EMISSIONS TEST REPORT

Report Number: 100869972BOX-001
Project Number: G100869972

Report Issue Date: 9/27/2012

Product Designation: DDI602U-F1

Standards: CFR47 FCC Part 15 Subpart C 15.245:2012
IC RSS-210 Issue 8 December 2010 Annex 7
IC RSS-Gen Issue 3 December 2010+Notice DRS 2012-DRS0126
CFR47 FCC Part 15 Subpart B:2012
IC ICES-003 Issue 5 August 2012

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719

Client:
UTC Fire and Security
9 Farm Springs Road
Farmington, CT 06034

Report prepared by Reviewer

Vathana Ven / Senior Project Engineer

Report reviewed by

Nicholas Abbondante / Transmitter Staff Engineer

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test	
5	System Setup and Method	
6	Fundamental Field Strength (CFR47 FCC Part 15 Subpart C:2012,15.245; IC RSS-210 Issue 8 December 2010 Annex 7)	Pass
7	Radiated Emissions CFR47 FCC Part 15 Subpart C:2012, 15.209 and 15.245; IC RSS-210 Issue 8 December 2010 Annex 7, CFR47 FCC Part 15 Subpart B:2012, IC ICES-003 Issue 5 August 2012)	Pass
8	20 dB Bandwidth (FCC PART 15C: 15.215(C), IC RSS-Gen Issue 3 December 2010 4.6.3)	Pass
9	Revision History	

3 Client Information

This EUT was tested at the request of:

Company: UTC Fire and Security
9 Farm Springs Road
Farmington, CT 06034
Contact: Rick Conner
Telephone: (651) 779-4824
Fax: (651) 779-4884
Email: Rick.Conner@FS.UTC.com

4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Outdoor motion sensors	UTC Fire & Security	DDI602U-F1	BOX1208291217-001 (Intertek assigned) (transmit)
Outdoor motion sensors	UTC Fire & Security	DDI602U-F1	BOX1208291217-003 (Intertek assigned) (Normal mode)

Receive Date:	08/29/2012
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The EUT is an Outdoor motion sensor.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
12VDC	11mA	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	For transmitter testing, the sample was programmed to transmit with a 100% duty cycle.
2	For occupied bandwidth testing, the sample with normal mode was used.

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	Wires	<3	None	None	DC supply

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
DC power supply	Electro Industries	DIGI35A	M12/EM 1127-01

5.1 Method:

Configuration as required by ANSI C63.4:2009.

5.2 EUT Block Diagram:

6 Fundamental Field Strength

6.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart C:2012,15.245,
IC RSS-210 Issue 8 December 2010 Annex 7 and ANSI C63.4:2009.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014
145128'	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
145034'	BiLog Antenna (30 MHz to 1GHz)	Schaffner Chase EMC	CBL6111C	2564	02/07/2012	02/07/2013
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2011	10/04/2012
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	10/04/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	10/04/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/16/2011	12/16/2012

Software Utilized:

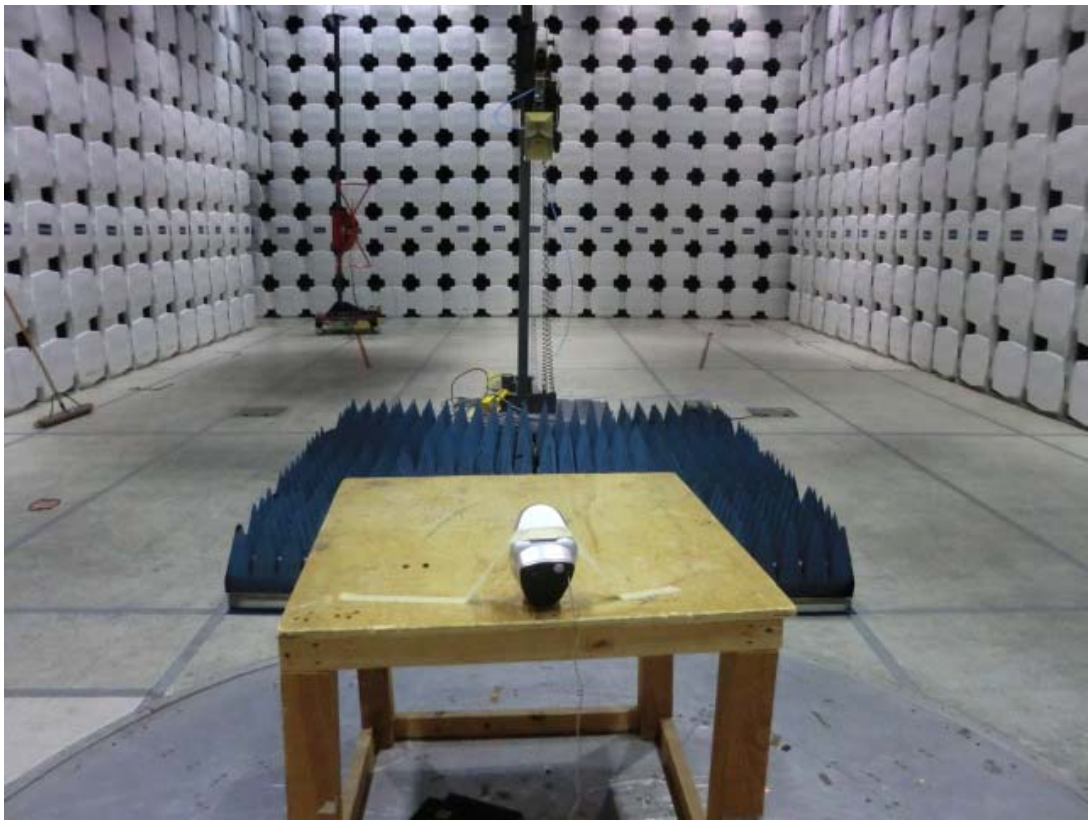
Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2010

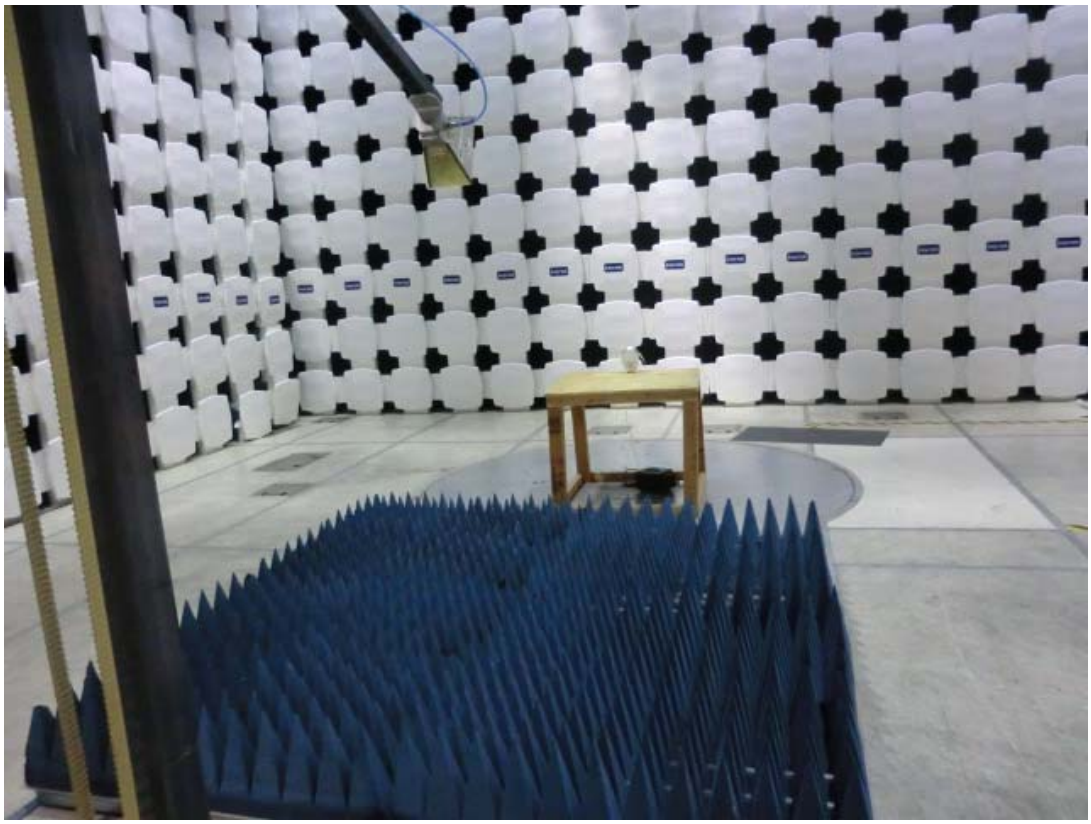
6.3 Results:

The sample tested was found to Comply.

The fundamental field strength must not exceed 2500 mV/m (128 dBuV/m) at a distance of 3 meters using an average detector. Peak emissions must meet a limit that is 20 dB higher than the average limit.

6.4 Setup Photographs:





6.5 Plots/Data:

Radiated Emissions

Company: UTC Fire and Security
Model #: DDI602U-F1
Serial #: BOX1208291217-001 (Intertek assigned)
Engineers: Vathana Ven
Project #: G100869972
Standard: FCC Part 15 Subpart C 15.245/RSS-210
Receiver: R&S ESI (145-128) 09-23-2011
PreAmp: PRE145014 12-16-2012.txt

Location: 10M
Date(s): 09/21/12
Limit Distance (m): 3
Test Distance (m): 3
PreAmp Used? (Y or N): N
Voltage/Frequency: 12VDC

Antenna & Cables: HF
Antenna: HORN2 V3m 10-24-2012.txt
Cable(s): 145-416 3mTrkB 09-04-2012.txt
Barometer: DAV001
Temp/Humidity/Pressure: 23 deg C

Bands: N, LF, HF, SHF
HORN2 H3m 10-24-2012.txt
NONE.
Filter:
23%
1008mB
Frequency Range: Fundamental

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC	Harmonic?
PK	V	10532.094	47.24	38.52	14.32	0.00	0.00	100.08	148.00	-47.92	1/3 MHz			No Pre-amp
AVG	V	10532.094	47.24	38.52	14.32	0.00	0.00	100.08	128.00	-27.92	1/3 MHz			No Pre-amp
PK	H	10532.094	56.52	38.41	14.32	0.00	0.00	109.25	148.00	-38.75	1/3 MHz			No Pre-amp
AVG	H	10532.094	56.52	38.41	14.32	0.00	0.00	109.25	128.00	-18.75	1/3 MHz			No Pre-amp

The EUT met the requirements when tested as received. Peak was compared to the average limits.

Test Personnel:	Vathana Ven VJV	Test Date:	09/21/2012
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.245 and RSS-2010	Test Levels:	Below specified limits
Input Voltage:	12VDC	Ambient Temperature:	23 ºC
Pretest Verification w/ Ambient Signals or BB Source:	**Yes, Ambient**	Relative Humidity:	23 %
		Atmospheric Pressure:	1008 mbars

Deviations, Additions, or Exclusions: None

7 Radiated Spurious Emissions

7.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart C:2012,15.245; 15.209, IC RSS-210 Issue 8 December 2010 Annex 7, IC ICES-003 Issue 5 August 2012, CFR47 FCC Part 15 Subpart B:2012, and ANSI C63.4:2009.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

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Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
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AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
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145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2011	10/04/2012
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	10/04/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	10/04/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/16/2011	12/16/2012
REA004'	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	11/30/2011	11/30/2012
REA003'	1GHz High Pass Filter	Reactel, Inc	7HS-1G/10G-S11	06-1	11/30/2011	11/30/2012
REA006'	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	08/08/2012	08/08/2013
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	02/08/2012	02/08/2013
OML4'	Mixer / Antenna	Oleson Microwave Lab	M19HWA	U21011-1	01/01/2002	Verified
CBL030'	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	02/08/2012	02/08/2013
MEG005'	High Frequency Cable	Megaphase	TM40-K1K1-197	8148601-001	02/07/2012	02/07/2013

Software Utilized:

Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2010

7.3 Results:

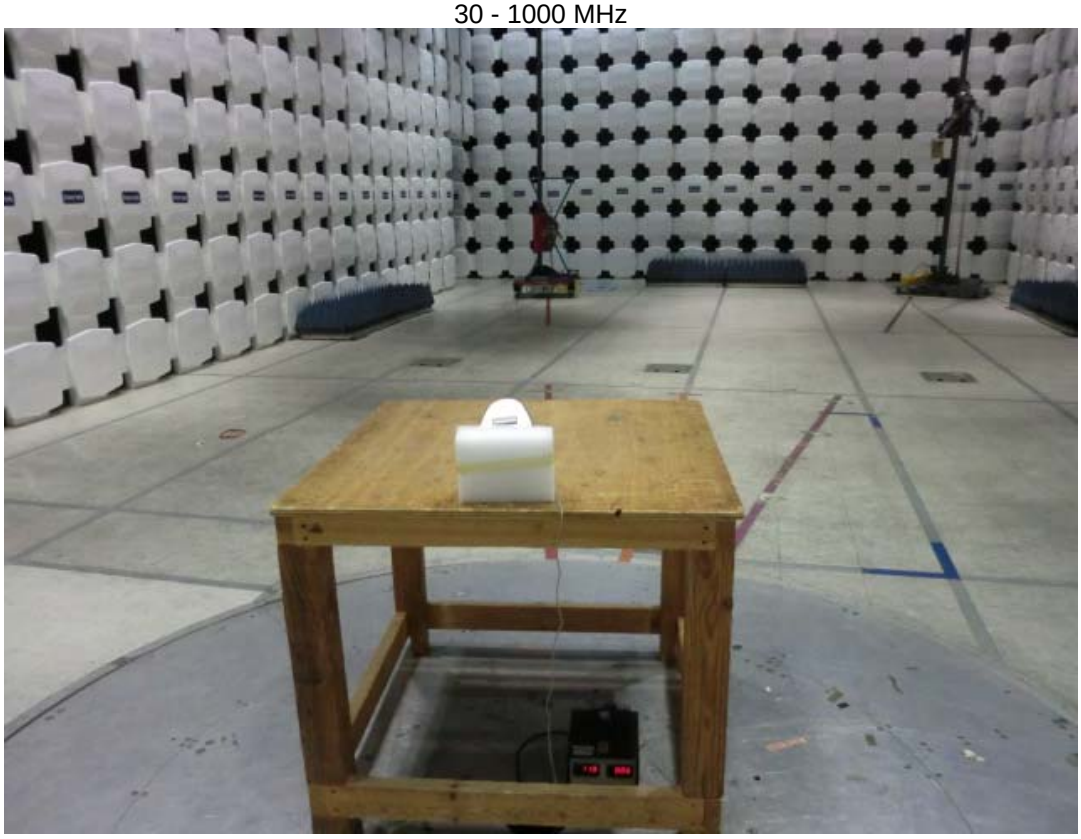
The sample tested was found to Comply. Note that in transmit mode the EUT meets the idle mode digital device requirements from 30-1000 MHz, therefore testing was not repeated with the transmitter idle. The receiver is exempt as it operates above 960 MHz.

Non-harmonic spurious emissions must be at least 50 dB down from the fundamental field strength or must meet the general limits of 15.209, whichever is the lesser attenuation. All limits are specified at a distance of 3 meters, using an average detector. Peak emissions must meet a limit that is 20 dB higher than the average limit.

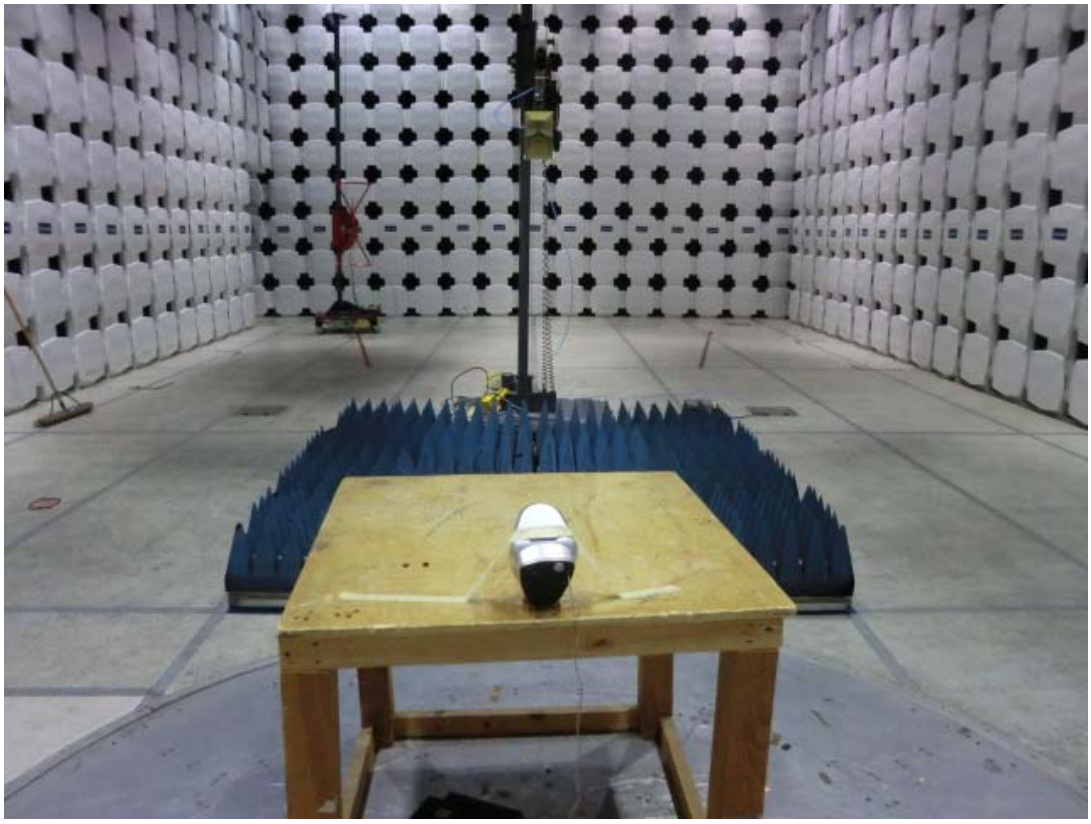
The harmonics must not exceed 7.5 mV/m (77.5 dBuV/m), and non-harmonic spurious emissions must be at least 50 dB down from the fundamental field strength or must meet the general limits of 15.209, whichever is the lesser attenuation. All limits are specified at a distance of 3 meters, using an average detector. Peak emissions must meet a limit that is 20 dB higher than the average limit.

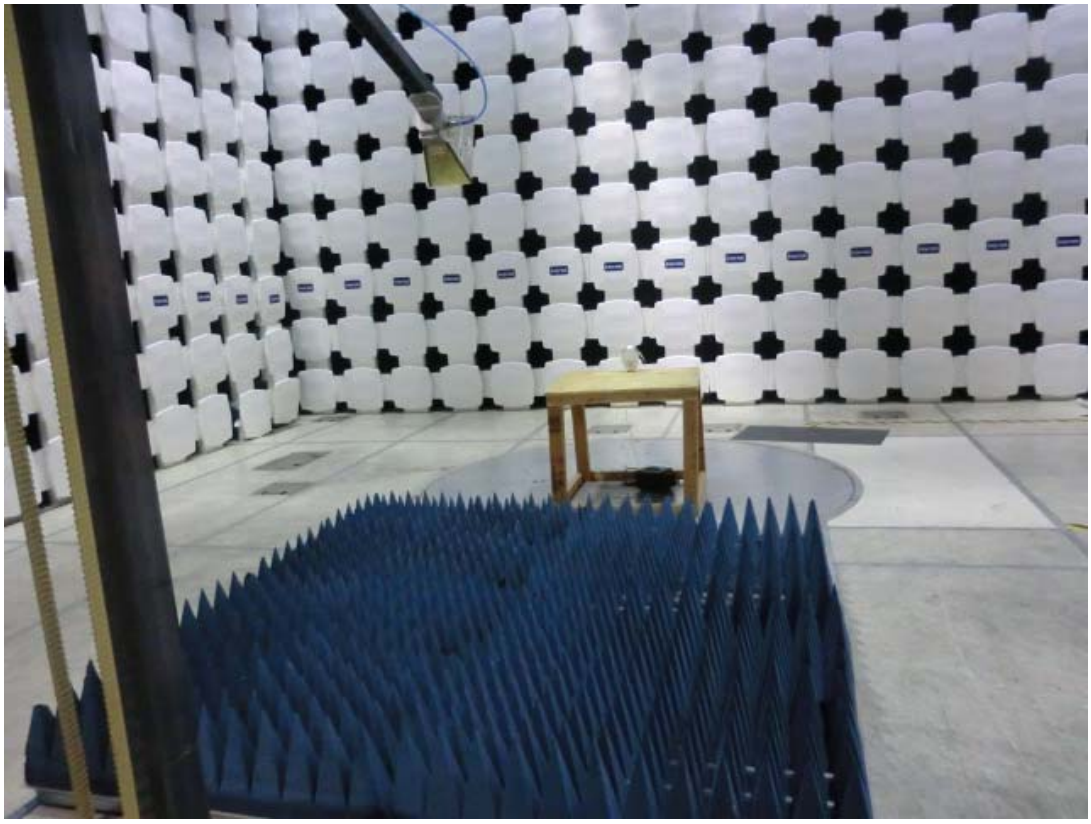
7.4 Setup Photographs:

30 - 1000 MHz

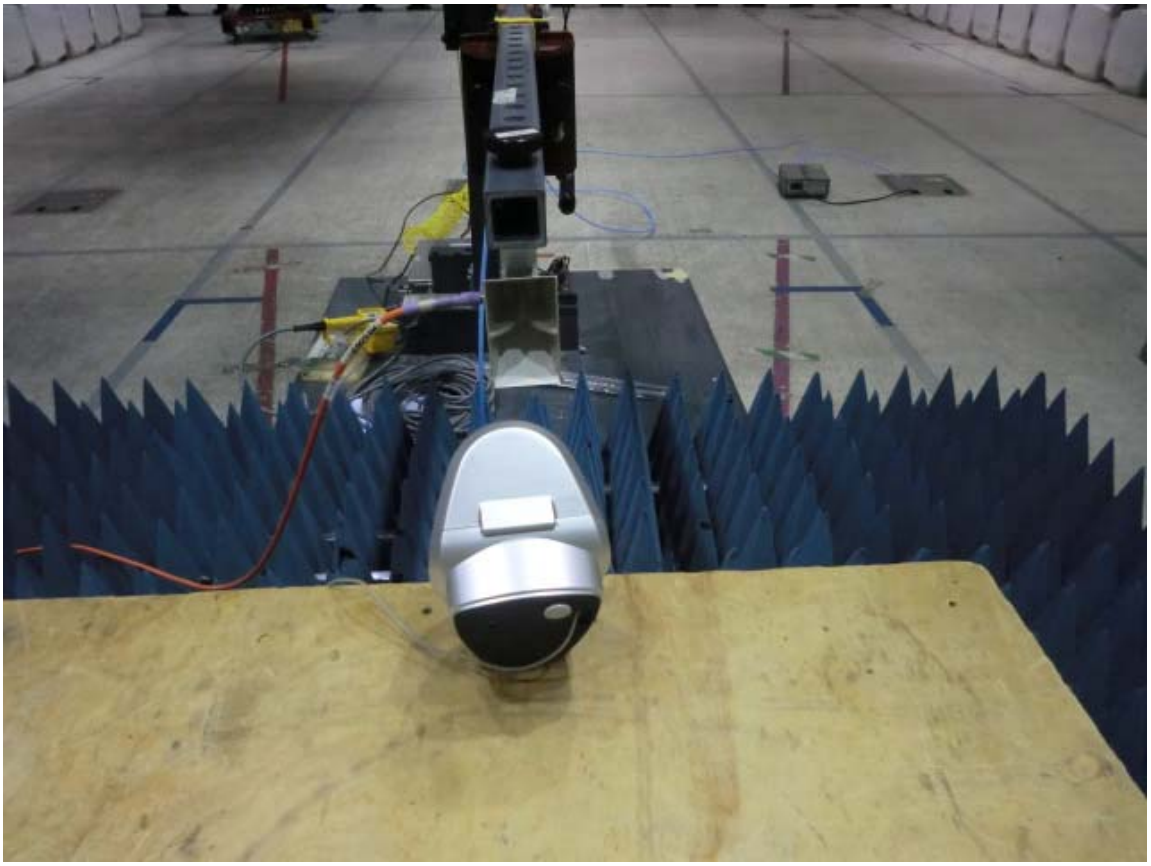


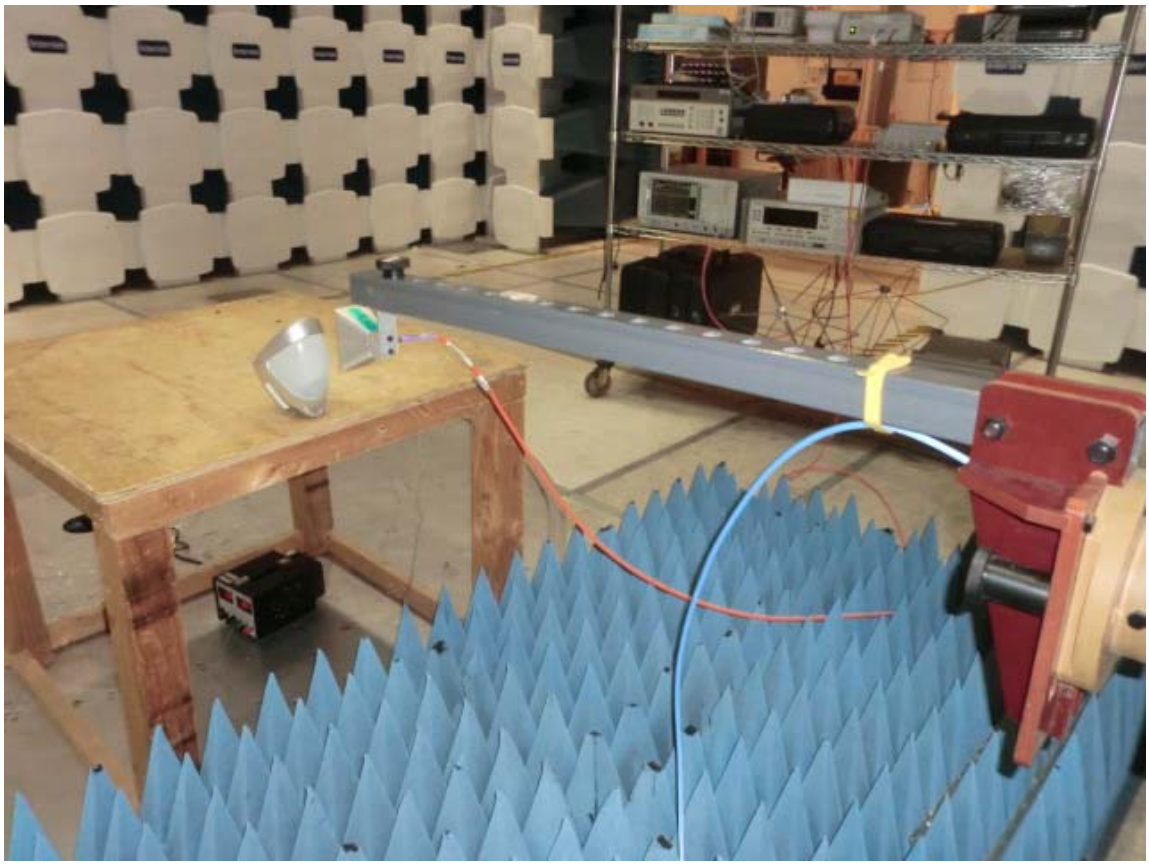
1 - 18 GHz



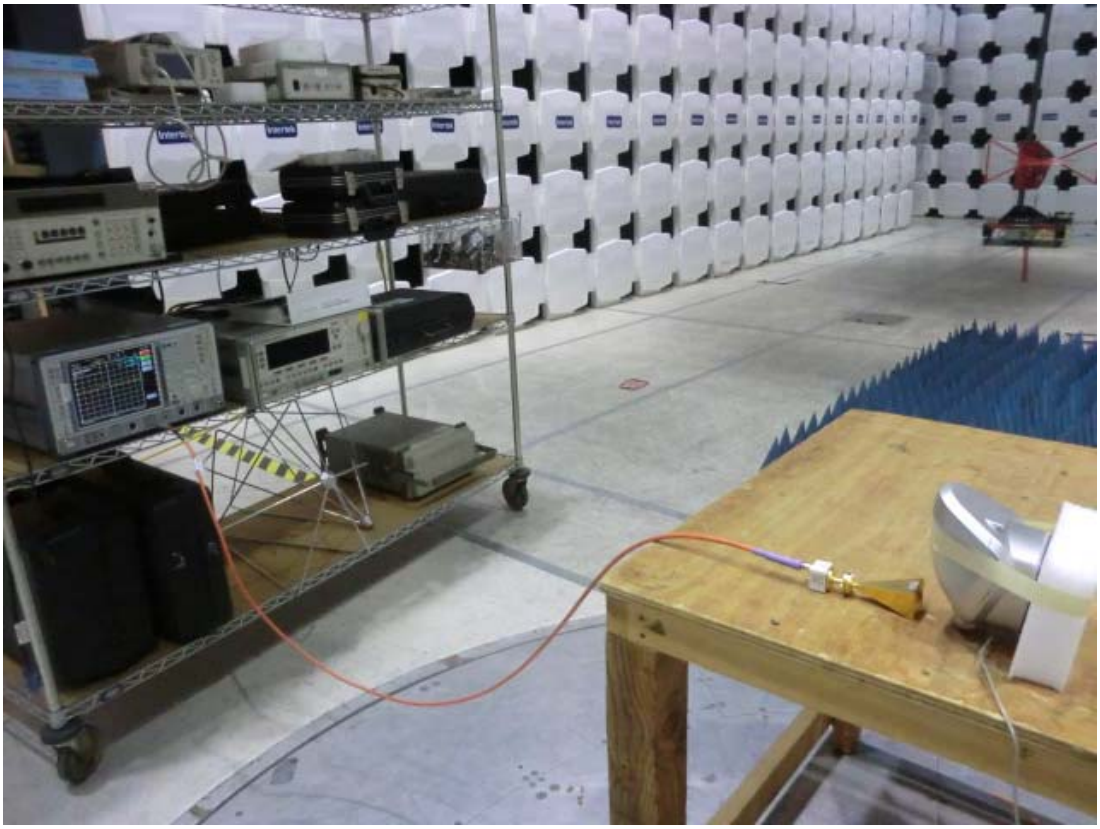


18 - 40 GHz





40 – 53 GHz



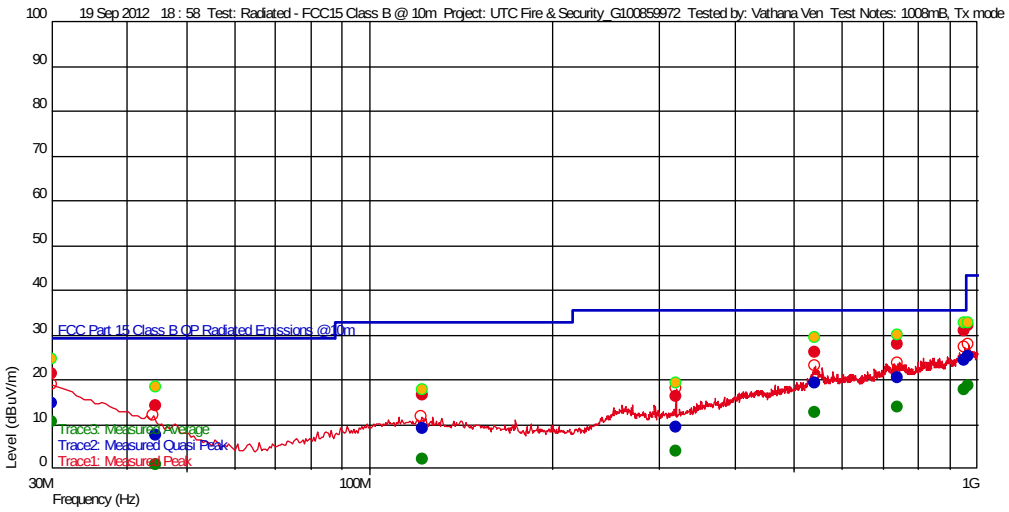
7.5 Plots/Data:

30 – 1000 MHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	UTC Fire & Security_G100859972	
Test Notes:	1008mB, Tx mode	
Temperature:	24 deg C	
Humidity:	39%	
Tested by:	Vathana Ven	
Test Started:	19 Sep 2012 18 : 58	

Prescan Emission Graph



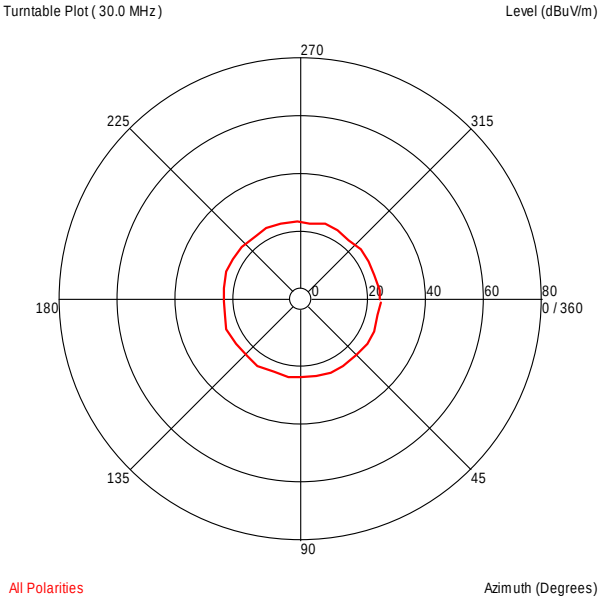
- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

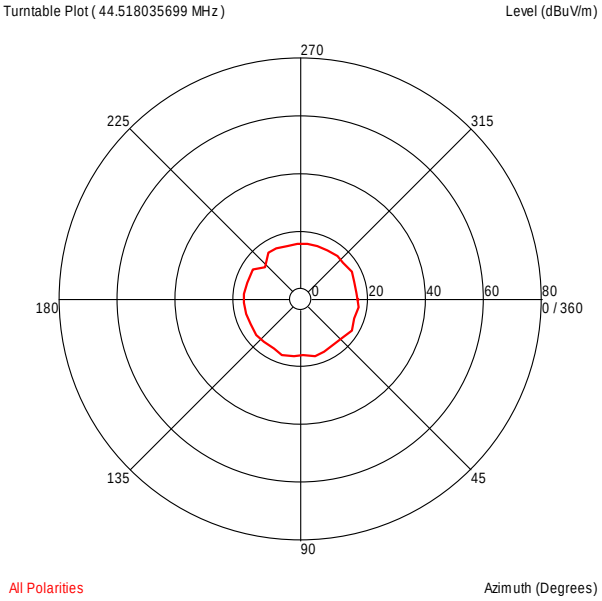
Emissions Test Data

Trace2: Measured Quasi Peak

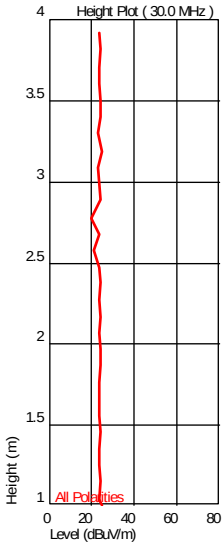
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver (|)	Azimuth (deg) (Deg)	Mast Height (m)	RBW (Hz)
319.335471385 M	9.43	13.300	-24.014	35.540	-26.11	|	274	3.00	120 k
122.41623207 M	8.96	11.317	-25.065	33.040	-24.08	--	96	2.47	120 k
44.518035699 M	7.69	11.745	-25.987	29.540	-21.85	--	20	3.75	120 k
967.685170581 M	25.23	24.907	-22.386	43.540	-18.31	--	80	2.49	120 k
540.572344719 M	19.32	21.966	-23.978	35.540	-16.22	--	360	3.51	120 k
741.398597287 M	20.46	21.984	-23.459	35.540	-15.08	|	265	2.12	120 k
30.0 M	14.80	19.100	-26.115	29.540	-14.74	|	0	3.30	120 k
954.632264311 M	24.39	24.415	-22.417	35.540	-11.15	|	234	1.05	120 k

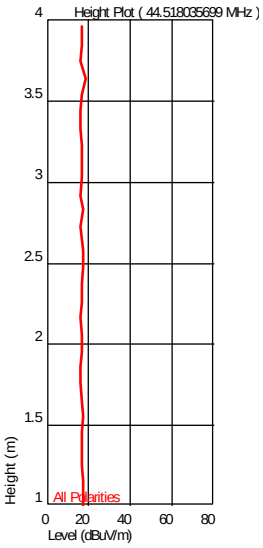
Azimuth Plots

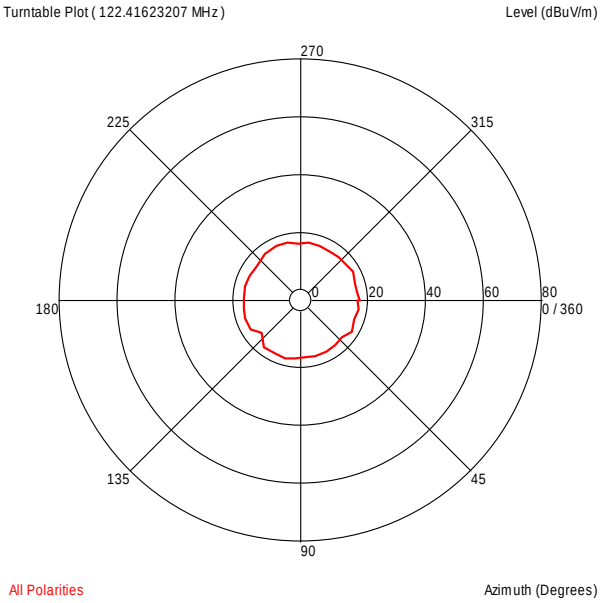


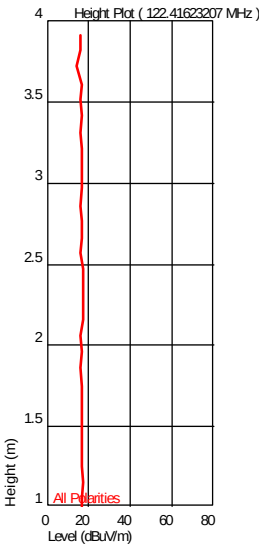


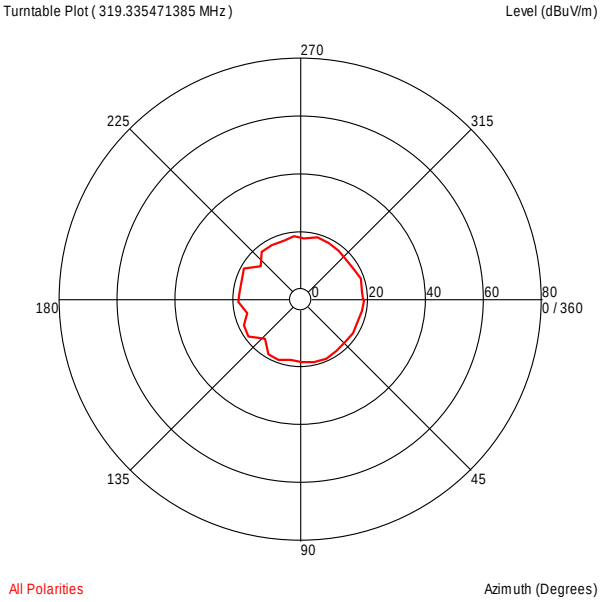
Turntable Plots

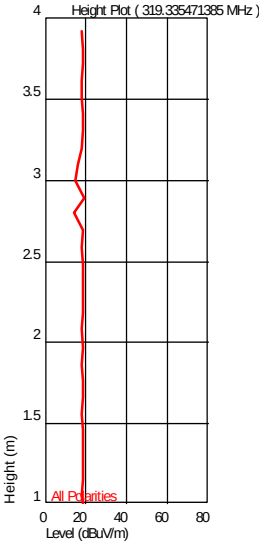


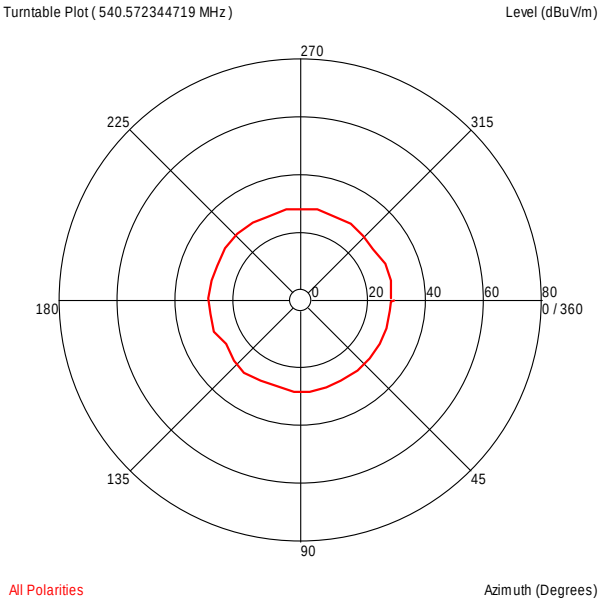


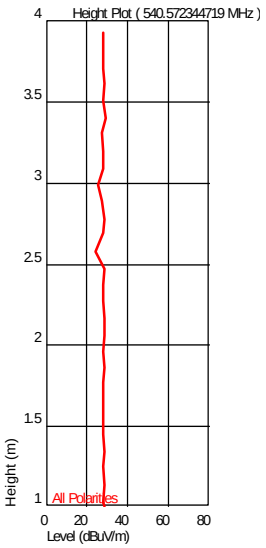

Turntable Plot (122.41623207 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

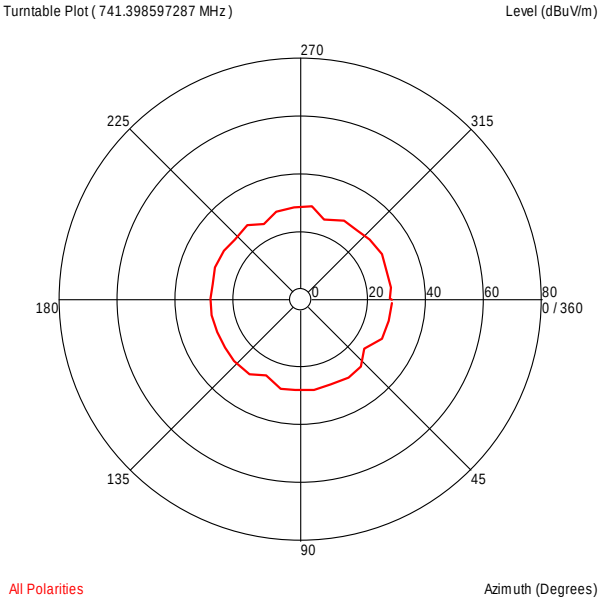

Height Plot (122.41623207 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

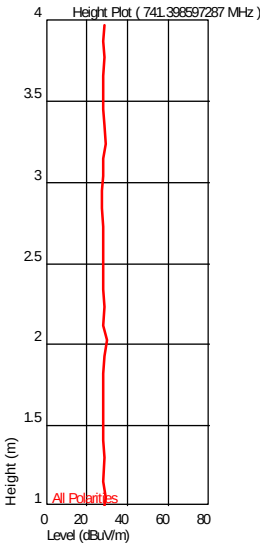

Turntable Plot (319.335471385 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

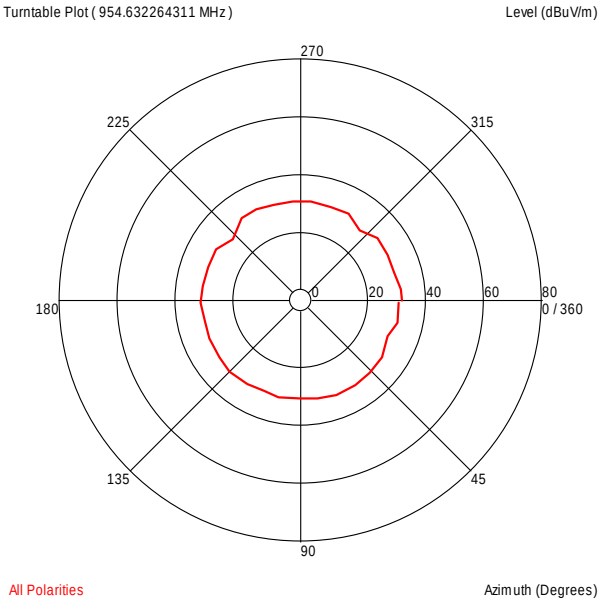

Height Plot (319.335471385 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

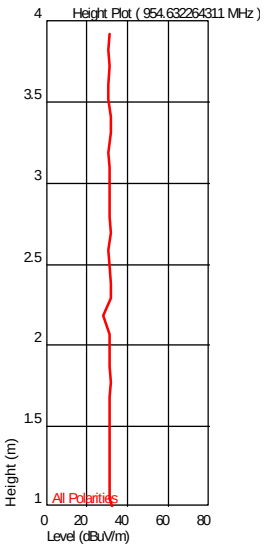

Turntable Plot (540.572344719 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

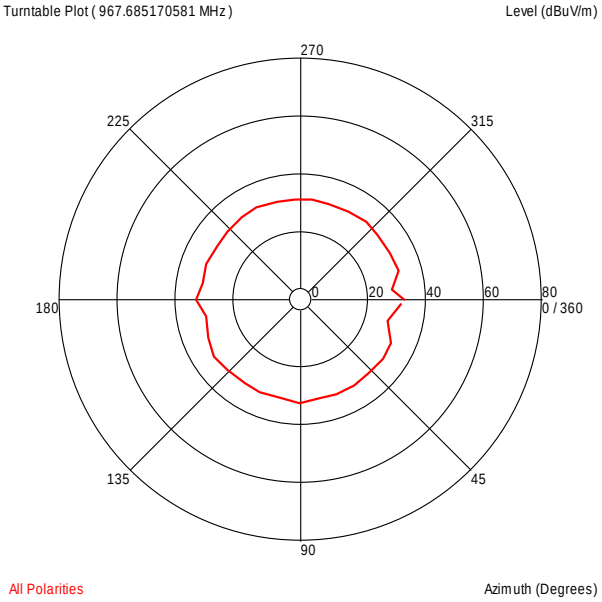

Height Plot (540.572344719 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

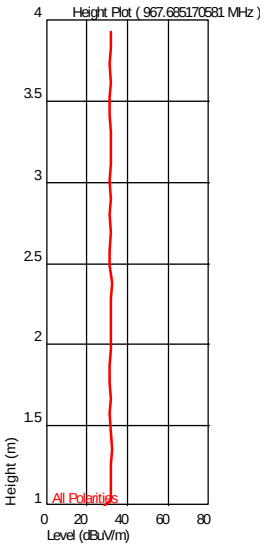

Turntable Plot (741.398597287 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (741.398597287 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (954.632264311 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (954.632264311 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (967.685170581 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

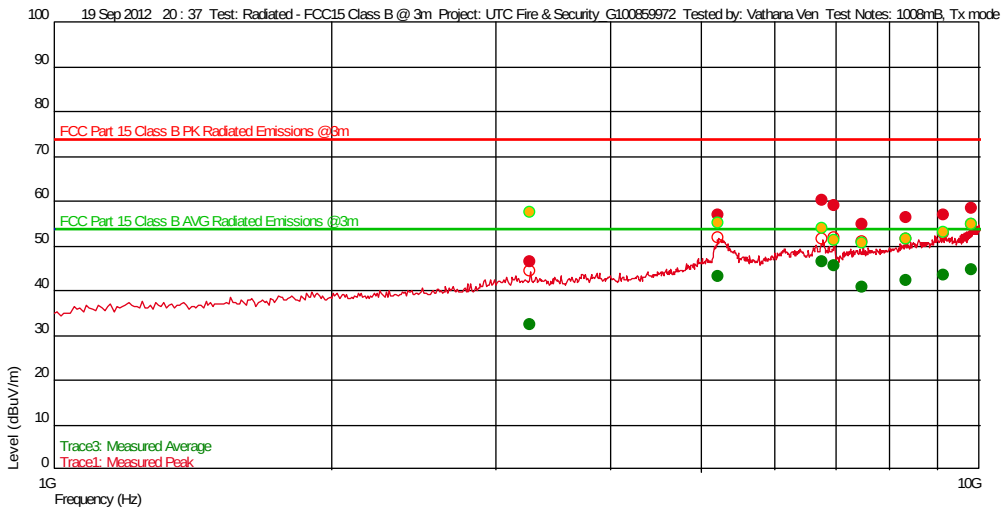

Height Plot (967.685170581 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

1 – 10 GHz

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 3m	
Project:	UTC Fire & Security_G100859972	
Test Notes:	1008mB, Tx mode	
Temperature:	24 deg C	
Humidity:	39%	
Tested by:	Vathana Ven	
Test Started:	19 Sep 2012 20 : 37	

Prescan Emission Graph



Measured Peak Value
Measured Quasi Peak Value
Measured Average Value
Maximum Value of Mast and Turntable
Swept Peak Data
Swept Quasi Peak Data
Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver (|)	Azimuth (deg) (Deg)	Mast Heigh t(m)	RBW (Hz)
3.275784903 G	46.41	30.987	-27.348	97.500	-51.09	--	254	1.08	1 M
7.482672011 G	54.81	36.480	-24.697	74.000	-19.19	|	0	2.40	1 M*
8.347080829 G	56.35	37.165	-23.719	74.000	-17.65	|	178	3.34	1 M*
9.165317301 G	56.79	37.808	-23.019	97.500	-40.71	|	286	2.90	1 M
5.232818972 G	56.85	33.703	-20.016	97.500	-40.65	|	223	1.57	1 M
9.823026052 G	58.25	38.080	-21.691	97.500	-39.25	--	155	1.56	1 M
6.974188377 G	58.99	35.037	-24.848	97.500	-38.51	--	360	1.09	1 M
6.774635938 G	60.11	35.064	-24.520	97.500	-37.39	|	342	3.57	1 M

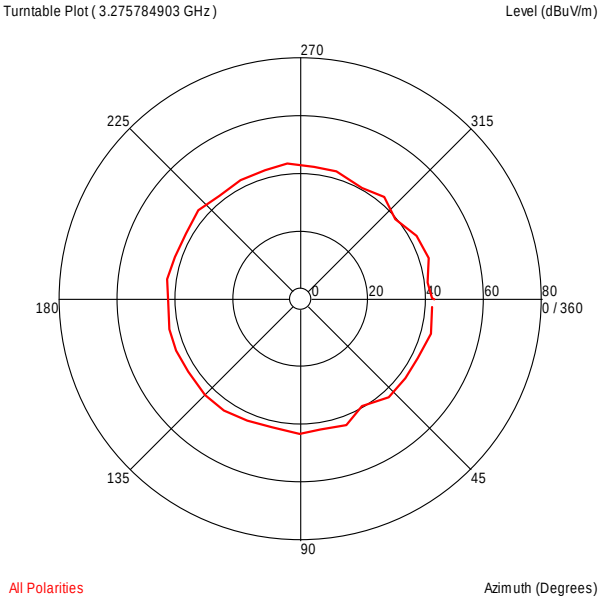
*Restricted band

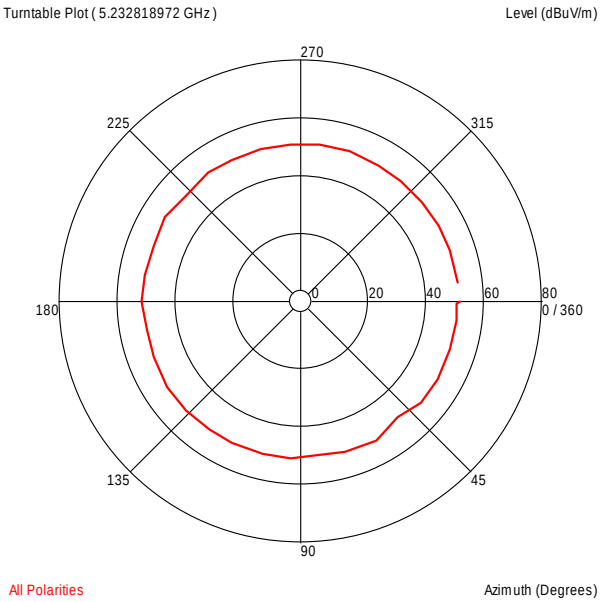
Trace3: Measured Average

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver (|)	Azimuth (deg) (Deg)	Mast Height (m)	RBW (Hz)
3.275784903 G	32.39	30.987	-27.348	77.500	-45.11	--	254	1.08	1 M
7.482672011 G	40.70	36.480	-24.697	54.000	-13.30	|	0	2.40	1 M*
8.347080829 G	42.37	37.165	-23.719	54.000	-11.63	|	178	3.34	1 M*
5.232818972 G	43.24	33.703	-20.016	77.500	-34.26	|	223	1.57	1 M
9.165317301 G	43.38	37.808	-23.019	77.500	-34.12	|	286	2.90	1 M
9.823026052 G	44.63	38.080	-21.691	77.500	-32.87	--	155	1.56	1 M
6.974188377 G	45.45	35.037	-24.848	77.500	-32.05	--	360	1.09	1 M
6.774635938 G	46.49	35.064	-24.520	77.500	-31.01	|	342	3.57	1 M

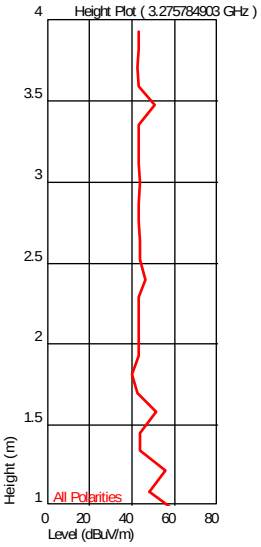
*Restricted band

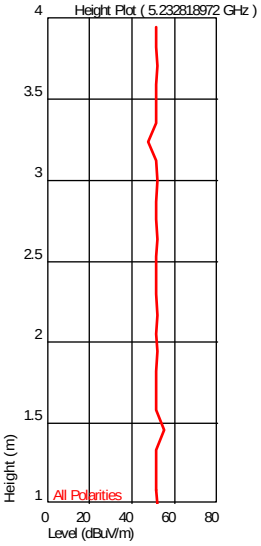
Azimuth Plots



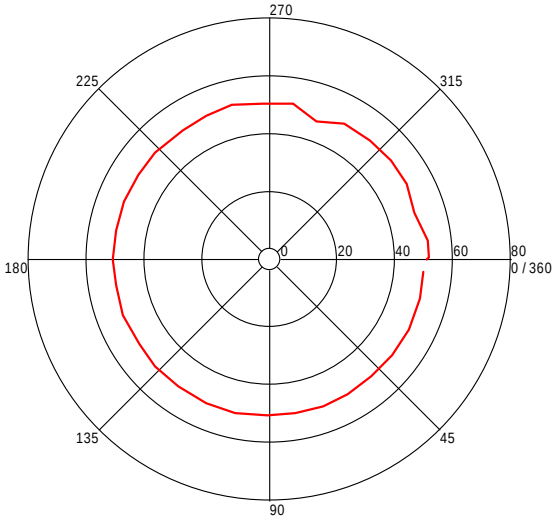


Turntable Plots

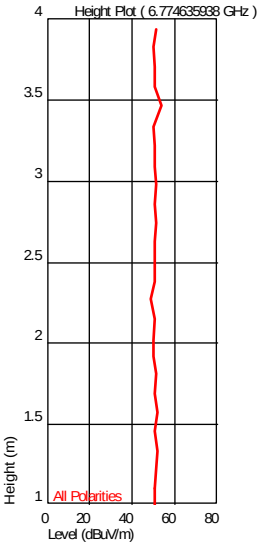




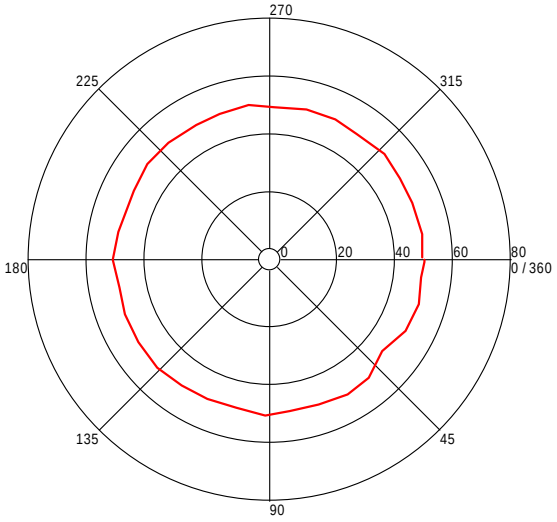
Turntable Plot (6.774635938 GHz) Level (dBuV/m)



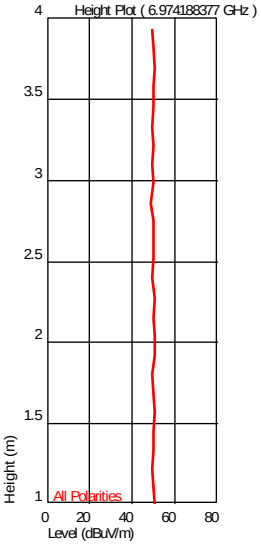
All Polarities Azimuth (Degrees)

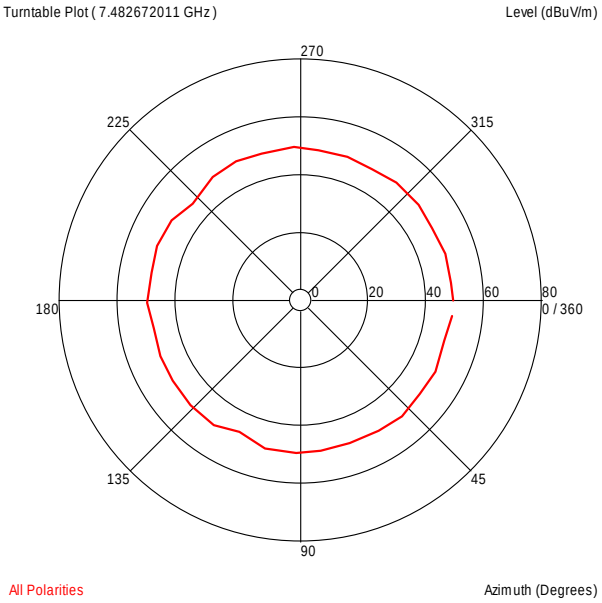


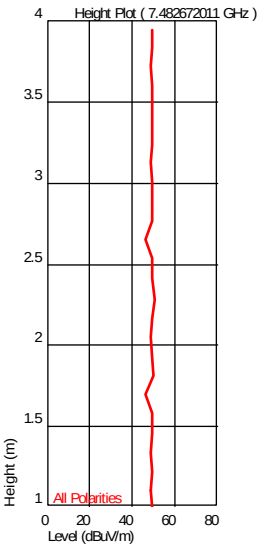
Turntable Plot (6.974188377 GHz) Level (dBuV/m)

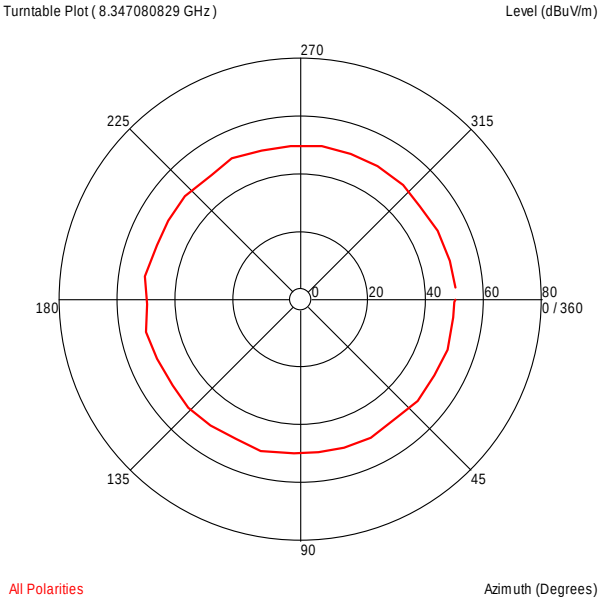


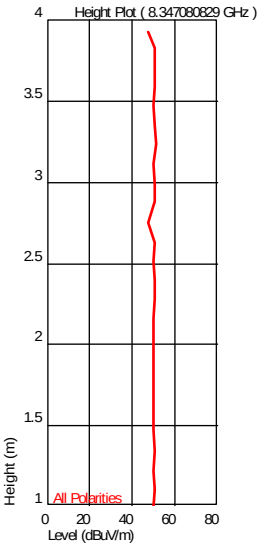
All Polarities Azimuth (Degrees)

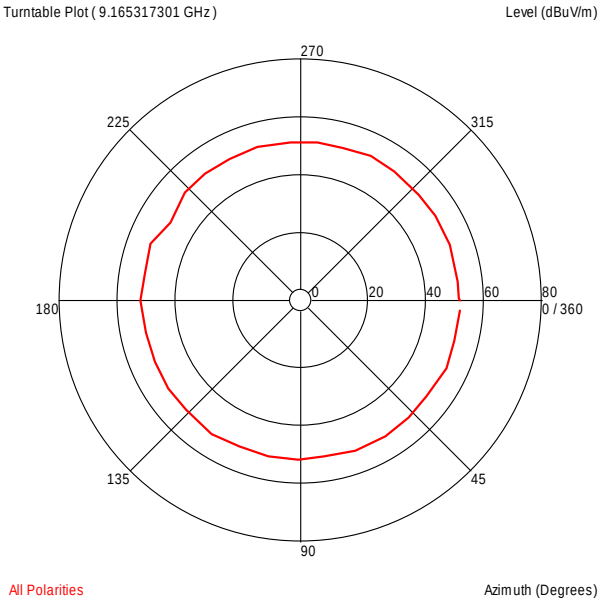


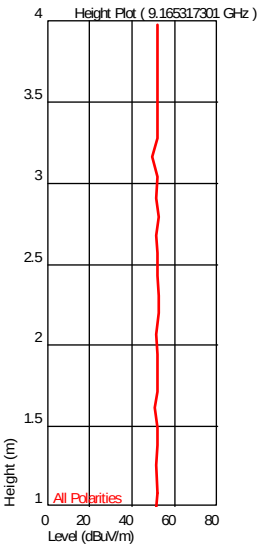

Turntable Plot (7.482672011 GHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

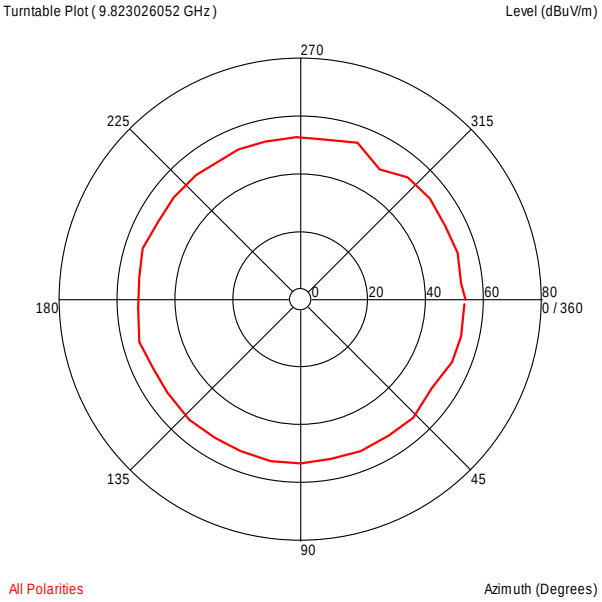

Height Plot (7.482672011 GHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

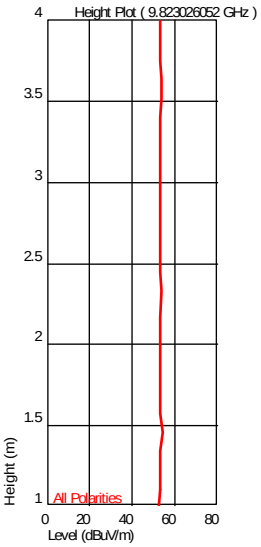

Turntable Plot (8.347080829 GHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (8.347080829 GHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (9.165317301 GHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (9.165317301 GHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (9.823026052 GHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (9.823026052 GHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

10 – 40 GHz

Radiated Emissions

Company: UTC Fire and Security
Model #: DDI602U-F1
Serial #: BOX1208291217-001 (Intertek assigned)
Engineers: Vathana Ven Location: 10M
Project #: G100869972 Date(s): 09/21/12
Standard: FCC Part 15 Subpart C 15.245/RSS-210
Receiver: R&S ESI (145-128) 09-23-2011 Limit Distance (m): 3
PreAmp: PRE9 05-12-2012.txt Test Distance (m): 0.12
PreAmp Used? (Y or N): Y Voltage/Frequency: 12VDC Frequency Range: 10-40 GHz

Antenna & Cables: SHF Bands: N, LF, HF, SHF
Antenna: EMC04 V1m 02-08-2013.txt EMC04 H1m 01-25-2012.txt EMC04
Cable(s): MEG005 02-07-2013.txt CBL030 02-08-2013.txt
Barometer: DAV001 Filter: REA06
Temp/Humidity/Pressure: 23 deg C 23% 1008mB

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC	Harmonic?	
PK	H	21030.000	33.22	45.44	16.86	27.73	27.96	39.82	97.50	-57.68	1/3 MHz	RB	RB	Harm	Nois Floor
AVG	H	21030.000	20.92	45.44	16.86	27.73	27.96	27.52	77.50	-49.98	1/3 MHz	RB	RB	Harm	Nois Floor
PK	V	31575.000	44.29	47.28	23.18	25.53	27.96	61.26	97.50	-36.24	1/3 MHz	RB	RB	Harm	Nois Floor
AVG	V	31575.000	31.90	47.28	23.18	25.53	27.96	48.87	77.50	-28.63	1/3 MHz	RB	RB	Harm	Nois Floor
PK	V	40000.000	42.00	47.94	29.10	28.24	35.56	55.24	97.50	-42.26	1/3 MHz	RB	RB	Harm	Nois Floor
AVG	V	40000.000	29.92	47.94	29.10	28.24	35.56	43.16	77.50	-34.34	1/3 MHz	RB	RB	Harm	Nois Floor

The antenna was placed at 12 cm from the EUT for the scan from 18 - 40GHz

40 – 53 GHz

Radiated Emissions

Company: UTC Fire and Security
Model #: DDI602U-F1
Serial #: BOX1208291217-001 (Intertek assigned)
Engineers: Vathana Ven Location: 10M
Project #: G100869972 Date(s): 09/19/12 09/21/12
Standard: FCC Part 15 Subpart C 15.245
Receiver: R&S ESI (145-128) 09-23-2011 Limit Distance (m): 3
PreAmp: PRE145014 12-16-2012.txt Test Distance (m): 0.05
PreAmp Used? (Y or N): N Voltage/Frequency: 12VDC Frequency Range: 40-53 GHz

Antenna & Cables: HF Bands: N, LF, HF, SHF
Antenna: OML4 OML4
Cable(s): CBL030 NONE.
Barometer: DAV001 Filter: REA06
Temp/Humidity/Pressure: 24 deg C 39% 1008mB
23 deg C 23% 1008mB

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC	Harmonic?	
PK	V	42100.000	42.00	38.67	8.00	0.00	35.56	53.11	97.50	-44.39	1/3 MHz	RB	RB	Harm	Nois Floor
AVG	V	42100.000	30.11	38.67	8.00	0.00	35.56	41.22	77.50	-36.28	1/3 MHz	RB	RB	Harm	Nois Floor
PK	V	52625.000	43.00	40.61	8.00	0.00	35.56	53.66	97.50	-43.84	1/3 MHz	RB		Harm	Nois Floor
AVG	V	52625.000	34.00	40.61	8.00	0.00	35.56	47.05	77.50	-30.45	1/3 MHz	RB		Harm	Nois Floor
PK	V	40000.000	42.00	38.23	8.00	0.00	35.56	52.67	97.50	-44.83	1/3 MHz			Harm	Nois Floor
AVG	V	40000.000	29.92	38.23	8.00	0.00	35.56	40.59	77.50	-36.91	1/3 MHz			Harm	Nois Floor
PK	V	53000.000	44.32	40.67	8.00	0.00	35.56	57.43	97.50	-40.07	1/3 MHz			Harm	Nois Floor
AVG	V	53000.000	33.23	40.67	8.00	0.00	35.56	46.34	77.50	-31.16	1/3 MHz			Harm	Nois Floor

The antenna was placed at 5cm from the EUT for the scan from 40 - 53GHz

Test Personnel: Vathana Ven VJV
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: FCC Part 15 Subpart C 15.245 and RSS-210, IC ICES-003, FCC Part 15 Subpart B
Input Voltage: 12VDC
Pretest Verification w/ Ambient Signals or BB Source: **Yes, Ambient**

Test Date: 09/19/2012, 09/21/2012
Test Levels: Below specified limits
Ambient Temperature: 24, 23 ºC
Relative Humidity: 23, 39 %
Atmospheric Pressure: 1008, 1008 mbars

Deviations, Additions, or Exclusions: None

8 Occupied Bandwidth

8.1 Method

Tests are performed in accordance with FCC PART 15C: 15.215(C), IC RSS-Gen Issue 3 December 2010 4.6.3.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001	Weather Station	Davis Instruments	7400	PE80519A61	08/28/2012	08/28/2014
145128'	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	10/04/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012

Software Utilized:

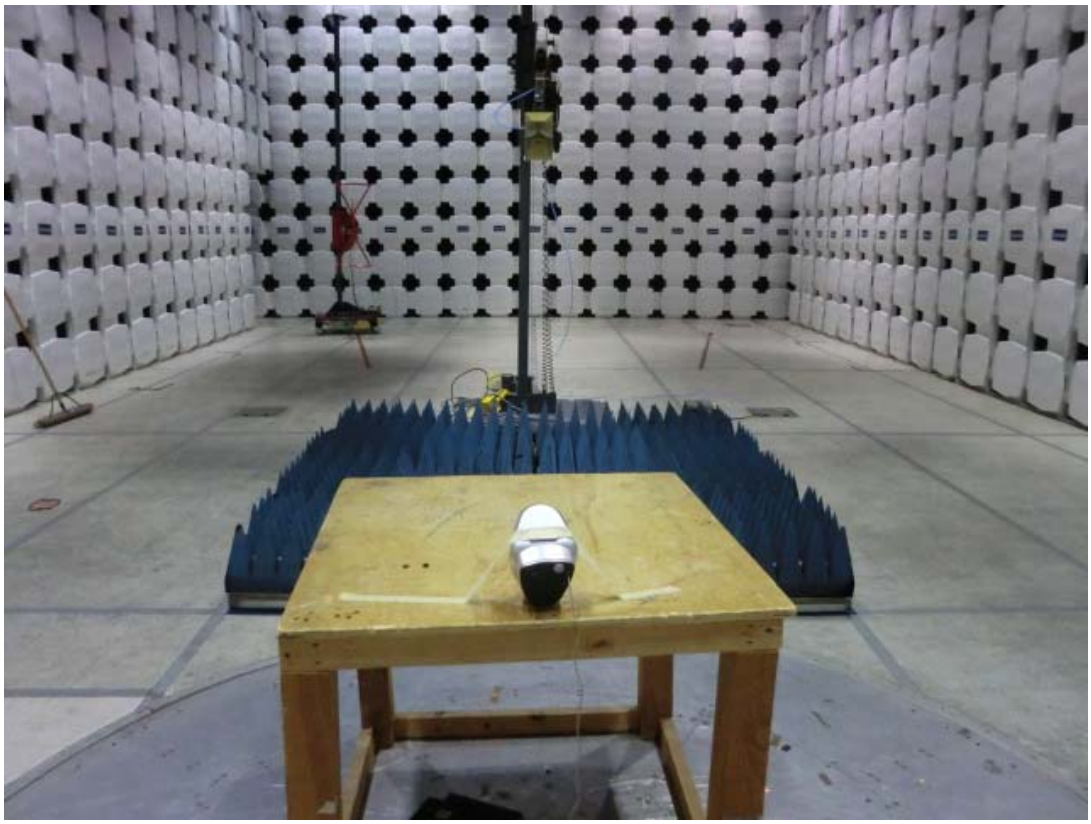
Name	Manufacturer	Version
None		

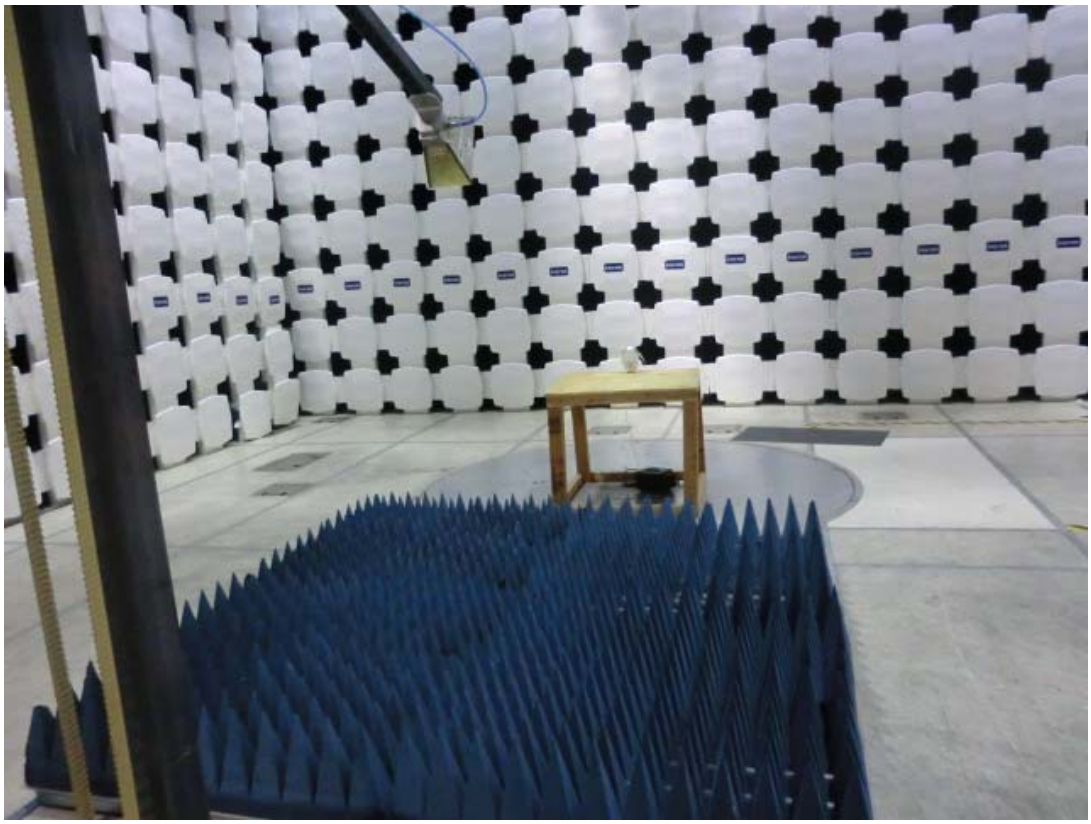
8.3 Results:

The sample tested was found to Comply.

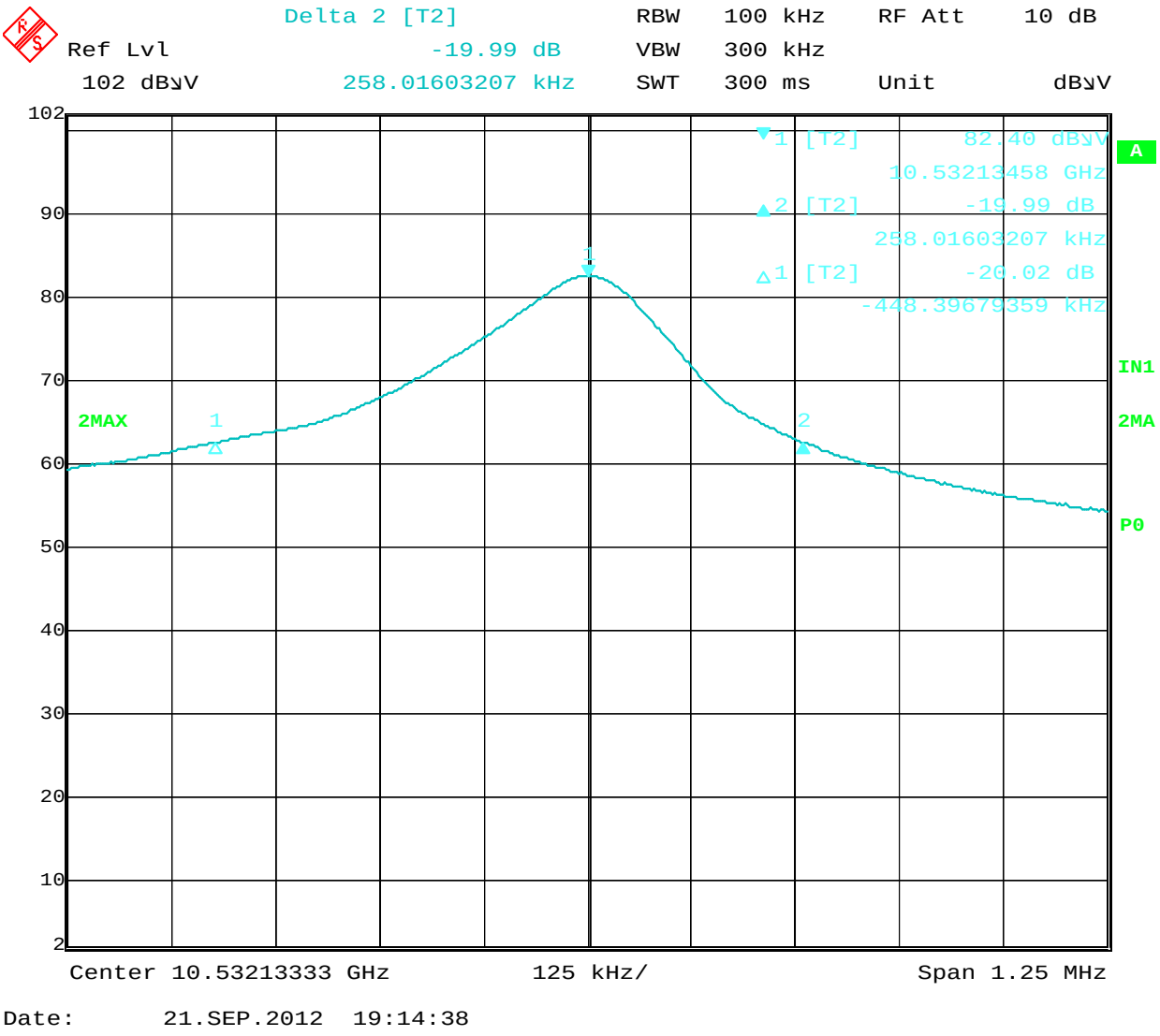
The fundamental frequency must stay within the assigned band, 10500–10550 MHz.

8.4 Setup Photographs:

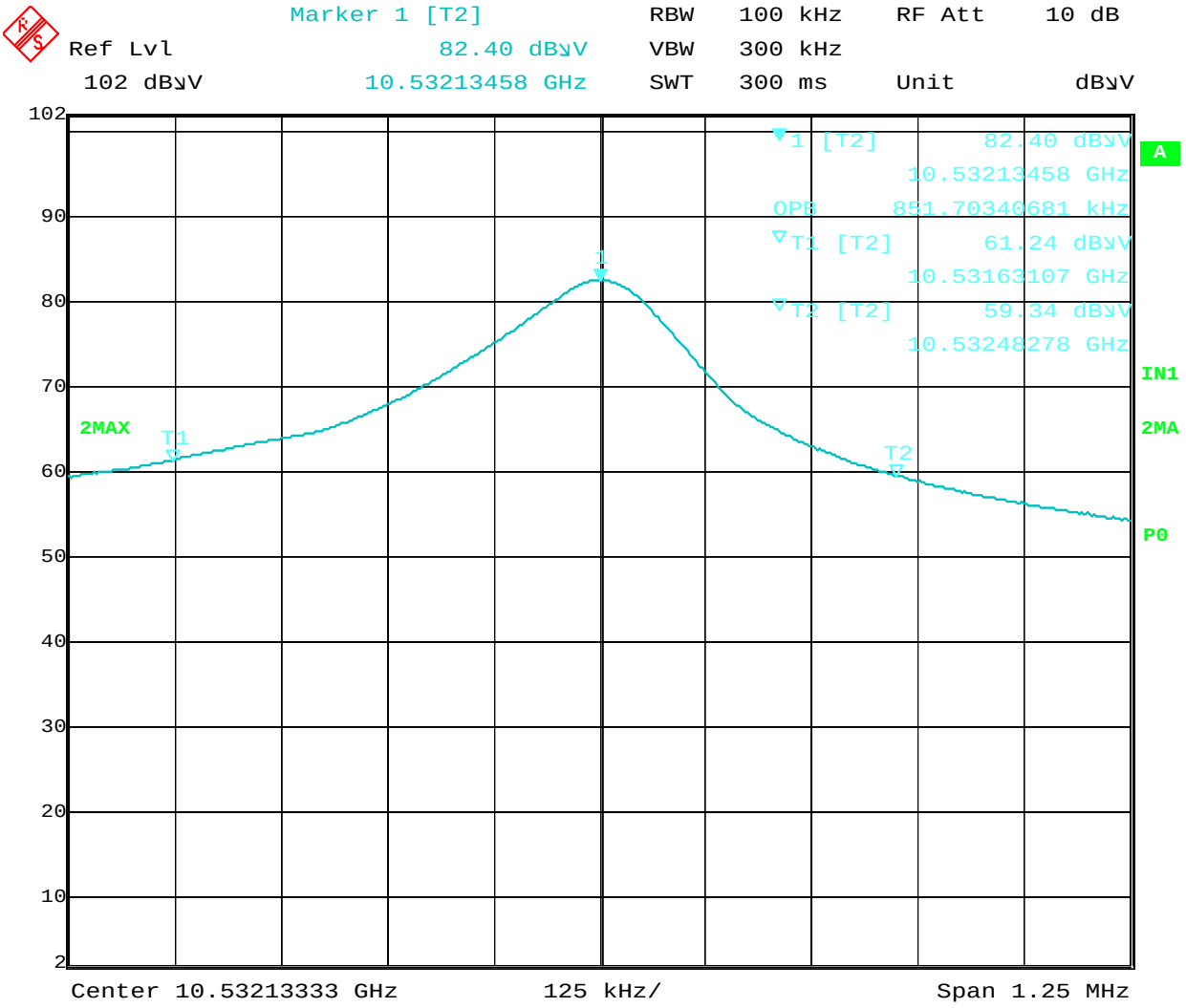




8.5 Plots/Data:



20 dB Bandwidth is 706 kHz



99% Power Bandwidth is 852 kHz

Test Personnel:	Vathana Ven VV	Test Date:	09/21/2012
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	15.245 and RSS-210	Test Levels:	Within assigned band
Input Voltage:	12VDC	Ambient Temperature:	23 ºC
Pretest Verification w/ Ambient Signals or BB Source:	**Yes, Ambient**	Relative Humidity:	23 %
		Atmospheric Pressure:	1008 mbars

Deviations, Additions, or Exclusions: None

9 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	09/27/2012	100869972BOX-001	VJV	NNA	Original issue