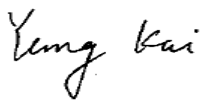
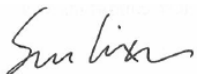


Prüfbericht - Nr.: 16802090 002			Seite 1 von 37 Page 1 of 37				
Auftraggeber: Client:			Additel Corp. 22865 Savi Ranch Parkway Ste F Yorba Linda, CA 92887, USA				
Gegenstand der Prüfung: Test item:			Digital Pressure Gauge				
Bezeichnung: Identification:		ADT680, ADT685		Serien-Nr.: Serial No.:			
				Engineering sample			
Wareneingangs-Nr.: Receipt No.:		1140004039		Eingangsdatum: Date of receipt:			
				2013-03-14			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of test item at delivery:			The sample is ok for test and not damaged.				
Prüfort: Testing location:			Refer to section 1.1				
Prüfgrundlage: Test specification:			FCC Part 15 Subpart C Section 15.209 FCC Part 15 Subpart C Section 15.247				
Prüfergebnis: Test Result:			Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>				
Prüflaboratorium: Testing Laboratory:			Refer to section 1.1				
geprüft/ tested by:			kontrolliert/ reviewed by:				
2013-5-2 Yang, Kai/PE 			2013-5-2 Sun, Lixun/Reviewer 				
Datum Date	Name/Stellung Name/Position	Unterschrift Signature	Datum Date	Name/Stellung Name/Position	Unterschrift Signature		
Sonstiges/ Other Aspects:							
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet </td> <td style="width: 50%; vertical-align: top;"> Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested </td> </tr> </table>						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
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. <i>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.</i>							

TEST SUMMARY

4.1.1 ANTENNA REQUIREMENT

RESULT: *Passed*

4.1.2 PEAK OUTPUT POWER

RESULT: *Passed*

4.1.3 6dB BANDWIDTH AND 26dB BANDWIDTH

RESULT: *Passed*

4.1.4 CONDUCTED SPURIOUS EMISSIONS IN 100KHz BANDWIDTH

RESULT: *Passed*

4.1.5 POWER SPECTRAL DENSITY

RESULT: *Passed*

4.1.6 SPURIOUS EMISSION

RESULT: *Passed*

4.2.1 ELECTROMAGNETIC FIELDS

RESULT: *Passed*

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1. Test Sites

1.1 Test Facilities

Laboratory 1: TA Beijing Limited (FCC Registration No.: 413514)
Address: Building B-4, No.1, JingHai 3rd Road, BDA East Park, Beijing,
100176 China

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Spurious Radiated Emissions				
Bi-log Antenna	Rohde & Schwarz	HL562	100488	2014-02-15
Double Ridge Guide Horn Antenna	ETS-Lindgren	EMCO 3117	00056662	2014-02-15
EMI Test Receiver	Rohde & Schwarz	ESIB26	100301	2014-02-21
Radio Frequency Test Suite				
Signal Analyzer	Rohde & Schwarz	FSQ26	100846	2014-01-29
DC Power Supply	TFS	RS-1303DF	05022506	2013-05-24

1.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology P.R. China) or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

1.4 Calibration

Equipment requiring calibration is calibrated periodically by the lab or according to lab's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

1.5 Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO/IEC 17025 are:

Table 2: Measurement Uncertainty

Items		Extended Uncertainty
RE (30-1000MHz)	Field strength (dBuV/m)	$U=\pm 4.94\text{dB}$, $k=2$, $\sigma=95\%$
RE (1-26GHz)	Field strength (dBuV/m)	$U=\pm 4.34\text{dB}$, $k=2$, $\sigma=95\%$

2. General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is a digital pressure gauge which designed to offer a truly compact, cost effective digital pressure gauge to cover a wide range of applications. It is not only can calibrate the precision pressure gauge, industry pressure gauge, blood-pressure meter and other pressure gauges, but also it can measure the high-accuracy pressure. The digital pressure gauge used the ZigBee technology (IEEE Std 802.15.4-2003 compliant) to communicate with the master device.

2.2 Ratings and System Details

Table 3: Rating of EUT

Kind of Equipment:	Digital Pressure Gauge
Type Designation:	ADT680, ADT685
FCC ID	ST3-ADT680
Rated Input Voltage	DC 3.0V (AA battery)

Identifiers and differences:

These 2 models have exactly same electric characteristics and construction except the difference model name.

Table 4: Technical Specification

Item	Description
Operating Frequency band	2.405GHz—2.480GHz
Channel Number	16
Channel Center Frequency	2405MHz, 2410MHz, 2415MHz, 2420MHz, 2425MHz, 2430MHz, 2435MHz, 2440MHz, 2445MHz, 2450MHz, 2455MHz, 2460MHz, 2465MHz, 2470MHz, 2475MHz, 2480MHz
Modulation	DSSS
Antenna	Integrated Antenna
Antenna Gain (dBi)	0

2.3 Independent Operation Modes

The basic operation modes are:

- A. On, transmitting
- B. On, receiving
- C. Off

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

2.5 Submitted Documents

- | | |
|--------------------|----------------------|
| - Bill of Material | - Circuit Diagram |
| - PCB Layout | - Instruction Manual |
| - Photo Document | - Rating Label |

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use. And prior to the measurements, the test object operated about 5 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

3.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2009.

3.3 Special Accessories and Auxiliary Equipment

None.

3.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

3.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

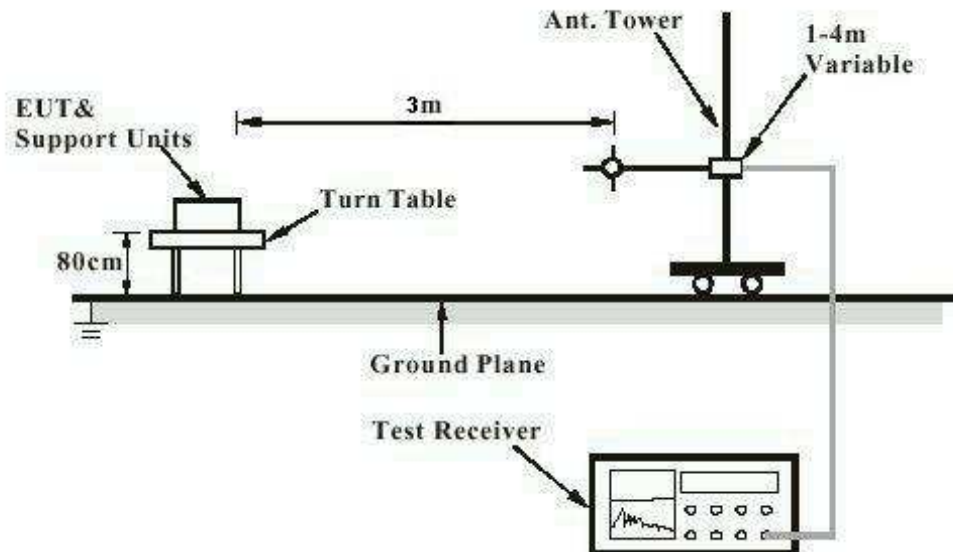


Diagram of Measurement Equipment Configuration for Conduction Measurement

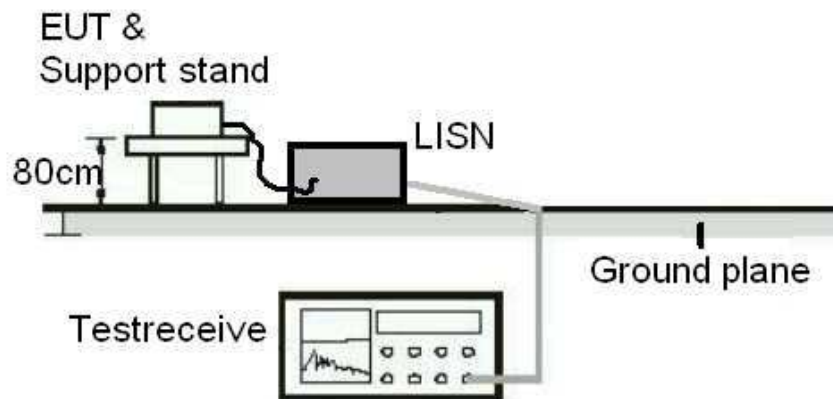
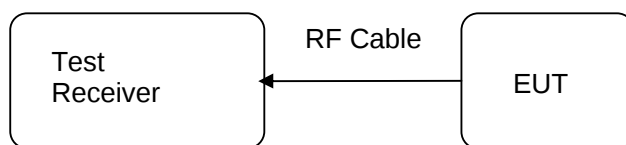


Diagram of Measurement Equipment Configuration for Transmitter Measurement



4. Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	2013-03-21
Test standard	:	FCC Part 15.247(b)(4) and Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

4.1.2 Peak Output Power**RESULT:****Passed**

Test date : 2013-03-21
Test standard : FCC Part 15.247(b)(1)
Basic standard : ANSI C63.10: 2009
Limit : 1 Watt
Kind of test site : Shielded room

Test setup

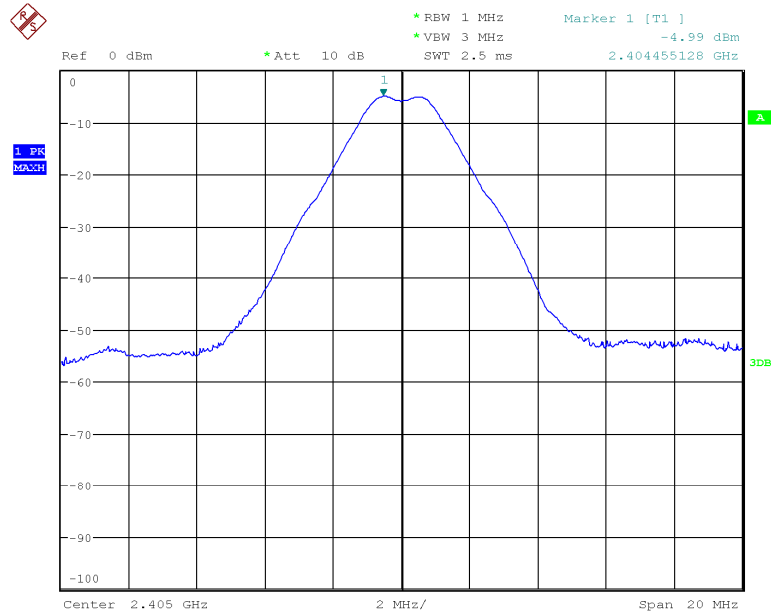
Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 23°C
Relative humidity : 49%
Atmospheric pressure : 101 kPa

Table 5: Test result of Peak Output Power

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (W)
		(dBm)	(mW)	
Low Channel	2405	-4.99	0.32	1
Middle Channel	2440	-5.48	0.28	1
High Channel	2480	-5.87	0.26	1

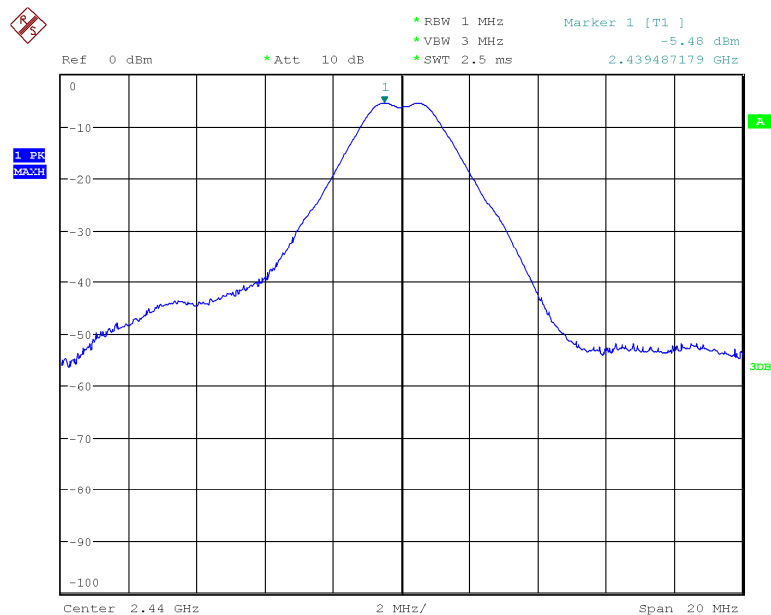
Test Graph of Peak Output Power

Low Channel



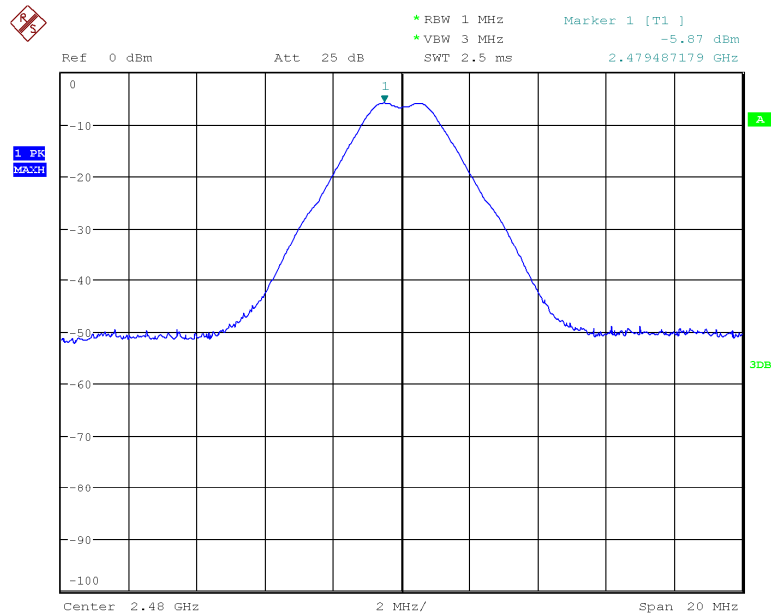
Date: 21.MAR.2013 13:09:52

Middle Channel



Date: 21.MAR.2013 11:25:33

High Channel



Date: 21.MAR.2013 10:57:05

4.1.3 6dB Bandwidth and 26dB Bandwidth

RESULT:
Passed

Date of testing : 2013-03-21
 Test standard : FCC Part 15.247(a)(2)
 Basic standard : ANSI C63.10: 2009
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 23°C
 Relative humidity : 49%
 Atmospheric pressure : 101 kPa

Table 6: Test result of 6dB Bandwidth

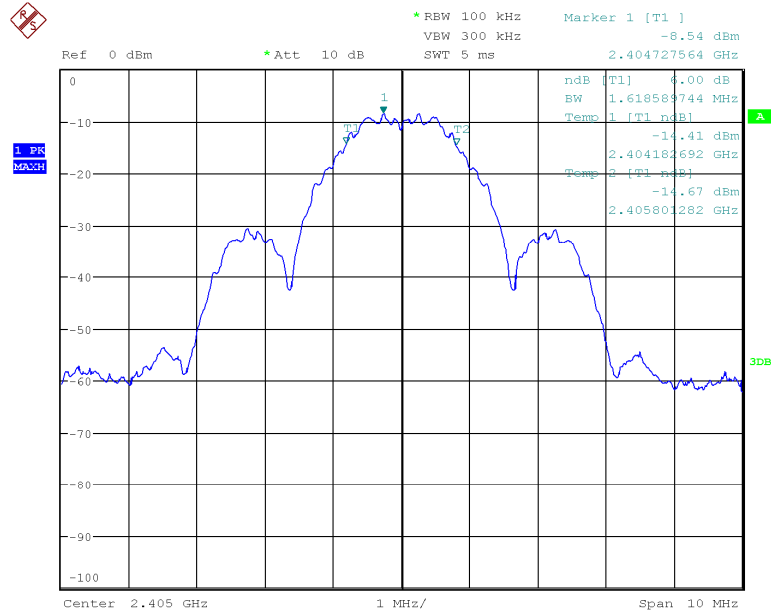
Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit(kHz)
Low Channel	2405	1618.6	>500
Mid Channel	2440	1634.6	>500
High Channel	2480	1618.6	>500

Table 7: Test result of 26dB Bandwidth

Channel	Channel Frequency (MHz)	26dB Bandwidth (kHz)
Low Channel	2405	3076.9
Mid Channel	2440	3076.9
High Channel	2480	3092.9

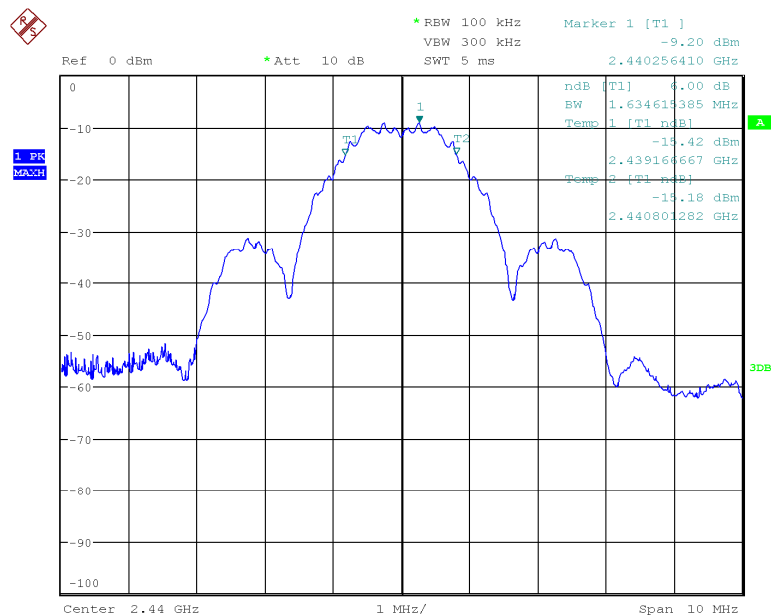
Notes: No specific 26dB bandwidth requirement in part 15.247(a) (1).

Test Graph of 6dB Bandwidth Low Channel

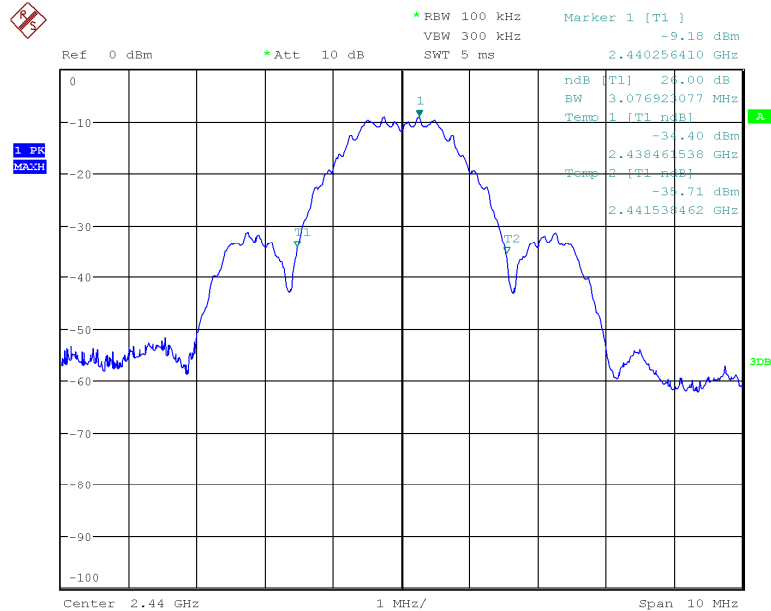


Date: 21.MAR.2013 10:21:54

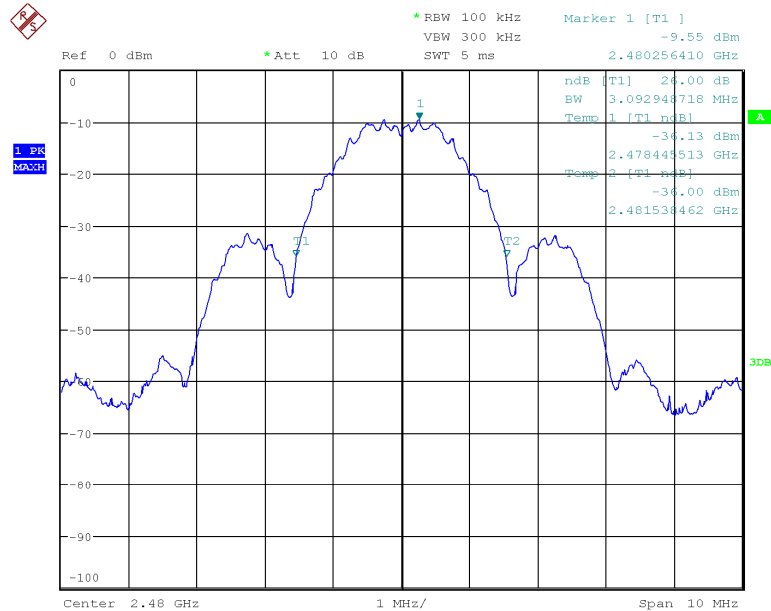
Middle Channel



Date: 21.MAR.2013 10:29:34

Middle Channel


Date: 21.MAR.2013 10:30:09

High Channel


Date: 21.MAR.2013 10:35:19

4.1.4 Conducted Spurious Emissions in 100kHz Bandwidth

RESULT:**Passed**

Date of testing	:	2013-03-21
Test standard	:	FCC part 15.247(d)
Basic standard	:	ANSI C63.10: 2009
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shield room

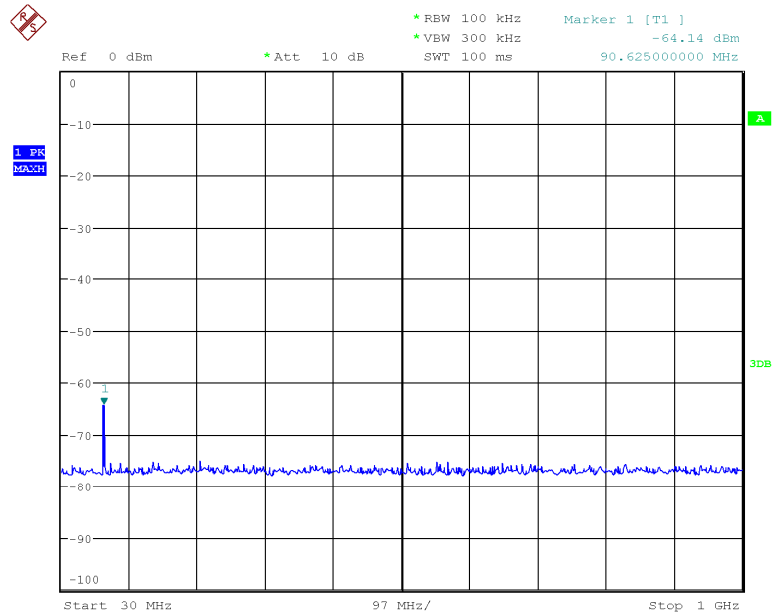
Test setup

Test Channel	:	Low/ Mid/High
Operation mode	:	A
Ambient temperature	:	23°C
Relative humidity	:	49%
Atmospheric pressure	:	101 kPa

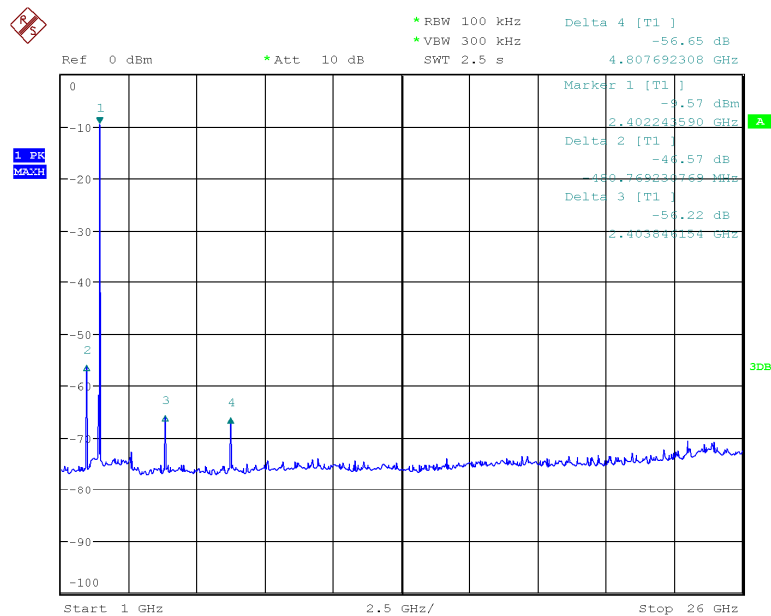
All emissions are more than 20dB below fundamental, details refer to following test Graph, and compliance is achieved as well.

Test Graph of Conducted Spurious Emissions measured in 100kHz Bandwidth

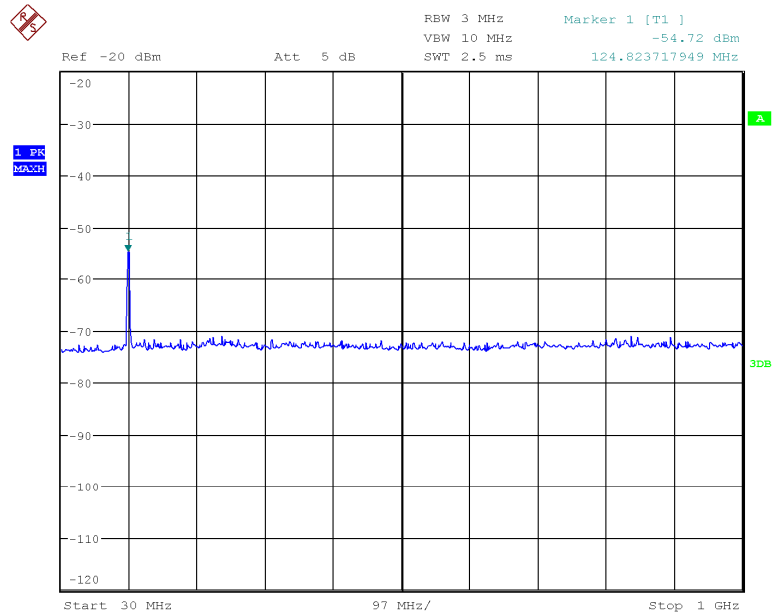
Low Channel



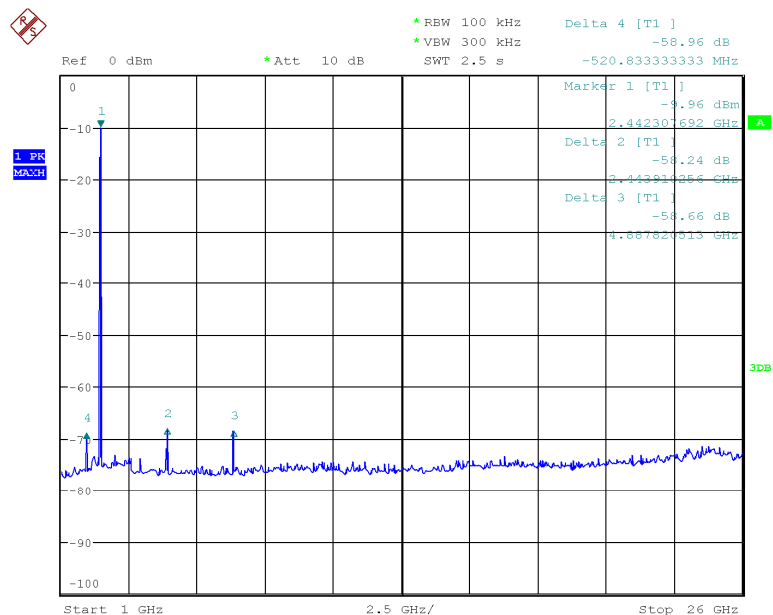
Date: 21.MAR.2013 13:11:19



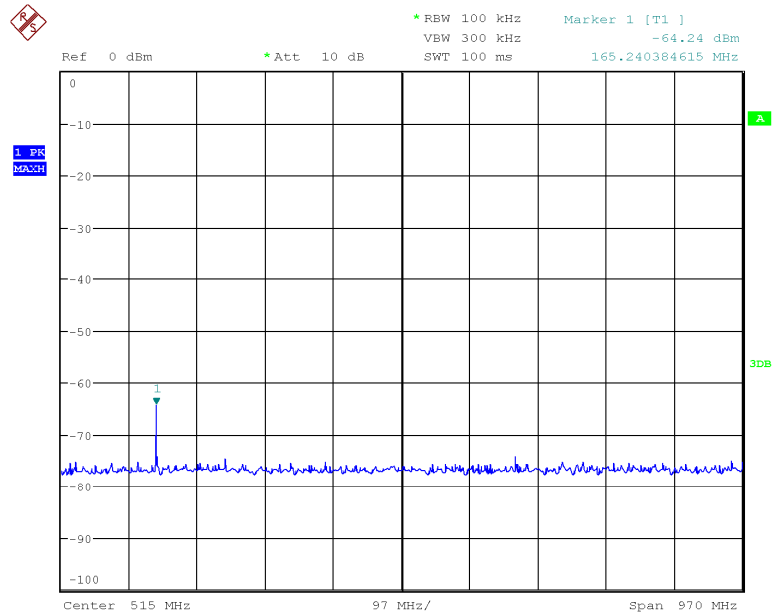
Date: 21.MAR.2013 13:13:10

Middle Channel


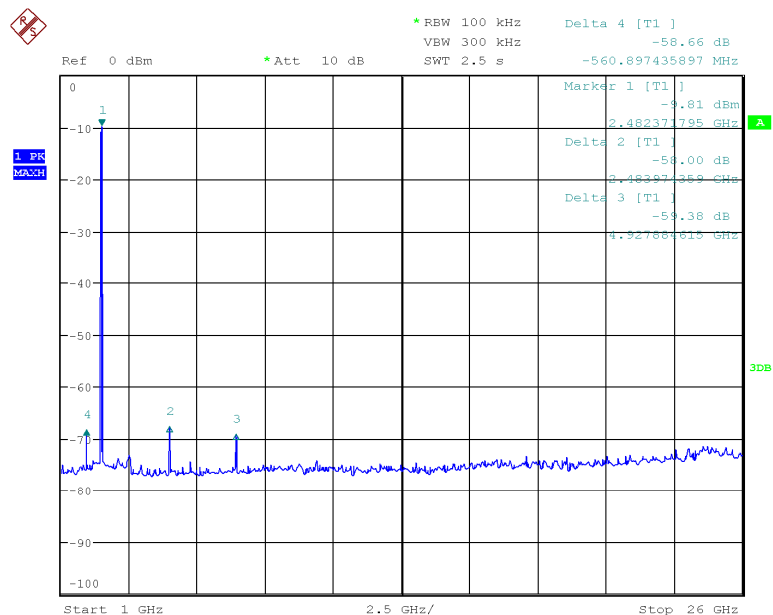
Date: 21.MAR.2013 11:16:50



Date: 21.MAR.2013 11:24:16

High Channel


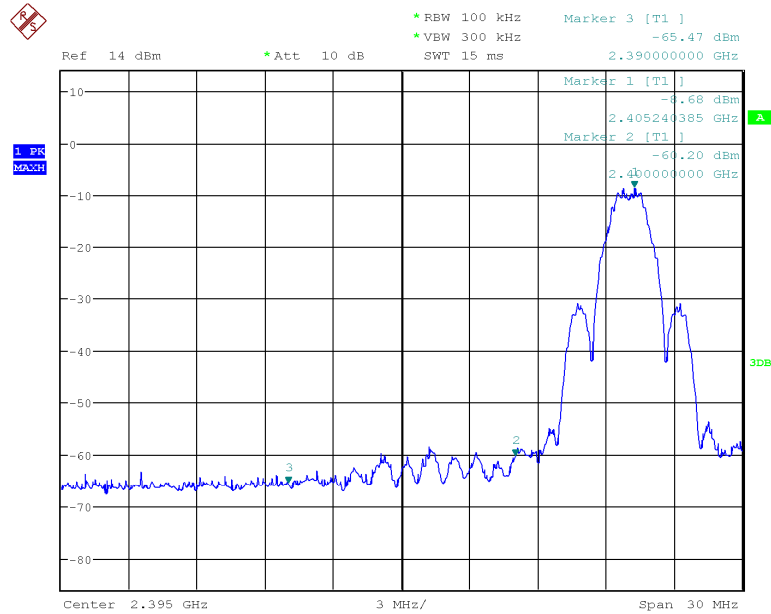
Date: 21.MAR.2013 10:41:06



Date: 21.MAR.2013 10:42:29

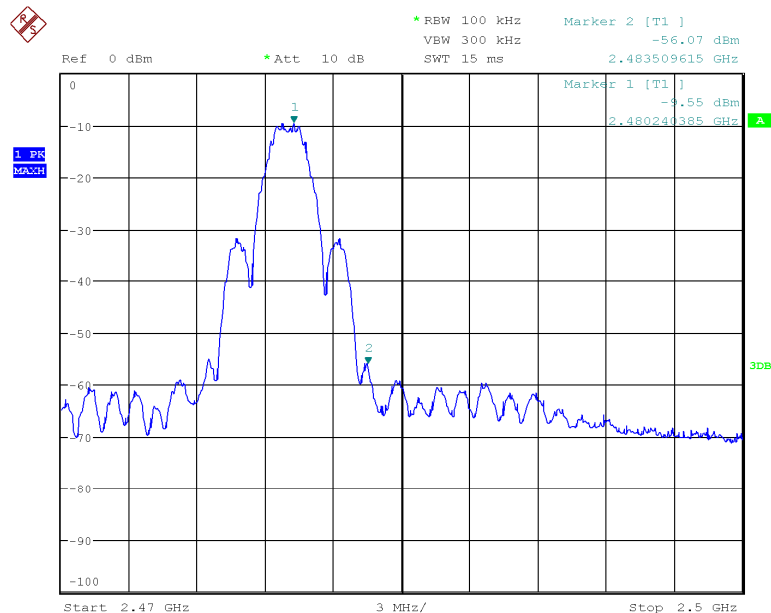
Test Graph of Band Edge measured in 100kHz Bandwidth

Low Channel



Date: 21.MAR.2013 13:20:42

High Channel



Date: 21.MAR.2013 10:48:00

4.1.5 Power Spectral Density

RESULT:
Passed

Date of testing : 2013-03-21
 Test standard : FCC part 15.247(e)
 Basic standard : ANSI C63.10: 2009
 Limits : 8.0 dBm (in any 3kHz band)
 Kind of test site : Shield room

Test Setup

Test Channel : Low/ Middle/ High
 Operation mode : A
 Ambient temperature : 23°C
 Relative humidity : 49%
 Atmospheric pressure : 101 kPa

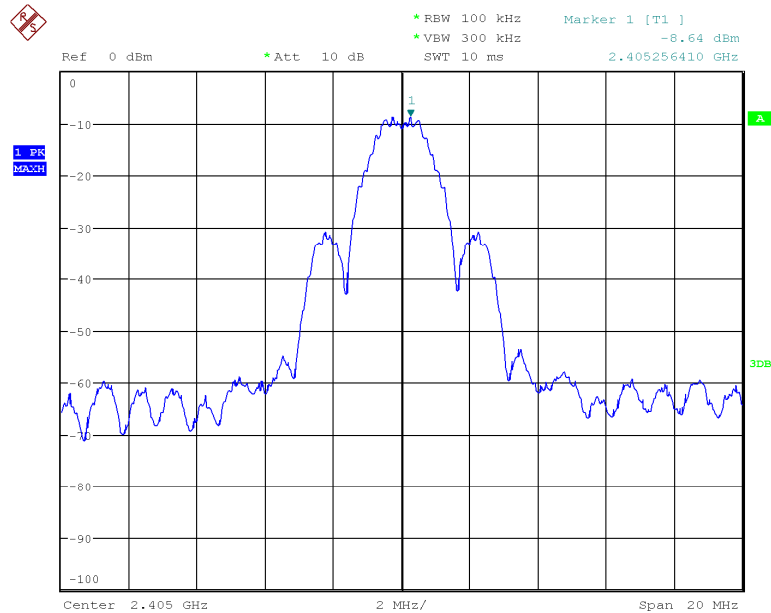
Table 8: Test result of power spectral density(PSD)

Channel	Maximum power spectral density (dBm/100kHz)	Maximum power spectral density (dBm/3kHz)	Limit (dBm/3kHz)
Low Channel	-8.64	-23.84	8
Mid Channel	-9.19	-24.39	8
High Channel	-9.54	-24.74	8

Note: According to the KDB558074, $PSD_{3kHz} = PSD_{100kHz} \times 10 \log(3kHz/100kHz) = PSD_{100kHz} - 15.2dB$

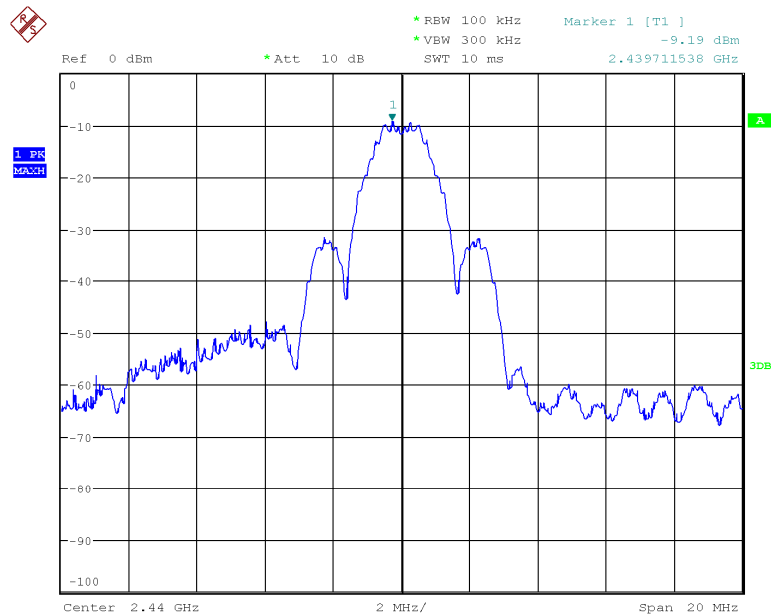
Test Graph of Power Spectral Density

Low Channel



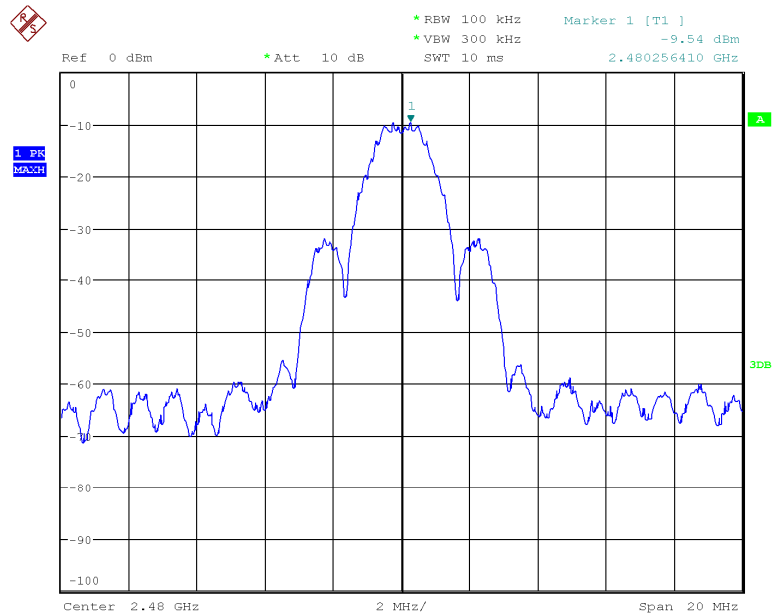
Date: 21.MAR.2013 13:15:07

Middle Channel



Date: 21.MAR.2013 11:28:36

High Channel



Date: 21.MAR.2013 11:00:08

4.1.6 Spurious Emission

RESULT:**Passed**

Date of testing	:	2013-03-25
Test standard	:	FCC part 15.247(d)
Basic standard	:	ANSI C63.10: 2009
Limits	:	Refer to 15.209(a)
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

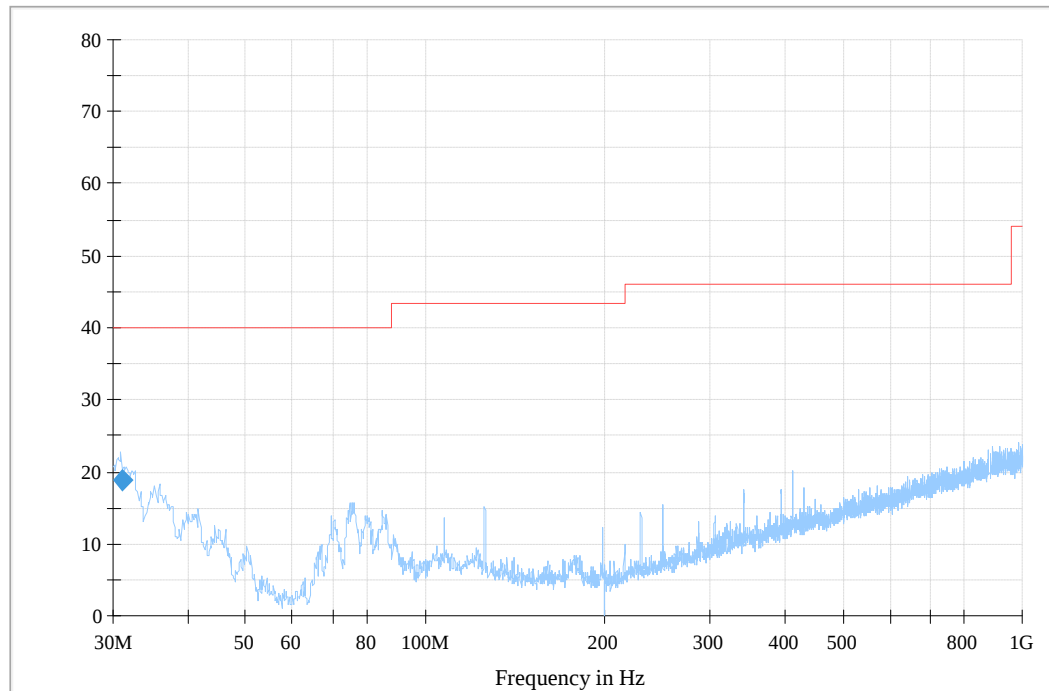
Test Channel	:	Low/ Middle/ High
Operation mode	:	A
Ambient temperature	:	23°C
Relative humidity	:	49%
Atmospheric pressure	:	100 kPa

During the test, the wooden table was rotated 360° around and the antenna was varied from 1m to 4m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. The vertical results are marked with red, and the horizontal ones are marked with blue. Plots of the band edge are also shown.

Figure 1: Spurious emission measurement results, low channel, 30-1000MHz, vertical and horizontal polarization

Level in dB μ V/m

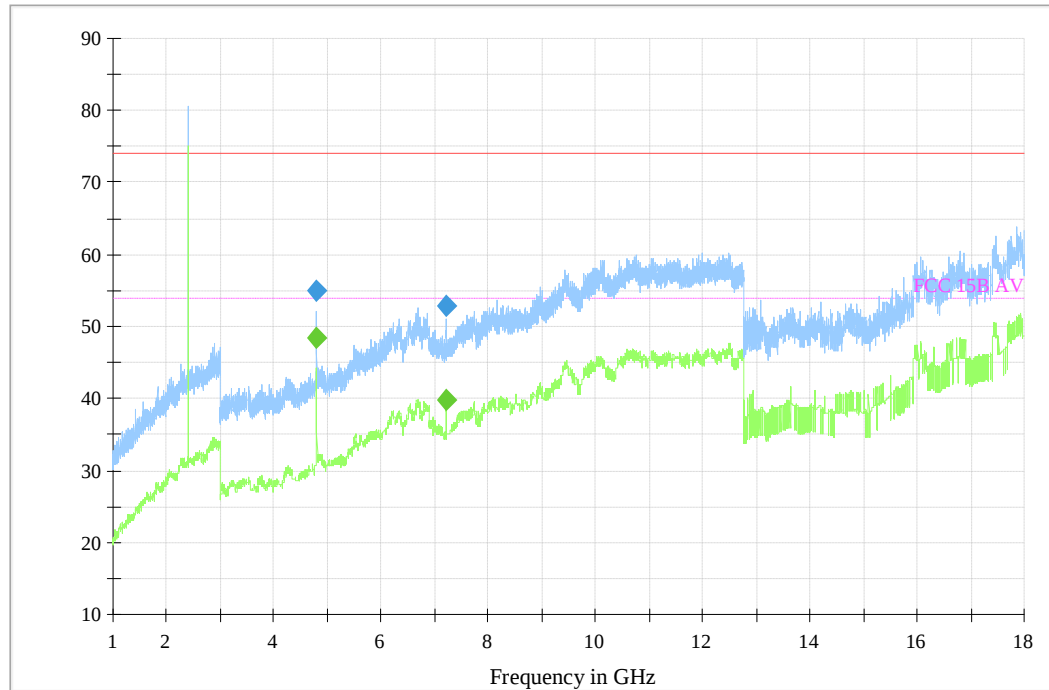


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
31.140000	18.8	120.000	148.0	H	268.0	21.20	40.00

Figure 2: Spurious emission measurement results, low channel, 1-18GHz, vertical and horizontal polarization

Level in dB μ V/m



Final measurement result:

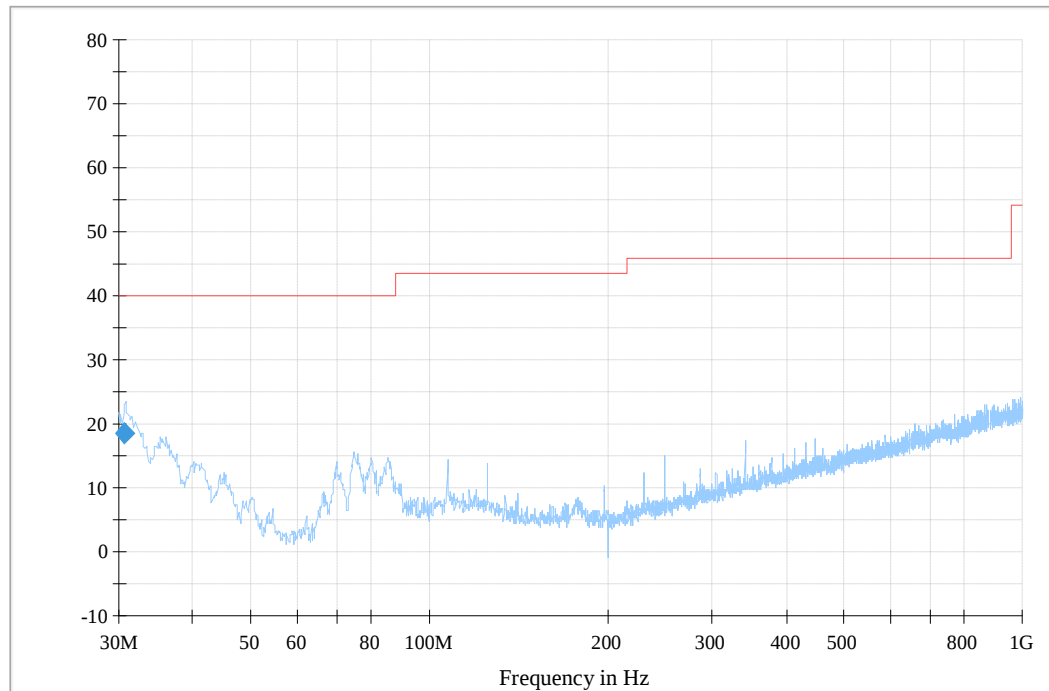
Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4809.919840	54.9	100.0	H	307.0	19.10	74.00
7213.527655	53.0	100.0	V	307.0	21.00	74.00

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4809.919840	48.4	100.0	H	285.0	5.60	54.00
7213.827655	39.7	100.0	H	285.0	14.30	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Figure 3: Spurious emission measurement results, mid channel, 30-1000MHz, vertical and horizontal polarization

Level in dB μ V/m

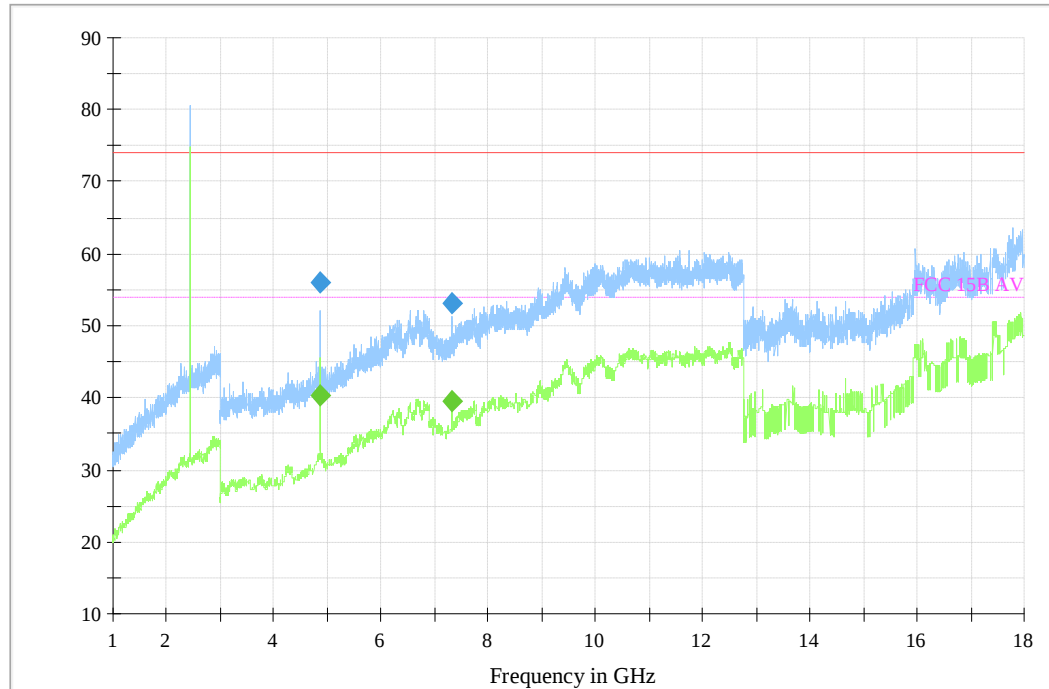


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
30.690000	18.7	120.000	126.0	H	283.0	21.30	40.00

Figure 4: Spurious emission measurement results, mid channel, 1-18GHz, vertical and horizontal polarization

Level in dB μ V/m



Final measurement result:

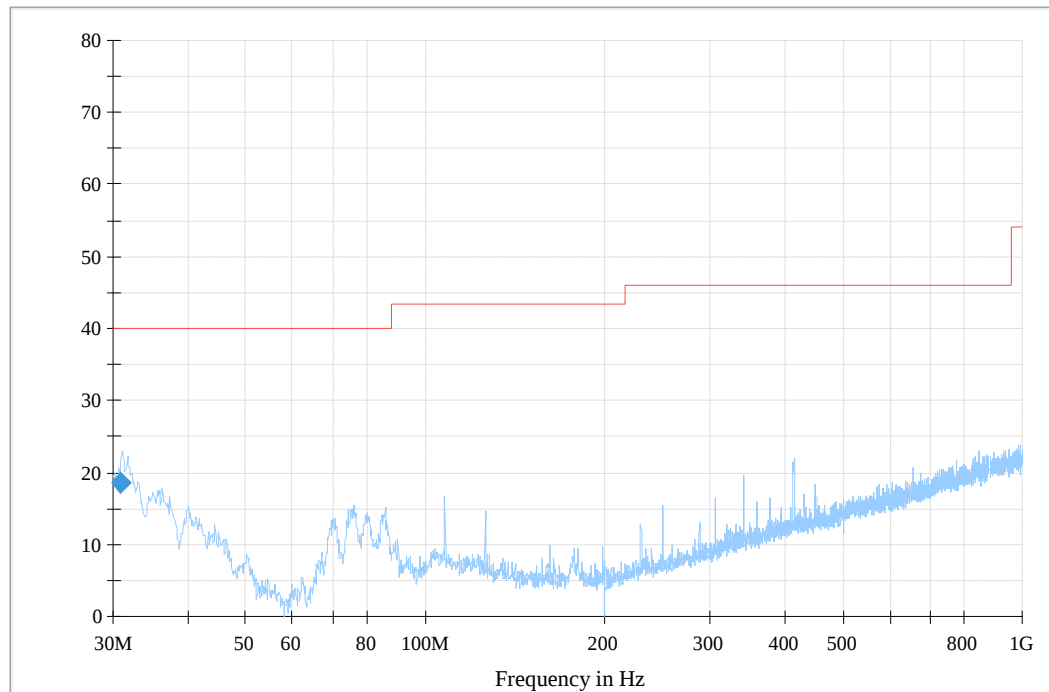
Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4879.958718	56.1	100.0	H	317.0	17.90	74.00
7318.536874	53.1	100.0	V	300.0	20.90	74.00

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4879.358718	40.4	100.0	V	295.0	13.60	54.00
7322.044088	39.6	100.0	H	295.0	14.40	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Figure 5: Spurious emission measurement results, high channel, 30MHz-1GHz, vertical and horizontal polarization

Level in dB μ V/m

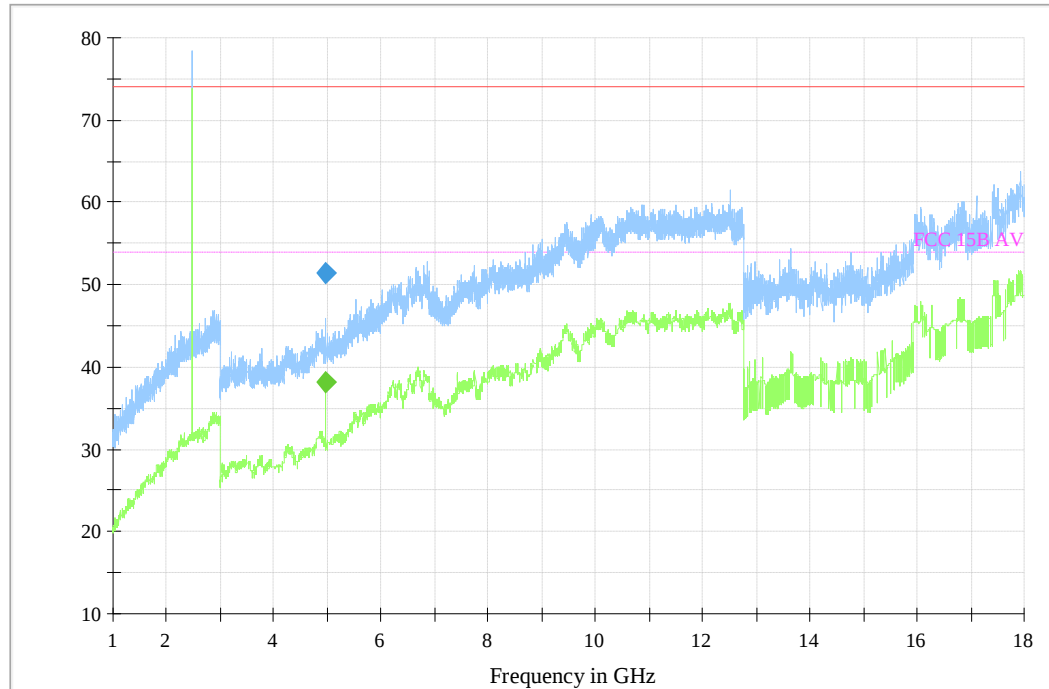


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
30.870000	18.5	120.000	136.0	V	22.0	21.50	40.00

Figure 6: Spurious emission measurement results, high channel, 1-18GHz, vertical and horizontal polarization

Level in dB μ V/m



Final measurement result:

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4959.719239	51.3	100.0	H	317.0	22.70	74.00

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dB μ V/m)
4959.619239	38.1	100.0	V	295.0	15.90	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Band Edge measurement results

No significant harmonic emissions was detected at the lower (2390MHz) and upper (2483.5MHz) restricted band.

4.2 Radio Frequency Exposure Compliance

4.2.1 Electromagnetic Fields

RESULT:**Passed**

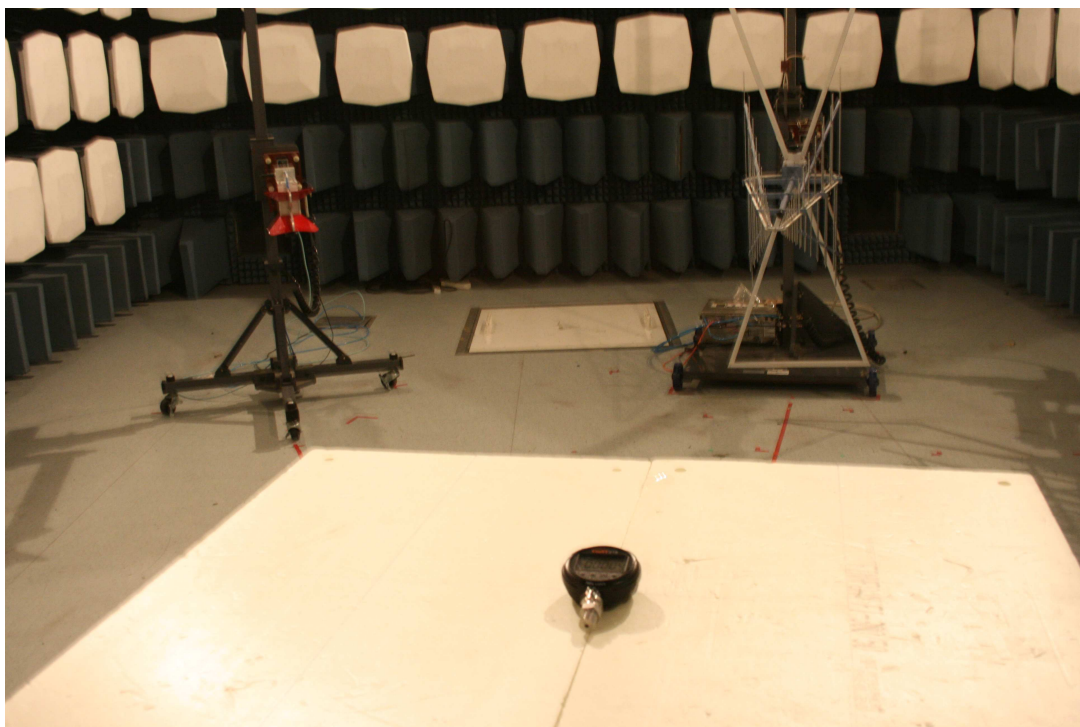
Date of testing : 2013-03-25
Test standard : FCC KDB publication 447498

Test setup

Since maximum peak output power of the transmitter is $<60/f$ (GHz) mW, i.e.
 $0.32\text{mW} < 25 (=60/2.4)$ mW, hence the EUT is excluded from SAR evaluation according to
FCC KDB publication 447498 D01: Mobile Portable RF Exposure.

5. Photographs of the Test Set-Up

Photograph 1: Set-up for Spurious Emissions, below 1GHz



Photograph 2: Set-up for Spurious Emissions, above 1GHz



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