EN 300 328 v1.8.1

BLE TEST REPORT

FOR

BLE RADIO MODULE

MODEL NUMBER: BCM20732S, BCM20736S, BCM20737S

REPORT NUMBER: 14U19243-E1

ISSUE DATE: NOVEMBER 11, 2014

Prepared for
BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A.

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/11/14	Initial Issue	H. Mustapha

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086, U.S.A.
EUT DESCRIPTION:	BLE RADIO MODULE
MODEL:	BCM20732S, BCM20736S, BCM20737S
SERIAL NUMBER:	1869321 (FOR CONDUCTED TESTING) 375 (FOR RADIATED TESTING)
DATE TESTED:	NOVEMBER 3 – NOVEMBER 6, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
EN 300 328 v1.8.1	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

Huda Mustapha

HUDA MUSTAPHA
PROJECT LEAD
UL Verification Services Inc.

Tested By:

JOEY GOMEZ
WiSE ENGINEER
UL Verification Services Inc.

FRANK IBRAHIM
PROGRAM MANAGER
UL Verification Services Inc.

2. TEST METHODOLOGY

All tests were performed in accordance with the procedures documented in EN 300 328 v1.8.1.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☐ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency	±3.5 x 10^(-8)
Total RF power, conducted	±0.47 dB
RF power density, conducted	±0.55 dB
Spurious emissions, conducted	±2.94 dB
All emissions, radiated	±5.64 dB
Temperature	±0.9 deg C
Humidity	±4.5 % RH
DC and low frequency voltages	±0.45 %

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a BLE radio module.

The radio module is manufactured by Broadcom Corporation

5.2. DESCRIPTION OF MODEL DIFFERENCE

1. BCM20732S – Base Part; Basic BLE function in the original limited SIP certification.

2. BCM20736S – Adds Simultaneous Master Slave and A4WP to BCM20732S; All have the same circuit but with additional Software features. This change doesn't affect the radio parameters from base model BCM20732S.

3. BCM20737S – Adds RSA Security and NFC bridging capabilities to the BCM20736S. All have the same circuit but with additional Software features. This change doesn't affect the radio parameters from base model BCM20732S.

The BCM20736S has one HW change. It has a pin strap to ground to be used by software to distinguish between the BCM20736S and the BCM20737S. This pin strap does NOT affect any of the radio parameters.

5.3. MAXIMUM EIRP

The highest EIRP under normal and extreme environmental conditions in each mode is as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	0.26	1.06

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of -1.5 dBi.

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was A_20738A1-bleloopback-rom-ram-spar_0x600218-0x7555_2

The test utility software used during testing was Broadcom Bluetool, ver. 1.8.1.7.

5.6. WORST-CASE CONFIGURATIONS

For the fundamental investigation, since the EUT is a portable device that has three orientations; X, Y and Z orientations were investigated under previous report 13U15716-3 and the worst case was found to be at X orientation. X orientation was used for the radiated testing covered by this report.

EUT does not have AFH mode. Also, measured EIRP is less than 10 dBm; therefore, the EUT is exempt from the following requirements:

- Duty Cycle, Tx-Sequence, Tx-Gap
- Medium Utilisation
- Adaptivity
- Receiver Blocking

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
Laptop	HP	EliteBook 2730p	2CE84601JN
AC / DC Adapter	HP	PPP009H	F1-09070642140A
EUT - Adapter Board	BROADCOM	BCM920732TAG	1746850

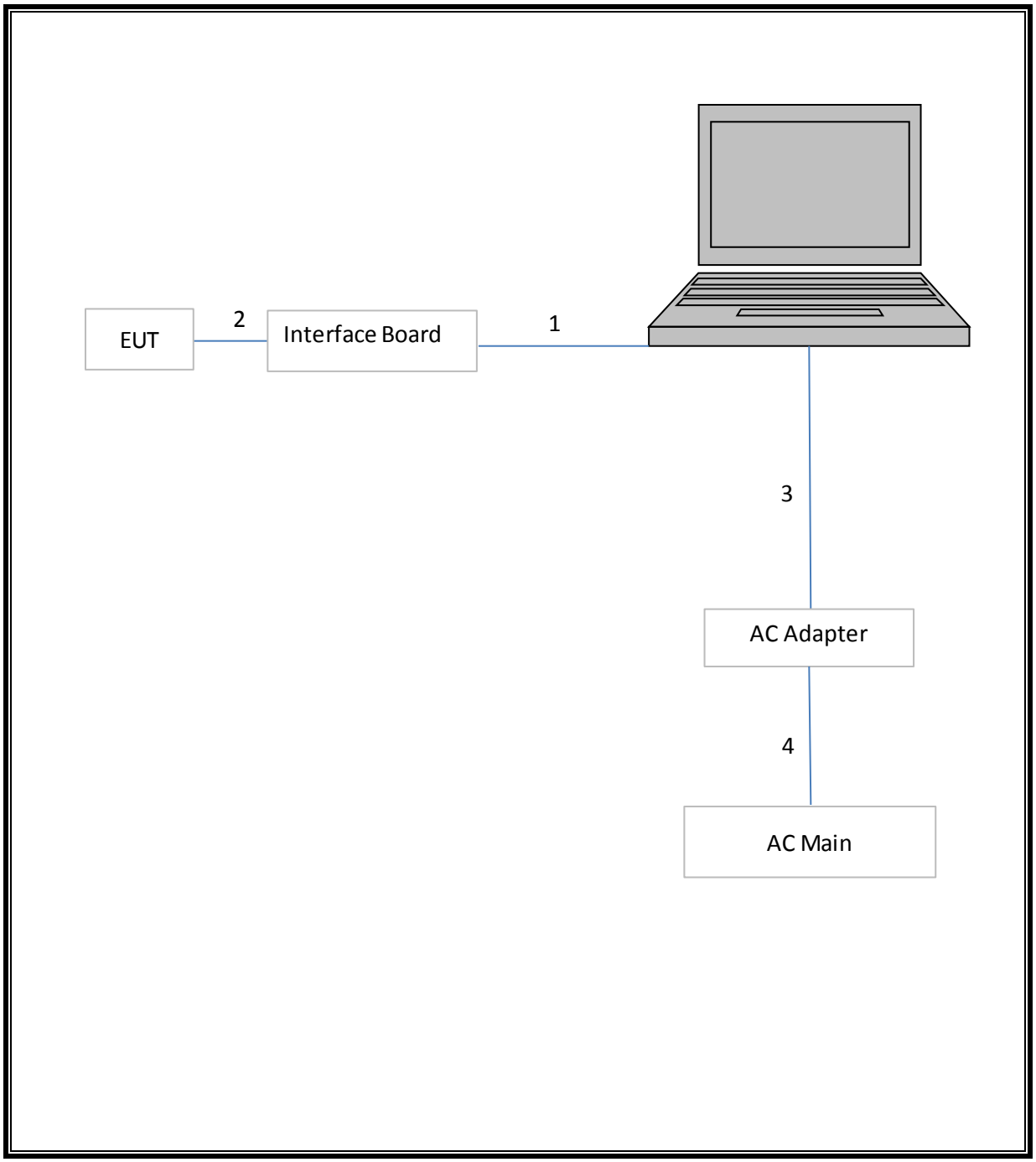
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	Unshielded	1.8m	N/A
2	JTAG	1	JTAG	Unshielded	0.3m	N/A
3	DC	1	DC	Unshielded	1.5m	N/A
4	AC	1	US 115V	Shielded	1.5m	N/A

TEST SETUP

The EUT is connected to an interface board via JTAG cables. The interface board is connected via USB to a laptop.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Spectrum Analyzer, 3 Hz-44GHz	Agilent	N9030A	F00491	05/09/14	05/09/15
Amplifier	Miteq	AFS42-0010180	F00002	08/19/14	08/19/15
Antenna, Horn 1-18GHz	ETS Lindgren	3117	C01022	02/28/14	02/28/15
Antenna, 30 to 2000MHz	Sunol Sciences	JB3	F00215	05/29/14	05/29/15
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14	01/09/15
Spectrum Analyzer, 3 Hz-44GHz	Agilent	N9030A-544	F00410	03/21/14	03/21/15
USB RF Power Sensor, 10MHz- 6GHz	ETS Lindgren	7002-006	T1021	08/25/14	08/25/15

7. TEST RESULTS

7.1. NORMAL AND EXTREME CONDITIONS

LIMITS

None; for reporting purposes only.

RESULTS

The normal and extreme conditions as declared by the customer are as follows:

Normal conditions are 25 deg C, 3.3 VDC.
The low temperature condition is -20 deg C.
The high temperature condition is 55 deg C.
The low voltage condition is 1.62 VDC.
The high voltage condition is 3.63 VDC.

7.2. OCCUPIED CHANNEL BANDWIDTH

LIMIT

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within 2.4 to 2.4835 GHz.

For non-adaptive Frequency Hopping equipment with e.i.r.p greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the value declared by the supplier. This declared value shall not be greater than 5MHz.

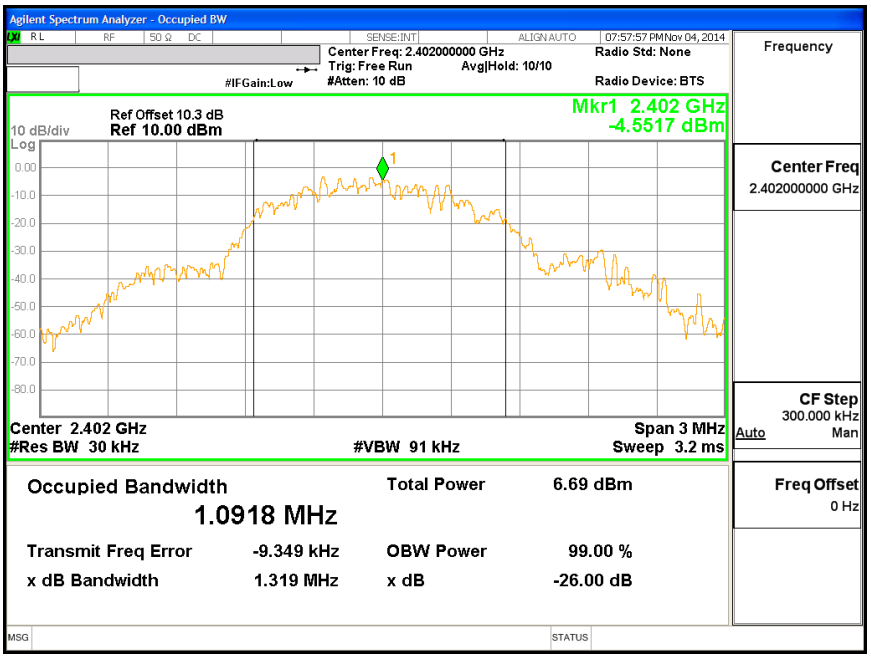
TEST PROCEDURE

ETSI EN 300 328 V1.8.1 Section 5.3.8.2.1

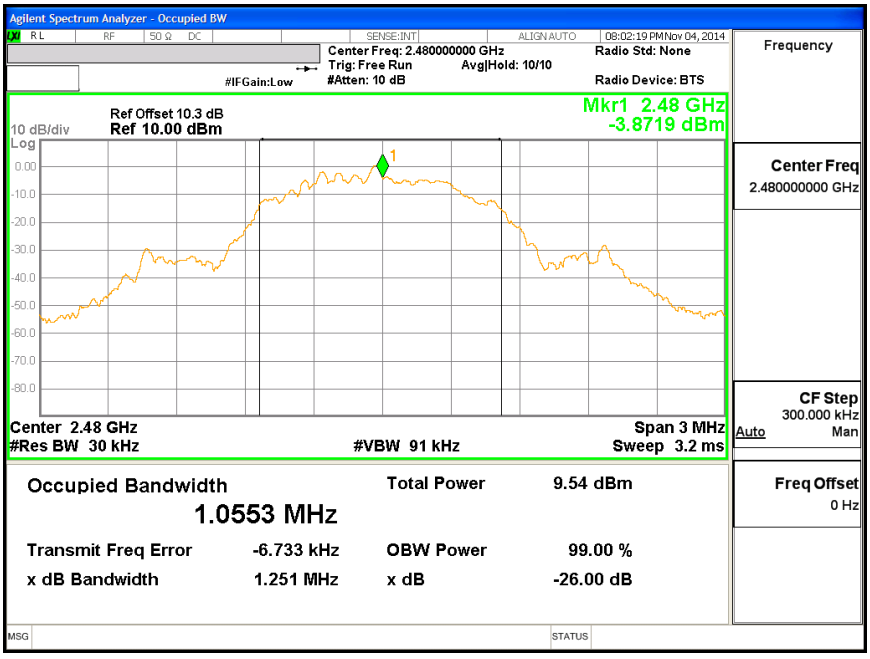
RESULTS

Mode	Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)	Margin (MHz)
BLE				
Low Channel	2402	1.0918	2400.00	-1.4541
High Channel	2480	1.0553	2483.50	-4.0276

BANDWIDTH LOW CH



BANDWIDTH HIGH CH



7.3. RF OUTPUT POWER

LIMIT

ETSI EN 300 328 Clause 4.3.2.1.2 (Non-AFH Wide Band Modulations)

For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. See clause 5.3.1 m).

For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

TEST PROCEDURE

ETSI EN 300 328 Clause 5.3.2.2.1.1

CALCULATIONS

EIRP = A + G + Y

Where,

EIRP is the effective isotropic radiated power in dBm
A is the highest of all Pburst values as measured by the test system in dBm
G is stated assembly antenna gain of the individual antenna in dBi
Y is any additional beam-forming gain

RESULTS

Antenna Gain	-1.5 dBi

Condition	Counducted Output Power (dBm)	EIRP (dBm)	Limit (dB)	Margin (dB)
2402 MHz				
Normal	1.71	0.21	20	-19.79
Extreme T low, V low	1.76	0.26	20	-19.74
Extreme T low, V high	1.74	0.24	20	-19.76
Extreme T high, V low	1.15	-0.35	20	-20.35
Extreme T high, V high	1.13	-0.37	20	-20.37
2440 MHz				
Normal	1.71	0.21	20	-19.79
Extreme T low, V low	1.75	0.25	20	-19.75
Extreme T low, V high	1.74	0.24	20	-19.76
Extreme T high, V low	1.16	-0.34	20	-20.34
Extreme T high, V high	1.13	-0.37	20	-20.37
2480 MHz				
Normal	1.71	0.21	20	-19.79
Extreme T low, V low	1.73	0.23	20	-19.77
Extreme T low, V high	1.75	0.25	20	-19.75
Extreme T high, V low	1.15	-0.35	20	-20.35
Extreme T high, V high	1.12	-0.38	20	-20.38

7.4. POWER SPECTRAL DENSITY

LIMIT

ETSI EN 300 328 Clause 4.3.2.2

For wide band modulations other then FHSS (e.g. DSSS, OFDM, etc.), the maximum e.i.r.p. spectral density is limited to 10 mW (10 dBm) per MHz.

TEST PROCEDURE

ETSI EN 300 328 Clause 5.3.3.2.1

RESULTS

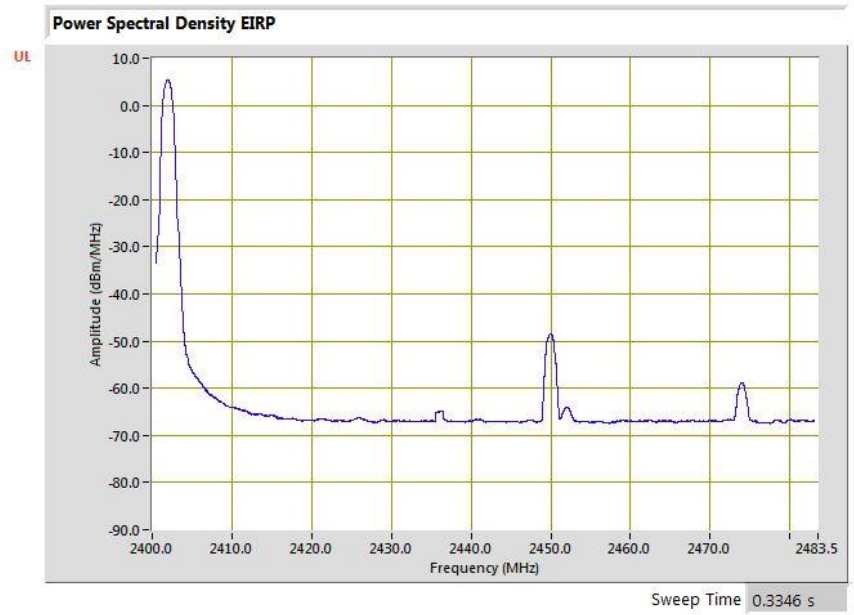
EUT Antenna Gain (dBi)	-1.5

Frequency (MHz)	Power Density EIRP (dBm/MHz)	Limit EIRP (dBm/MHz)	Margin (dB)
2402	5.24	10	-4.76
2440	5.57	10	-4.43
2480	5.00	10	-5.00

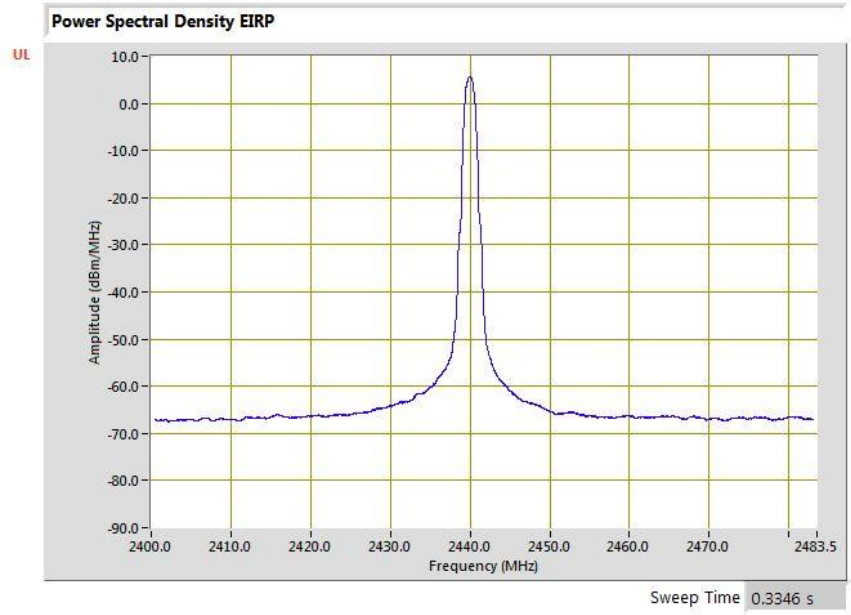
Note: Measured Density values account for EUT Antenna gain

POWER DENSITY PLOTS

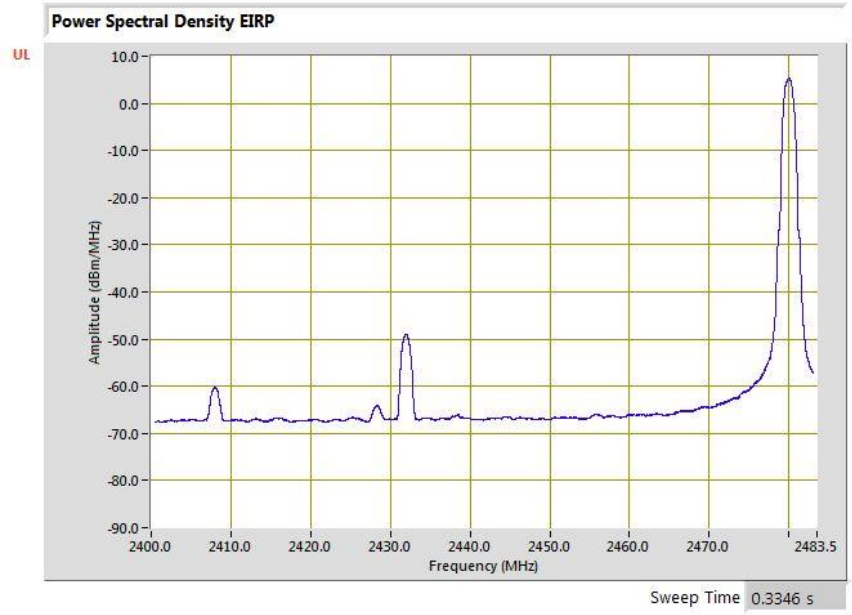
POWER DENSITY LOW



POWER DENSITY MID



POWER DENSITY HIGH



7.5. TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

LIMIT

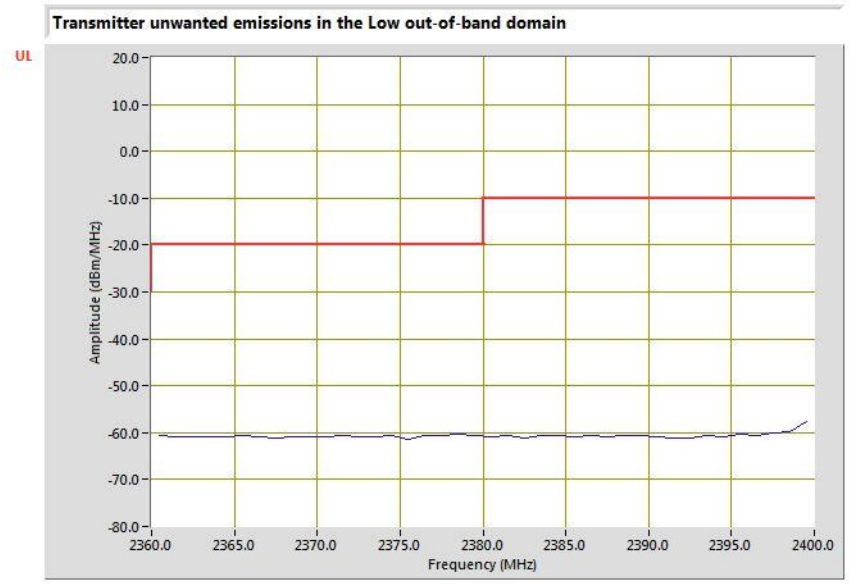
ETSI EN 300 328 Clause 4.3.1.8.2

TEST PROCEDURE

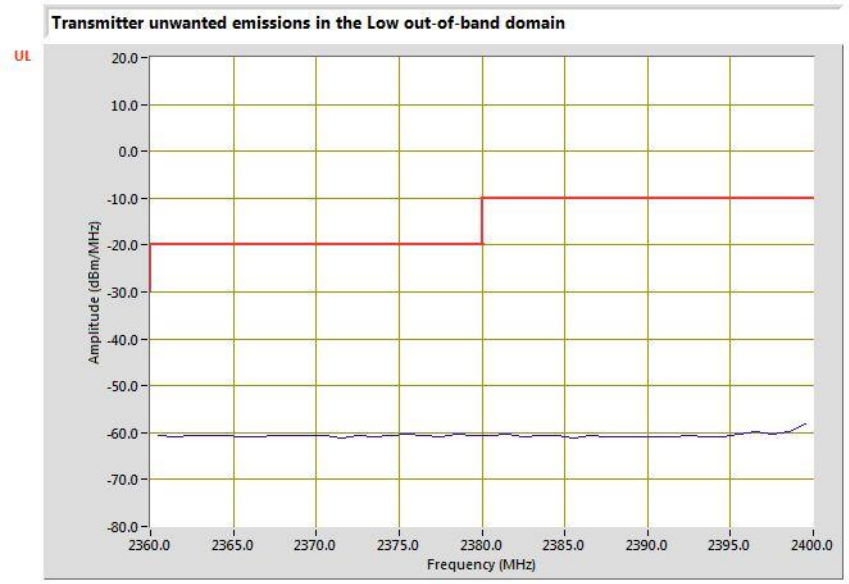
Reference to clause 5.3.9.2.1 of ETSI EN 300 328 V1.8.1 (2012-06)

RESULTS

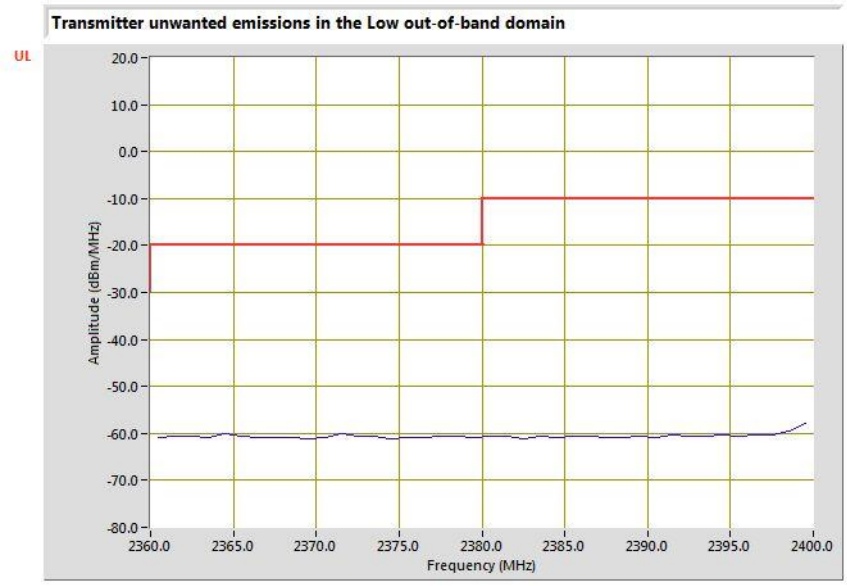
LOW CHANNEL (Normal Condition)



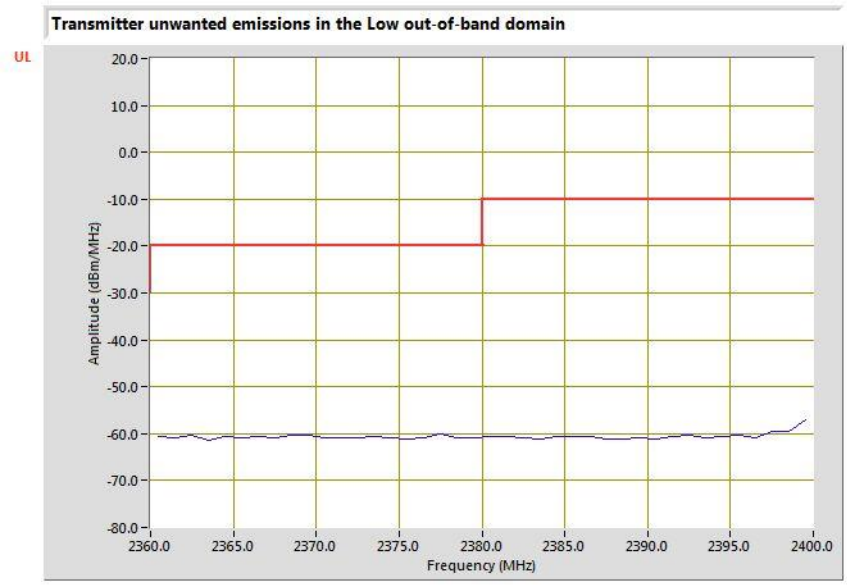
LOW CHANNEL (T low, V low Condition)



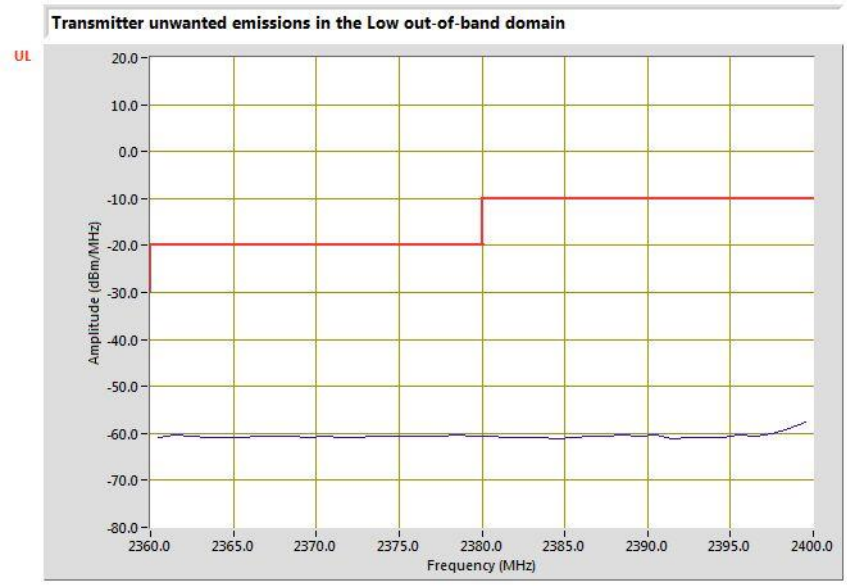
LOW CHANNEL (T low, V high Condition)



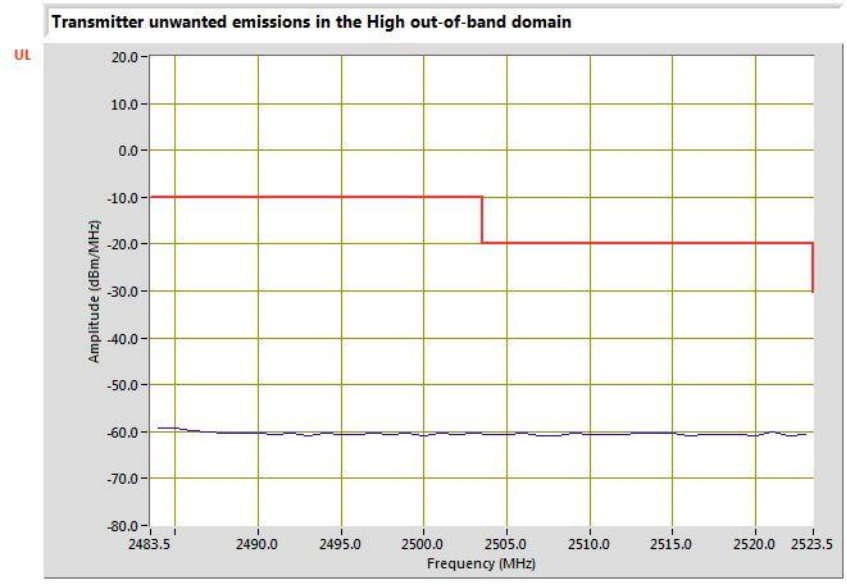
LOW CHANNEL (Thigh, V low Condition)



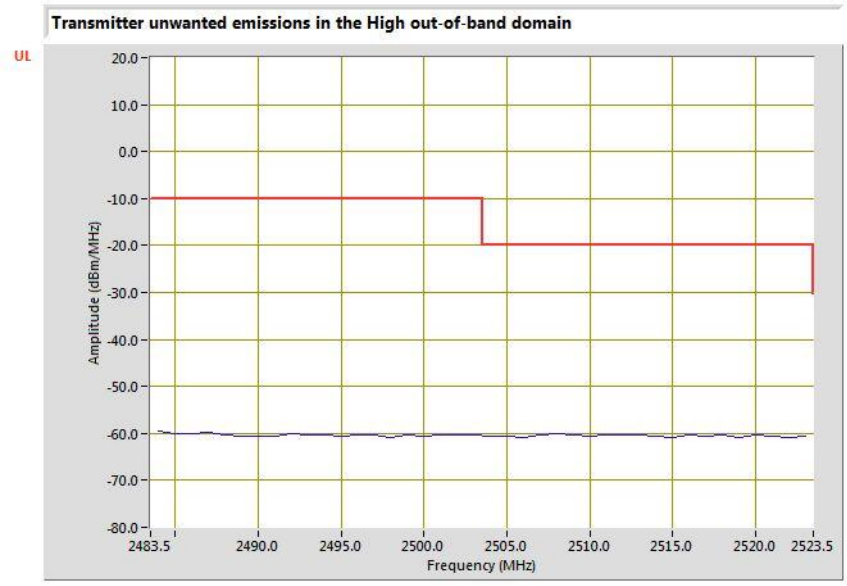
LOW CHANNEL (Thigh, V high Condition)



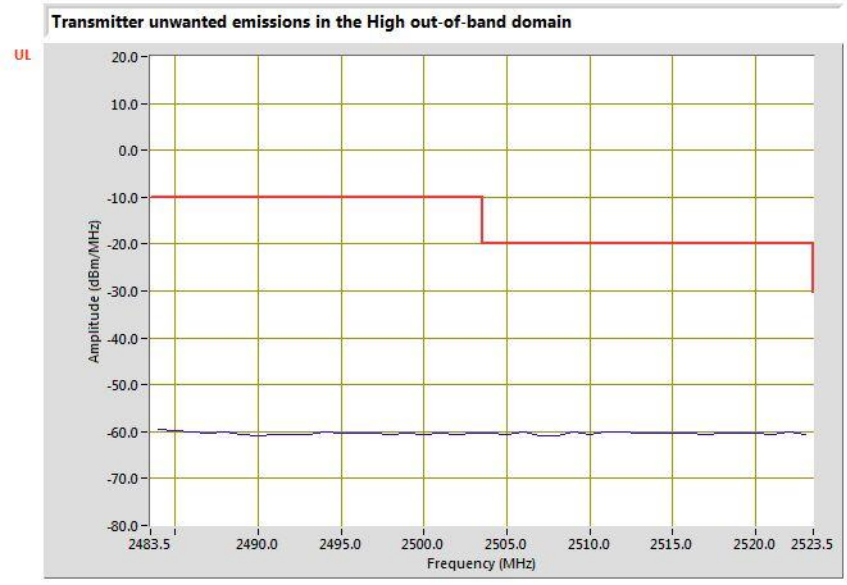
HIGH CHANNEL (Normal Condition)



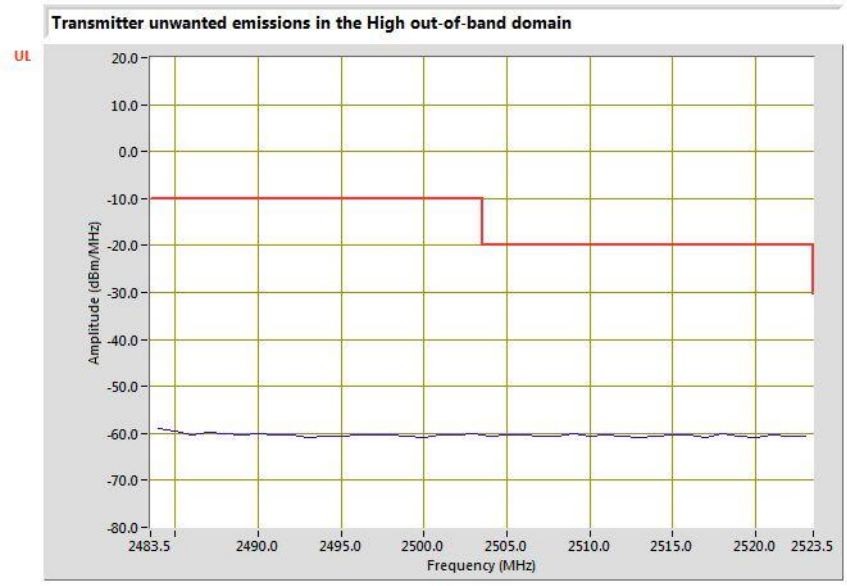
HIGH CHANNEL (T low, V low Condition)



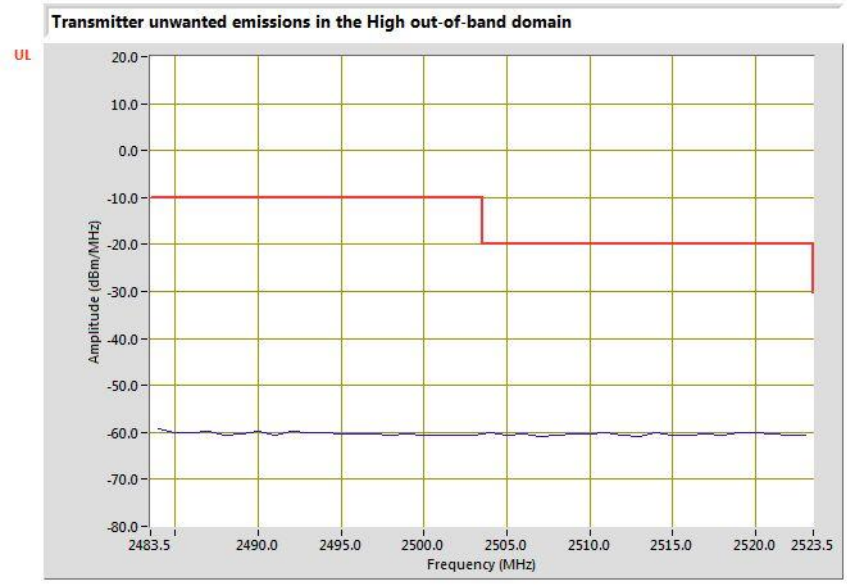
HIGH CHANNEL (T low, V high Condition)



HIGH CHANNEL (T high, V low Condition)



HIGH CHANNEL (T high, V high Condition)



7.6. TRANSMITTER SPURIOUS EMISSIONS

LIMITS

ETSI EN 300 328 Clause 4.3.2.8.2

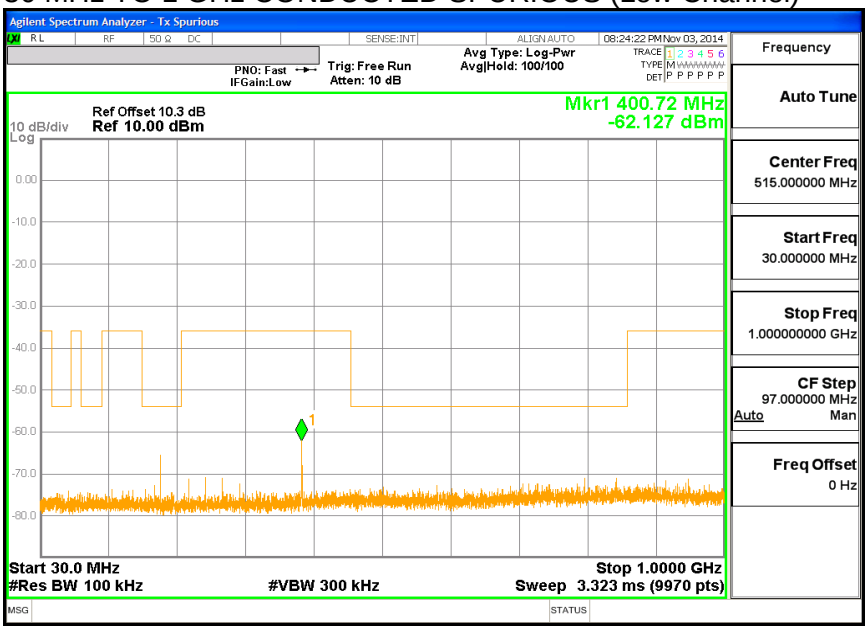
TEST PROCEDURE

EN 300 328 Clause 5.3.10.2 of ETSI EN 300 328 V1.8.1 (2012-06)

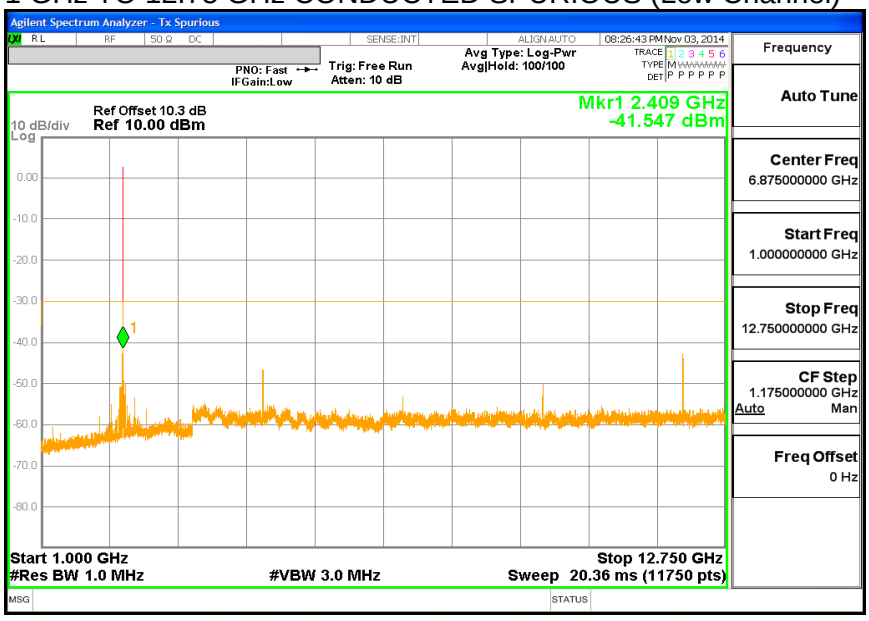
RESULTS

CONDUCTED SPURIOUS EMISSIONS

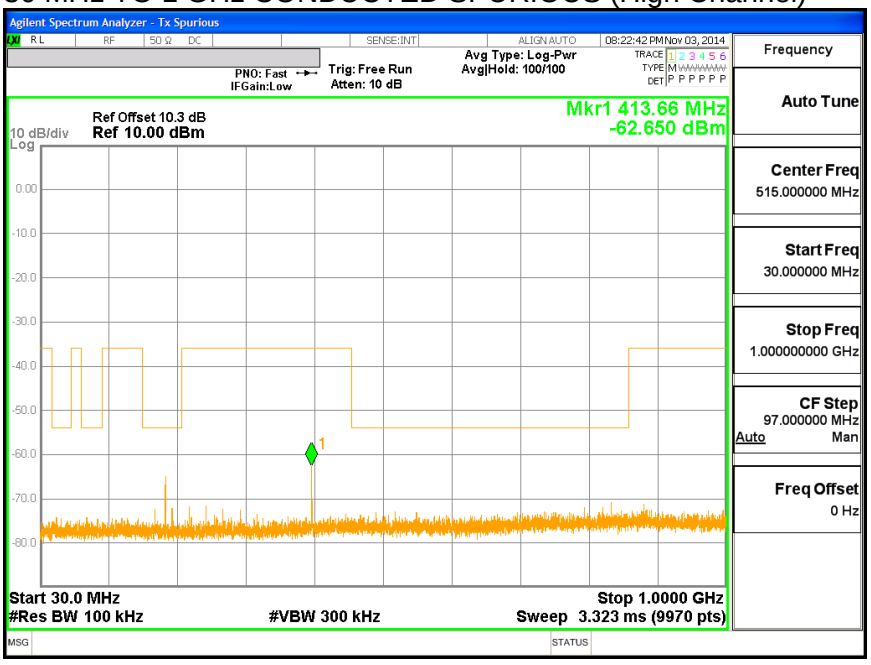
30 MHz TO 1 GHz CONDUCTED SPURIOUS (Low Channel)



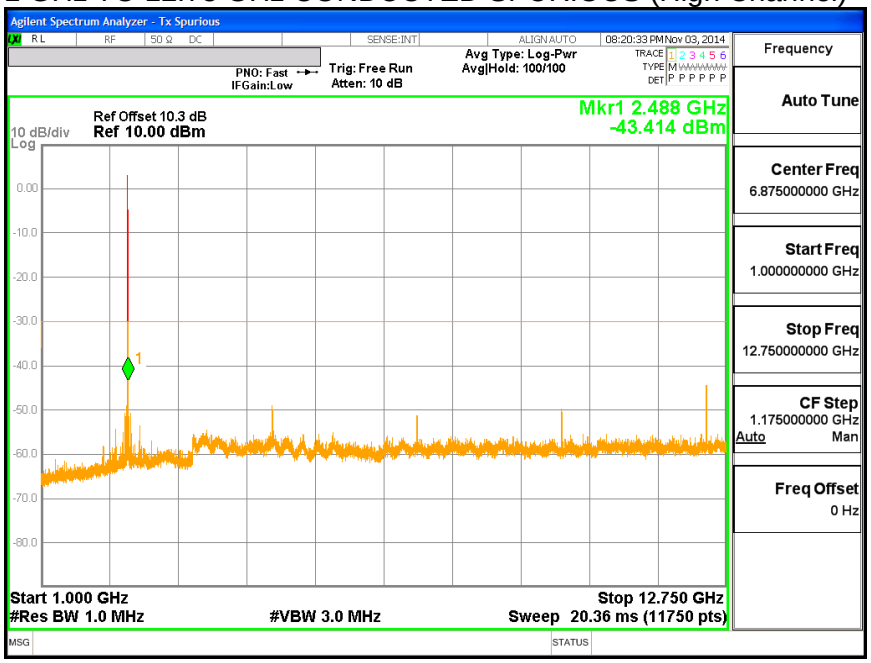
1 GHz TO 12.75 GHz CONDUCTED SPURIOUS (Low Channel)



30 MHz TO 1 GHz CONDUCTED SPURIOUS (High Channel)



1 GHz TO 12.75 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS (LOW CHANNEL 2402 MHz)

BELOW 1GHz

3m Radiated Emissions Chamber
30 - 1000MHz Substitution Measurement

Company: 14U19243
Project #: Broadcom
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT with laptop
Mode: BLE Tx 2402 MHz

Chamber	Pre-amplifer	Attenuator	Limit
3m Chamber A	3m-AT64		ETSI 300 328 Tx

Frequency (MHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Attenuator (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel 2402 MHz										
108.06	-52.7	H	3.0	18.0	28.1		-62.8	-54.0	-8.8	
288.12	-59.4	H	3.0	22.1	28.0		-65.3	-36.0	-29.3	
336.03	-55.4	H	3.0	23.5	27.9		-59.9	-36.0	-23.9	
450.13	-56.3	H	3.0	26.3	27.8		-57.9	-36.0	-21.9	
999.17	-71.4	H	3.0	33.6	27.6		-65.4	-36.0	-29.4	
76.82	-69.4	V	3.0	19.8	28.1		-77.8	-36.0	-41.8	
95.81	-68.1	V	3.0	20.0	28.1		-76.3	-54.0	-22.3	
150.02	-49.3	V	3.0	25.0	28.0		-52.4	-36.0	-16.4	
997.02	-66.9	V	3.0	35.6	27.6		-58.9	-36.0	-22.9	

Rev. 08.19.13

ABOVE 1GHz

3m Radiated Emissions Chamber
Above 1GHz High Frequency Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT only
Mode: BLE Tx Mode 2402 MHz

Chamber	Pre-amplifer	Filter	Limit
3m Chamber A	3m Chamber A	10dB Pad	ETSI 300 328 Tx

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss @ SG End (dBm)	Preamp (dB)	Attenuator (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel 2402 MHz										
7.21	-69.0	H	3.0	-10.0	36.2	10.0	-36.3	-30.0	-6.3	
1.67	-65.2	V	3.0	-18.9	39.1	10.0	-48.0	-30.0	-18.0	
7.21	-67.5	V	3.0	-7.7	36.2	10.0	-33.9	-30.0	-3.9	

Rev. 08.21.14

NOTE: No emissions detected above the system noise floor

RADIATED SPURIOUS EMISSIONS (HIGH CHANNEL 2480 MHz)

BELOW 1GHz

3m Radiated Emissions Chamber
30 - 1000MHz Substitution Measurement

Company: 14U19243
Project #: Broadcom
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT with laptop
Mode: BLE Tx 2480 MHz

Chamber	Pre-amplifer	Attenuator	Limit
3m Chamber A	3m-AT64		ETSI 300 328 Tx

Frequency (MHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Attenuator (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
High Channel 2480 MHz										
192.06	-55.5	H	3.0	19.5	28.0		-64.0	-54.0	-10.0	
336.03	-54.9	H	3.0	23.5	27.9		-59.4	-36.0	-23.4	
450.25	-56.9	H	3.0	26.3	27.8		-58.5	-36.0	-22.5	
60.02	-40.0	V	3.0	13.5	28.2		-54.6	-54.0	-0.6	
89.98	-65.7	V	3.0	20.1	28.1		-73.7	-54.0	-19.7	
332.02	-66.0	V	3.0	24.4	27.9		-69.5	-36.0	-33.5	

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ABOVE 1GHz

3m Radiated Emissions Chamber
Above 1GHz High Frequency Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT only
Mode: BLE Tx Mode 2480 MHz

Chamber	Pre-amplifer	Filter	Limit
3m Chamber A	3m Chamber A	10dB Pad	ETSI 300 328 Tx

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss @ SG End (dBm)	Preamp (dB)	Attenuator (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
High Channel 2480 MHz										
1.597	-60.9	V	3.0	-15.2	39.3	10.0	-44.5	-30.0	-14.5	
1.662	-60.1	V	3.0	-13.9	39.1	10.0	-43.0	-30.0	-13.0	
4.75	-69.6	V	3.0	-15.1	38.0	10.0	-43.1	-30.0	-13.1	

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NOTE: No emissions detected above the system noise floor

7.7. RECEIVER SPURIOUS EMISSIONS

LIMITS

ETSI EN 300 328 Clause 4.3.2.9.2

TEST PROCEDURE

EN 300 328 Clause 5.3.11.2

TEST CONDITIONS

EN 300 328 Clause 5.3.11.1

The level of spurious emissions shall be measured as, either:

a) their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation); or

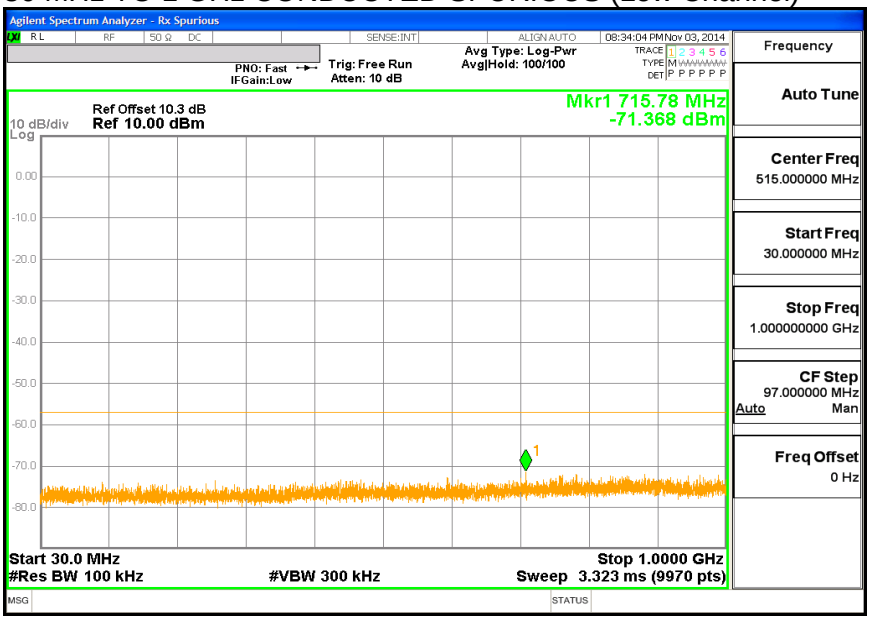
b) their effective radiated power when radiated by cabinet and antenna

Protocol (b) was used for emissions testing as covered by this report.

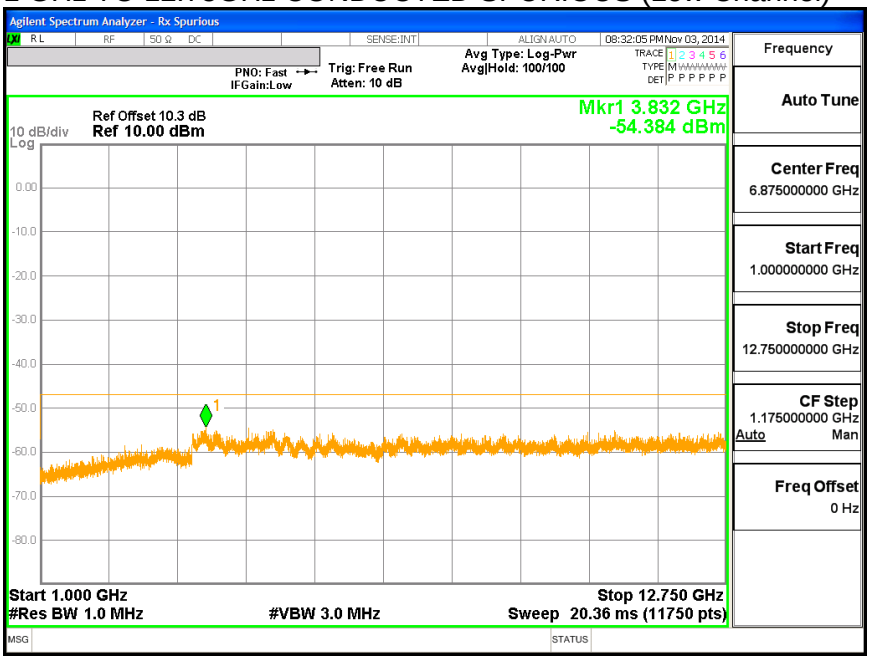
RESULTS

CONDUCTED SPURIOUS EMISSIONS

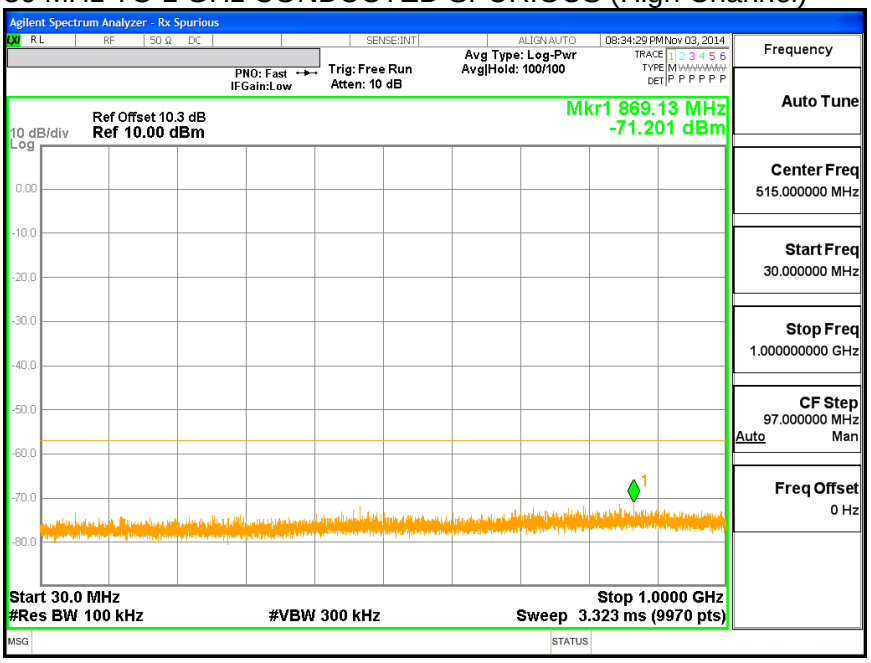
30 MHz TO 1 GHz CONDUCTED SPURIOUS (Low Channel)



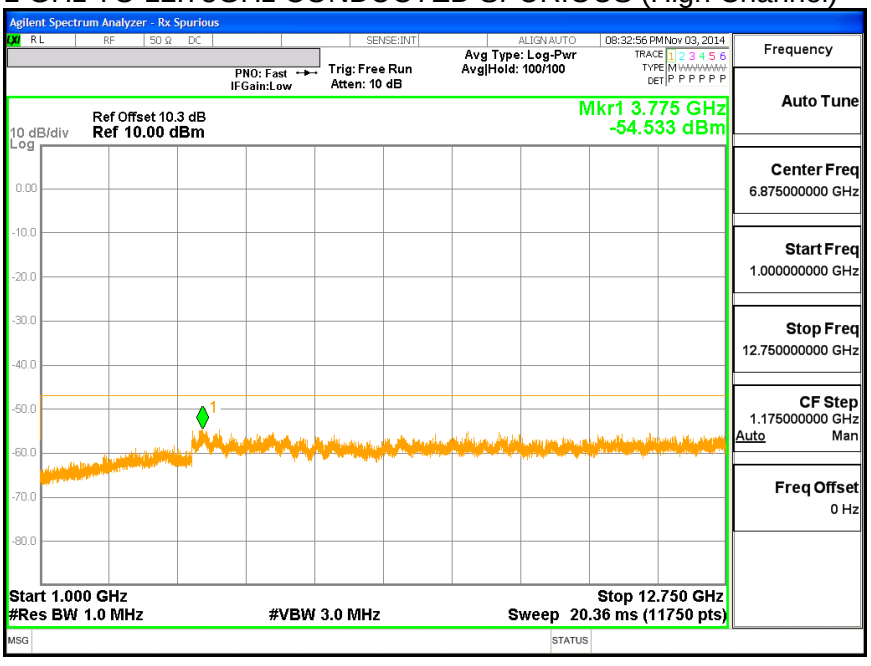
1 GHz TO 12.75GHz CONDUCTED SPURIOUS (Low Channel)



30 MHz TO 1 GHz CONDUCTED SPURIOUS (High Channel)



1 GHz TO 12.75GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS (LOW CHANNEL 2402 MHz)

30 MHz TO 1000 MHz (Low Channel)

3m Radiated Emissions Chamber
30 - 1000MHz Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: November 4, 2014
Test Engineer: V. Nguyen
Configuration: EUT w/Laptop
Mode: BLE RX Mode 2402MHz

Chamber	Pre-amplifer	Attenuator	Limit
3m Chamber A	3m-AT64		ETSI 300 328 Rx

Frequency (MHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Attenuator (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
85.61	-63.3	H	3.0	14.4	28.1		-77.1	-57.0	-20.1	
216.38	-63.7	H	3.0	20.3	27.9		-71.3	-57.0	-14.3	
332.56	-60.3	H	3.0	23.4	27.9		-64.8	-57.0	-7.8	
995.82	-69.6	H	3.0	33.6	27.6		-63.6	-57.0	-6.6	
83.71	-63.1	V	3.0	20.0	28.2		-71.2	-57.0	-14.2	
240.17	-61.2	V	3.0	22.1	27.9		-67.1	-57.0	-10.1	
443.43	-60.9	V	3.0	26.8	27.9		-62.0	-57.0	-5.0	
680.17	-70.6	V	3.0	31.7	27.0		-65.9	-57.0	-8.9	

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ABOVE 1 GHz (Low Channel)

3m Radiated Emissions Chamber
Above 1GHz High Frequency Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT only
Mode: Rx Mode 2402 MHz

Chamber	Pre-amplifer	Filter	Limit
3m Chamber A	3m Chamber A		ETSI 300 328 Rx

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss @ SG End (dBm)	Preamp (dB)	Attenuator (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel 2402 MHz										
4.82	-68.6	H	3.0	-13.9	38.1		-52.0	-47.0	-5.0	
1.66	-60.5	V	3.0	-14.3	39.1		-53.4	-47.0	-6.4	
2.99	-62.1	V	3.0	-11.1	38.2		-49.4	-47.0	-2.4	
4.81	-67.4	V	3.0	-12.8	38.1		-50.9	-47.0	-3.9	

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RADIATED SPURIOUS EMISSIONS (HIGH CHANNEL 2480 MHz)

30 MHz TO 1000 MHz (High Channel)

3m Radiated Emissions Chamber
30 - 1000MHz Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: November 4, 2014
Test Engineer: V. Nguyen
Configuration: EUT w/Laptop
Mode: BLE RX Mode 2480MHz

Chamber	Pre-amplifer	Attenuator	Limit
3m Chamber A	3m-AT64		ETSI 300 328 Rx

Frequency (MHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Attenuator (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
166.42	-65.8	H	3.0	20.3	28.0		-73.6	-57.0	-16.6	
211.66	-57.4	H	3.0	20.2	27.9		-65.1	-57.0	-8.1	
332.80	-59.6	H	3.0	23.4	27.9		-64.2	-57.0	-7.2	
663.82	-70.5	H	3.0	29.6	27.0		-67.8	-57.0	-10.8	
211.86	-57.4	V	3.0	22.6	27.9		-62.8	-57.0	-5.8	
298.36	-63.8	V	3.0	23.0	28.0		-68.8	-57.0	-11.8	
332.90	-60.2	V	3.0	24.5	27.9		-63.6	-57.0	-6.6	
666.35	-65.2	V	3.0	31.5	27.0		-60.7	-57.0	-3.7	

Rev. 08.19.13

ABOVE 1 GHz (High Channel)

3m Radiated Emissions Chamber
Above 1GHz High Frequency Substitution Measurement

Company: Broadcom
Project #: 14U19243
Date: 11/3/2014
Test Engineer: J. Gomez
Configuration: EUT only
Mode: Rx Mode 2480 MHz

Chamber	Pre-amplifer	Filter	Limit
3m Chamber A	3m Chamber A		ETSI 300 328 Rx

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss @ SG End (dBm)	Preamp (dB)	Attenuator (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
High Channel 2480 MHz										
1.61	-64.1	H	3.0	-18.8	39.3		-58.1	-47.0	-11.1	
4.95	-65.2	H	3.0	-10.2	38.2		-48.4	-47.0	-1.4	
1.593	-53.6	V	3.0	-8.0	39.3		-47.3	-47.0	-0.3	
1.659	-57.3	V	3.0	-11.1	39.1		-50.2	-47.0	-3.2	
2.489	-62.8	V	3.0	-12.9	38.6		-51.5	-47.0	-4.5	
2.989	-63.6	V	3.0	-12.6	38.2		-50.8	-47.0	-3.8	

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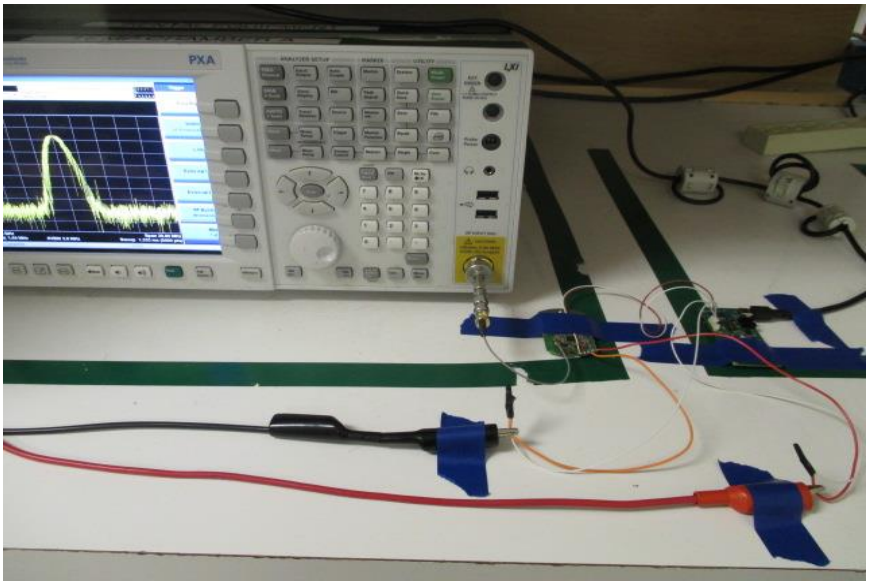
8. SETUP PHOTO

8.1. RF CONDUCTED MEASUREMENT AT ANTENNA PORT

ANTENNA PORT CONDUCTED PHOTO

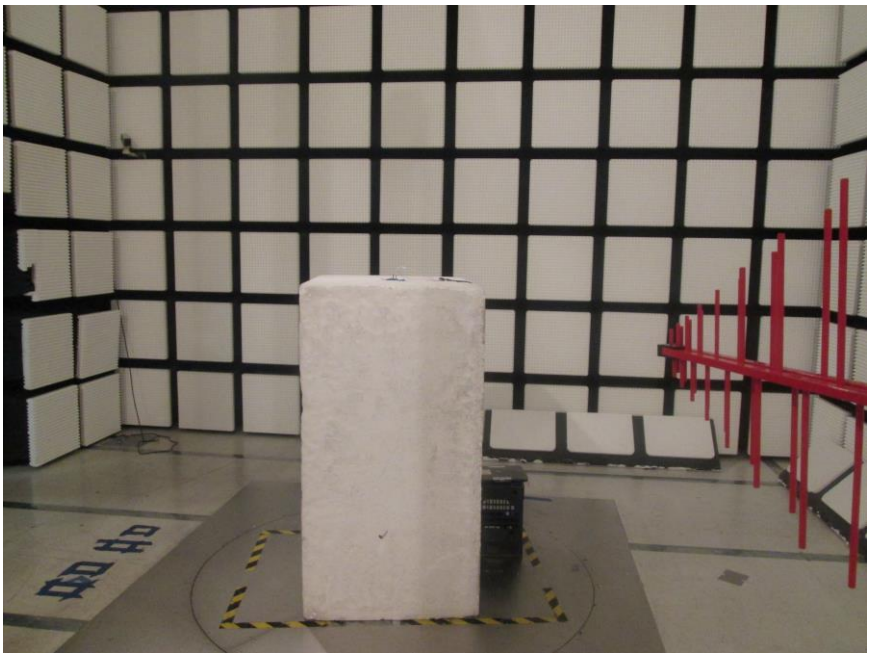


ENVIRONMENTAL CHAMBER SETUP

ENVIRONMENTAL CHAMBER PHOTO

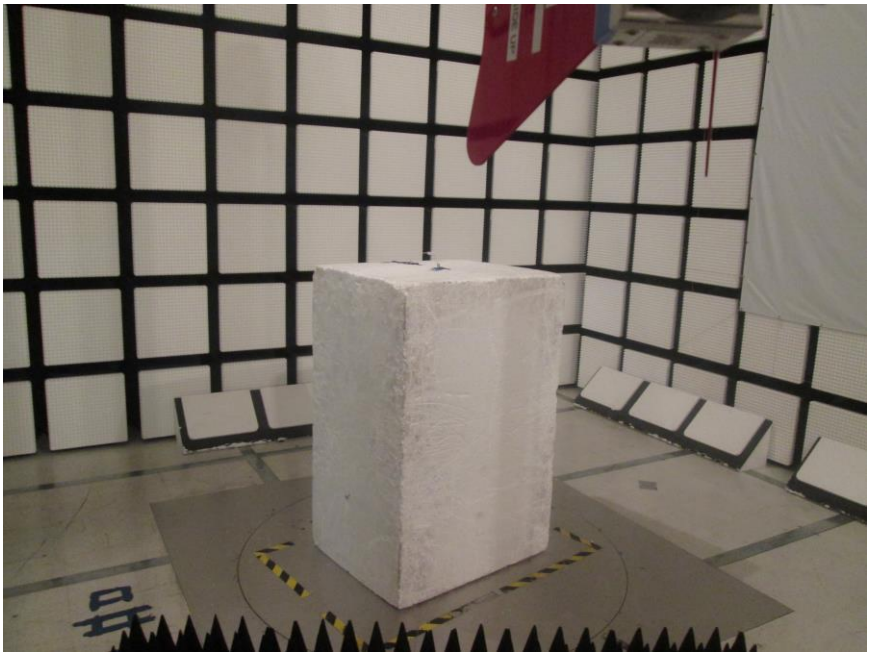
8.2. RADIATED SPURIOUS EMISSIONS

RADIATED SPURIOUS FRONT PHOTO BELOW 1GHz

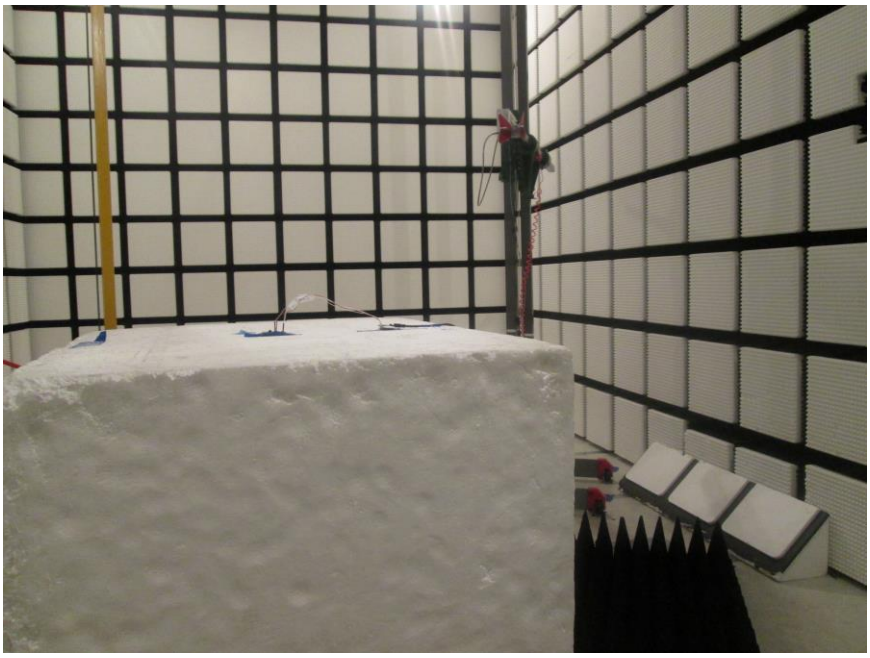


RADIATED SPURIOUS BACK PHOTO BELOW 1GHz

RADIATED SPURIOUS FRONT PHOTO ABOVE 1GHz



RADIATED SPURIOUS BACK PHOTO ABOVE 1GHz



END OF REPORT