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Report On

Application for Grant of Equipment Authorization of the
Si 14
i'm Watch Smart Watch

FCC Part 15 Subpart C §15.247
IC RSS-Gen and RSS-210 Issue 8 December 2010

Report No. SC1210158A

October 2012

REPORT ON Radio Testing of the
Si 14
Smart Watch

TEST REPORT NUMBER SC1210158A

PREPARED FOR Si 14
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DATED October 05, 2012

Revision History

SC1210158A Si 14 i'm Color; i'm Jewel; i'm Tech Smart Watch					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
10/05/12	Initial Release				Ferdinand Custodio

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Si 14
Smart Watch

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Si 14 Smart Watch to the requirements of FCC Part 15 Subpart C §15.247 and IC RSS-Gen and RSS-210 Issue 8 December 2010.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Si 14
Model Number(s)	i'm Color; i'm Jewel; i'm Tech
FCC ID Number	QJN280276
IC Number	10673A-280276
Serial Number(s)	00544211, 00009077. Both samples verified uses an aluminium housing (i'm Color). I'm Jewel uses silver or gold housing while i'm tech uses titanium housing. All three models are identical electrically. Verification performed only on one housing type since all are metallic type.
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC Part 15 Subpart C §15.247 (October 1, 2011). • RSS-210 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment (Issue 8, December 2010). • RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).
Start of Test	September 28, 2012
Finish of Test	October 03, 2012
Name of Engineer(s)	Ferdinand S. Custodio Lan Sayasane
Related Document(s)	• DA 00-705 (March 30, 200) Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. • ANSI C63.10-2009 (American National Standard for Testing Unlicensed Wireless Devices. • Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart C §15.247 with cross-reference to the corresponding IC RSS standard is shown below.

Section	§15.247 Spec Clause	RSS	Test Description	Result	Comments/ Base Standard
2.1	§15.207 (a)	RSS-Gen 7.2.4	Conducted Emissions	Compliant	
2.2	§15.247(a)(1)	RSS-210 A8.1(b)	Carrier Frequency Separation	Compliant	
2.3	§15.247(a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping Frequencies	Compliant	
2.4	§15.247(a)(1)(iii)	RSS-210 A8.1(d)	Time of Occupancy (Dwell Time)	Compliant	
2.5	§15.215(c)	RSS-210 A8.1(a)	20 dB Bandwidth	Compliant	
2.6	§15.247(b)(1)	RSS-210 A8.4(2)	Peak Output Power	Compliant	
2.7	§15.247(d)	RSS-210 A8.5	Band-edge Compliance of RF Conducted Emissions	Compliant	
2.8	§15.247(d)	RSS-210 A8.5	Spurious RF Conducted Emissions	Compliant	
2.9	§15.247(d)	RSS-210 2.2	Spurious Radiated Emissions	Compliant	
2.10		RSS-Gen 6.0	Receiver Spurious Emissions	Compliant	

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Si 14 Smart Watch as shown in the photograph below. The EUT connects to a smart phone through Bluetooth™. The operating system is i'm Droid specifically developed for the EUT. The EUT uses various app supported by the operating system, this includes but not limited to calls, text message, emails, notifications, music, pictures, etc. Three models are covered by this report (i'm Color; i'm Jewel; i'm Tech), the difference is cosmetic primarily the strap and housing of the EUT.



Equipment Under Test



1.3.2 EUT General Description

EUT Description	Smart Watch
Model Name	i'm Watch
Model Number(s)	i'm Color; i'm Jewel; i'm Tech
Rated Voltage	3.7VDC from internal rechargeable battery (450 mAh).
Output Power	2.65mW (4.23dBm peak conducted)
Frequency Range	2402 MHz to 2480 MHz in the 2400 MHz to 2483.5 MHz Band
Number of Operating Frequencies	62
Channels Verified	Channel 0 (Low Channel 2402 MHz) Channel 39 (Mid Channel 2459 MHz) Channel 79 (High Channel 2480MHz)
Modulation Used	GFSK, $\pi/4$ -DQPSK, 8DPSK

1.3.3 Antenna Details

Model	2450AT18A100
Manufacturer	Johanson Technology Inc.
Antenna Type	2.45 GHz Antenna
Antenna Gain (Peak)	0.5 dBi
EUT Antenna Connector	N/A (small SMD chip antenna).
Maximum Dimensions	3.2mm x 1.6mm x 1.3mm

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configurations	Description
A	Antenna port conducted measurement. Manufacturer provided a SMA test port for conducted measurements (Test Mode).
B	Antenna port conducted measurement. Manufacturer provided a SMA test port for conducted measurements (FHSS Mode).
C	Radiated emissions test configuration. EUT configured to transmit on the built-in integral antenna.

1.4.2 EUT Exercise Software

Client provided programming software (Test_BT_Imwatch) already installed in the provided support Net PC running Ubuntu Linux 2.6.38-13-generic. The software allows the following parameters to be modified: channels (0-79), frequency (2402-2480MHz), modulation (br,br+edr,edr2 and edr3), radio (off, TX and RX) and symbol (1 or 0).

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
I'm S.p.A.	I'm Watch connector	30cm, shielded, USB A type to 3.5mm mini plug with three metal bands (rings)
Asus	Support Net PC	Eee PC R101 SNACOAAS237383

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report based from Peak Output Power measurements:

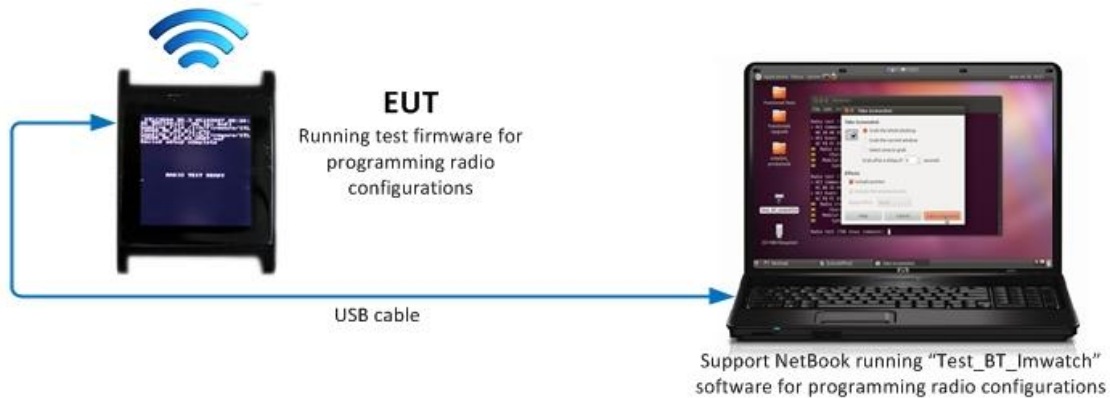
Mode	Channel	Frequency
br+edr	0 (Low Channel)	2402 MHz

EUT is a portable device. For radiated measurements X, Y and Z orientations were verified. Worst case position is "Y".

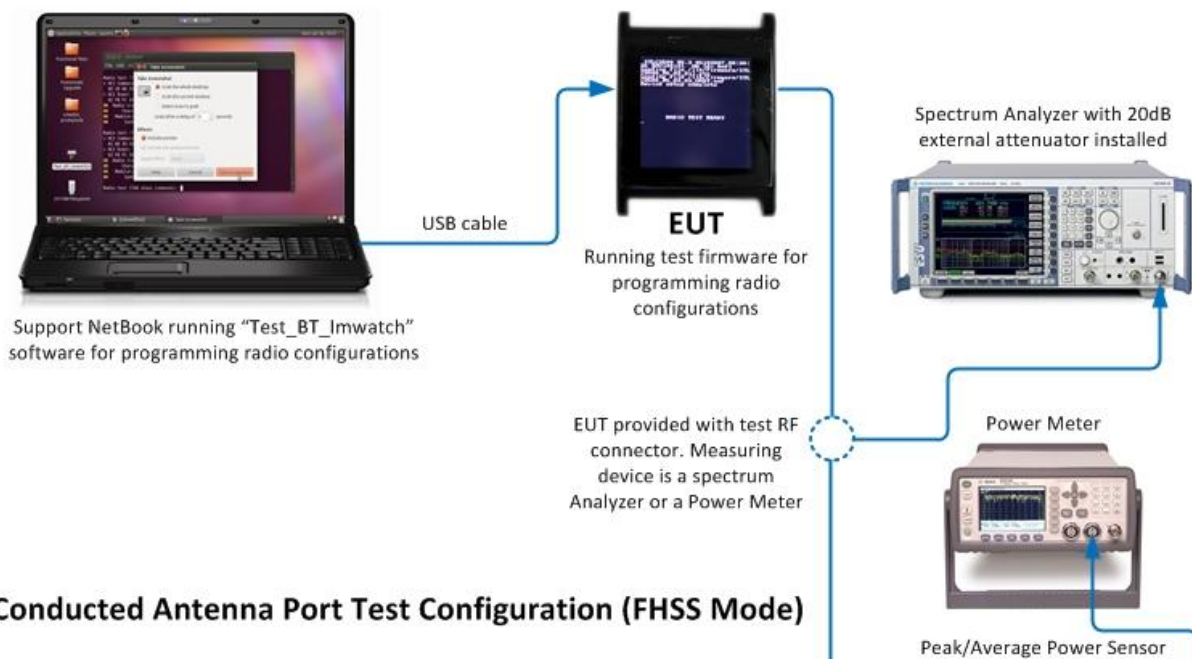


1.4.5 Simplified Test Configuration Diagram

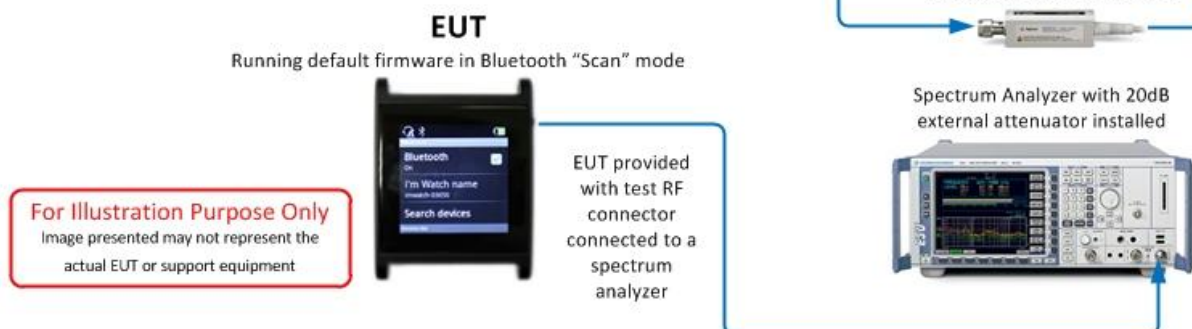
Radiated Test Configuration (Test Mode)



Conducted Antenna Port Test Configuration (Test Mode)



Conducted Antenna Port Test Configuration (FHSS Mode)



1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number 00544211, 00009077		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY

1.8.1 FCC – Registration No.: US5281

TUV SUD America Inc. (San Diego), a \$2.498 listed test firm operates the EMC Laboratory registered under Sony Electronics Inc. Product Quality Division EMC. This laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is US5281.

1.8.2 Industry Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.



SECTION 2

TEST DETAILS

Radio Testing of the
Si 14
Smart Watch

2.1 CONDUCTED EMISSIONS

2.1.1 Specification Reference

Part 15 Subpart C §15.207(a)

2.1.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

**Decreases with the logarithm of the frequency.*

2.1.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration A

2.1.4 Date of Test/Initial of test personnel who performed the test

October 01, 2012/LTS

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Ambient Temperature	21.3°C
Relative Humidity	41.2%
ATM Pressure	99.6 kPa

2.1.7 Additional Observations

- The EUT is a battery operated device and is not AC powered. The EUT is normally charged via USB.
- To show general compliance to the present requirement, the EUT was connected to a PC via USB simulating a charging condition.



- The EUT was verified using worst case configuration. The EUT was set to transmit max. power. Only the worst channel presented.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.1.8 for sample computation.

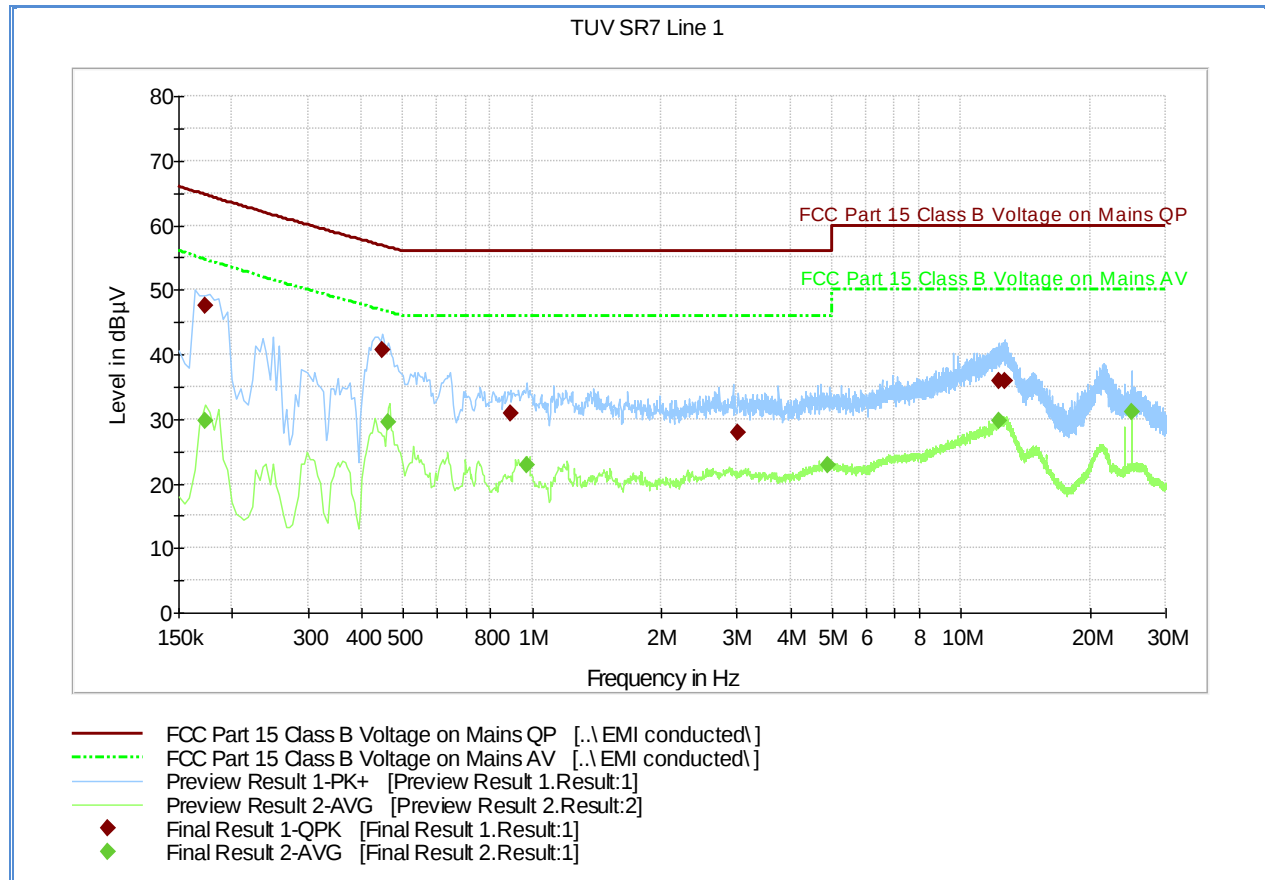
2.1.8 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (db μ V) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8607 (20 dB attenuator)	19.9	20.7
	Asset# 1177 (cable)	0.15	
	Asset# 1176 (cable)	0.35	
	Asset# 1171 (LISN)	0.30	
Reported QuasiPeak Final Measurement (db μ V) @ 150kHz			26.2

2.1.9 Test Results

Compliant. See attached plots and tables.

2.1.10 Line 1 (Hot)



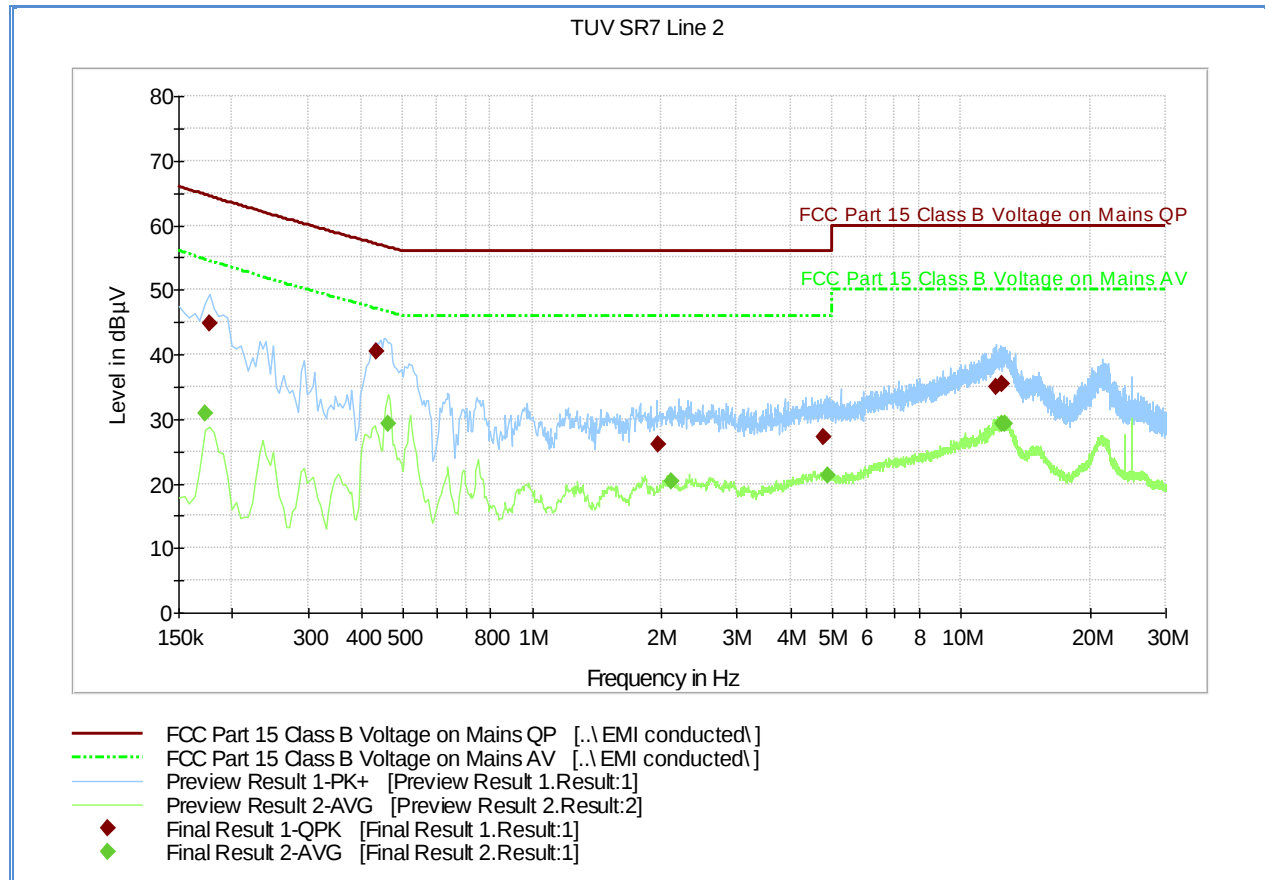
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.172500	47.5	1000.0	9.000	Off	L1	19.5	17.3	64.8
0.447000	40.7	1000.0	9.000	Off	L1	19.4	16.1	56.9
0.892500	30.9	1000.0	9.000	Off	L1	19.6	25.1	56.0
3.025500	27.8	1000.0	9.000	Off	L1	20.2	28.2	56.0
12.241500	35.9	1000.0	9.000	Off	L1	20.5	24.1	60.0
12.642000	36.0	1000.0	9.000	Off	L1	20.5	24.0	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.172500	29.8	1000.0	9.000	Off	L1	19.5	24.9	54.7
0.460500	29.4	1000.0	9.000	Off	L1	19.4	17.2	46.6
0.973500	22.9	1000.0	9.000	Off	L1	19.6	23.1	46.0
4.884000	22.8	1000.0	9.000	Off	L1	20.4	23.2	46.0
12.304500	29.8	1000.0	9.000	Off	L1	20.5	20.2	50.0
24.999000	31.0	1000.0	9.000	Off	L1	21.0	19.0	50.0

2.1.11 Line 2 (Neutral)



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.177000	44.9	1000.0	9.000	Off	N	19.6	19.6	64.5
0.433500	40.5	1000.0	9.000	Off	N	19.6	16.6	57.1
1.963500	26.1	1000.0	9.000	Off	N	20.6	29.9	56.0
4.785000	27.2	1000.0	9.000	Off	N	21.1	28.8	56.0
12.057000	35.0	1000.0	9.000	Off	N	21.3	25.0	60.0
12.453000	35.5	1000.0	9.000	Off	N	21.3	24.5	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.172500	30.9	1000.0	9.000	Off	N	19.6	23.8	54.7
0.460500	29.4	1000.0	9.000	Off	N	19.6	17.3	46.6
2.112000	20.3	1000.0	9.000	Off	N	20.7	25.7	46.0
4.879500	21.2	1000.0	9.000	Off	N	21.2	24.8	46.0
12.430500	29.4	1000.0	9.000	Off	N	21.3	20.6	50.0
12.606000	29.2	1000.0	9.000	Off	N	21.3	20.8	50.0



2.2 CARRIER FREQUENCY SEPARATION

2.2.1 Specification Reference

Part 15 Subpart C §15.247(a)(1)

2.2.2 Standard Applicable

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

2.2.3 Equipment Under Test and Modification State

Serial No: 00009077 / Test Configuration B

2.2.4 Date of Test/Initial of test personnel who performed the test

October 01, 2012/LTS

2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

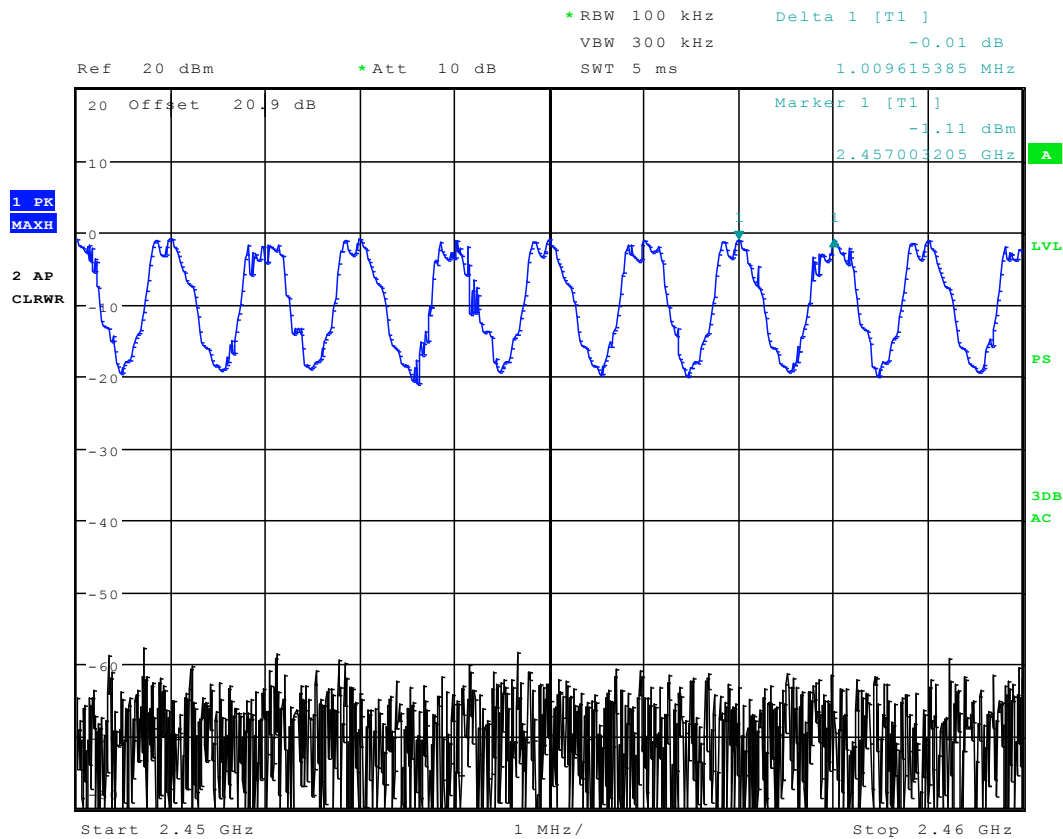
Ambient Temperature	21.3°C
Relative Humidity	41.2%
ATM Pressure	99.6 kPa

2.2.7 Additional Observations

- Hopping function enabled.
- Scan mode activated repeatedly until the trace is stabilized.
- Span is wide enough to capture the peaks of two adjacent channels.
- RBW is 1% of the span.
- VBW is 3x RBW
- Sweep is auto

- Detector is peak.
- Trace is max hold.
- An offset of 20.9dB was added to compensate for the external attenuator and cable used.
- Marker-delta function is used between the peaks of the adjacent channels.
- Limit used is 445.51kHz (worst case 20 dB Bandwidth. See Section 2.5 for details).

2.2.8 Test Results



Date: 1.OCT.2012 13:04:33

Observed carrier frequency separation = 1.01 MHz (Complies. Greater than 20 dB bandwidth of 445.51 kHz)

2.3 NUMBER OF HOPPING FREQUENCIES

2.3.1 Specification Reference

Part 15 Subpart C §15.247(a)(1)(iii)

2.3.2 Standard Applicable

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

2.3.3 Equipment Under Test and Modification State

Serial No: 00009077 / Test Configuration B

2.3.4 Date of Test/Initial of test personnel who performed the test

October 01, 2012/LTS

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions

Ambient Temperature	21.3°C
Relative Humidity	41.2%
ATM Pressure	99.6 kPa

2.3.7 Additional Observations

- Hopping function enabled.
- Scan mode activated repeatedly until the trace is stabilized.
- Span is wide enough to capture the channels of interests.
- The span was broken up to sections in order to clearly show all of the hopping frequencies.
- RBW is 1% of the span.
- VBW is 3x RBW
- Sweep is auto
- Detector is peak.
- Trace is max hold.
- An offset of 20.9dB was added to compensate for the external attenuator and cable used.

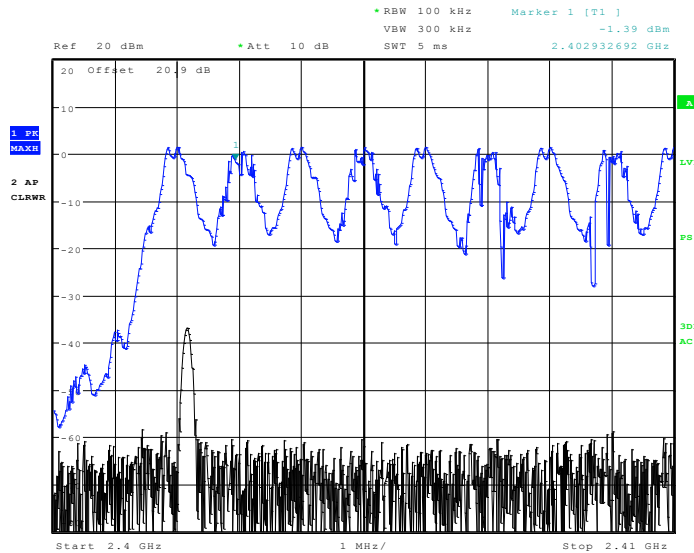
2.3.8 Test Results

Observed Number of Hopping Frequencies is

= 62

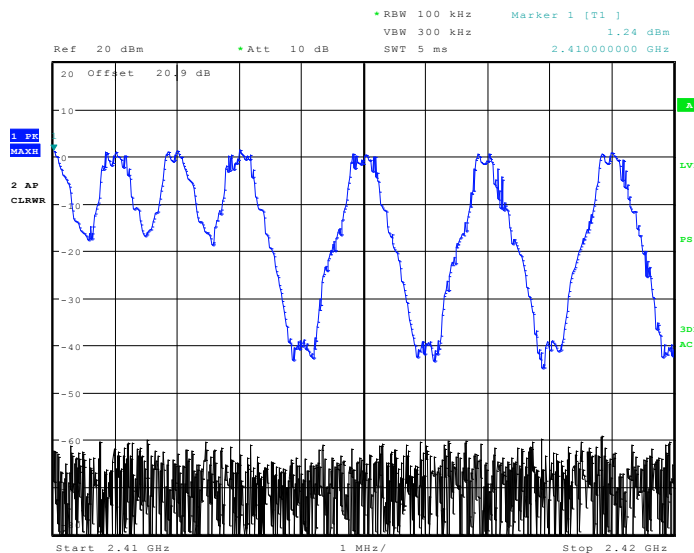
= Plot #1 + Plot #2 + Plot #3 + Plot #4 + Plot #5 + Plot #6 + Plot #7 + Plot #8

= 9 + 6 + 5 + 5 + 7 + 10 + 10 + 10



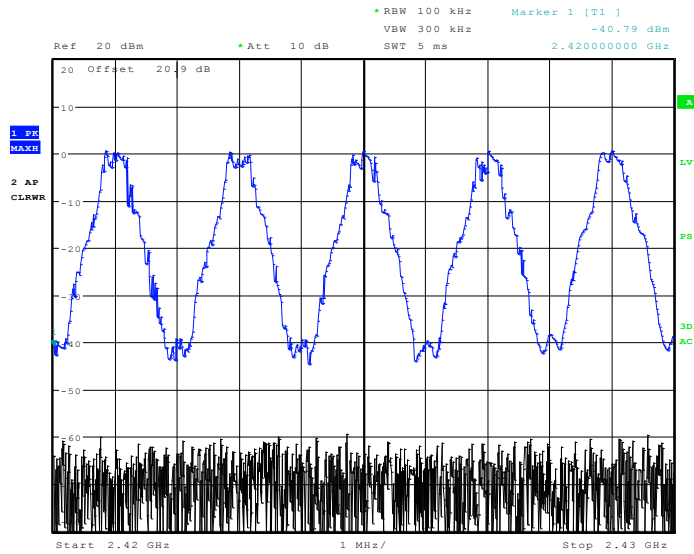
Date: 1.OCT.2012 10:52:41

Plot #1



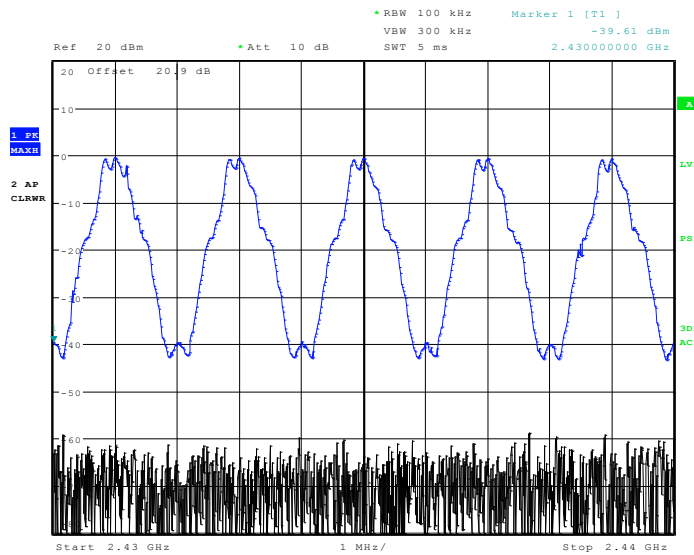
Date: 1.OCT.2012 11:18:44

Plot #2



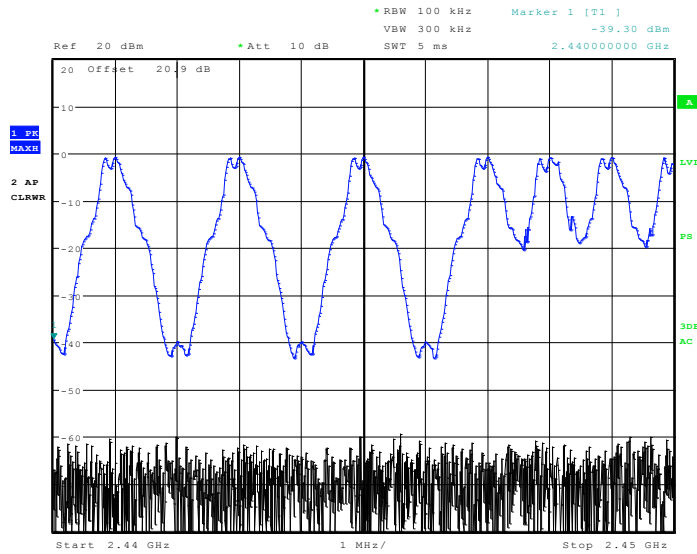
Date: 1.OCT.2012 12:28:19

Plot #3



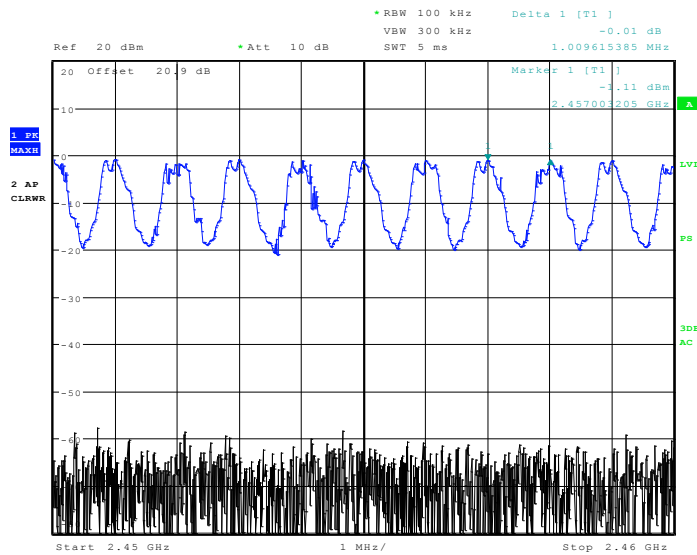
Date: 1.OCT.2012 12:36:27

Plot #4



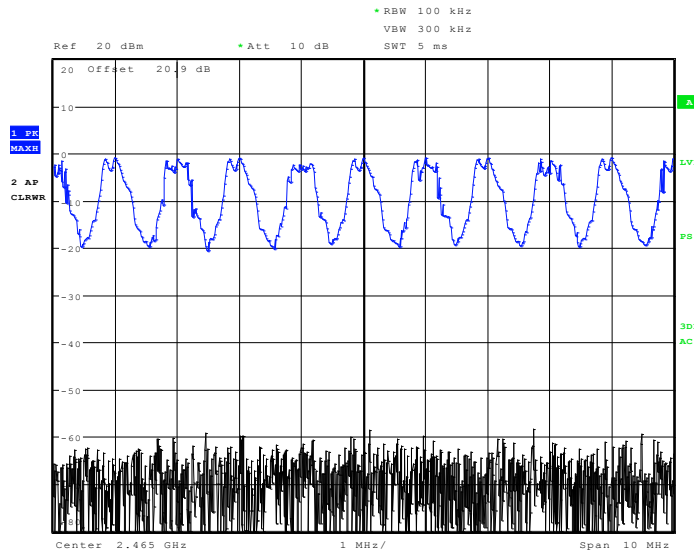
Date: 1.OCT.2012 12:52:00

Plot #5



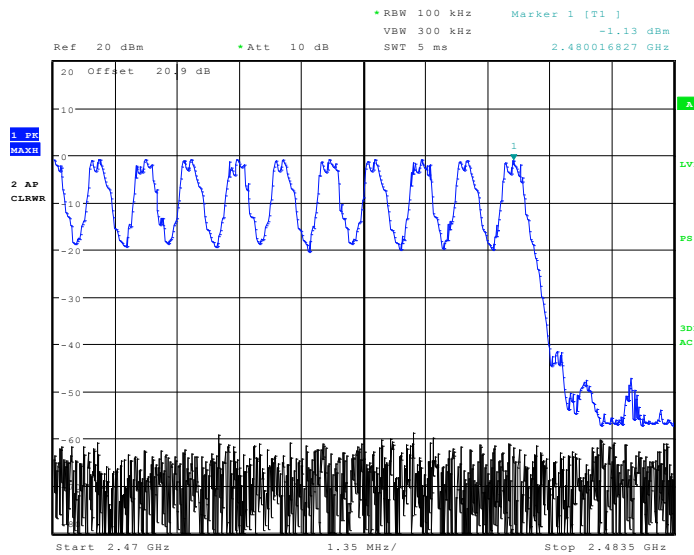
Date: 1.OCT.2012 13:04:33

Plot #6



Date: 1.OCT.2012 13:26:00

Plot #7



Date: 1.OCT.2012 13:50:47

Plot #8

2.4 TIME OF OCCUPANCY (DWELL TIME)

2.4.1 Specification Reference

Part 15 Subpart C §15.247(a)(1)(iii)

2.4.2 Standard Applicable

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

2.4.3 Equipment Under Test and Modification State

Serial No: 00009077 / Test Configuration B

2.4.4 Date of Test/Initial of test personnel who performed the test

October 02, 2012/FSC

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions

Ambient Temperature	21.0°C
Relative Humidity	41.5%
ATM Pressure	99.8 kPa

2.4.7 Additional Observations

- Hopping function enabled.
- No other mode or configuration possible when set to Hopping mode. Default Hopping mode verified.
- Span = zero span, centered on a hopping channel.
- RBW is 1MHz.
- VBW is 3x RBW
- Detector is peak.
- Trace is max hold.
- A single pulse is first measured. This measurement is then used to compute the average time of occupancy in the required period (no. of channels x 0.4 second).

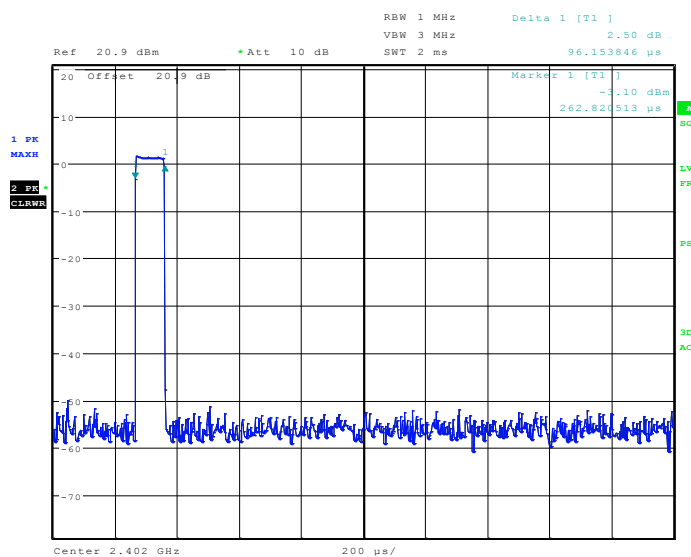
2.4.8 Test Results

Width of single pulse = 96.15µs
 Observed occurrence = 10 pulses/100 ms
 = 100 pulses/second
 Required period = 62 channels x 0.4 second
 = 24.8 seconds

Average time of occupancy = Pulse width x $\frac{100 \text{ pulses}}{\text{second}}$ x 24.8 seconds
 = 0.00009615 second x 100 x 24.8
 = 0.2384 second

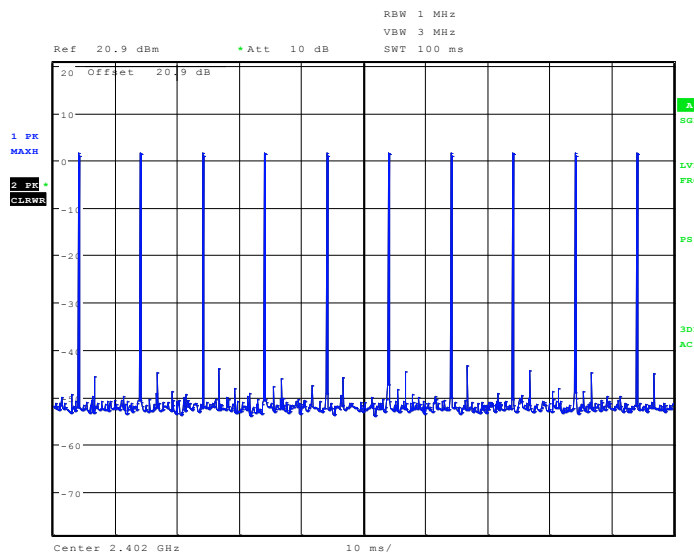
Compliance = **Complies.** 0.2384 second < 0.4 second

2.4.9 Test Results Plots



Date: 2.OCT.2012 13:49:38

Width of single pulse (96.15µs)



Date: 2.OCT.2012 13:50:43

10 pulses/100ms



2.5 20 dB BANDWIDTH

2.5.1 Specification Reference

Part 15 Subpart C §15.215(c)

2.5.2 Standard Applicable

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

2.5.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration A

2.5.4 Date of Test/Initial of test personnel who performed the test

September 28, 2012/LTS

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions

Ambient Temperature	23.5°C
Relative Humidity	47.4%
ATM Pressure	99.1 kPa

2.5.7 Additional Observations

- This is a conducted test.
- An offset of 20.9dB was added to compensate for the external attenuator and cable used.
- Span is approximately 2 to 3 times the expected 20dB bandwidth.
- RBW is $\geq 1\%$ of the expected 20dB bandwidth.
- VBW is $\geq$ RBW.
- Sweep is auto.

- Detector is peak.
- Trace is max hold.
- All modulations and symbols verified.
- “n dB down” (20dB) marker function of the spectrum analyzer was used for this test.

2.5.8 Test Results

Channel	Symbol	Modulation	Measured 20dB Bandwidth (kHz)
Low Channel	0	br	302.88
	1	br	301.28
	0	br+edr	299.67
	1	br+edr	302.88
	0	edr2	299.67
	1	edr2	301.28
	0	edr3	299.67
	1	edr3	301.28
Mid Channel	0	br	445.51
	1	br	411.85
	0	br+edr	423.07
	1	br+edr	429.28
	0	edr2	410.25
	1	edr2	423.07
	0	edr3	426.28
	1	edr3	424.67
High Channel	0	br	304.48
	1	br	307.69
	0	br+edr	304.48
	1	br+edr	304.48
	0	edr2	306.08
	1	edr2	304.48
	0	edr3	304.48
	1	edr3	306.08

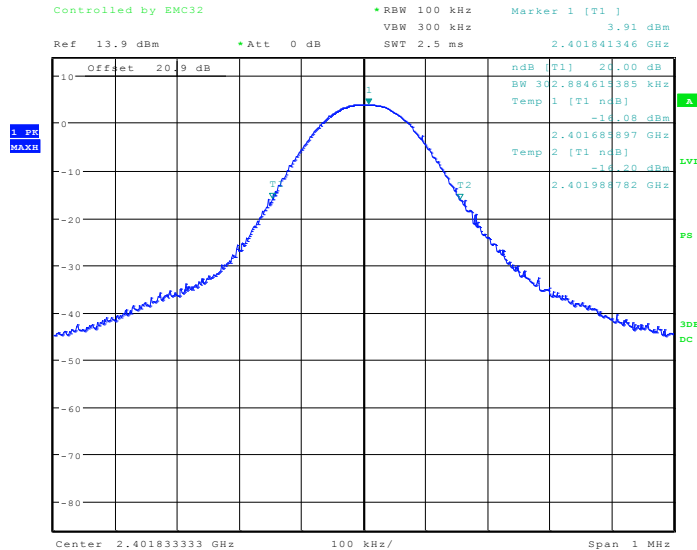
Worst case configuration (Low Channel using Symbol 0)

2401.833 MHz – (20dB BW/2) = 2401.61MHz (within the frequency band - **Compliant**)

Worst case configuration (High Channel using Symbol 1)

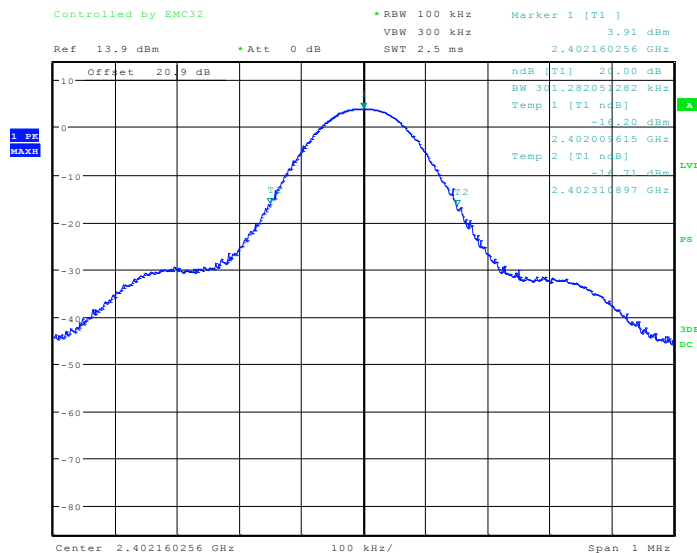
2480.161MHz + (20dB BW/2) = 2480.38MHz (within the frequency band - **Compliant**)

2.5.9 Test Results Plots



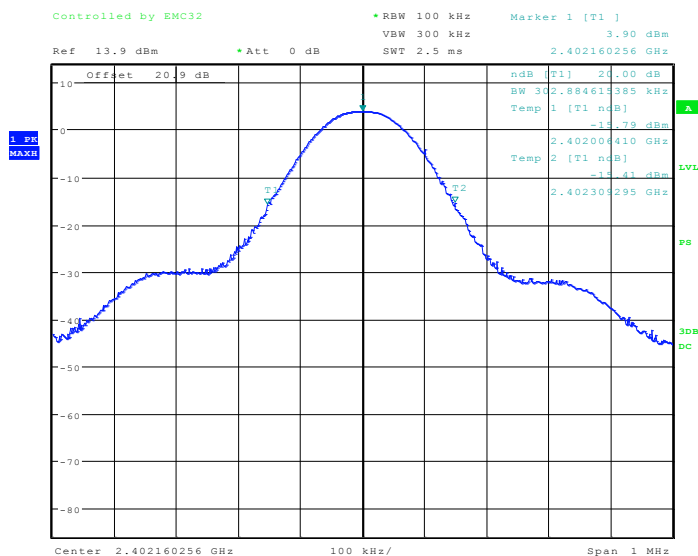
Date: 28.SEP.2012 11:35:26

Low Channel Symbol 0/br



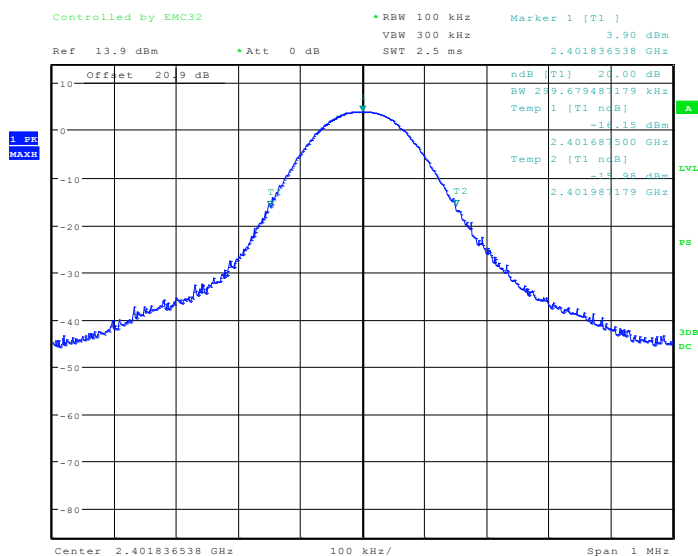
Date: 28.SEP.2012 11:39:12

Low Channel Symbol 1/br



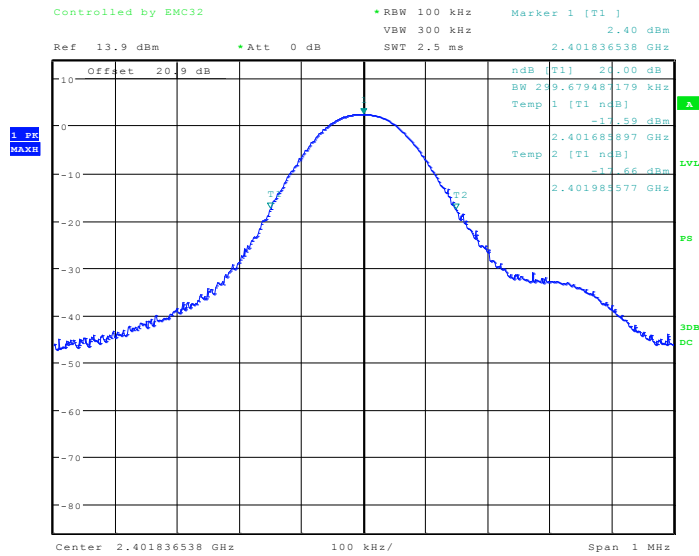
Date: 28.SEP.2012 11:41:07

Low Channel Symbol 1/br+edr



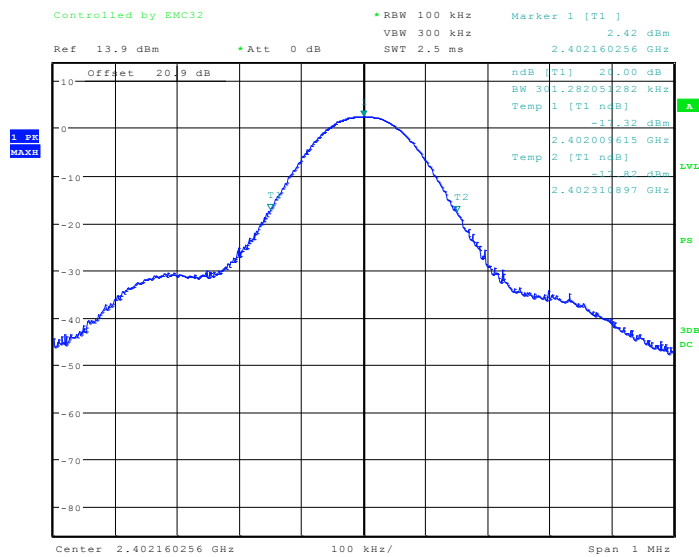
Date: 28.SEP.2012 11:42:23

Low Channel Symbol 0/br+edr



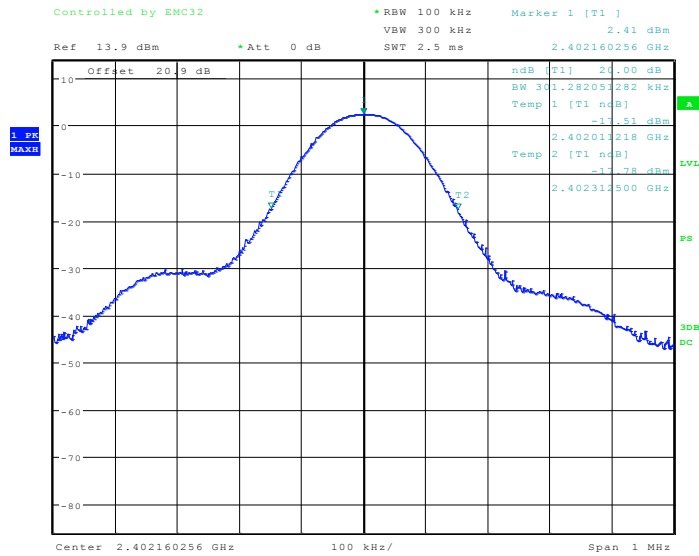
Date: 28.SEP.2012 11:59:23

Low Channel Symbol 0/edr2



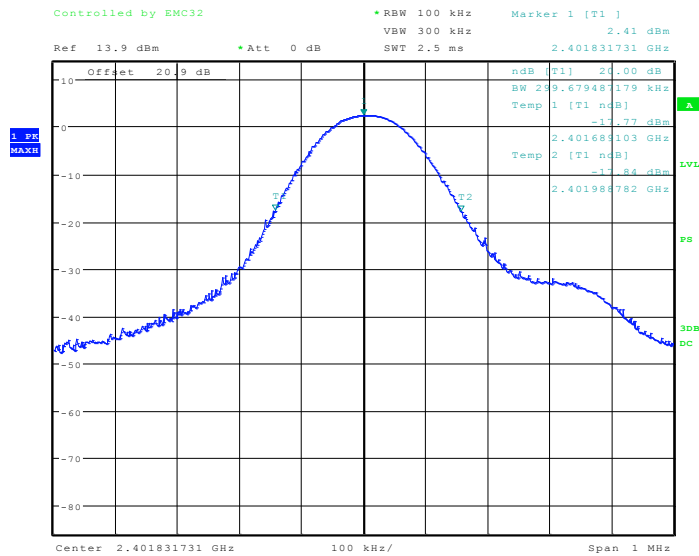
Date: 28.SEP.2012 12:00:51

Low Channel Symbol 1/edr2



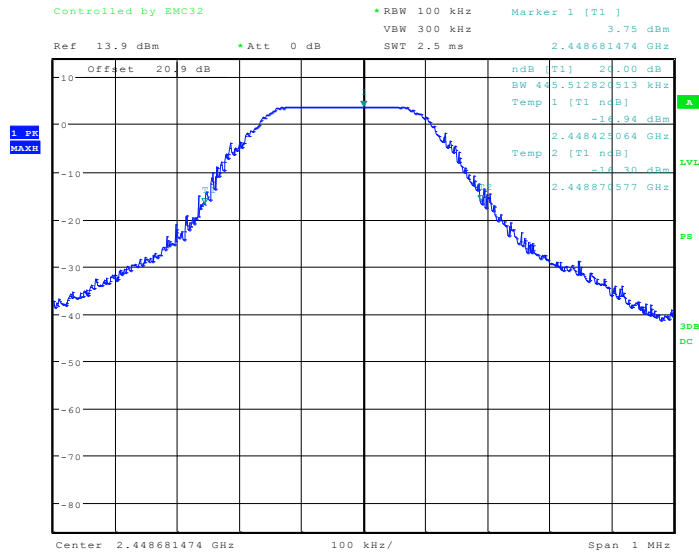
Date: 28.SEP.2012 12:02:18

Low Channel Symbol 1/edr3



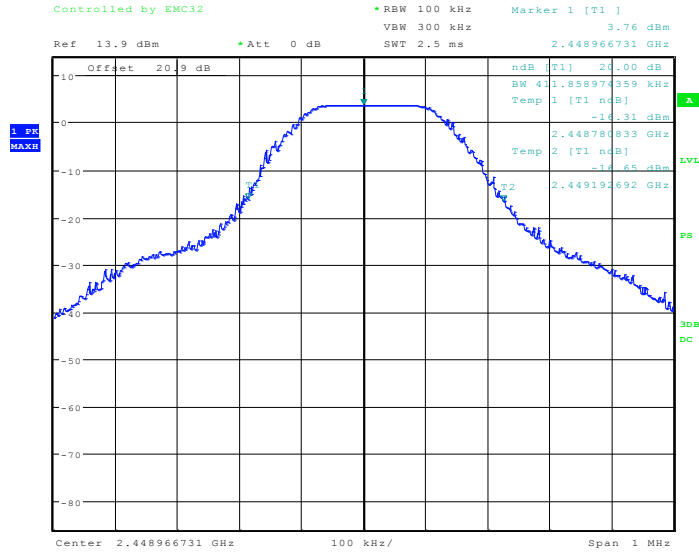
Date: 28.SEP.2012 12:03:12

Low Channel Symbol 0/edr3



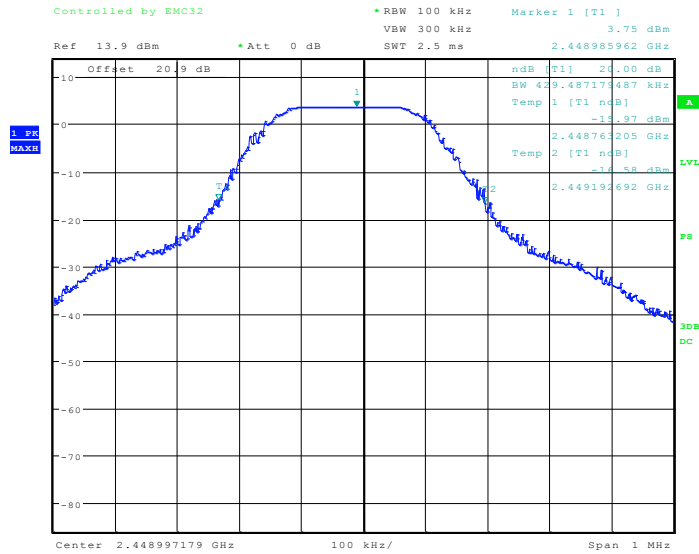
Date: 28.SEP.2012 12:08:05

Mid Channel Symbol 0/br



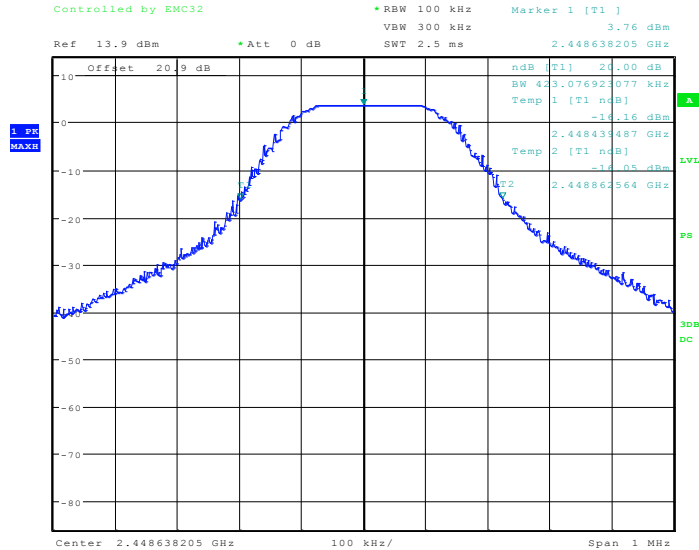
Date: 28.SEP.2012 12:10:39

Mid Channel Symbol 1/br



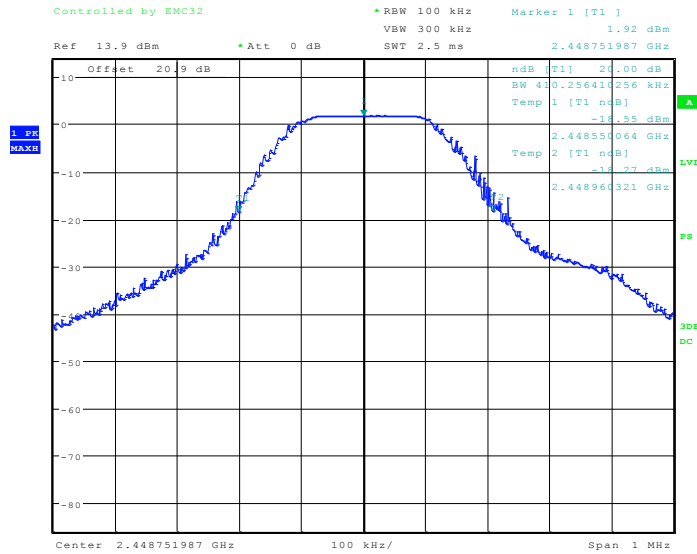
Date: 28.SEP.2012 12:13:25

Mid Channel Symbol 1/br+edr



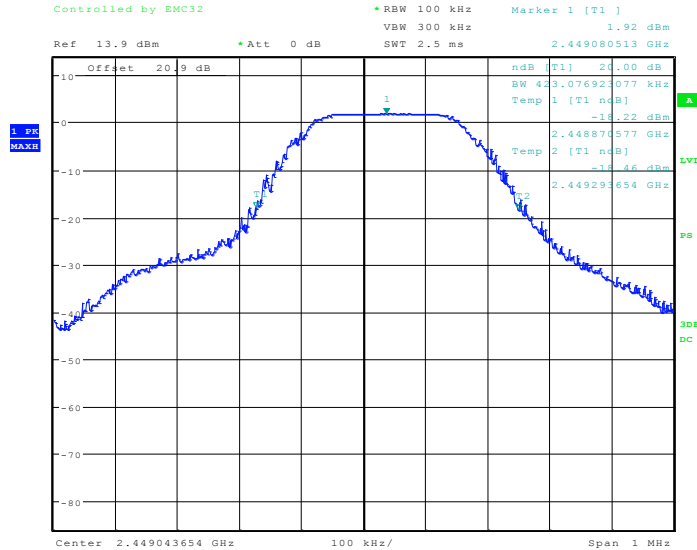
Date: 28.SEP.2012 12:17:15

Mid Channel Symbol 0/br+edr



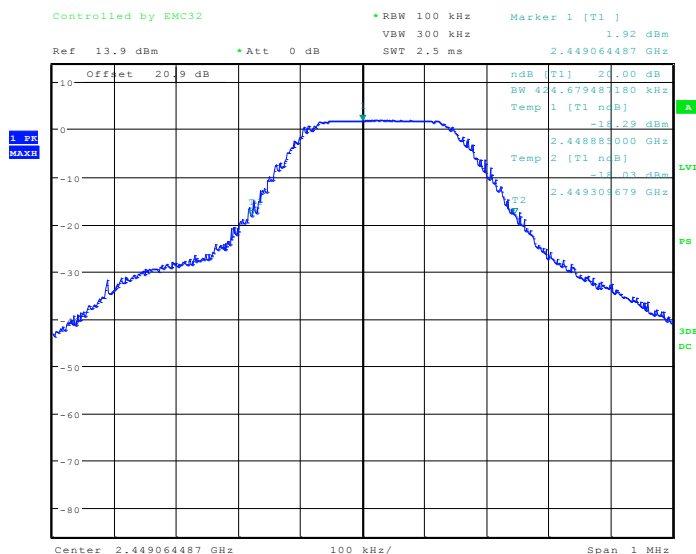
Date: 28.SEP.2012 12:19:51

Mid Channel Symbol 0/edr2



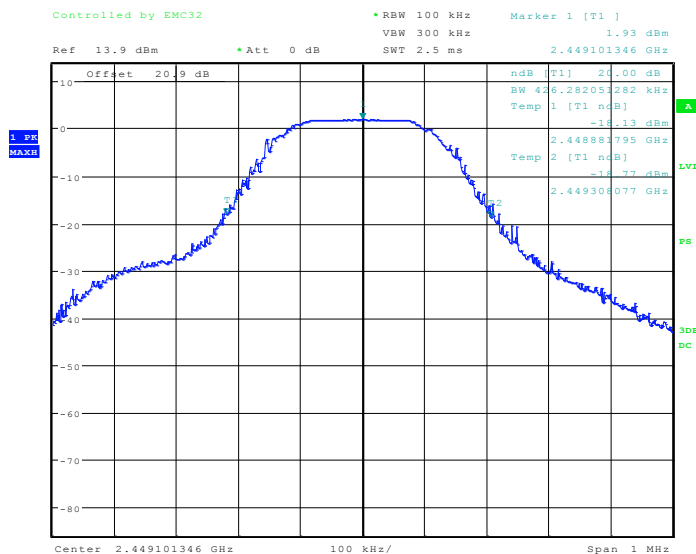
Date: 28.SEP.2012 12:30:23

Mid Channel Symbol 1/edr2



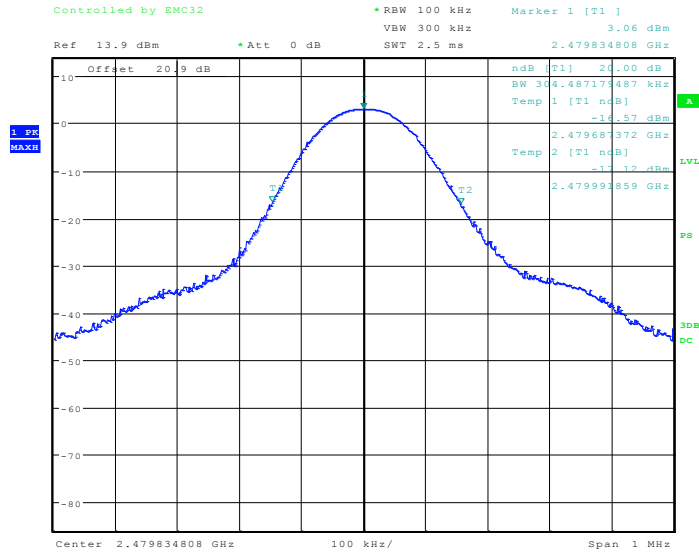
Date: 28.SEP.2012 12:35:52

Mid Channel Symbol 1/edr3



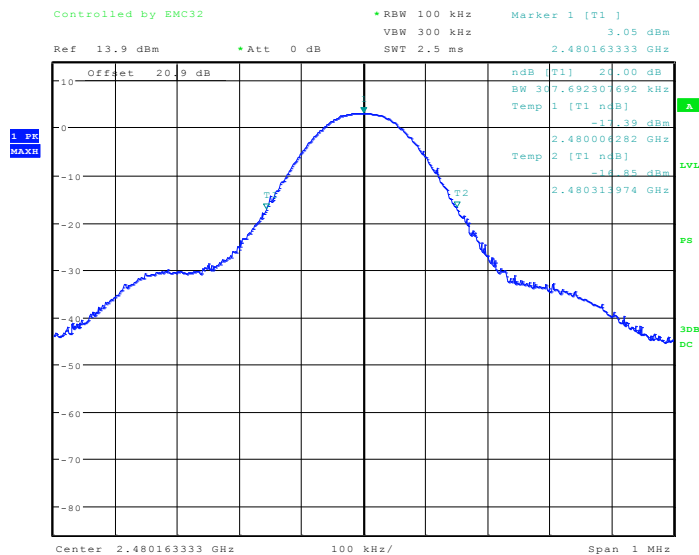
Date: 28.SEP.2012 12:33:07

Mid Channel Symbol 0/edr3



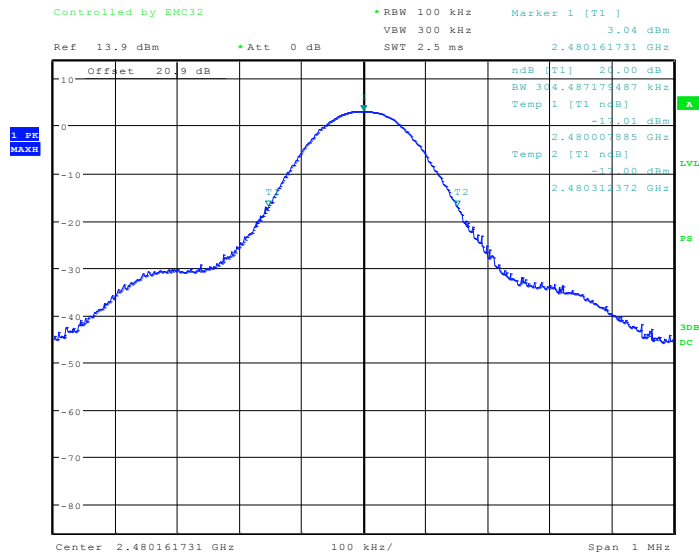
Date: 28.SEP.2012 12:45:38

High Channel Symbol 0/br



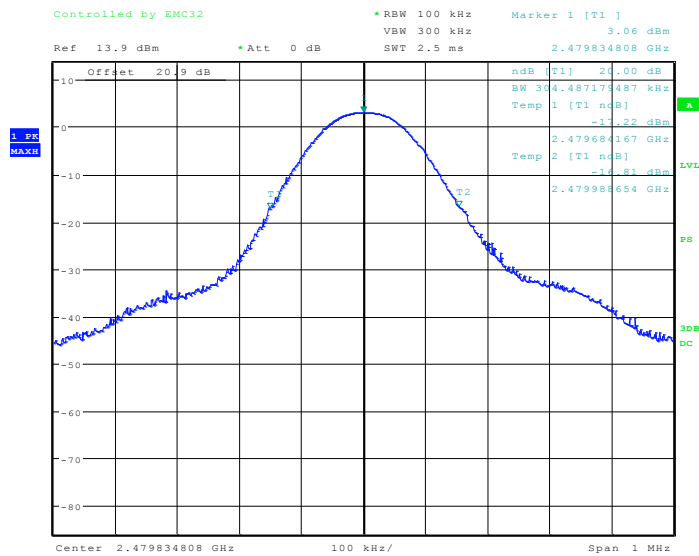
Date: 28.SEP.2012 12:43:30

High Channel Symbol 1/br



Date: 28.SEP.2012 12:48:44

High Channel Symbol 1/br+edr



Date: 28.SEP.2012 12:47:13

High Channel Symbol 0/br+edr



Controlled by EMC32

• RBW 100 kHz Marker 1 [T1] 1.06 dBm

VBW 300 kHz

Ref 13.9 dBm

• Att 0 dB

SWT 2.5 ms

2.480161731 GHz

1 Pk MAX

Offset 20.9 dB

nB [T1] 20.09 dB

BW 304.487179487 kHz

Temp 1 [T1 nB] -18.97 dBm

2.48000985 GHz

Temp 2 [T1 nB] -18.11 dBm

2.480312372 GHz

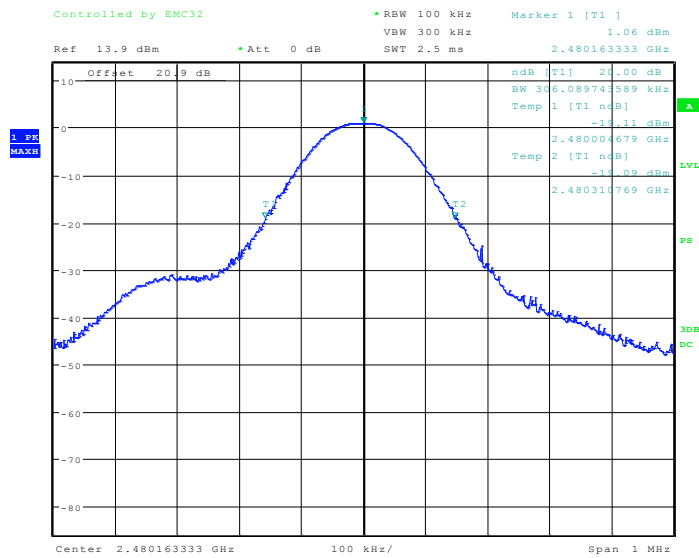
Center 2.480161731 GHz

100 kHz/

Span 1 MHz

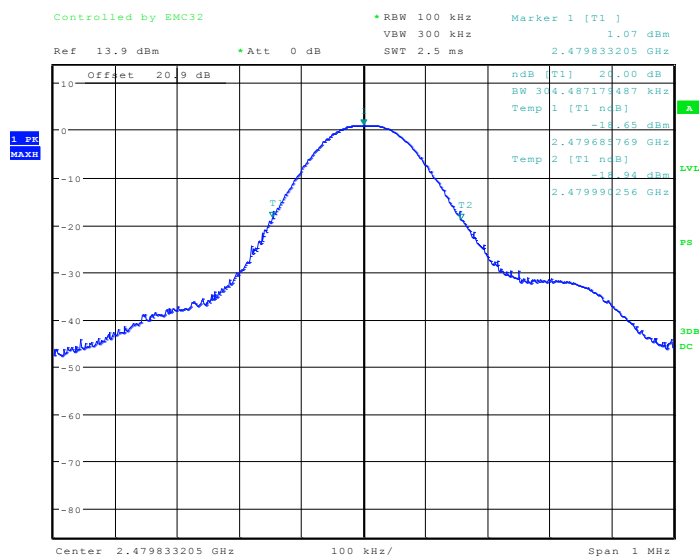
Date: 28.SEP.2012 12:51:22

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Date: 28.SEP.2012 12:56:36

High Channel Symbol 1/edr3



Date: 28.SEP.2012 12:55:11

High Channel Symbol 0/edr3



2.6 PEAK OUTPUT POWER

2.6.1 Specification Reference

Part 15 Subpart C §15.247(b)(1)

2.6.2 Standard Applicable

(1) For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

2.6.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration A

2.6.4 Date of Test/Initial of test personnel who performed the test

September 28, 2012/LTS

2.6.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.6 Environmental Conditions

Ambient Temperature	23.5°C
Relative Humidity	47.4%
ATM Pressure	99.1 kPa

2.6.7 Additional Observations

- This is a conducted test using a Peak Power Meter.
- All available modes and data rates were verified.

2.6.8 Test Results

Worst case configuration	= Low Channel, Symbol 0, br (basic rate) or br+edr (enhanced data rate)
	= 4.23 dBm
	= 2.65mW (Complies with 125mW limit)

See attached table for complete list of measurements.

Channel	Symbol	Modulation	Measured Peak Power (dBm)
Low Channel	0	br	4.23
	1	br	4.19
	0	br+edr	4.23
	1	br+edr	4.21
	0	edr2	2.78
	1	edr2	2.77
	0	edr3	2.80
	1	edr3	2.80
Mid Channel	0	br	4.02
	1	br	4.04
	0	br+edr	4.04
	1	br+edr	4.04
	0	edr2	2.33
	1	edr2	2.30
	0	edr3	2.33
	1	edr3	2.32
High Channel	0	br	4.02
	1	br	4.05
	0	br+edr	4.07
	1	br+edr	4.02
	0	edr2	2.36
	1	edr2	2.32
	0	edr3	2.34
	1	edr3	2.31

2.7 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

2.7.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.7.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.7.3 Equipment Under Test and Modification State

Serial No: 00544211 and 00009077/ Test Configuration A and B

2.7.4 Date of Test/Initial of test personnel who performed the test

September 28 and October 03, 2012/FSC

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions

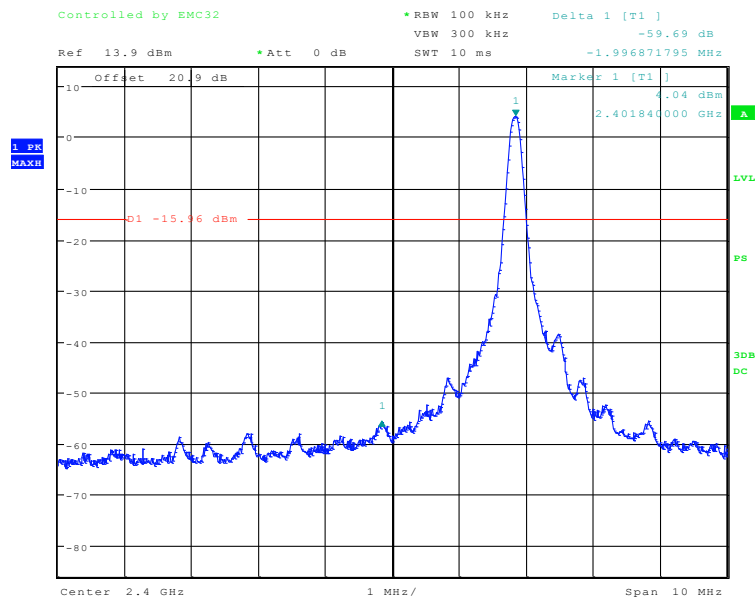
Ambient Temperature	21.0 and 23.5°C
Relative Humidity	41.5 and 47.4%
ATM Pressure	99.8 and 99.1 kPa

2.7.7 Additional Observations

- This is a conducted test.
- An offset of 20.9dB was added to compensate for the external attenuator and cable used.
- Span is wide enough to capture the peak level of the emission operating on the channel closest to the bandedge.
- RBW is $\geq 1\%$ of the span.
- VBW is $\geq$ RBW.
- Sweep is auto.

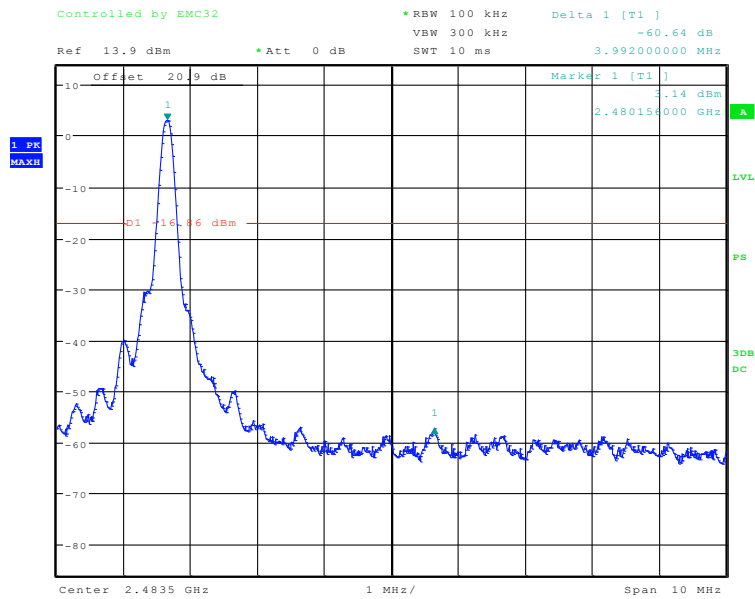
- Detector is peak.
- Trace is max hold.
- Trace allowed to stabilize. Marker-delta function used to verify compliance.
- Limit is 20dBc.
- Both Hopping and Non-Hopping mode verified.
- Only worst case modulation verified when in Non-Hopping mode (br+edr)

2.7.8 Test Results



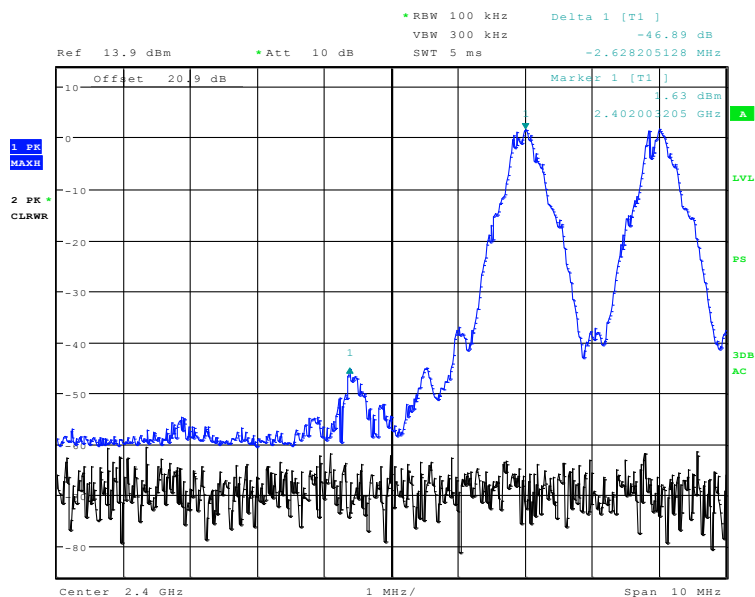
Date: 28.SEP.2012 15:16:27

Lower Band-Edge (Low Channel Symbol 0 Non-Hopping)



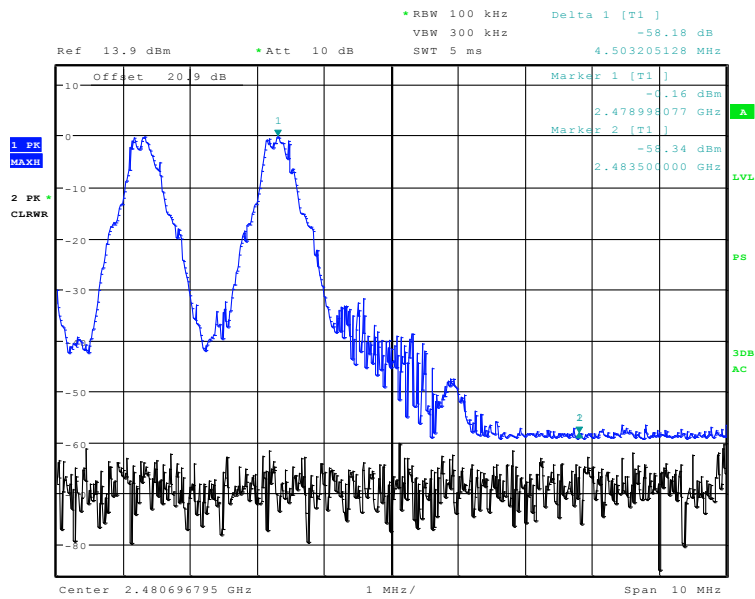
Date: 28.SEP.2012 15:19:37

Upper Band-Edge (High Channel Symbol 1 Non-Hopping)



Date: 3.OCT.2012 09:35:40

Lower Band-Edge (Hopping Mode)



Date: 3.OCT.2012 10:12:06

Upper Band-Edge (Hopping Mode)

2.8 SPURIOUS RF CONDUCTED EMISSIONS

2.8.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.8.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.8.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration A

2.8.4 Date of Test/Initial of test personnel who performed the test

September 28, 2012/LTS

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.6 Environmental Conditions

Ambient Temperature	23.5°C
Relative Humidity	47.4%
ATM Pressure	99.1 kPa

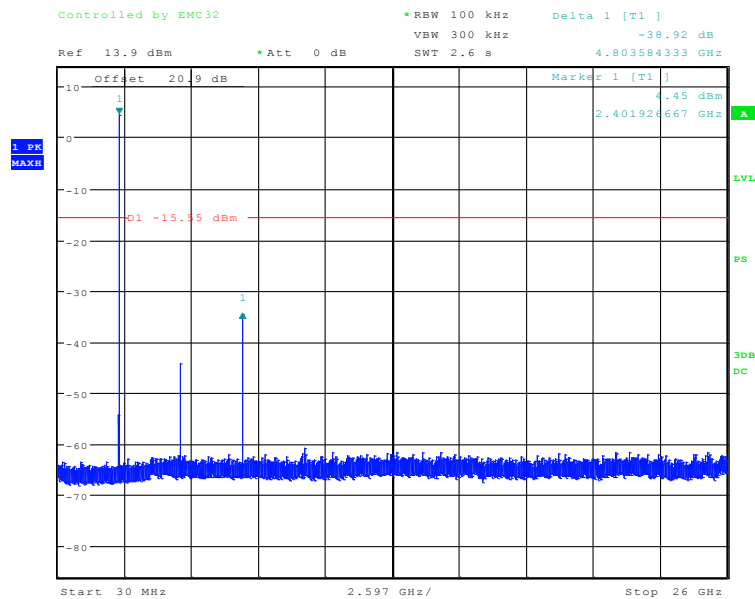
2.8.7 Additional Observations

- This is a conducted test.
- An offset of 20.9dB was added to compensate for the external attenuator and cable used.
- Span is from 30MHz up to 26GHz (to cover 10th harmonic of the High Channel).
- Sweep point setting of the spectrum analyzer is set to maximum (30001).
- RBW is 100kHz.
- VBW is ≥ RBW.
- Sweep is auto.
- Detector is peak.

- Trace is max hold.
- Trace allowed to stabilize. Marker-delta function used to verify compliance.
- Limit is 20dBc
- All modulation modulation verified.

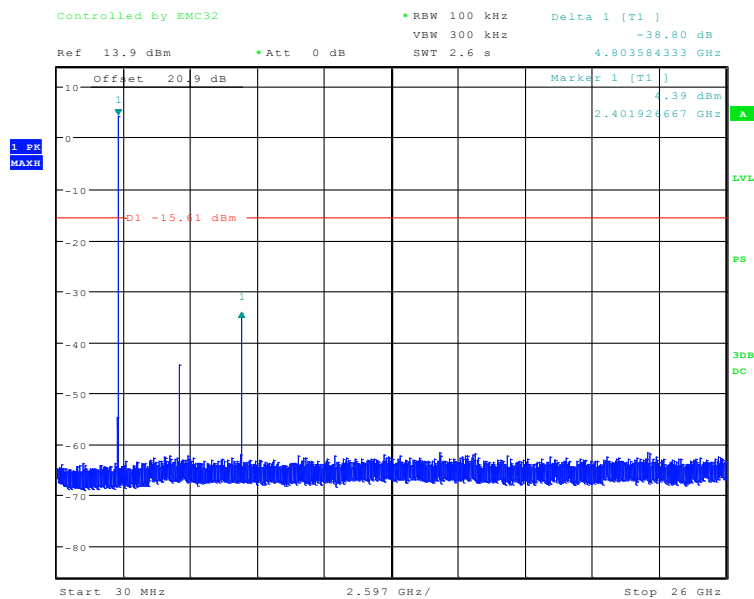
2.8.8 Test Results

See attached plots.



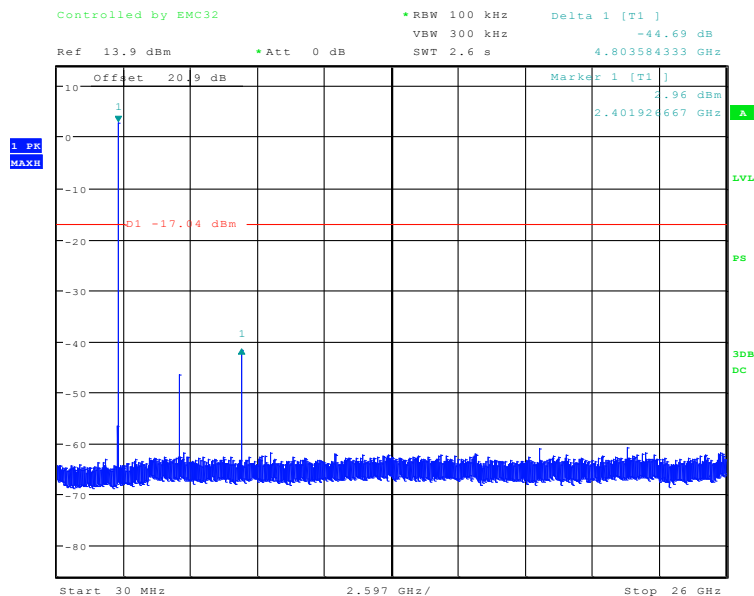
Date: 28.SEP.2012 13:30:45

Low Channel (br)



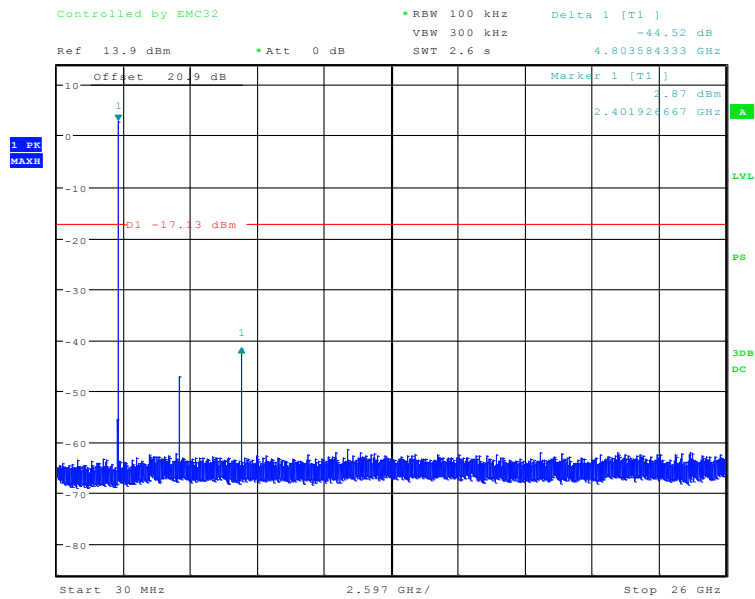
Date: 28.SEP.2012 13:32:38

Low Channel (br + edr)



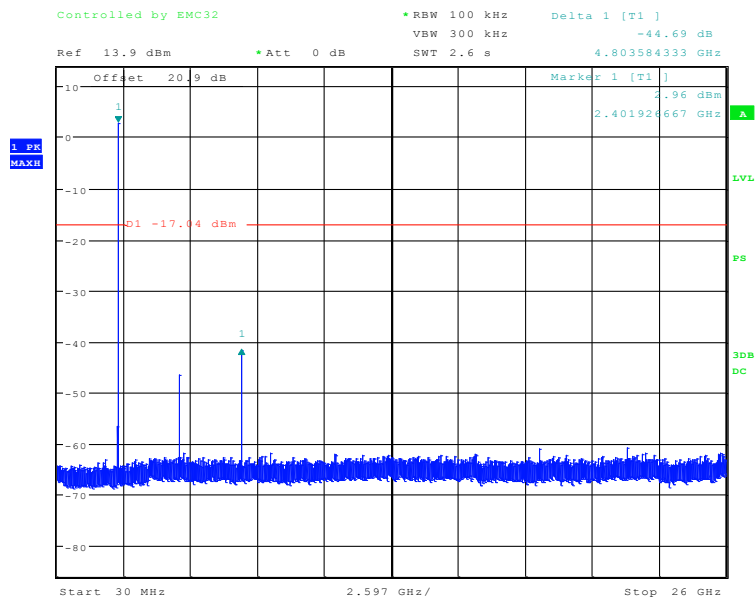
Date: 28.SEP.2012 13:34:39

Low Channel (edr2)



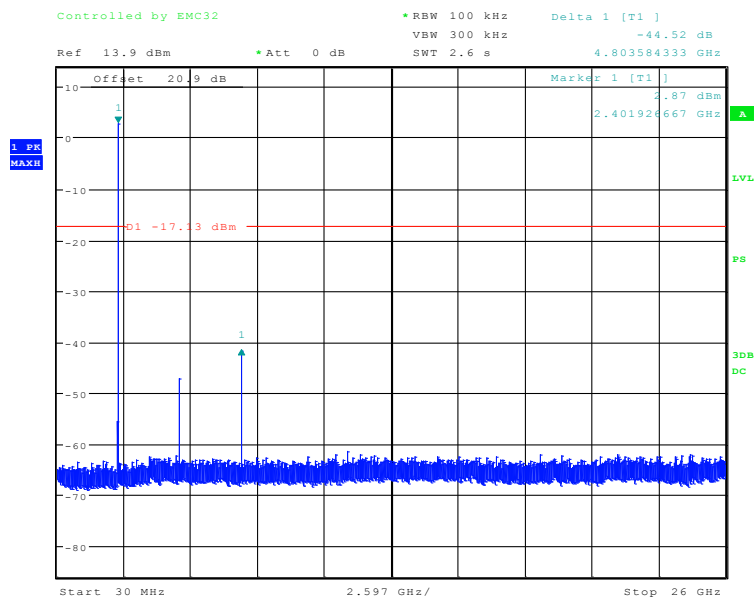
Date: 28.SEP.2012 13:36:38

Low Channel (edr3)



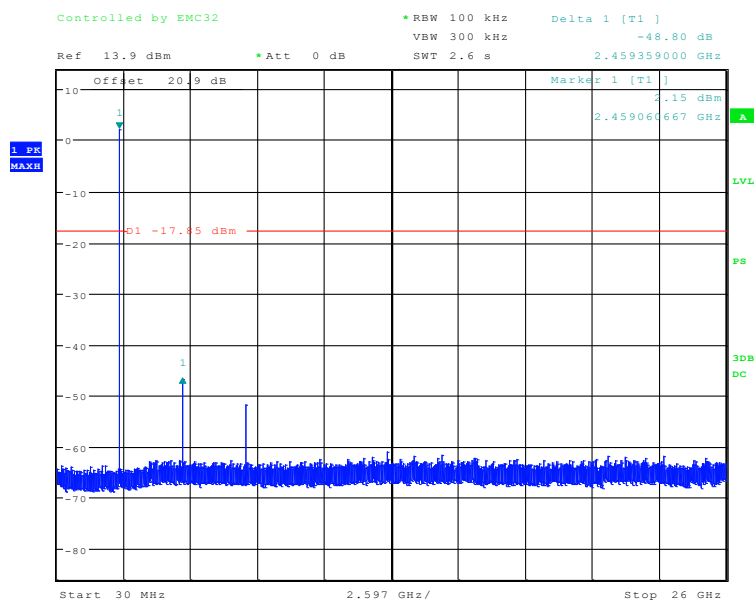
Date: 28.SEP.2012 13:34:39

Mid Channel (br)



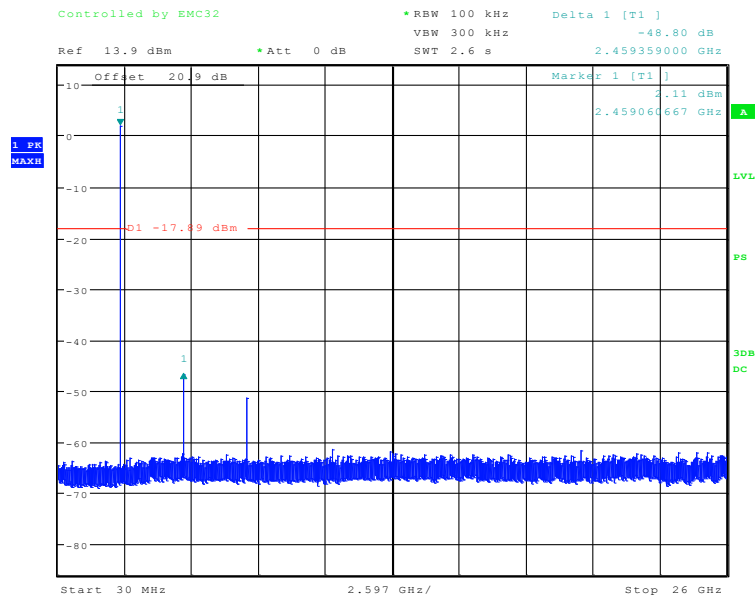
Date: 28.SEP.2012 13:36:38

Mid Channel (br + edr)



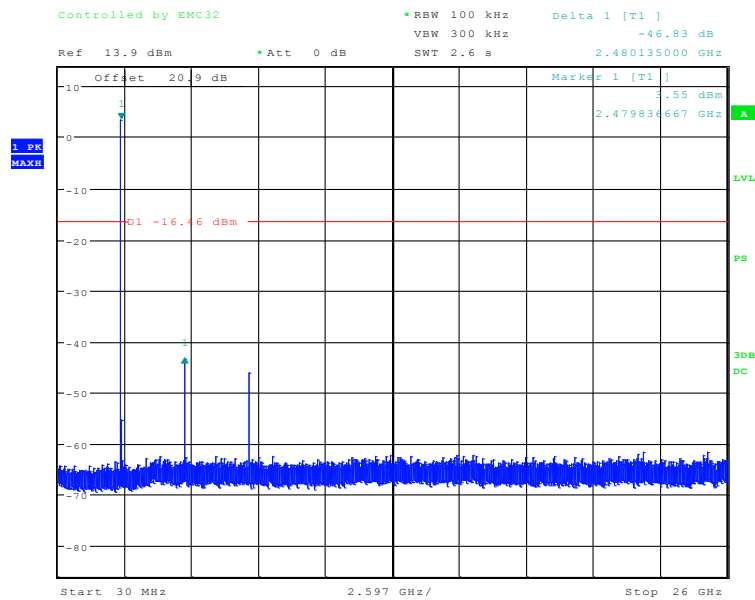
Date: 28.SEP.2012 14:03:01

Mid Channel (edr2)



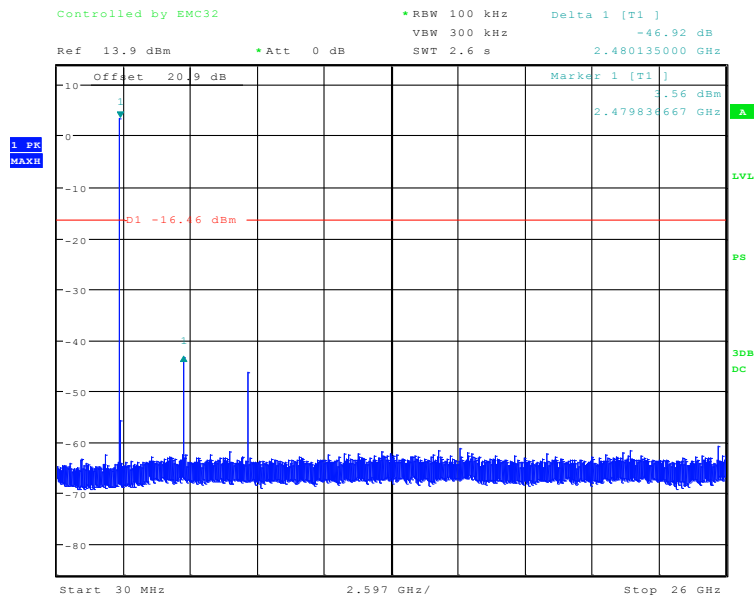
Date: 28.SEP.2012 14:04:37

Mid Channel (edr3)



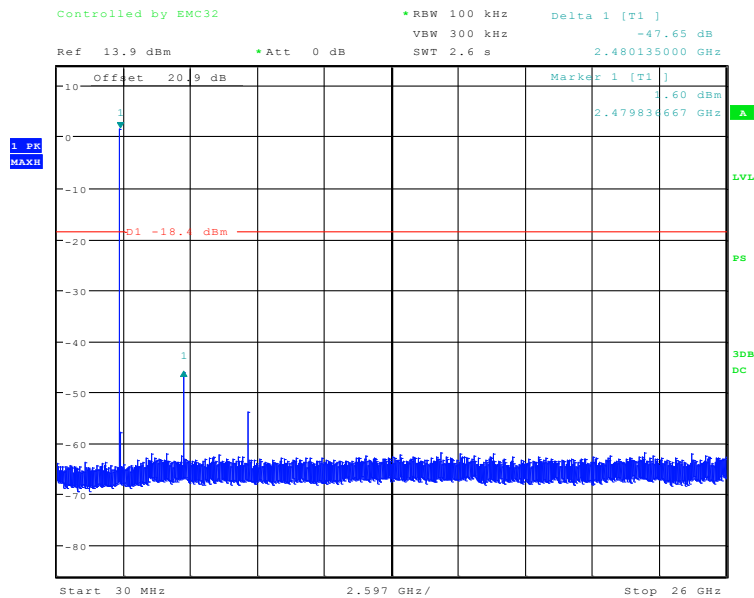
Date: 28.SEP.2012 13:38:47

High Channel (br)



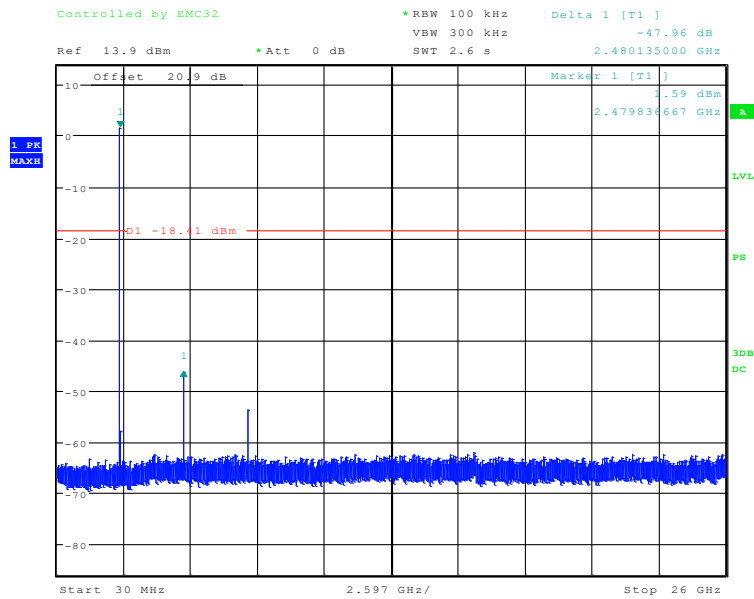
Date: 28.SEP.2012 13:40:05

High Channel (br + edr)



Date: 28.SEP.2012 13:41:43

High Channel (edr2)



Date: 28.SEP.2012 13:42:57

High Channel (edr3)



2.9 SPURIOUS RADIATED EMISSIONS

2.9.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.9.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.9.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration B

2.9.4 Date of Test/Initial of test personnel who performed the test

September 29 to September 30, 2012/FSC,LTS

2.9.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.6 Environmental Conditions

Ambient Temperature	23.5 to 24.6°C
Relative Humidity	48.5to 49.4%
ATM Pressure	99.2 to 99.8kPa

2.9.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic.
- There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Test procedure is consistent with those specified under C63.10.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.9.8 for sample computation.

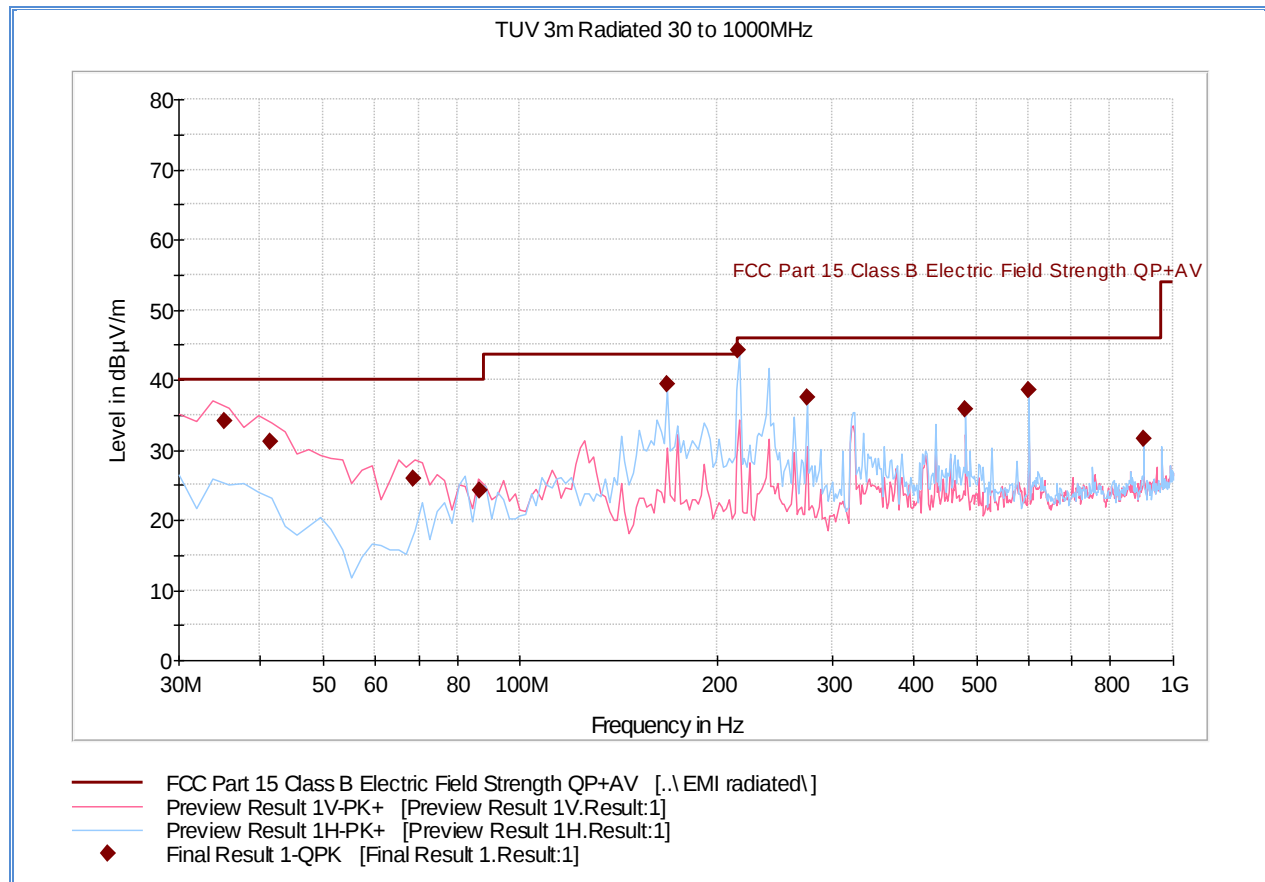
2.9.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db μ V) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (db μ V/m) @ 30MHz			11.8

2.9.9 Test Results

See attached plots.

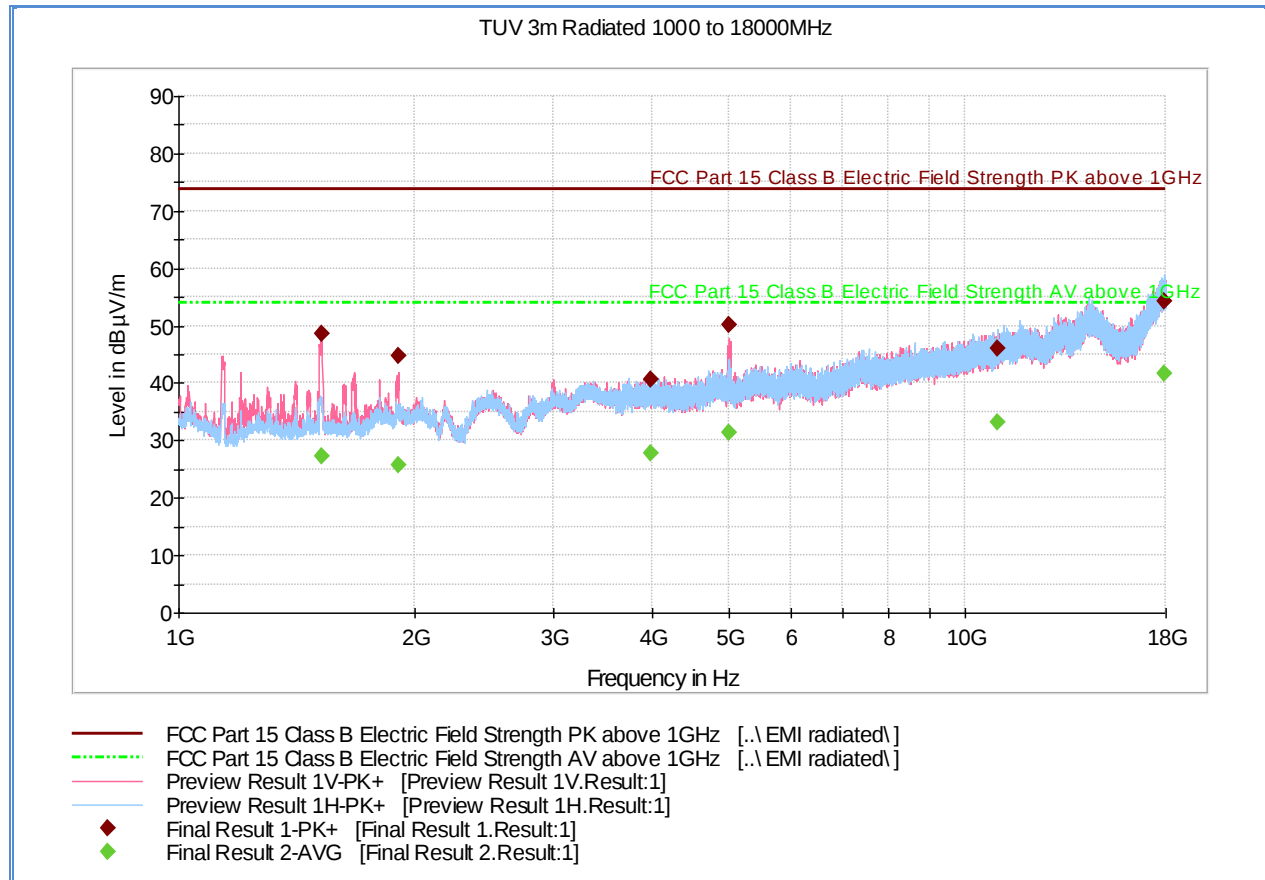
2.9.10 Test Results Below 1GHz (Receive Mode)



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
35.247776	34.1	1000.0	120.000	104.0	V	159.0	-14.8	5.9	40.0
41.367214	31.2	1000.0	120.000	106.0	V	206.0	-17.7	8.8	40.0
68.509980	25.8	1000.0	120.000	117.0	V	110.0	-21.8	14.2	40.0
86.772745	24.2	1000.0	120.000	100.0	V	294.0	-21.1	15.8	40.0
168.016032	39.3	1000.0	120.000	185.0	H	193.0	-17.3	4.2	43.5
216.013226	44.3	1000.0	120.000	125.0	H	5.0	-15.3	1.7	46.0
275.009860	37.5	1000.0	120.000	100.0	H	244.0	-12.5	8.5	46.0
480.021964	35.8	1000.0	120.000	157.0	H	158.0	-6.3	10.2	46.0
600.023006	38.5	1000.0	120.000	129.0	H	154.0	-5.5	7.5	46.0

2.9.11 Test Results Above 1GHz (Receive Mode)



Peak Data

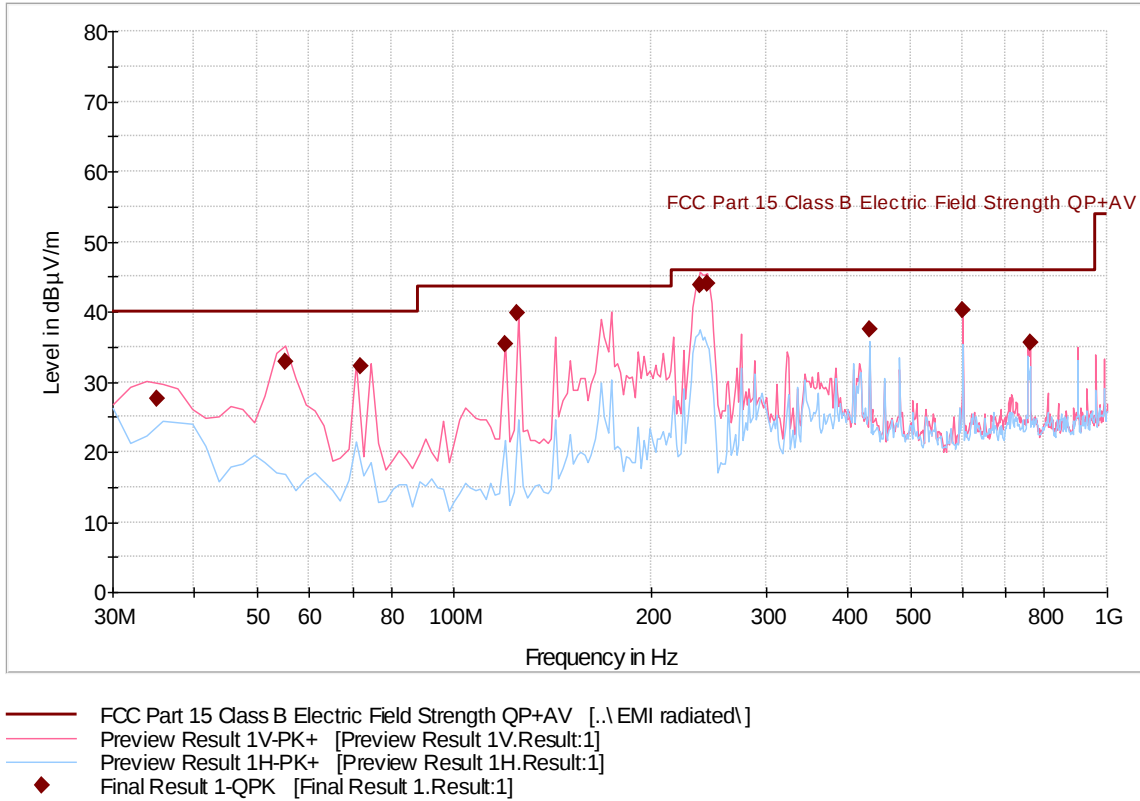
Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1519.773333	48.6	1000.0	1000.000	100.0	V	0.0	-9.0	25.3	73.9
1904.013333	44.7	1000.0	1000.000	100.0	V	286.0	-6.5	29.2	73.9
3986.553333	40.8	1000.0	1000.000	280.0	V	330.0	1.4	33.1	73.9
5004.166667	50.2	1000.0	1000.000	100.0	V	162.0	2.4	23.7	73.9
10982.30000	46.0	1000.0	1000.000	267.0	H	194.0	11.5	27.9	73.9
17920.07333	54.2	1000.0	1000.000	139.0	H	18.0	21.4	19.7	73.9

Average Data

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1519.773333	27.2	1000.0	1000.000	100.0	V	0.0	-9.0	26.7	53.9
1904.013333	25.7	1000.0	1000.000	100.0	V	286.0	-6.5	28.2	53.9
3986.553333	27.8	1000.0	1000.000	280.0	V	330.0	1.4	26.1	53.9
5004.166667	31.5	1000.0	1000.000	100.0	V	162.0	2.4	22.4	53.9
10982.30000	33.2	1000.0	1000.000	267.0	H	194.0	11.5	20.7	53.9
17920.07333	41.5	1000.0	1000.000	139.0	H	18.0	21.4	12.4	53.9

2.9.12 Test Results Below 1GHz (Transmit Low Channel br+edr)

TUV 3m Radiated 30 to 1000MHz

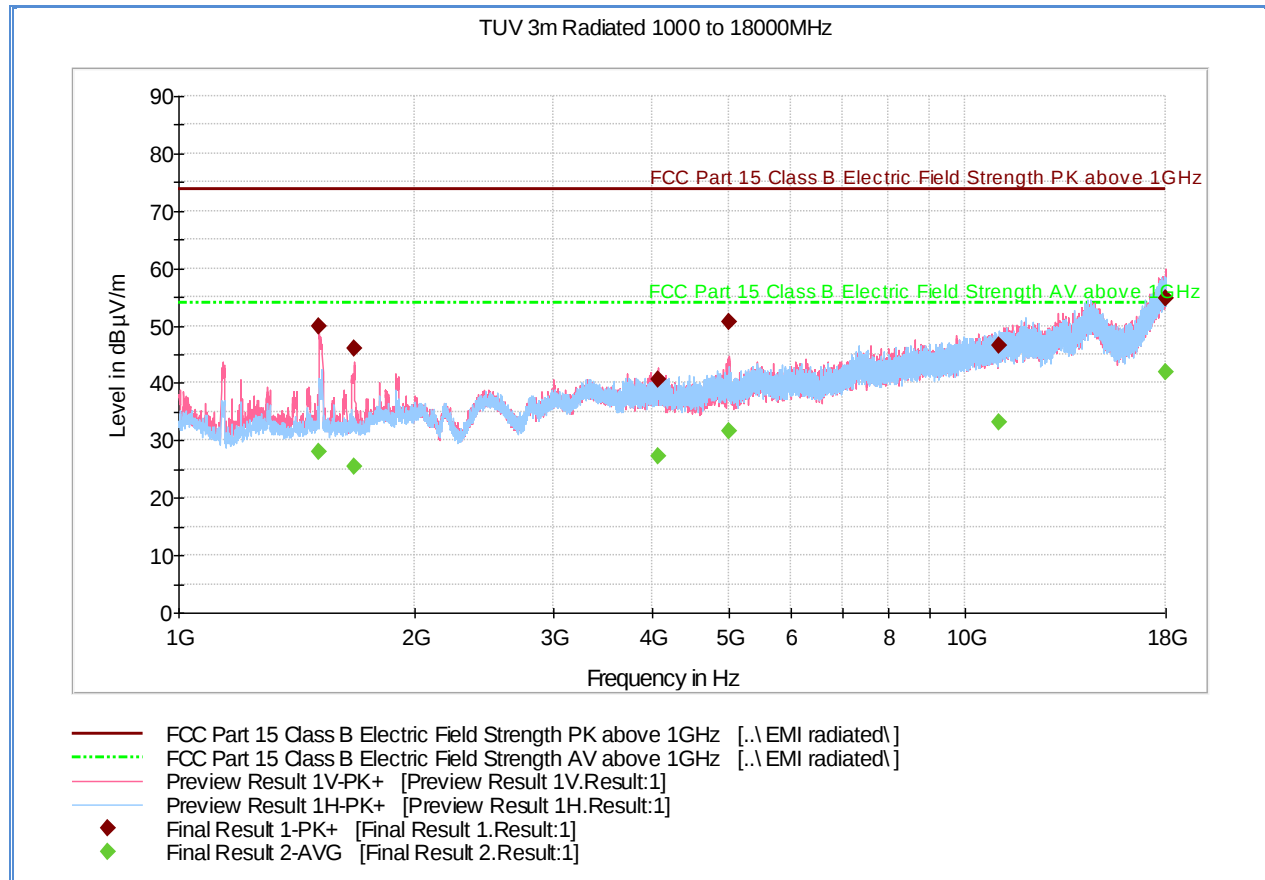


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
35.007776	27.5	1000.0	120.000	100.0	V	61.0	-14.6	12.5	40.0
55.030541	32.9	1000.0	120.000	100.0	V	145.0	-21.1	7.1	40.0
72.021643	32.1	1000.0	120.000	103.0	V	270.0	-21.9	7.9	40.0
120.018838	35.4	1000.0	120.000	103.0	V	250.0	-20.6	8.1	43.5
125.010501	39.8	1000.0	120.000	103.0	V	258.0	-20.7	3.7	43.5
238.475992	43.7	1000.0	120.000	213.0	V	206.0	-14.3	2.3	46.0
244.235431	43.9	1000.0	120.000	196.0	V	89.0	-14.0	2.1	46.0
432.024770	37.5	1000.0	120.000	143.0	H	203.0	-9.0	8.5	46.0
600.023006	40.3	1000.0	120.000	100.0	V	60.0	-5.5	5.7	46.0
761.485691	35.6	1000.0	120.000	100.0	V	144.0	-1.4	10.4	46.0

Test Notes: Only worst case channel presented for spurious emissions below 1GHz.

2.9.13 Test Results Above 1GHz (Low Channel)



Peak Data

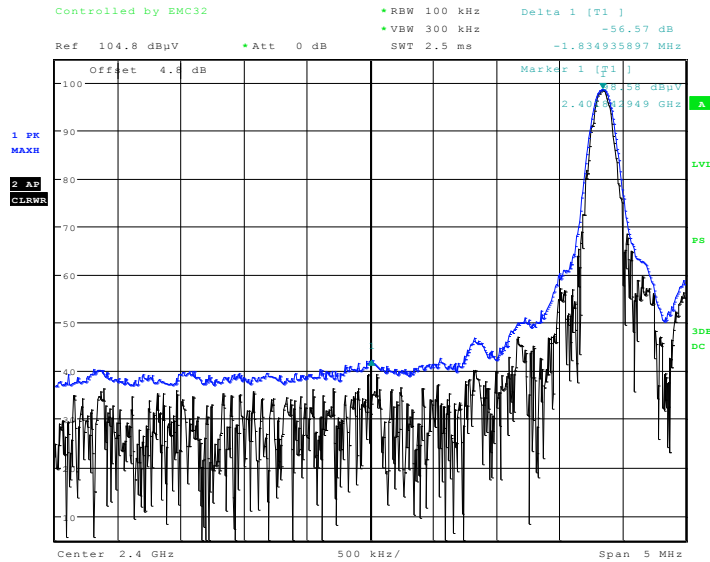
Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1510.186667	49.8	1000.0	1000.000	103.0	V	286.0	-9.0	24.1	73.9
1672.253333	46.1	1000.0	1000.000	115.0	V	92.0	-8.3	27.8	73.9
4064.913333	40.6	1000.0	1000.000	342.0	V	265.0	1.1	33.3	73.9
5007.893333	50.8	1000.0	1000.000	103.0	V	163.0	2.4	23.1	73.9
11058.793333	46.6	1000.0	1000.000	296.0	H	251.0	11.6	27.3	73.9
17989.860000	54.7	1000.0	1000.000	400.0	V	251.0	21.8	19.2	73.9

Average Data

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1510.186667	28.2	1000.0	1000.000	103.0	V	286.0	-9.0	25.7	53.9
1672.253333	25.5	1000.0	1000.000	115.0	V	92.0	-8.3	28.4	53.9
4064.913333	27.2	1000.0	1000.000	342.0	V	265.0	1.1	26.7	53.9
5007.893333	31.6	1000.0	1000.000	103.0	V	163.0	2.4	22.3	53.9
11058.793333	33.2	1000.0	1000.000	296.0	H	251.0	11.6	20.7	53.9
17989.860000	42.0	1000.0	1000.000	400.0	V	251.0	21.8	11.9	53.9

Test Notes: A 2.4 GHz notch filter was used during this test to avoid overloading of the measuring instrument.

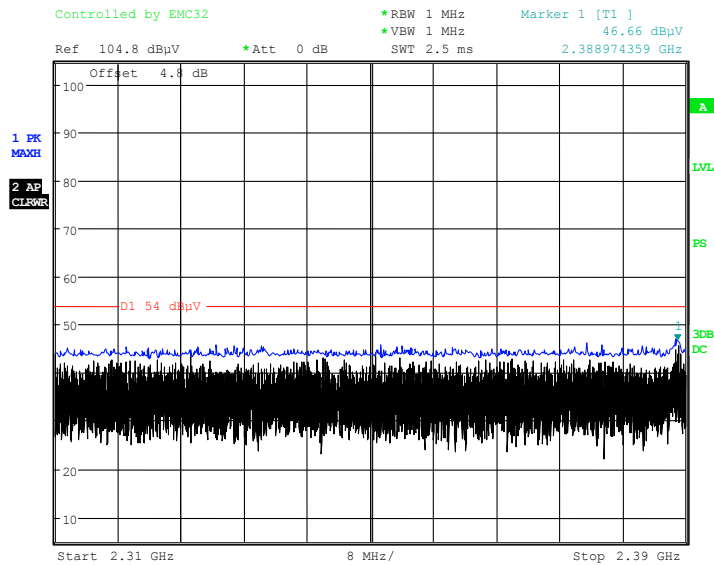
2.9.14 Test Results Lower Band Edge (Radiated - Low Channel using 100 kHz RBW)



Date: 1.OCT.2012 08:12:08

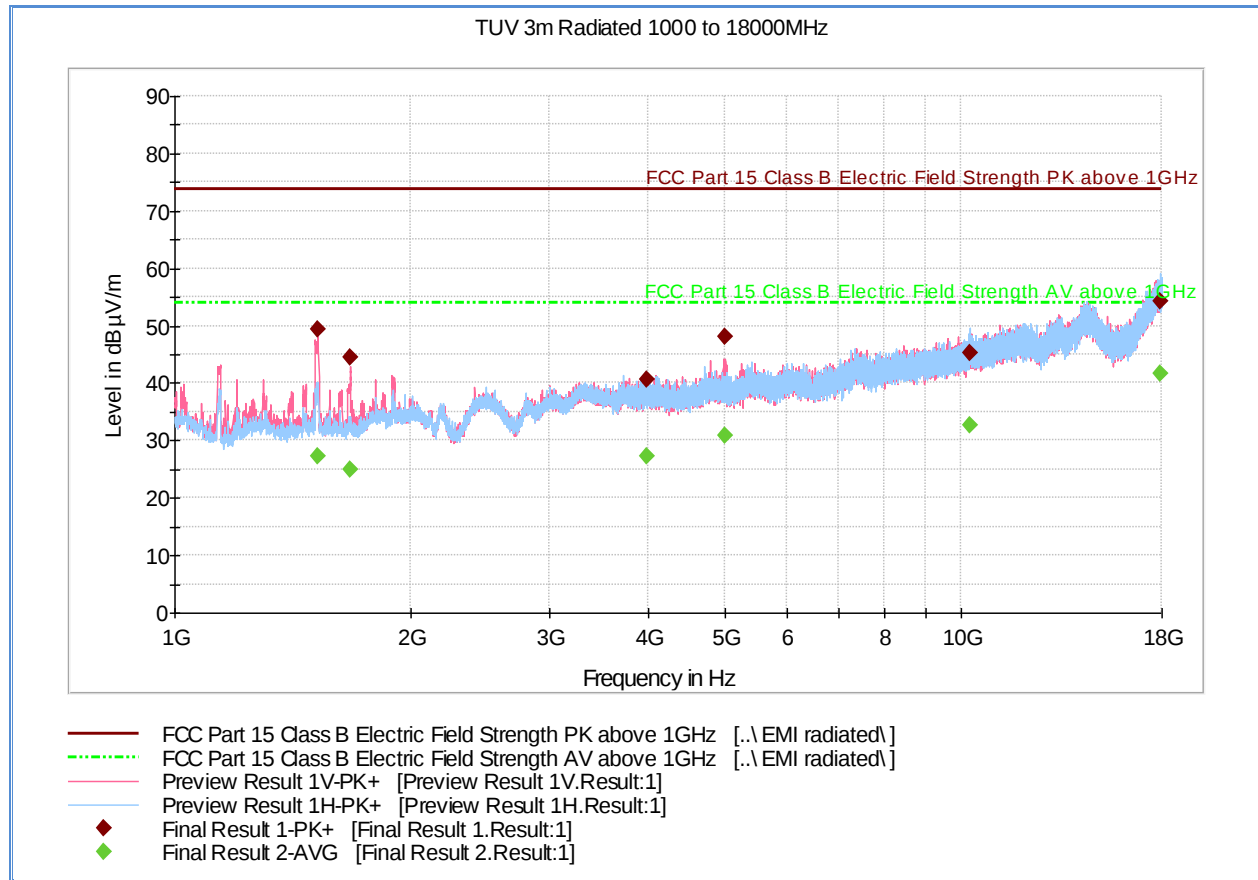
Test Notes: Carrier frequency (Low Channel) was maximized for this test. Correction factor of 4.8dB is from the cable, antenna and preamp used. Limit for this test is 20dBc.

2.9.15 Test Results Restricted Band (2310MHz to 2390MHz) Low Channel



Test Notes: Carrier frequency (Low Channel) was maximized for this test. Correction factor of 4.8dB is from the cable, antenna and preamp used. Peak complies with Average limit therefore no Average measurement performed.

2.9.16 Test Results Above 1GHz (Mid Channel)



Peak Data

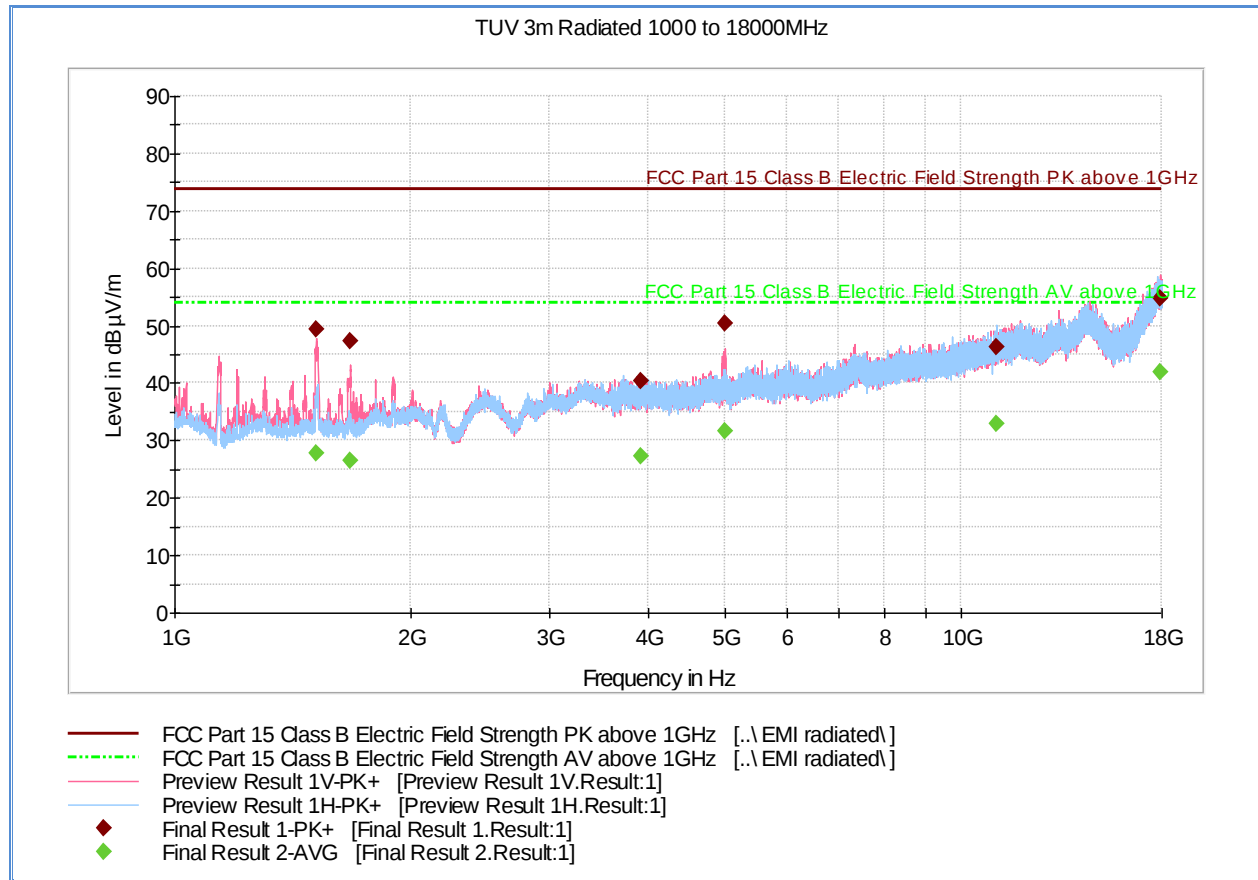
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1521.466667	49.3	1000.	1000.000	108.0	V	66.0	-9.0	24.6	73.9
1674.100000	44.6	1000.	1000.000	123.0	V	110.0	-8.3	29.3	73.9
3979.513333	40.6	1000.	1000.000	310.0	H	62.0	1.3	33.3	73.9
5002.186667	48.1	1000.	1000.000	103.0	V	154.0	2.4	25.8	73.9
10258.100000	45.3	1000.	1000.000	320.0	H	123.0	10.3	28.6	73.9
17890.173333	54.3	1000.	1000.000	316.0	H	159.0	21.3	19.6	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1521.466667	27.3	1000.0	1000.000	108.0	V	66.0	-9.0	26.6	53.9
1674.100000	24.8	1000.0	1000.000	123.0	V	110.0	-8.3	29.1	53.9
3979.513333	27.4	1000.0	1000.000	310.0	H	62.0	1.3	26.5	53.9
5002.186667	30.7	1000.0	1000.000	103.0	V	154.0	2.4	23.2	53.9
10258.100000	32.6	1000.0	1000.000	320.0	H	123.0	10.3	21.3	53.9
17890.173333	41.7	1000.0	1000.000	316.0	H	159.0	21.3	12.2	53.9

Test Notes: A 2.4 GHz notch filter was used during this test to avoid overloading of the measuring instrument.

2.9.17 Test Results Above 1GHz (High Channel - 802.11 b)



Peak Data

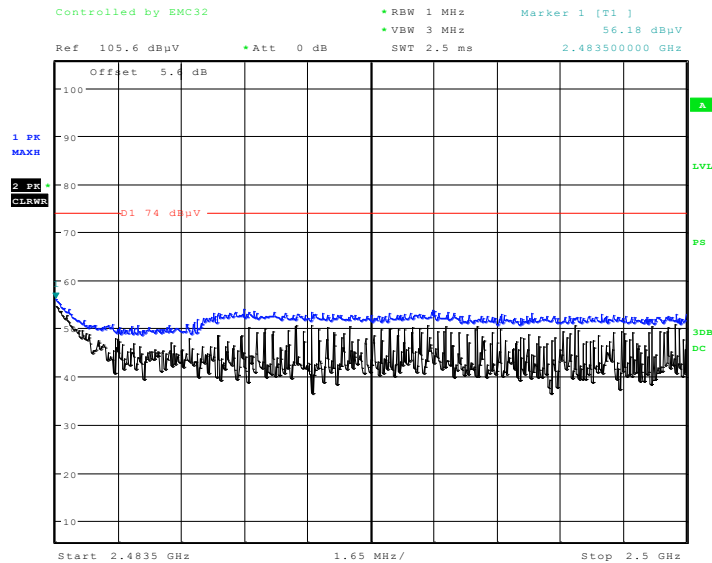
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1511.606667	49.3	1000.0	1000.000	103.0	V	278.0	-9.0	24.6	73.9
1674.513333	47.3	1000.0	1000.000	103.0	V	128.0	-8.3	26.6	73.9
3924.260000	40.5	1000.0	1000.000	170.0	V	328.0	1.1	33.4	73.9
5009.960000	50.4	1000.0	1000.000	103.0	V	162.0	2.4	23.6	73.9
11099.793333	46.4	1000.0	1000.000	304.0	H	326.0	11.7	27.5	73.9
17926.513333	54.9	1000.0	1000.000	142.0	V	204.0	21.5	19.0	73.9

Average Data

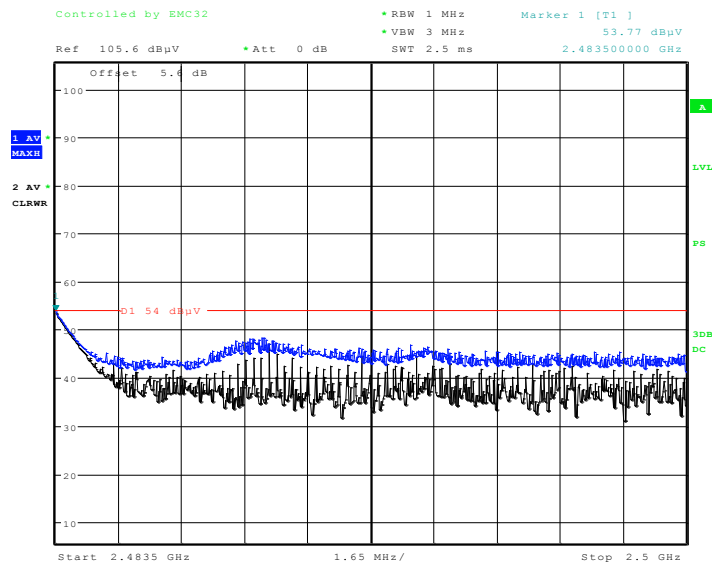
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1511.606667	27.8	1000.0	1000.000	103.0	V	278.0	-9.0	26.1	53.9
1674.513333	26.6	1000.0	1000.000	103.0	V	128.0	-8.3	27.3	53.9
3924.260000	27.2	1000.0	1000.000	170.0	V	328.0	1.1	26.7	53.9
5009.960000	31.5	1000.0	1000.000	103.0	V	162.0	2.4	22.4	53.9
11099.793333	33.0	1000.0	1000.000	304.0	H	326.0	11.7	20.9	53.9
17926.513333	41.8	1000.0	1000.000	142.0	V	204.0	21.5	12.1	53.9

Test Notes: A 2.4 GHz notch filter was used during this test to avoid overloading of the measuring instrument.

2.9.18 Test Results Restricted Band (2483.5MHz to 2500MHz)



Date: 1.OCT.2012 08:23:54



Date: 1.OCT.2012 08:24:28

Test Notes: Carrier frequency (High Channel) was maximized for this test. Correction factor of 5.6dB is from the cable, antenna and preamp used. Peak and Average measurement performed.

2.10 RECEIVER SPURIOUS EMISSIONS

2.10.1 Specification Reference

RSS-Gen 6.0

2.10.2 Standard Applicable

Receivers shall comply with the limits of spurious emissions set out in this section, measured over the frequency range determined in accordance with Section 4.10 of RSS-Gen.

Table 2: Radiated Limits of Receiver Spurious Emissions

Frequency (MHz)	Field Strength (microvolts/m at 3 metres)*
30-88	100
88-216	150
216-960	200
Above 960	500

*Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7 of RSS-Gen.

2.10.3 Equipment Under Test and Modification State

Serial No: 00544211 / Test Configuration B

2.10.4 Date of Test/Initial of test personnel who performed the test

September 29 to September 30, 2012/FSC,LTS

2.10.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.6 Environmental Conditions

Ambient Temperature	23.5 to 24.6°C
Relative Humidity	48.5to 49.4%
ATM Pressure	99.2 to 99.8kPa

2.10.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 3rd harmonic (up to 10th performed).
- Result identical to Section 2.9.10 and 2.9.11 of this test report.
- EUT in RX (Receive) mode configuration.



SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Conducted Port Setup						
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
7569	Series Power Meter	N1911A P-	MY45100625	Agilent	02/24/12	02/24/14
7570	50MHz-18GHz Wideband Power Sensor	N1921A	MY45240588	Agilent	02/14/12	02/24/13
Radiated Test Setup						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	12/06/11	12/06/12
6669	Double-ridged waveguide horn antenna	3115	94124364	EMCO	11/07/11	11/07/12
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	08/17/12	08/17/13
1153	High-frequency cable	SucoFlex 100 SX	N/A	Suhner	08/17/12	08/17/13
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	08/17/12	08/17/13
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/10/12	08/10/13
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
1016	Pre-amplifier	PAM-0202	187	PAM	08/17/12	08/17/13
6815	2.4GHz Band Notch Filter	BRM50702	008	Micro-Tronics	Verified by 1040	
1150	Horn antenna	RA42-K-F-4B-C	012054-004	CMT	Verified by 1003 and 1049	
1151	Pre-amplifier	TS-PR26	100026	Rhode & Schwarz	Verified by 1003 and 1049	
Miscellaneous						
1072	DC Power Supply	E3610A	KR51311519	Hewlett Packard	Verified by 6452	
6452	Multimeter	3478A	2911A52177	Hewlett Packard	07/16/12	07/16/13
1003	Signal Generator	SMR-40	1104.0002.4 0	Rhode & Schwarz	10/13/11	10/13/12
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	07/12/12	07/12/13
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Emission Measurements (Below 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	3.55	2.05	4.20
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.23
Coverage Factor (k):					2
Expanded Uncertainty:					4.45

3.2.2 Radiated Emission Measurements (Above 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	3.55	2.05	4.20
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.22
Coverage Factor (k):					2
Expanded Uncertainty:					4.44

3.2.3 Conducted Antenna Port Measurement

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.50	0.29	0.08
3	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					0.72
Coverage Factor (k):					2
Expanded Uncertainty:					1.45

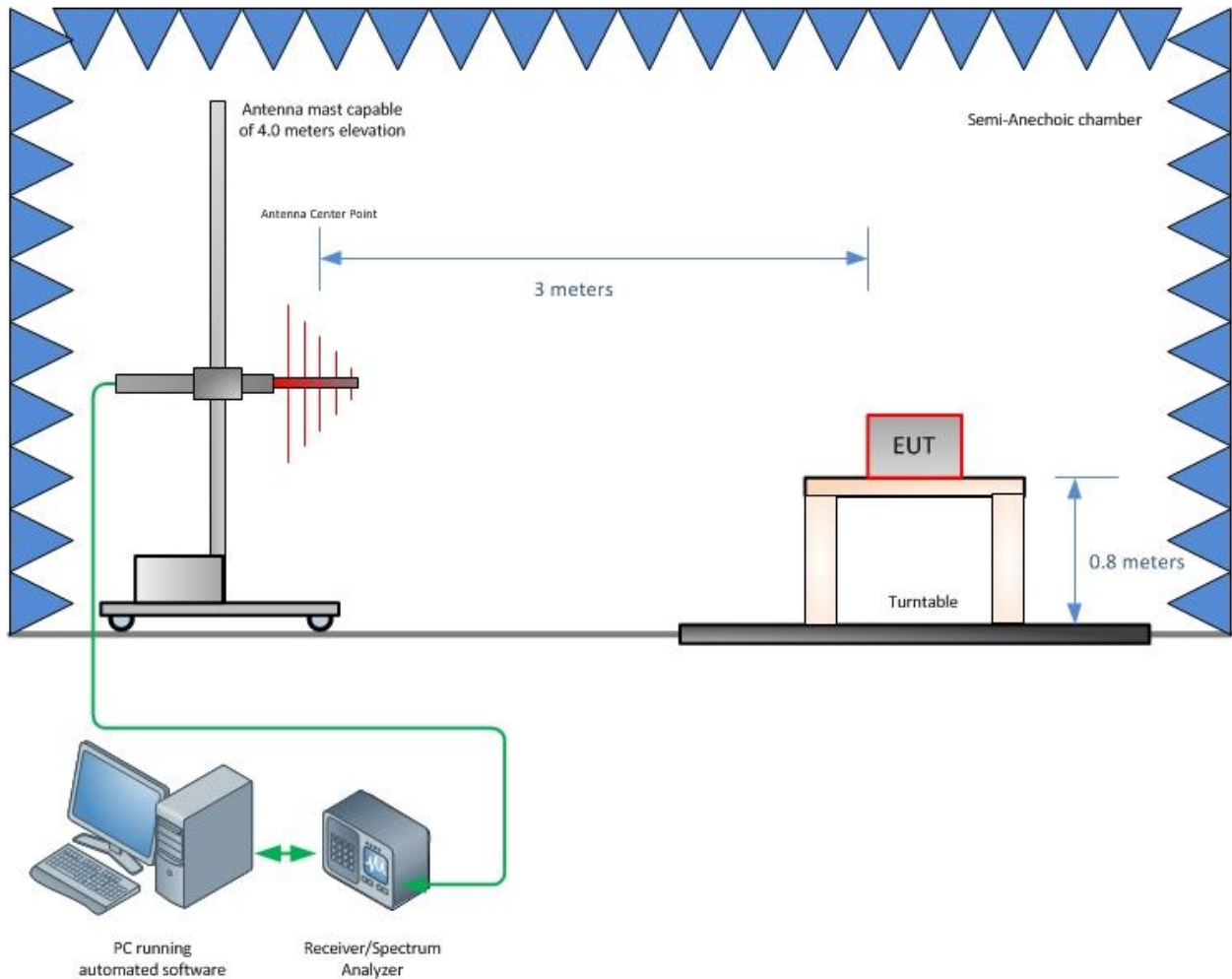
3.2.4 Conducted Emissions Measurement

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.36	0.21	0.04
2	Cables	Rectangular	0.50	0.29	0.08
3	LISN	Rectangular	0.66	0.38	0.15
	Attenuator	Rectangular	0.30	0.17	0.03
Combined Uncertainty (u_c):					0.80
Coverage Factor (k):					2
Expanded Uncertainty:					1.59

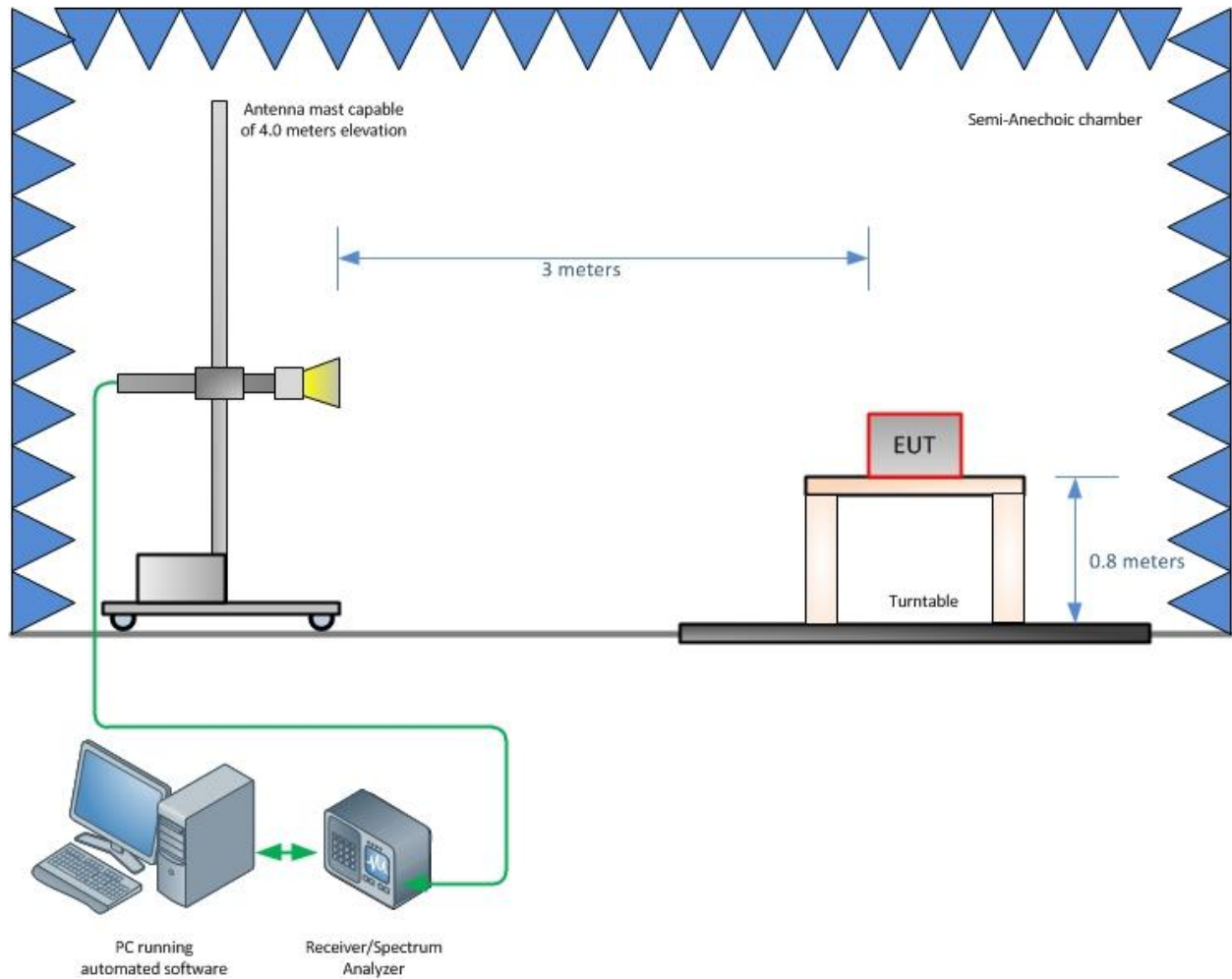
SECTION 4

DIAGRAM OF TEST SETUP

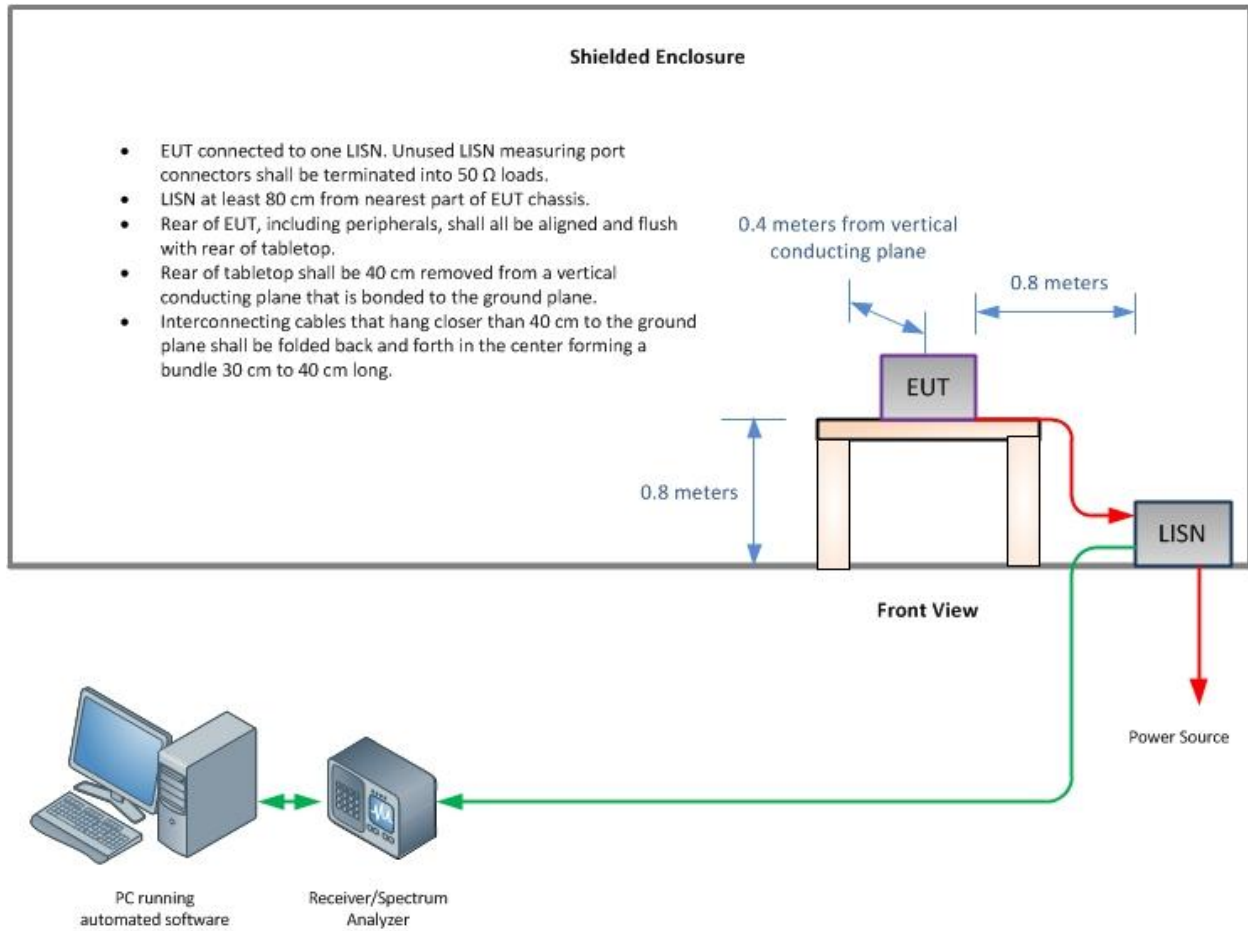
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)





SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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