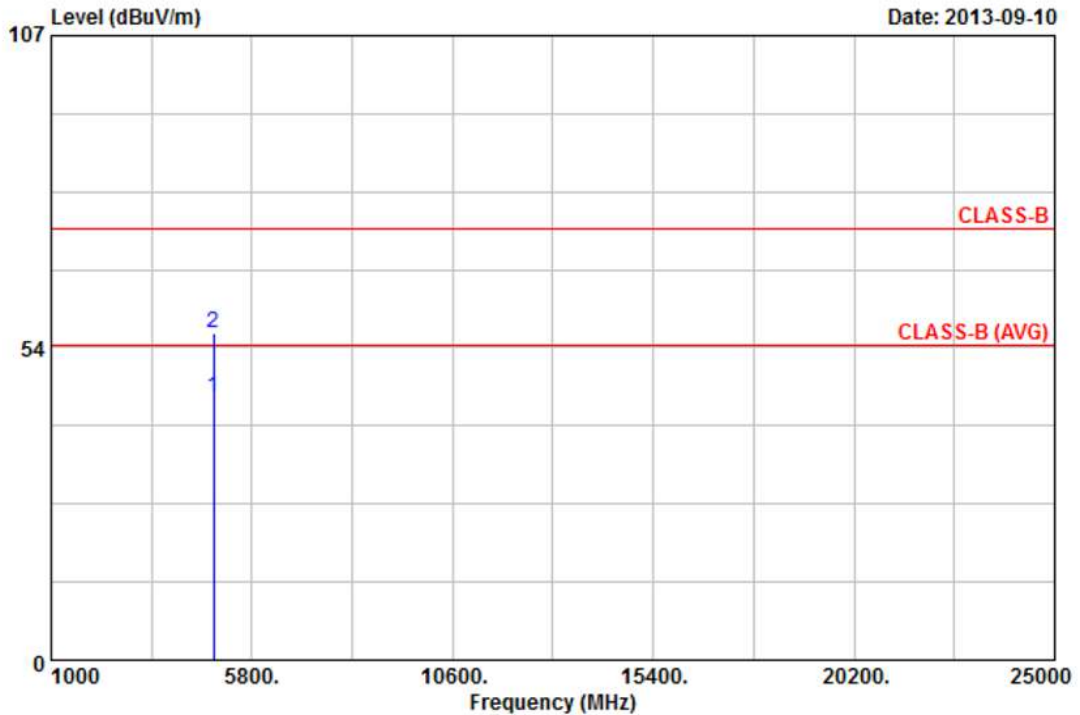
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4890.88	50.01	6.97	56.98	74.00	-17.02	Peak	100	172
2	4890.91	37.79	6.97	44.76	54.00	-9.24	Average	100	172

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	:	From System	Pol/Phase	:	HORIZONTAL
Test Mode	:	O-QPSK, CH9	Temperature	:	26 °C
Test Date	:	Sep. 10, 2013	Humidity	:	47 %
Memo	:		Atmospheric Pressure	:	1018 hPa



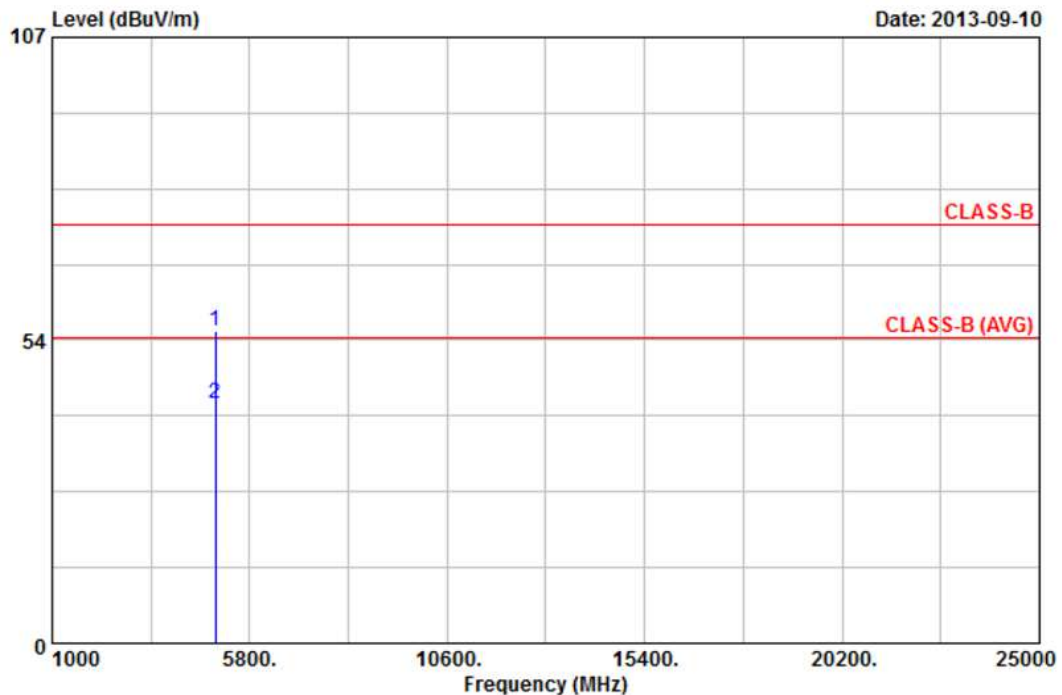
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4890.94	40.03	5.05	45.08	54.00	-8.92	Average	100	219
2	4890.99	50.89	5.05	55.94	74.00	-18.06	Peak	100	219

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: O-QPSK, CH16	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



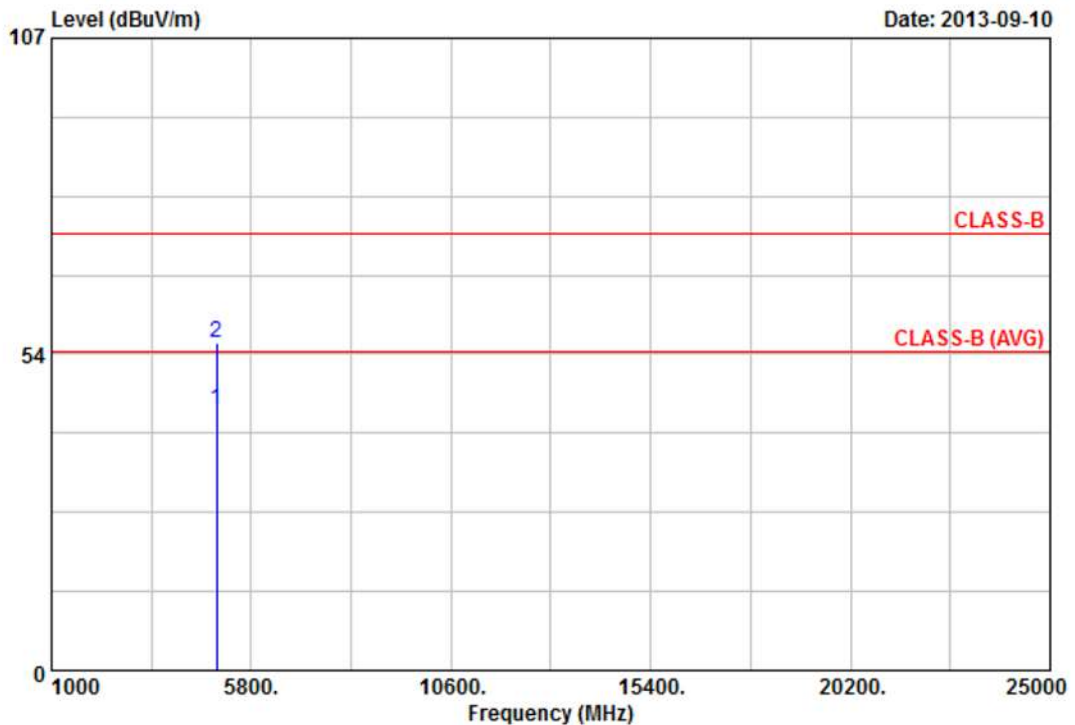
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4960.82	47.75	7.32	55.07	74.00	-18.93	Peak	100	165
2	4960.91	35.09	7.32	42.41	54.00	-11.59	Average	100	165

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: From System	Pol/Phase	: HORIZONTAL
Test Mode	: O-QPSK, CH16	Temperature	: 26 °C
Test Date	: Sep. 10, 2013	Humidity	: 47 %
Memo	:	Atmospheric Pressure	: 1018 hPa



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	4960.93	38.90	5.22	44.12	54.00	-9.88	Average	100	210
2	4960.94	50.15	5.22	55.37	74.00	-18.63	Peak	100	210

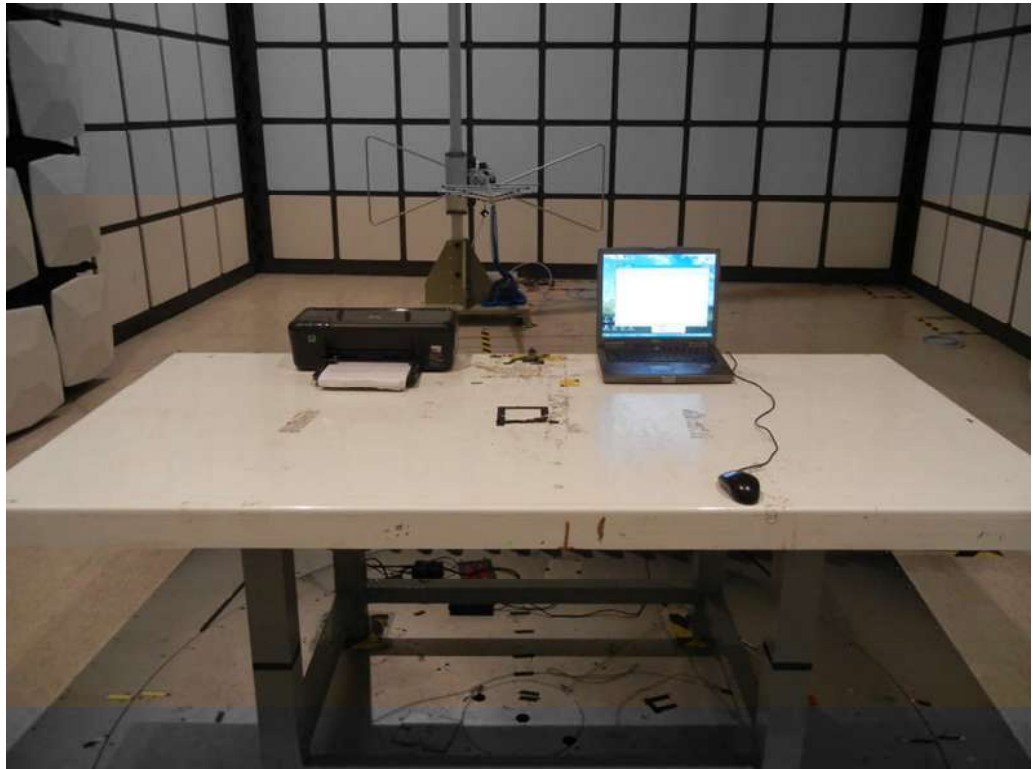
Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz (detector sample mode) for Average detection at frequency above 1GHz.
6. The other emissions is too low to be measured.
7. The data is worse case.

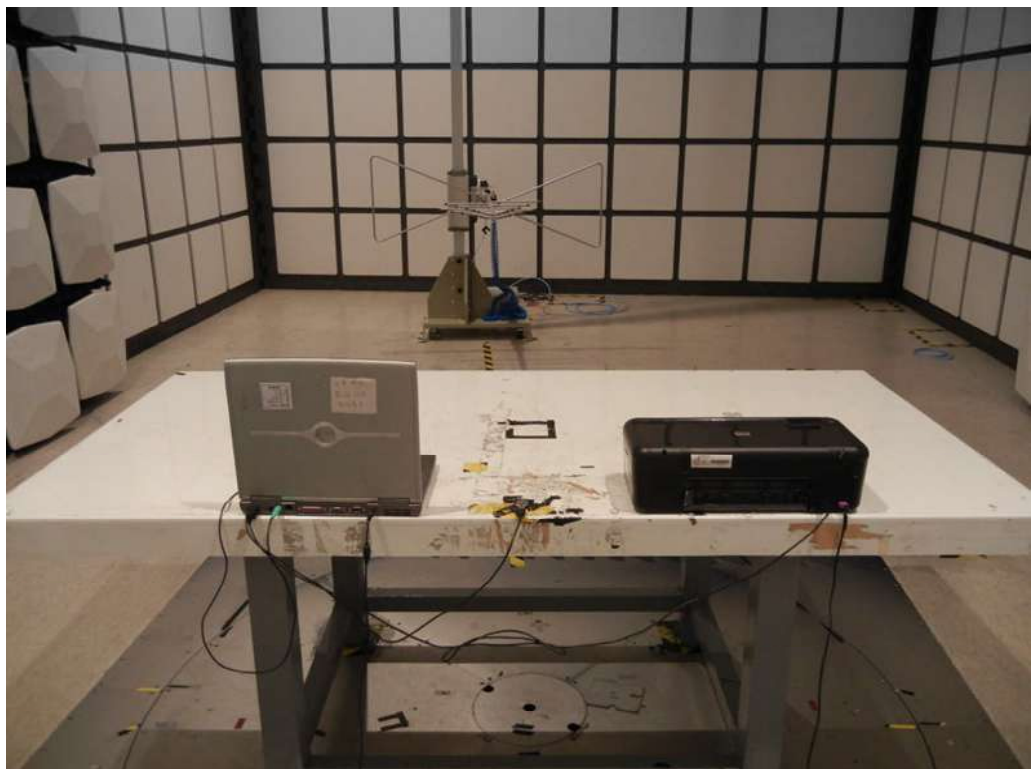


5.8 Test Photographs (30MHz ~ 1GHz)

Front View



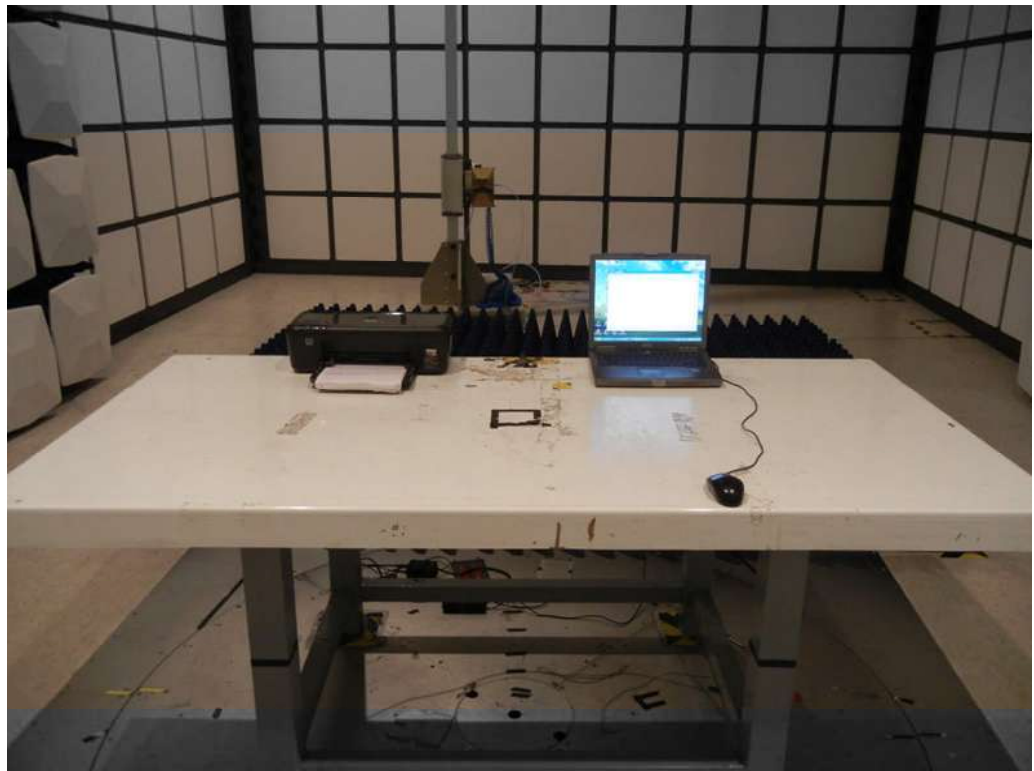
Rear View



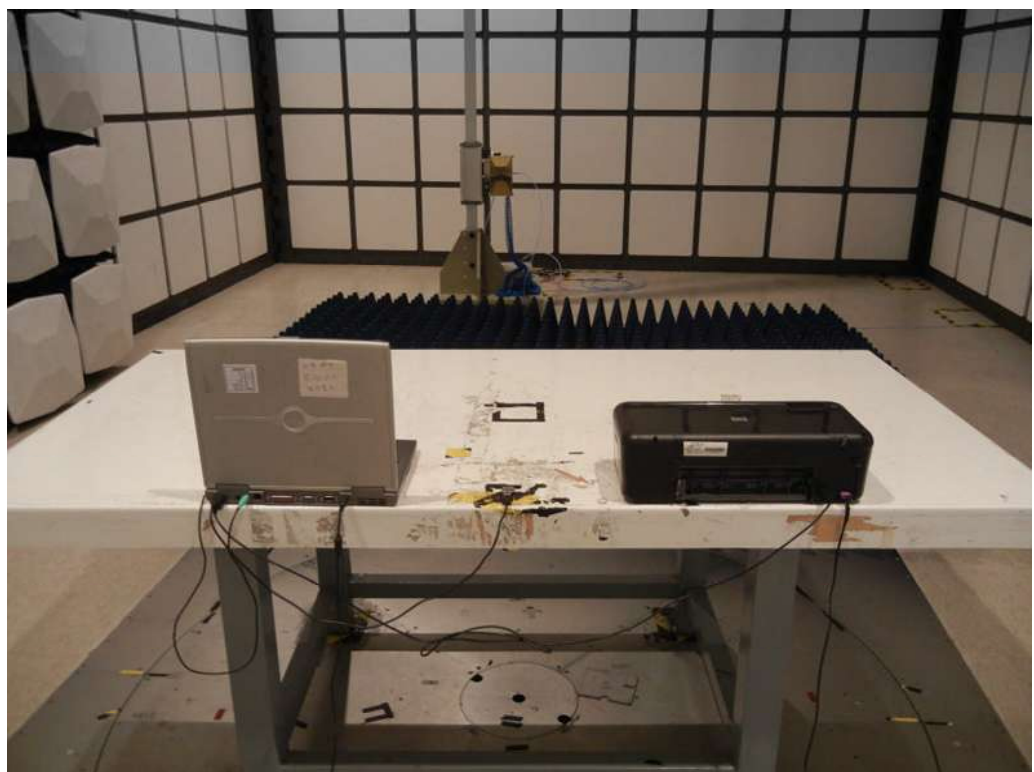


5.9 Test Photographs (1GHz ~ 25GHz)

Front View



Rear View





6. 6dB Bandwidth Measurement Data

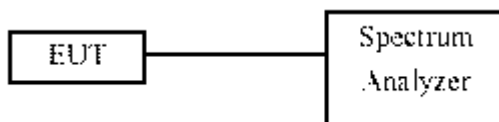
6.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

6.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 100 KHz and VBW to 100 KHz.
- The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

6.3 Test Setup Layout



6.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

6.5 Test Result and Data

Test Date: Sep. 06, 2013

Temperature: 24°C

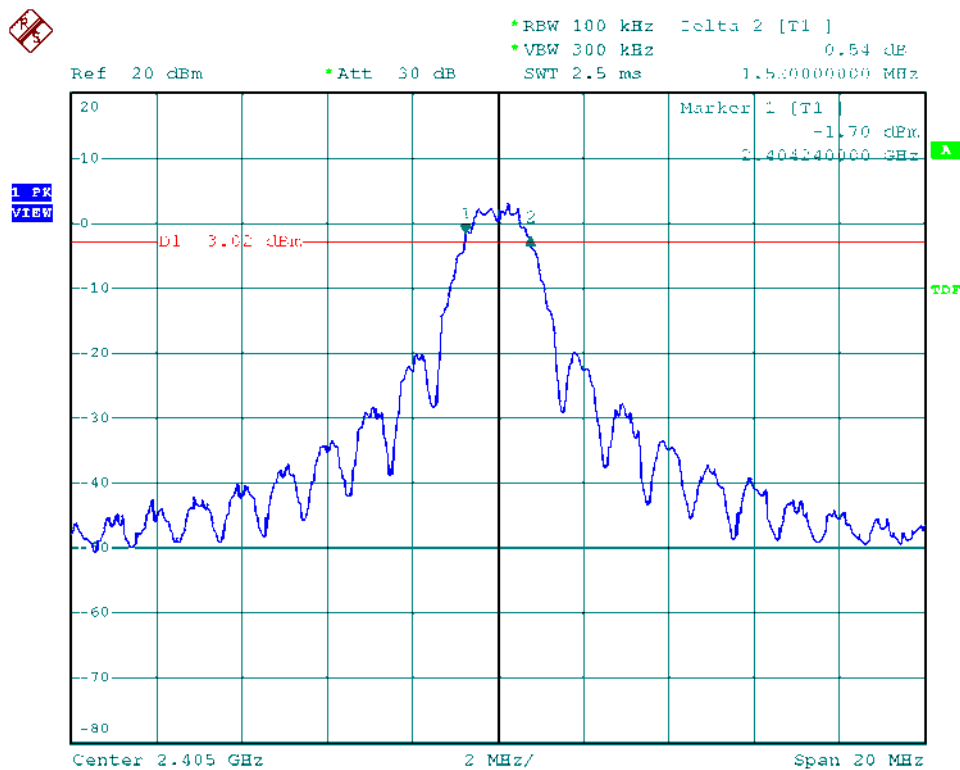
Atmospheric pressure: 1016 hPa

Humidity: 46%

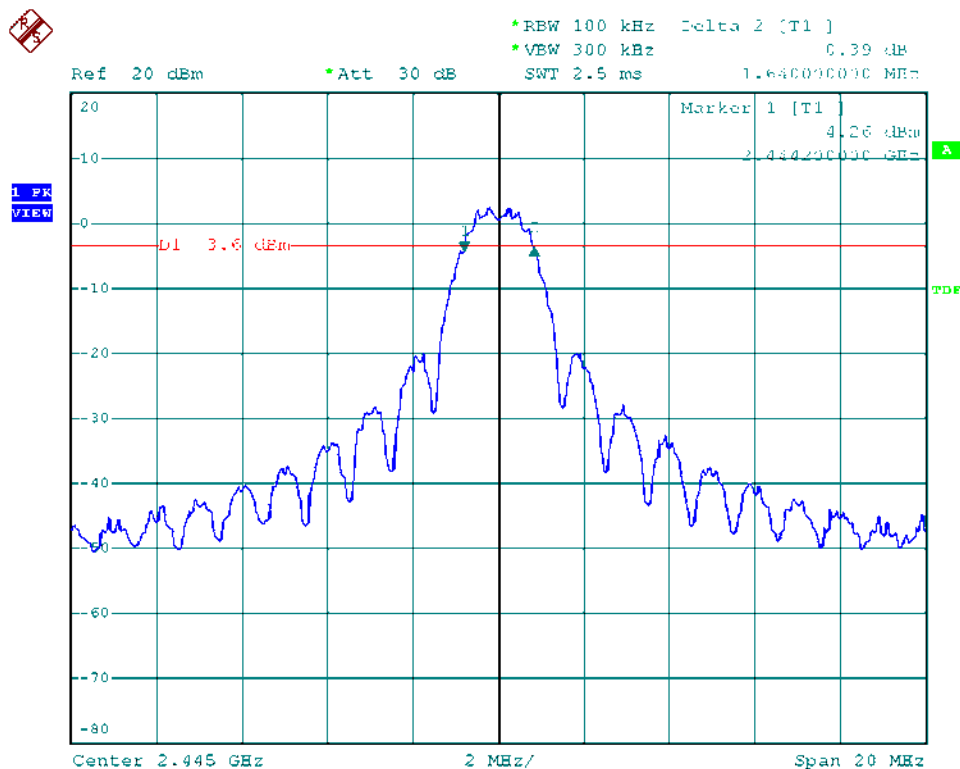
Modulation Standard	Channel	Frequency (MHz)	6dB Bandwidth (MHz)
O-QPSK	01	2405	1.52
	09	2445	1.64
	16	2480	1.64



Modulation Standard: O-QPSK
Channel: 01

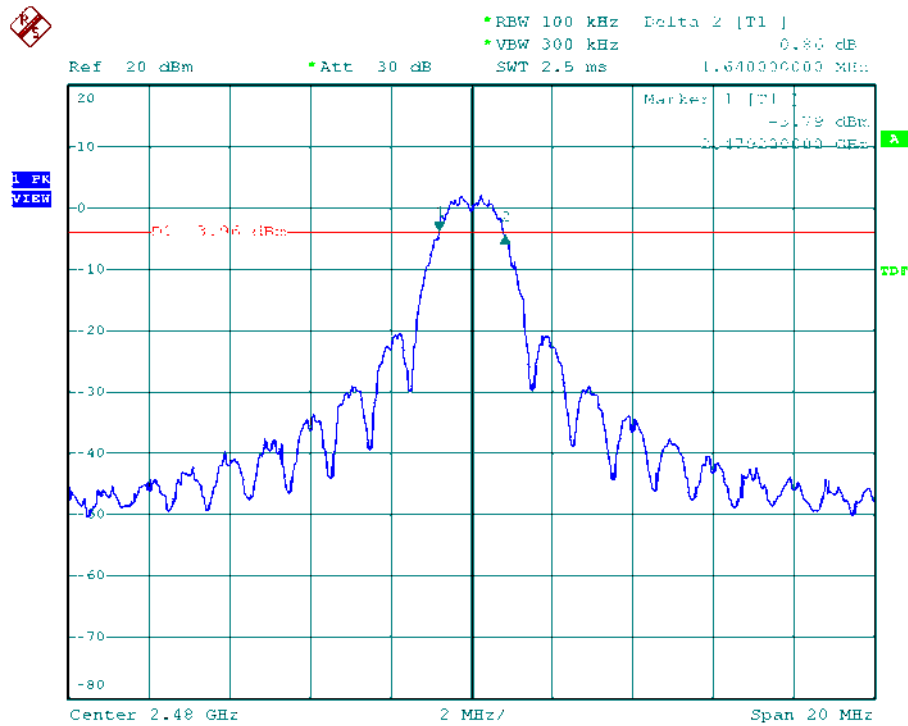


Modulation Standard: O-QPSK
Channel: 09





Modulation Standard: O-QPSK
Channel: 16





7. Maximum Peak Output Power

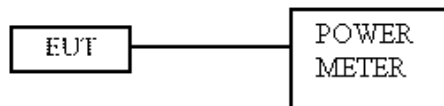
7.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

7.2 Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

7.3 Test Setup Layout



7.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14
SERIES POWER METER	ANRITSU	ML2495A	1224005	2013/03/21	2014/03/20
POWER SENSOR	ANRITSU	MA2411B	1207295	2013/03/21	2014/03/20

7.5 Test Result and Data

Test Date: Sep. 06, 2013

Temperature: 24°C

Atmospheric pressure: 1016 hPa

Humidity: 46%

Modulation Standard	Channel	Frequency (MHz)	Peak Power Output (dBm)		Peak Power Output (mW)	
			Peak	Average	Peak	Average
O-QPSK	01	2405	7.88	7.79	6.1	6.0
	09	2445	7.58	7.49	5.7	5.6
	16	2480	5.11	4.96	3.2	3.1



8. Power Spectral Density

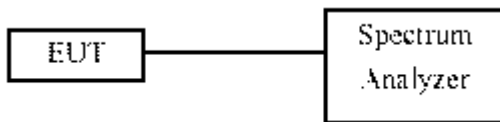
8.1 Test Limit

The Maximum of Power Spectral Density Measurement is 8dBm.

8.2 Test Procedures

- The transmitter output was connected to spectrum analyzer.
- The spectrum analyzer's resolution bandwidth were set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=span/3KHz.
- The power spectral density was measured and recorded.
- The Sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

8.3 Test Setup Layout



8.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

8.5 Test Result and Data

Test Date: Sep. 06, 2013

Temperature: 24°C

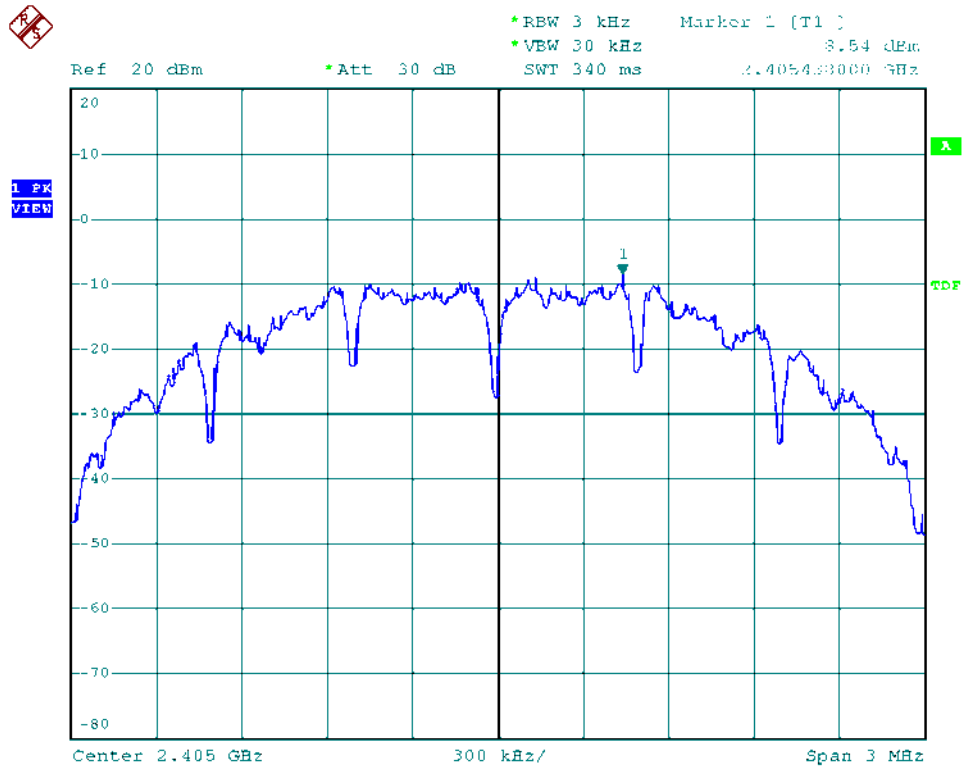
Atmospheric pressure: 1014 hPa

Humidity: 47%

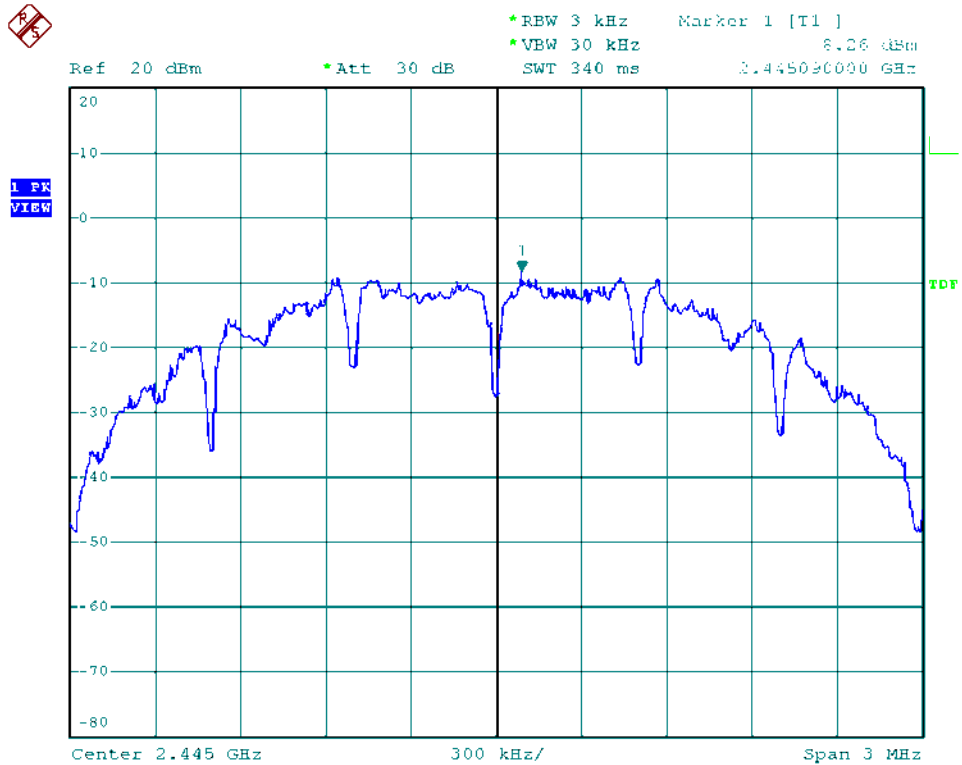
Modulation Standard	Channel	Frequency (MHz)	Maximum Power Density of 3 kHz Bandwidth (dBm)
O-QPSK	01	2405	-8.54
	09	2445	-8.26
	16	2480	-10.44



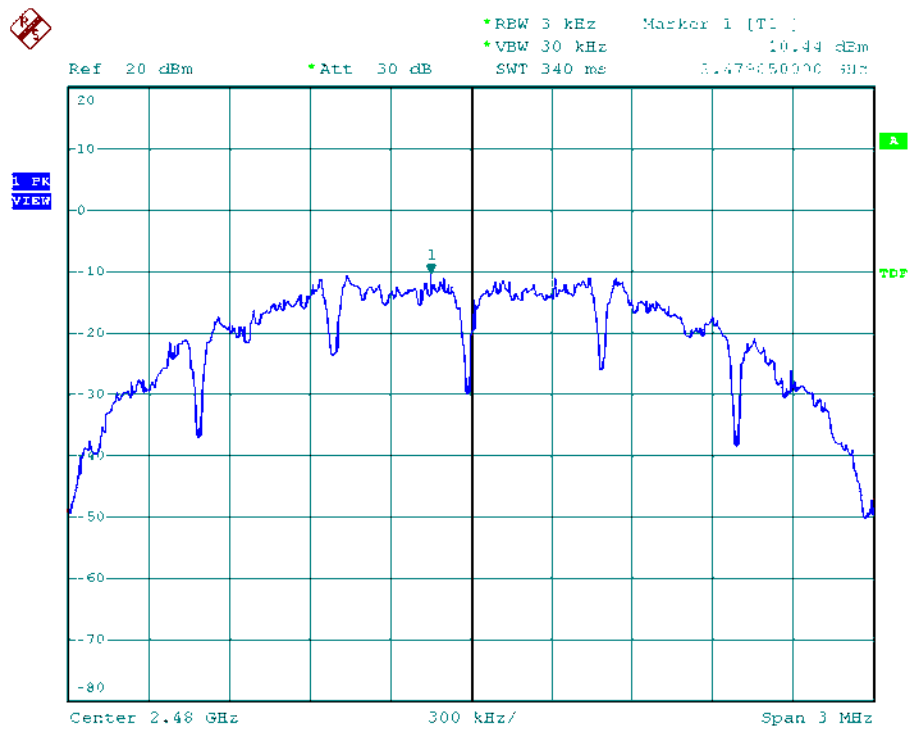
Modulation Standard: O-QPSK
Channel: 01



Modulation Standard: O-QPSK
Channel: 09



Modulation Standard: O-QPSK
Channel: 16





9. Band Edges Measurement

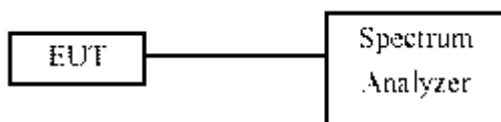
9.1 Test Limit

Below -20dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

9.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer via a low lose cable.
- Set both RBW and VBW of spectrum analyzer to 100 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- The band edges was measured and recorded.

9.3 Test Setup Layout



9.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

9.5 Test Result and Data

Test Date: Sep. 06, 2013

Temperature: 24°C

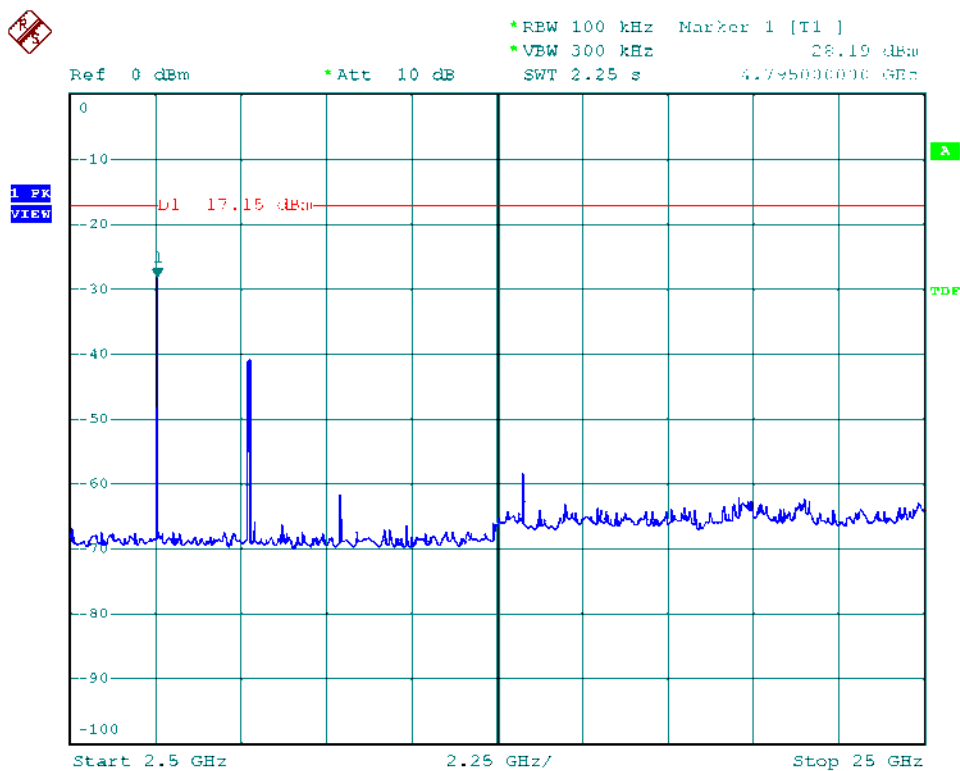
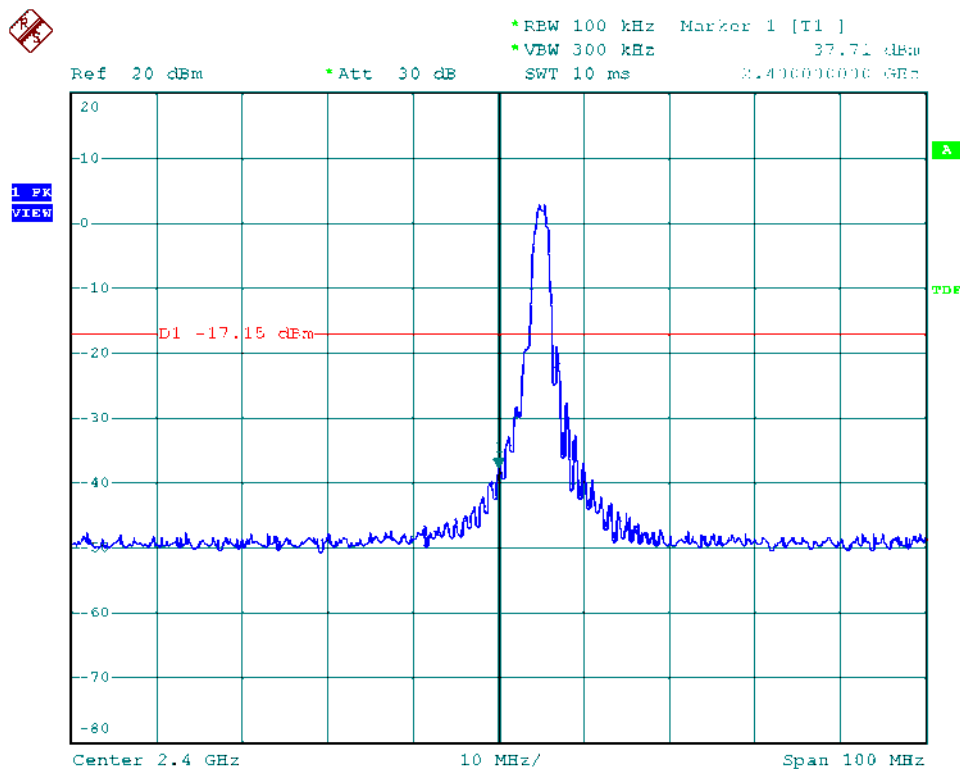
Atmospheric pressure: 1014 hPa

Humidity: 47%

Modulation Standard	Channel	Frequency (MHz)	maximum value in frequency (MHz)	maximum value (dBm)
O-QPSK	01	2425	4795.00	-28.19
	16	2480	4930.00	-32.97

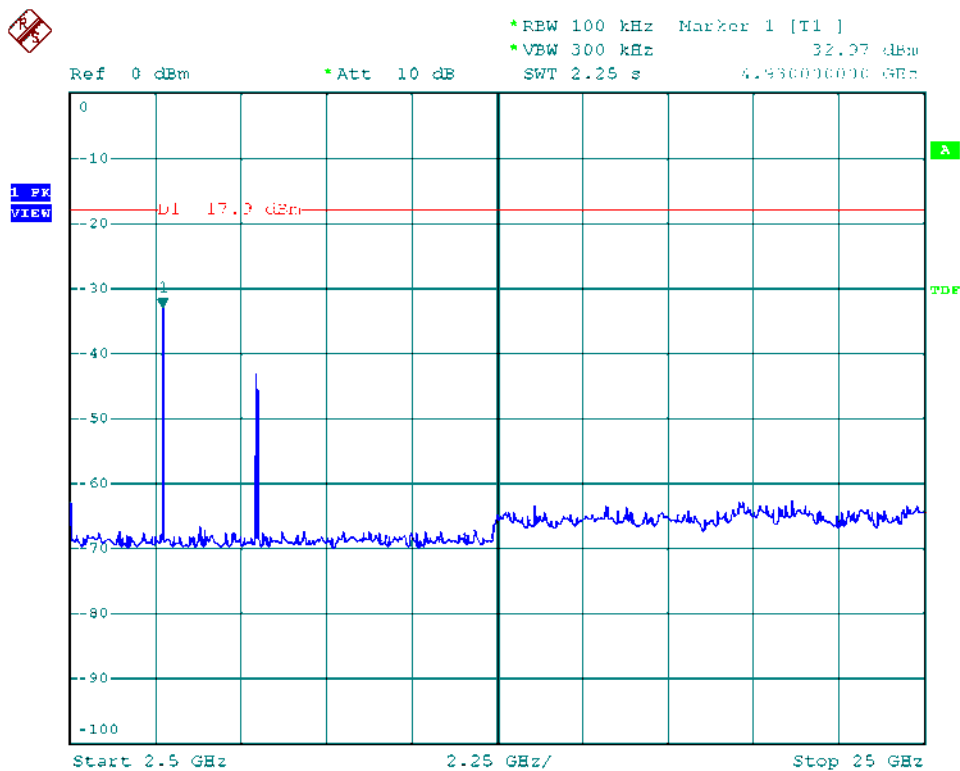
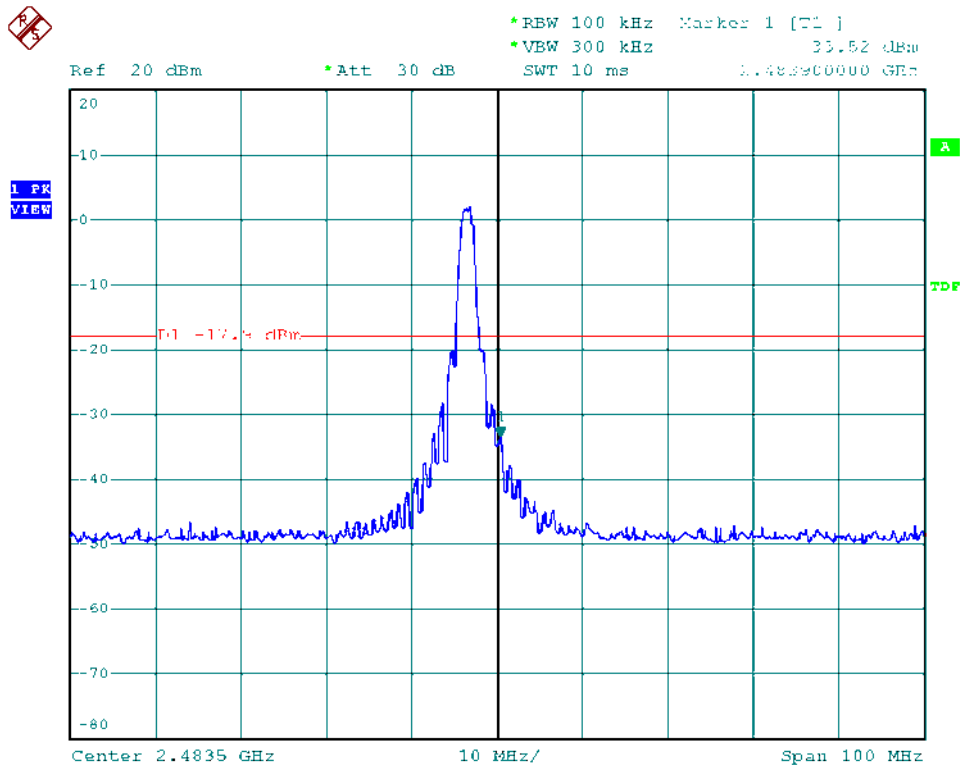


Modulation Standard: O-QPSK
Channel: 01





Modulation Standard: O-QPSK
Channel: 16





10. Restrict Band Emission Measurement Data

Test Date: Sep. 10, 2013

Temperature: 26°C

Atmospheric pressure: 1018 hPa

Humidity: 47%

Modulation Standard: O-QPSK

Channel 1						Fundamental Frequency: 2425 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2324.06	H	46.17	2.06	48.23	Peak	74	54	-25.77	160	1.00
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2343.73	V	48.45	3.18	51.63	Peak	74	54	-22.37	160	1.00
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----
Channel 16						Fundamental Frequency: 2480 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2483.50	H	61.43	0.50	61.93	Peak	74	54	-12.07	175	1.00
2483.55	H	50.41	0.50	50.91	Ave	74	54	-3.09	175	1.00
2483.50	V	63.68	-2.15	61.53	Peak	74	54	-12.47	133	1.00
2483.55	V	52.97	-2.15	50.82	Ave	74	54	-3.18	133	1.00

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector peak mode) for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector sample mode) for Average detection at frequency above 1GHz.



11. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

11.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.