FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart F § 15.519

Equipment	:	**Staccato Communications RC2 Model WUSB Dongle Module**
Model No.	:	**SC4404R-C**
Brand Name	:	**Staccato Communications Inc.**
Filing Type	:	**New Application**
Applicant	:	**Staccato Communications, Inc.** 6195 Lusk Blvd Suite 200 San Diego, CA92121 United States
FCC ID	:	**UQL-RC2-SC4404R**
Test Freq. Range	:	**3100 ~ 10600MHz**
Manufacturer	:	**Vencer Co., Ltd.** 20F-1, No.77, Sec. 1, Hsin Tai Wu Rd., His-Chih, Taipei Hsien, Taiwan 22101, R.O.C.
Received Date	:	Feb. 10, 2010
Final Test Date	:	Feb. 12, 2010

Statement

The test result in this report refers exclusively to the presented test model / sample.
Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart F**.
The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Table of Contents

History of This Test Report

Original Issue Date: Feb. 12, 2010

Report No.: FR020304

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart F § 15.519

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		6195 Lusk Blvd Suite 200 San Diego, CA92121 United States

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on May 28, 2007 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart F				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
3.1	15.207	AC Power Line Conducted Emissions	Complies	10.89 dB
3.2	15.519(a)	Operational Limitations	Complies	-
3.3	15.519(b)	UWB Bandwidth	Complies	-
3.4	15.519(c)/15.209	Radiated Emissions	Complies	0.54 dB
3.5	15.519(d)	Radiated Emissions in GPS Bands	Complies	7.56 dB
3.5	15.519(e)	Peak Emissions within a 50 MHz Bandwidth	Complies	8.74 dB
3.7	15.19/15.212	Labeling Requirements	Complies	-
3.8	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
UWB Bandwidth	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions / in GPS Bands (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7oC	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2. GENERAL INFORMATION

2.1. Product Details

Items	Description
Power Type	Host (Notebook)
Modulation	Multi-band OFDM (QPSK / DCM)
Operation Frequency Range	3168 ~ 4752 MHz
10 dB Bandwidth	508 MHz
RF Output Rating	From 3.1~10.6GHz band, max EIRP is -22.71 dBm (EIRP) @ RBW 10MHz, transfer to -8.74 dBm (EIRP) @ RBW 50MHz
Antenna	Acon antenna part number: ADM6P-700042 External Antenna (U.FL antenna connector)

2.2. Table for Carrier Frequencies

Band Group	BAND_ID (n_b)	Lower Frequency (MHz)	Center Frequency (MHz)	Upper Frequency (MHz)
1	1	3168	3432	3696
	2	3696	3960	4224
	3	4224	4488	4752

2.3. Table for TFC

Open band		☒	☐	☐	☐	☐
Frequency Range		3.1-4.8GHz	4.8-6.3GHz	6.3-7.9GHz	7.4-9GHz	7.9-9.5GHz
Band Group		1	2	3	6	4
Band_ID	Band_1	1	4	7	9	10
	Band_2	2	5	8	10	11
	Band_3	3	6	9	11	12
TFC	TFC1	1-2-3-1-2-3	4-5-6-4-5-6	7-8-9-7-8-9	9-10-11-9-10-11	10-11-12-10-11-12
	TFC2	1-3-2-1-3-2	4-6-5-4-6-5	7-9-8-7-9-8	9-11-10-9-11-10	10-12-11-10-12-11
	TFC3	1-1-2-2-3-3	4-4-5-5-6-6	7-7-8-8-9-9	9-9-10-10-11-11	10-10-11-11-12-12
	TFC4	1-1-3-3-2-2	4-4-6-6-5-5	7-7-9-9-8-8	9-9-11-11-10-10	10-10-12-12-11-11
	TFC5	1-1-1-1-1-1	4-4-4-4-4-4	7-7-7-7-7-7	9-9-9-9-9-9	10-10-10-10-10-10
	TFC6	2-2-2-2-2-2	5-5-5-5-5-5	8-8-8-8-8-8	10-10-10-10-10-10	11-11-11-11-11-11
	TFC7	3-3-3-3-3-3	6-6-6-6-6-6	9-9-9-9-9-9	11-11-11-11-11-11	12-12-12-12-12-12
	TFC8	1-2-1-2-1-2	4-5-4-5-4-5	7-8-7-8-7-8	9-10-9-10-9-10	10-11-10-11-10-11
	TFC9	1-3-1-3-1-3	4-6-4-6-4-6	7-9-7-9-7-9	9-11-9-11-9-11	10-12-10-12-10-12
	TFC10	2-3-2-3-2-3	5-6-5-6-5-6	8-9-8-9-8-9	10-11-10-11-10-11	11-12-11-12-11-12

2.4. Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Band Group	Data Rate	Remark
AC Power Line Conducted Emissions	Normal Link	1	TFC 1, 53.3 Mbps	-
UWB Bandwidth	CTX	1	TFC 1, 53.3 Mbps	-
Radiated Emissions 9kHz~960MHz	CTX	1	TFC 1, 53.3 Mbps	-
Radiated Emissions above 960MHz	CTX	1	TFC 1, 53.3 Mbps	-
Peak Emissions within a 50 MHz Bandwidth	CTX	1	TFC 1, 53.3 Mbps	-

Note:

1. CTX=continuously transmitting at Band Group 1:
2. Investigation has been done on all data rates for searching the worst cases. The EUT with TFC 1, 53.3Mbps has been found to be the worst case.

2.5. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
CO01-HY	Conduction	Hwa Ya	643075	IC 4086B-1
TH01-HY	OVEN Room	Hwa Ya	-	-
03CH01-HY	SAC	Hwa Ya	643075	IC 4086B-1

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

2.6. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	IBM	1953	DoC
Headset	J-S	CD-87MV	DoC
(USB) Mouse	Microsoft	1004	DoC

2.7. Table for Parameters of Test Software Setting

For Radiated test Software:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware on the final end product.

UWB

Test Software Version	N/A		
BAND_ID(nb)	1	2	3
UWB	Default	Default	Default

2.8. EUT Operation during Test

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

Turn on the power of all equipment.

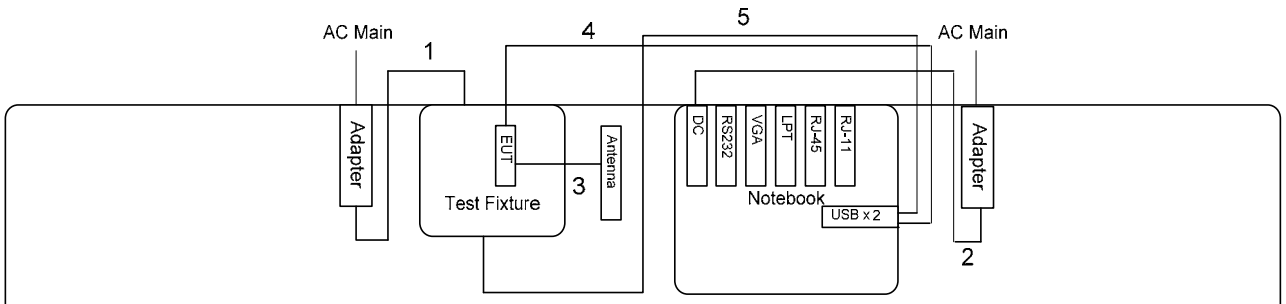
a. The NB reads the test program from the hard disk drive and runs it.
b. The NB sends " H " messages to the panel, and the panel displays " H " patterns on the screen.
c. The NB sends " H " messages to the external Hard Disk, and the Hard Disk reads and writes the message.

- Executed "CD player" to play music.

- Executed "ATMEL RF" to keep transmitting signals at fixed frequency.

2.9. Test Configurations

2.9.1. Radiation Emissions Test Configuration



1. DC power line, 1.5m, Non-Shielding.
2. DC power line, 1.5m, Non-Shielding.
3. RF cable, 0.2m, shielding.
4. USB cable, 1m, shielding.
5. USB cable, 1m, shielding.

3. TEST RESULT

3.1. AC Power Line Conducted Emissions Measurement

3.1.1. Limit

For a Low-power Radio-frequency device which is designed to be connected to the 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 below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2. Measuring Instruments and Setting

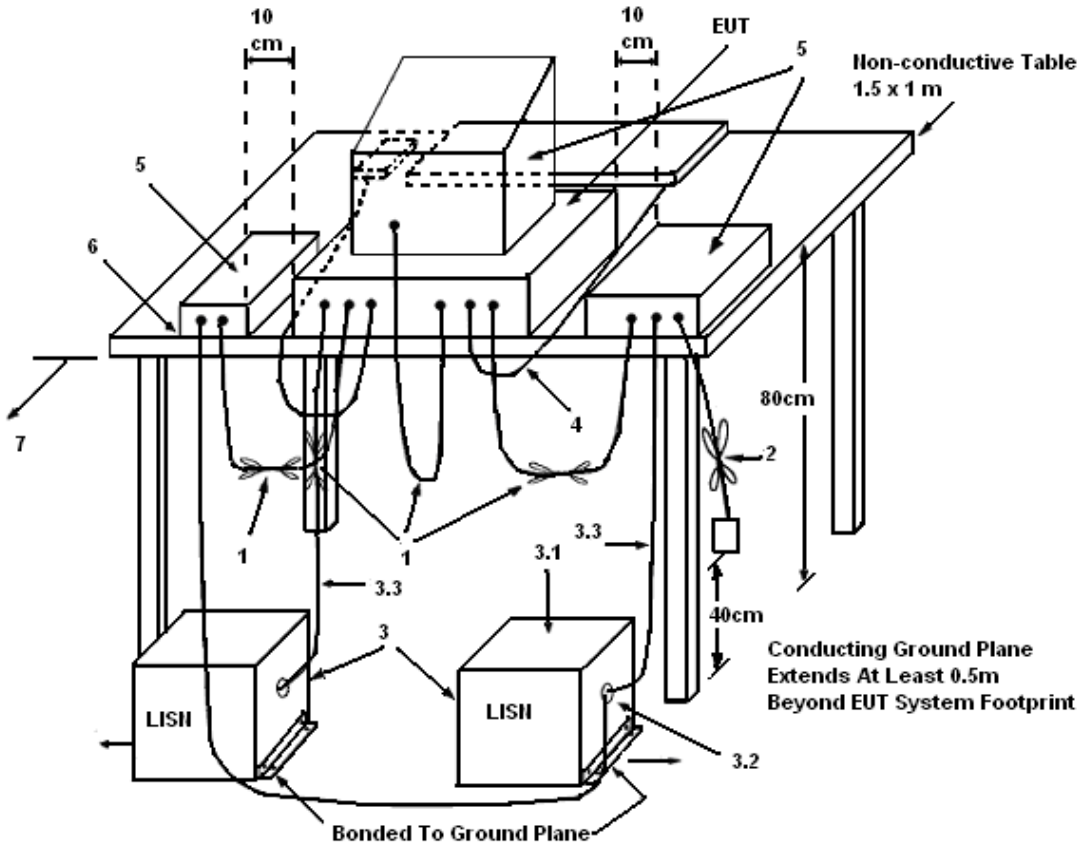
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.1.3. Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5. Test Deviation

There is no deviation with the original standard.

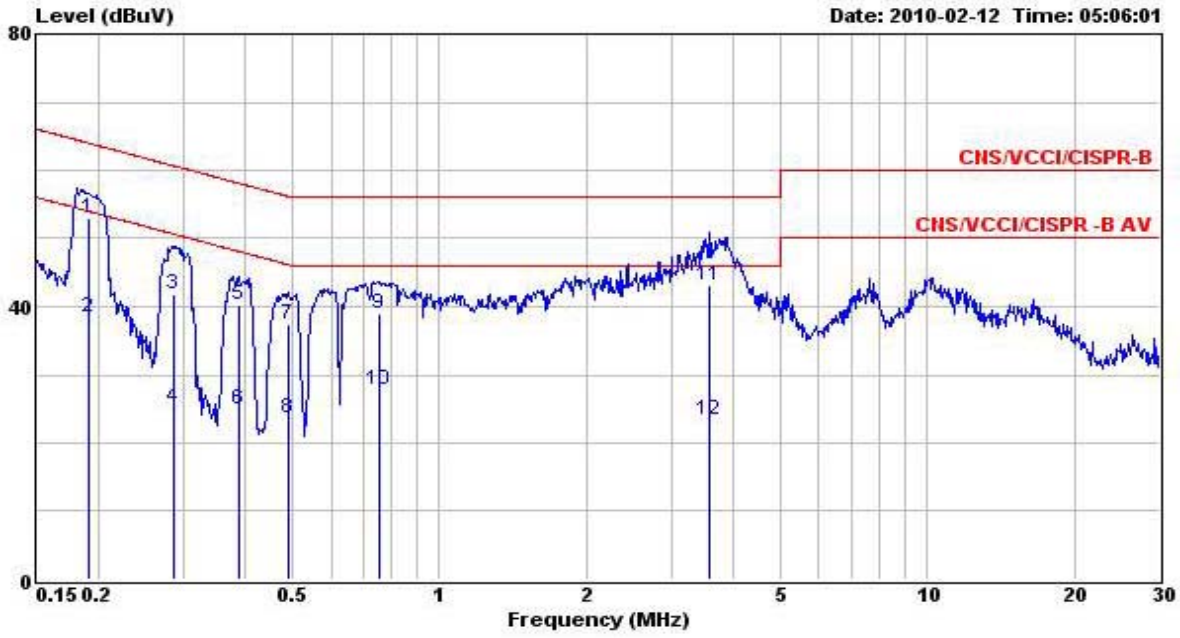
3.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7. Results of AC Power Line Conducted Emissions Measurement

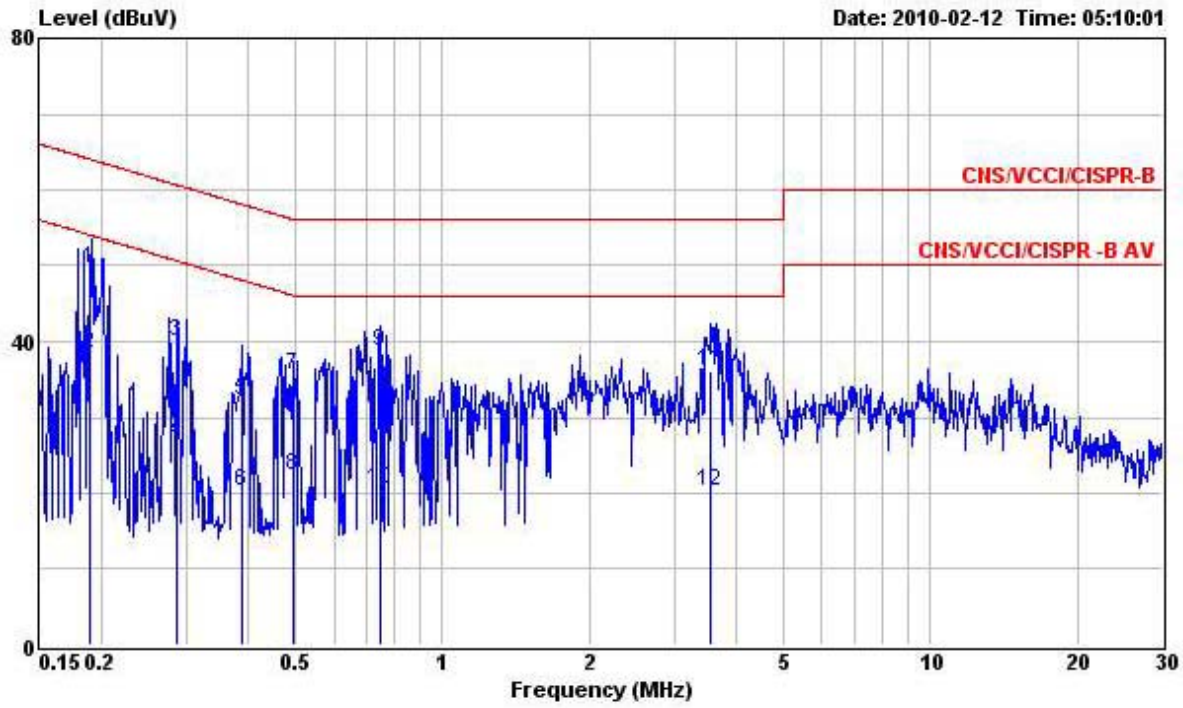
Final Test Date	Feb. 12, 2010	**Test Site No.**	CO01-HY
Temperature	20oC	**Humidity**	50%
Test Engineer	Steven	**Configuration**	Normal Link

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.191	53.09	-10.89	63.98	52.95	0.08	0.06	QP
2	0.191	38.35	-15.63	53.98	38.21	0.08	0.06	Average
3	0.286	41.85	-18.79	60.64	41.69	0.09	0.07	QP
4	0.286	25.29	-25.35	50.64	25.13	0.09	0.07	Average
5	0.387	40.14	-17.99	58.13	39.98	0.09	0.07	QP
6	0.387	24.89	-23.24	48.13	24.73	0.09	0.07	Average
7	0.489	37.39	-18.79	56.18	37.21	0.09	0.09	QP
8	0.489	23.70	-22.48	46.18	23.52	0.09	0.09	Average
9	0.755	39.03	-16.97	56.00	38.81	0.10	0.12	QP
10	0.755	27.90	-18.10	46.00	27.68	0.10	0.12	Average
11	3.570	43.09	-12.91	56.00	42.79	0.16	0.14	QP
12	3.570	23.37	-22.63	46.00	23.07	0.16	0.14	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.190	49.66	-14.38	64.04	49.54	0.06	0.06	QP
2	0.190	38.40	-15.64	54.04	38.28	0.06	0.06	Average
3	0.287	39.96	-20.66	60.62	39.82	0.07	0.07	QP
4	0.287	26.72	-23.90	50.62	26.58	0.07	0.07	Average
5	0.387	32.24	-25.89	58.13	32.10	0.07	0.07	QP
6	0.387	20.20	-27.93	48.13	20.06	0.07	0.07	Average
7	0.497	35.68	-20.37	56.05	35.52	0.07	0.09	QP
8	0.497	22.38	-23.67	46.05	22.22	0.07	0.09	Average
9	0.743	38.78	-17.22	56.00	38.58	0.08	0.12	QP
10	0.743	20.58	-25.42	46.00	20.38	0.08	0.12	Average
11	3.550	36.09	-19.91	56.00	35.82	0.13	0.14	QP
12	3.550	20.33	-25.67	46.00	20.06	0.13	0.14	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2. Operational Limitations

3.2.1. Test Result of Operation Restriction

Operation Restriction	Informed the applicant	Not applicable	User Manual Informed	Passed
☒ 47 CFR FCC Part 15 Subpart F 15.519(a)				
UWB devices operating under the provisions of this section must be hand held, i.e., they are relatively small devices that are primarily hand held while being operated and do not employ a fixed infrastructure. **[A transmitter that had been connected to portable device e.g. Laptop PC…and be considered sufficient to demonstrate not a fixed infrastructure application.]**	☒	☐	☐	☒
(1) The radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver				
A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting. **[The applicant has been informed of this requirement and instruct the caution in user manual.]**	☒	☐	☒	☒
(2) Outdoor mounted antennas				
The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device. **[The applicant has been informed of this requirement.]**	☒	☐	☐	☒
(5) Indoors or Outdoors				
UWB devices operating under the provisions of this section may operate indoors or outdoors. **[The applicant has been informed of this requirement.]**	☒	☐	☐	☒

3.3. UWB Bandwidth Measurement

3.3.1. Limit

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

The UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated f_H and the lower boundary is designated f_L. The frequency at which the highest radiated emission occurs is designated f_M.

Center frequency. The center frequency, f_C, equals $(f_H + f_L)/2$.

Fractional bandwidth. The fractional bandwidth equals $2(f_H - f_L)/ (f_H + f_L)$.

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

3.3.2. Measuring Instruments and Setting

Please refer to equipments list in section 4 of this report. The following table is the setting of the spectrum analyzer.

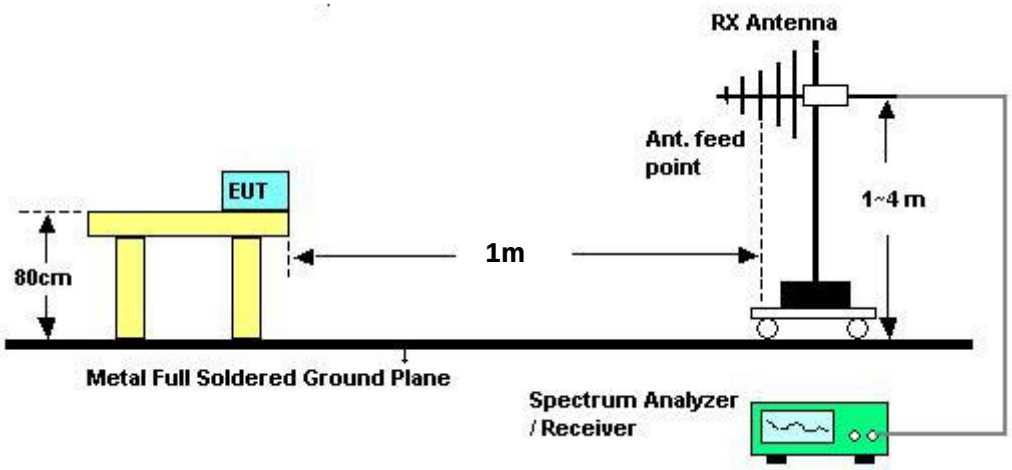
Parameter	Setting
RBW / VBW	10 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3. Test Procedures

1. The EUT was placed on the top of the turntable that is non-conductive materials (glass fiber) and 0.8 meter above ground. The EUT was flush on the back of the tabletop. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. The horn receiving antenna was varied between 1 meter and 4 meters , 1 meter step above ground while find the maximum emissions field strength of both horizontal and vertical polarization.
3. For maximum emission amplitude, the antenna tower was scanning (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading and was used to determine the frequency at which the highest radiated emission occurs, f_M. Next, the points that are 10dB or more below the highest radiated emission were observed in a search from f_M in both the lower and higher frequency direction in the measured frequency EIRP graph, they are denoted as f_L and f_H, respectively. The UWB bandwidth is the difference between f_L and f_H.

4. The individual UWB bandwidths were measured for each BAND_ID (n_b) of the UWB spectrum. Both horizontal and vertical polarizations were taken into account to determine the full UWB BW on the maximized (in azimuth and elevation) signals.

3.3.4. Test Setup Layout



3.3.5. Test Deviation

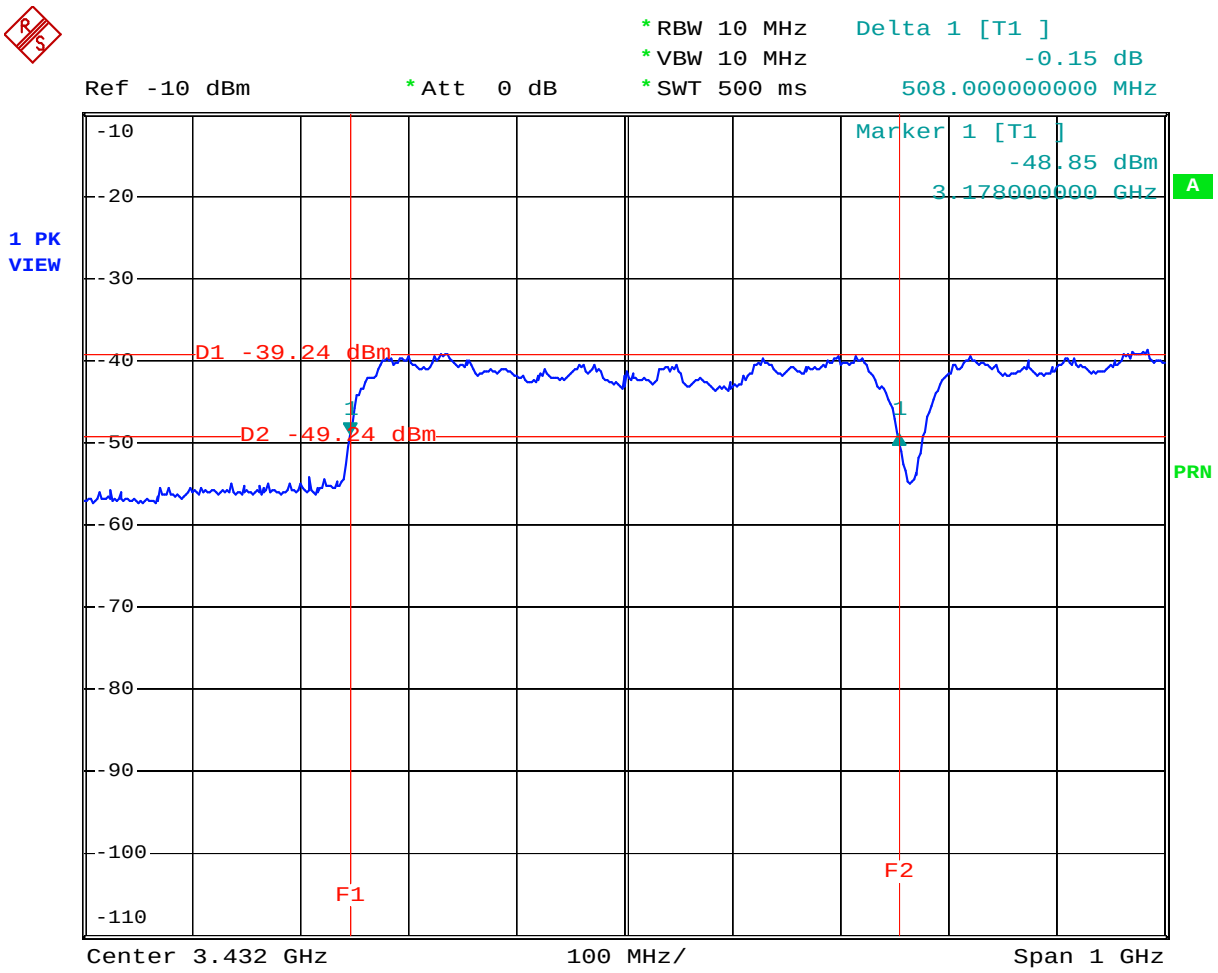
There is no deviation with the original standard.

3.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode and TFC 1 and data rate is 53.3Mbps.

3.3.7. Test Result of UWB Bandwidth

UWB Bandwidth on BAND_ID (n_b) 1

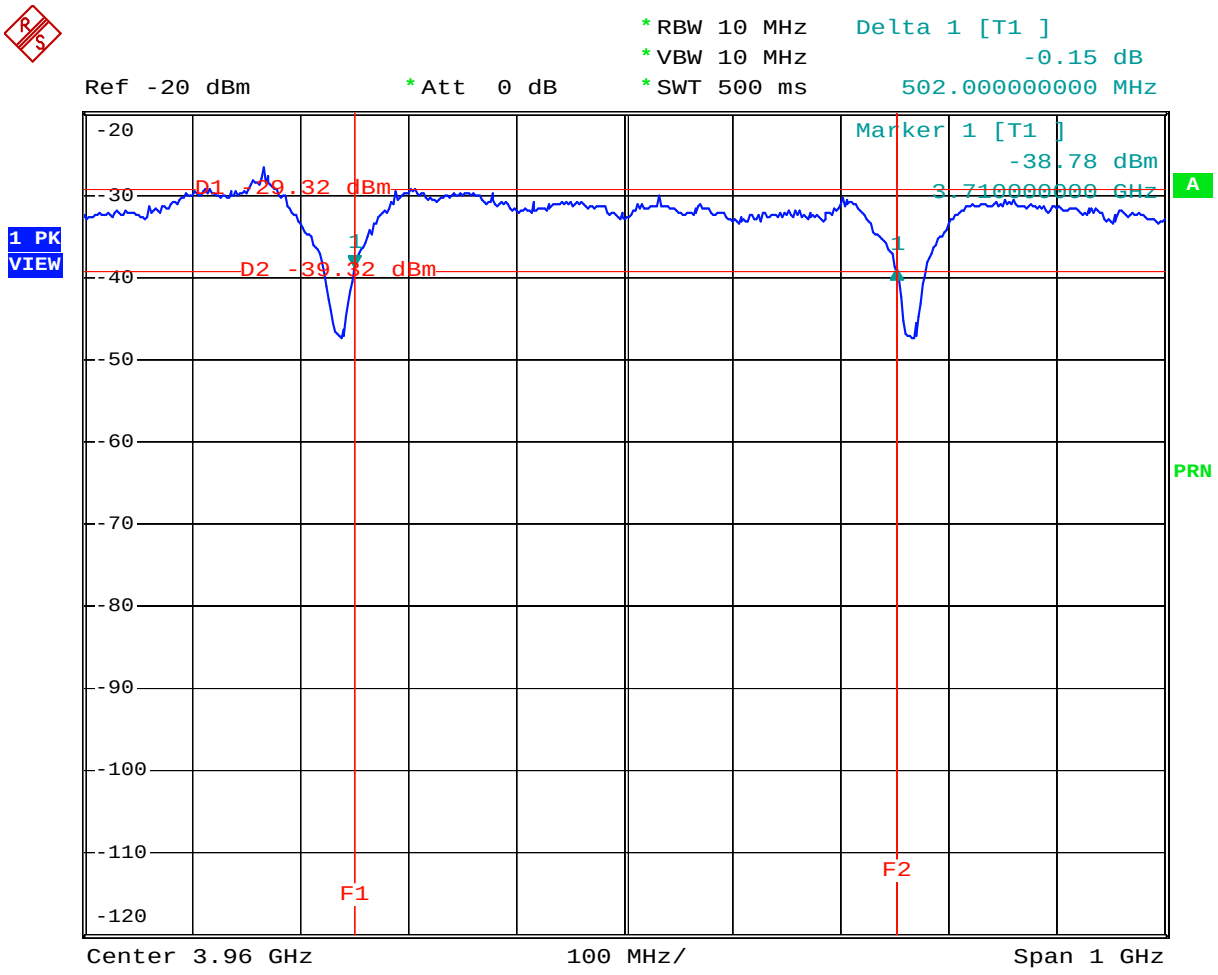


UWB BW = 508 MHz; F_L = 3178 MHz; F_H = 3686 MHz; F_C = 3432 MHz

Note:

1. Test Distance: 1m

UWB Bandwidth on BAND_ID (n_b) 2



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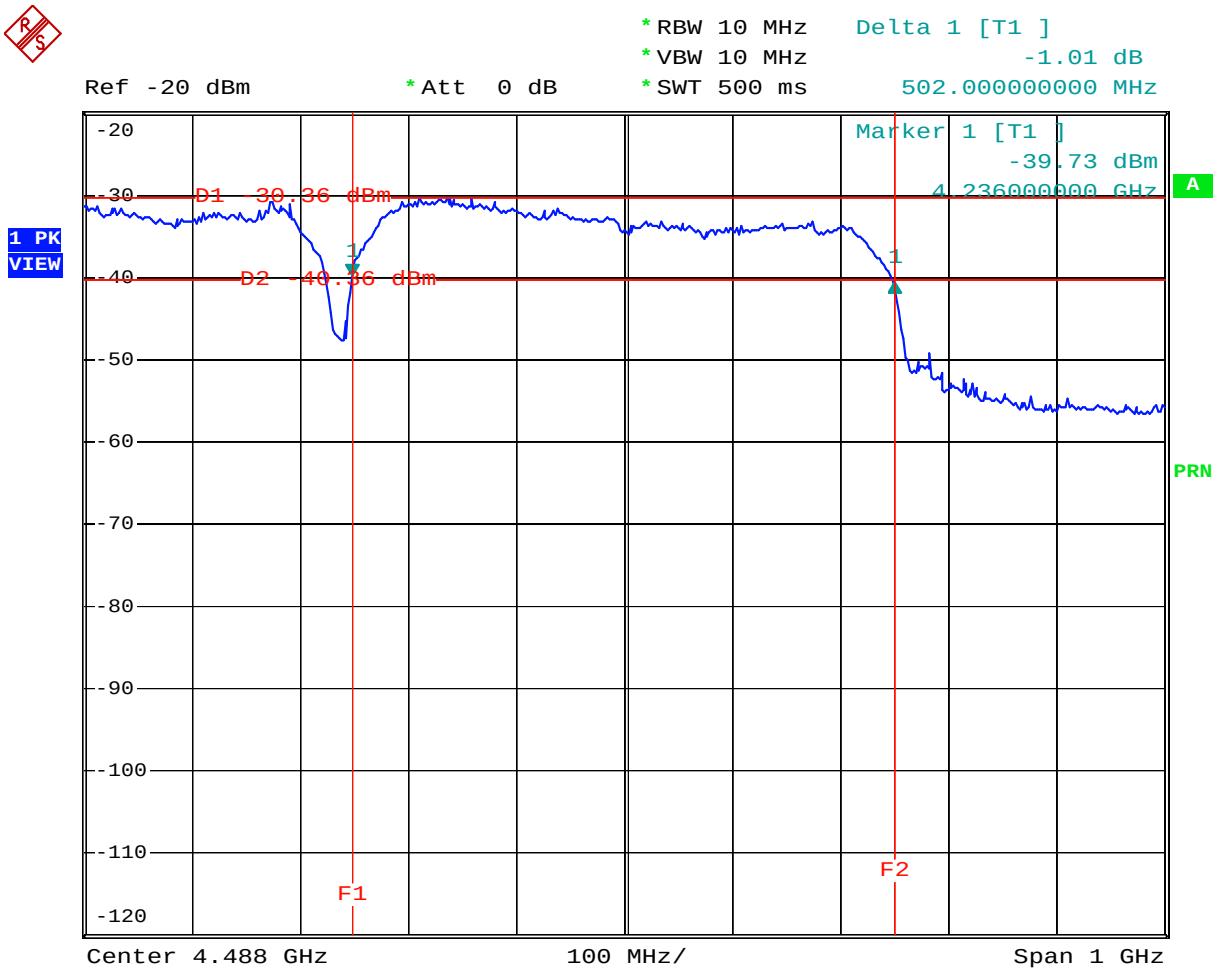
UWB BW = 502 MHz; F_L = 3710 MHz; F_H = 4212 MHz; F_C = 3961 MHz

Note:

1. Test Distance: 1m

UWB Bandwidth on BAND_ID (n_b) 3



UWB BW = 502 MHz; F_L = 4236 MHz; F_H = 4738 MHz; F_C = 4487 MHz

Note:

1. Test Distance: 1m

3.4. Radiated Emissions Measurement

3.4.1. Limit

1. The radiated emissions at or below 960 MHz from a device shall not exceed the emission levels in section 15.209(a) limit below.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3

2. The radiated emissions above 960 MHz from a device shall not exceed the emission levels in section 15.519(c) limit below.

Freq. (MHz)	EIRP (dBm)
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
10600 above	-61.3

3. This may be converted to a peak field strength level at 3 meters using E(dBuV/m) = P(dBm EIRP) + 95.2 dB.

4. For 47 CFR Section 15.521(c): Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in Section 15.209 of this chapter, rather than the limits specified in this subpart, provided it can be clearly demonstrated that those emissions from the UWB device are due solely to emissions from digital circuitry contained within the transmitter and that the emissions are not intended to be radiated from the transmitter's antenna. Emissions from associated digital devices, as defined in Section 15.3(k) of this chapter, e.g., emissions from digital circuitry used to control additional functions or capabilities other than the UWB transmission, are subject to the limits contained in Subpart B of Part 15 of this chapter.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
above 960	500	3

3.4.2. Measuring Instruments and Setting

Please refer to equipments list in section 4 of this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	0 dB
Start Frequency	960 MHz
Stop Frequency	10th carrier harmonic or 40 GHz
RBW / VBW	47 CFR Section15.519(c): 1MHz / 3MHz for RMS, 1 msec averaging time were used for these measurement frequencies. 47 CFR Section 15.521(c): (47 CFR Section 15.209 (a)) 1MHz/1MHz for peak; 1MHz/10Hz for Average. (in accordance with ANSI C63.4)

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

3.4.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable that is non-conductive material (glass fiber) and 0.8 meter above ground. The EUT was flush on the back of the tabletop. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed equal or less than 3 meters far away from the turntable, shorter measurement distances may be used to improve the measurement systems noise floor.

2. Extrapolation factor when test distance other than 3m. (in accordance with 47 CFR 15.31 (f) (1))

   2.1. From 3m to 1m. Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

   2.2. From 3m to 0.5m. Distance extrapolation factor = 20 log (specific distance [3m] / test distance [0.5m]) (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].

3. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
4. The height of the broadband receiving antenna was varied between 1 meter and 4 meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
5. For each suspected emissions, the antenna tower was scanning (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
6. The measurements made over the frequency range from 9 kHz to 960 MHz were maximized using an

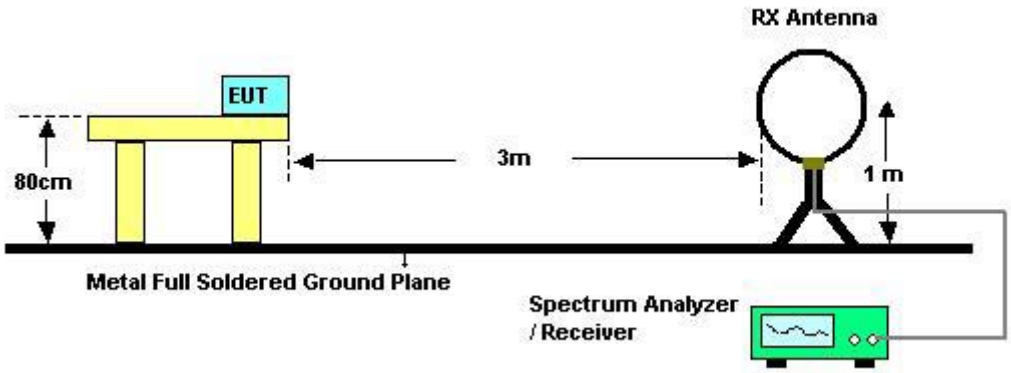
EMI receiver with peak detector capabilities. If the emissions level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 960MHz.

7. Measurements above 960MHz were maximized using a spectrum analyzer with RMS detector capabilities. A spectrum analyzer was used for the final measurements utilizing an RMS detector at the frequencies with the largest amplitudes. The prescribed RBW of 1 MHz and VBW of 3 MHz, and a 1 msec averaging time were used for these measurements.
8. The spectrum between 9 kHz and 960MHz contained no intentional radiation and lies below the limits. The spectrum from 960MHz to18GHz contained intentional UWB signals between 3100 MHz and 10600 MHz and lie below the limits. No other emissions above 10600 MHz were detected. The maximum frequency tested was 40 GHz.
9. Per 47 CFR, Part 15, Subpart F, §15.521(c) (§15.209) all digital emissions from the transmitter not intended to be radiated from the antenna port meet the 15.209 subpart C limits.
10. Additional measurements in the 960 MHz to 40 GHz range were performed to determine the nature of all unintentional emissions in this span. Conducted antenna port measurement and terminated antenna port measurement were done in the 960 MHz to 8 GHz range show that all noise peaks have the same frequency and polarization and are determined to be emission from the digital circuit and are not radiated from the antenna.

3.4.4. Test Setup Layout

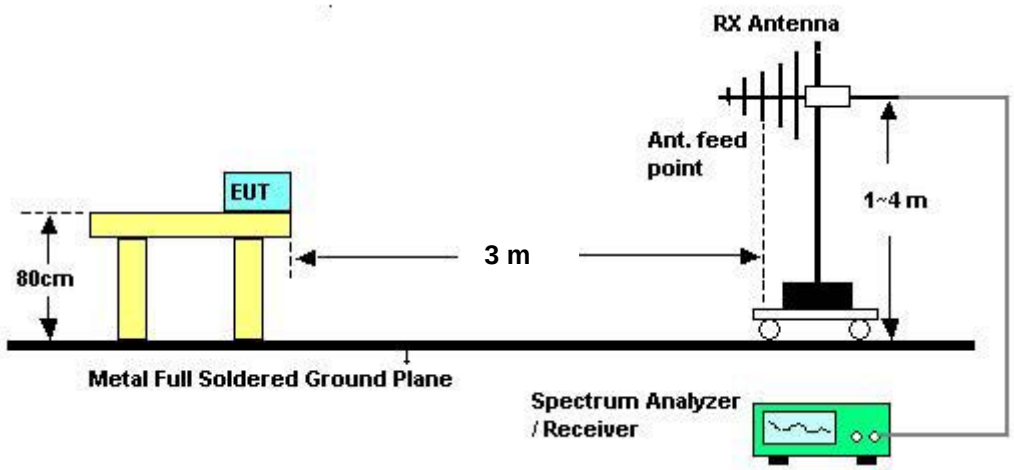
For radiated emissions below 30MHz

Investigated emissions from digital circuitry used to control additional functions or capabilities other than the UWB transmission



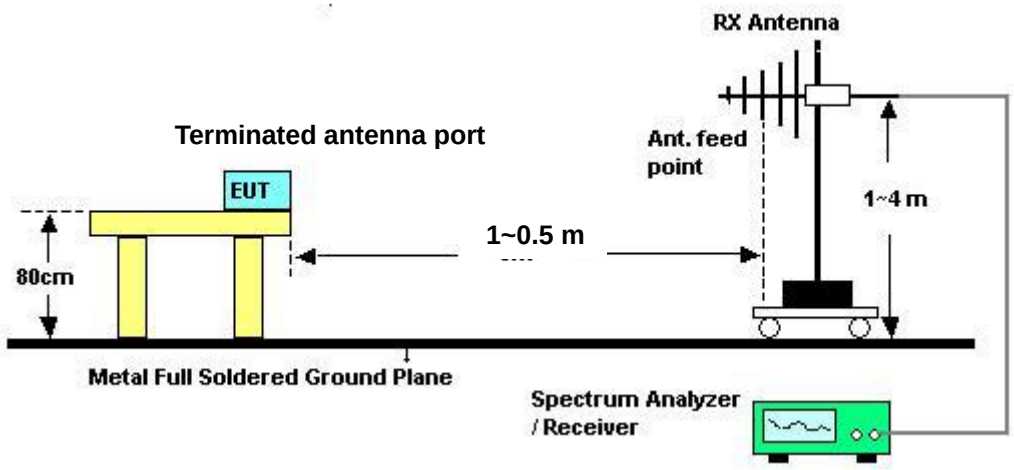
For radiated emissions from 30MHz~960MHz

Investigated emissions from digital circuitry used to control additional functions or capabilities other than the UWB transmission

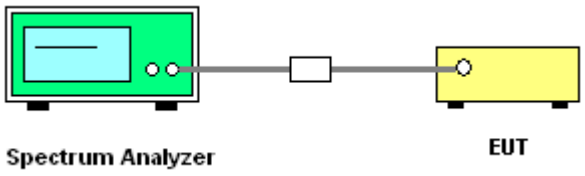


For radiated emissions above 960MHz

Investigated emissions from digital circuitry used to control additional functions or capabilities other than the UWB transmission

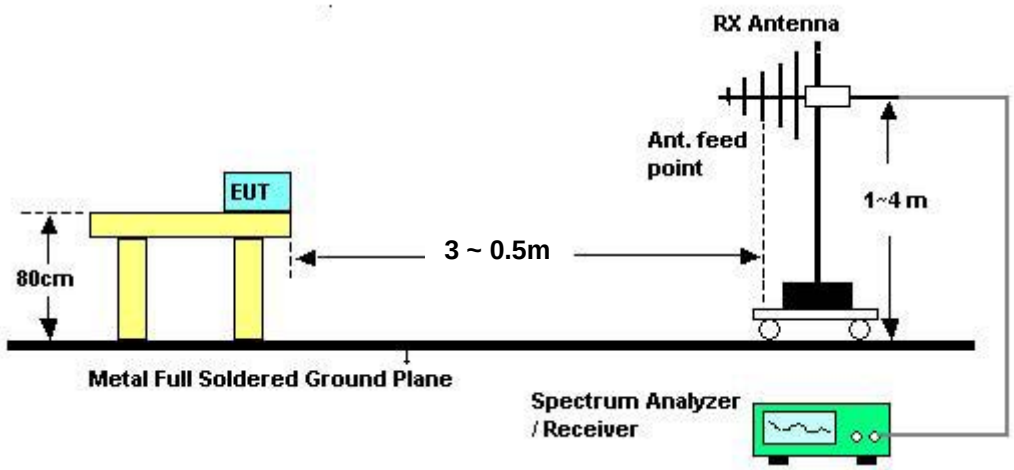


For conducted emissions above 960MHz (Conducted antenna port measurement)



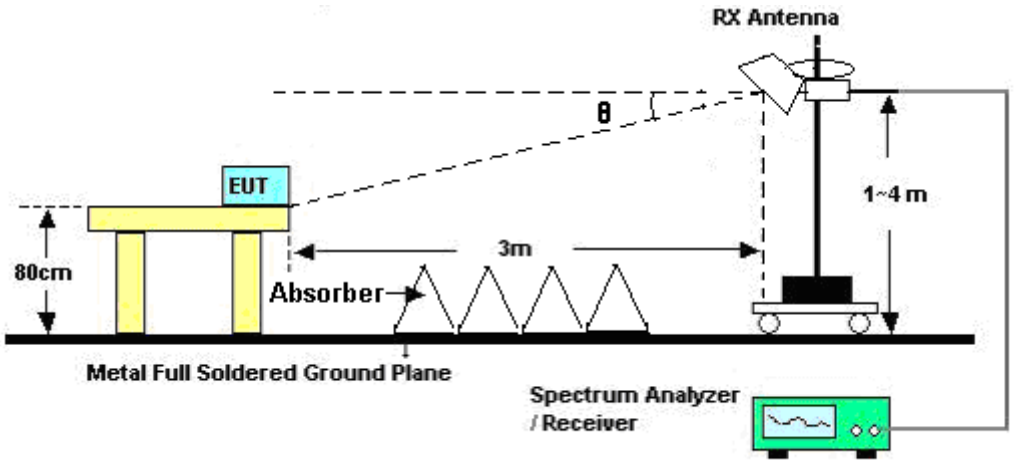
For radiated emissions above 960MHz

Investigated emissions from UWB transmission



For radiated emissions from fundamental emission (3m bore sight)

Investigated emissions from UWB transmission



Note: The Horn Antenna maintaining bore sight alignment.

$$\theta=\tan^{-1}\left(\frac{\text{The Antenna's Height} - \text{The Table's Height}}{\text{The Test Distance}}\right)$$

3.4.5. Test Deviation

There is no deviation with the original standard.

3.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode and TFC 1 and data rate is 53.3Mbps.

3.4.7. Results of Radiated Emissions

Radiated Emissions (9kHz~30MHz)

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB) (in accordance with 47 CFR 15.31 (f) (2));

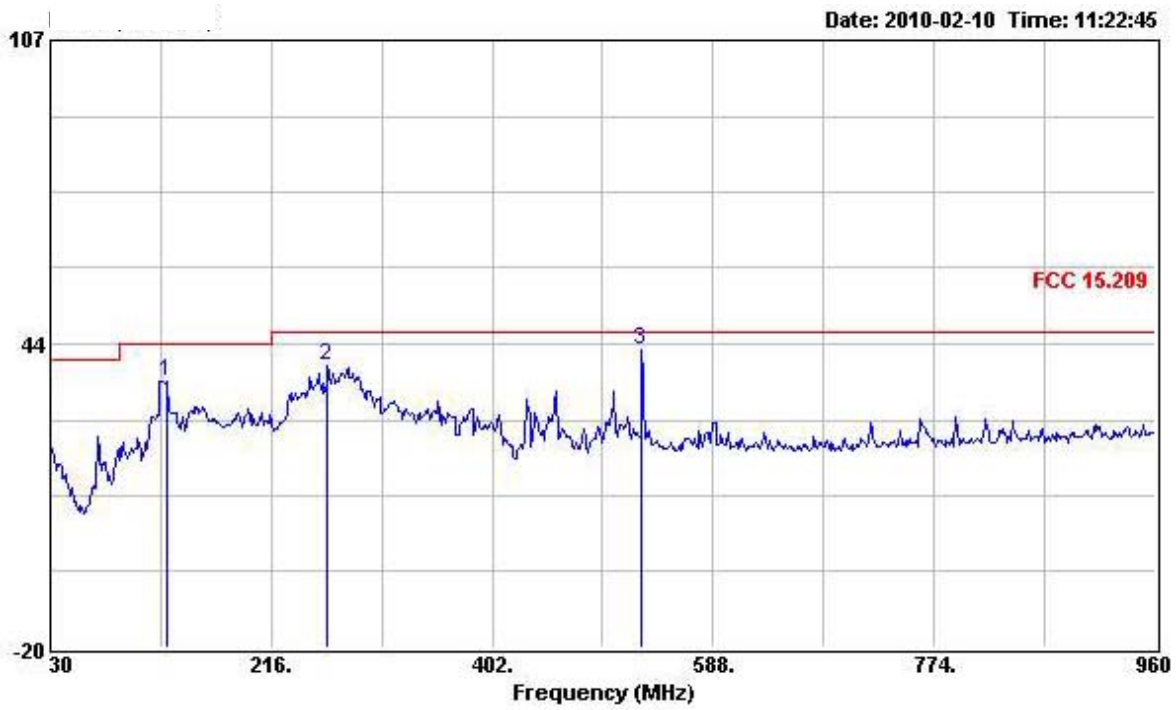
Limit line = specific limits (dBuV) + distance extrapolation factor.

Radiated Emissions (30MHz~960MHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 3m

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	
1	128.580	35.87	-7.63	43.50	55.38	1.21	32.57	Peak
2	263.430	38.91	-7.09	46.00	56.61	1.86	32.38	Peak
3	527.550	42.20	-3.80	46.00	53.12	3.00	31.97	Peak

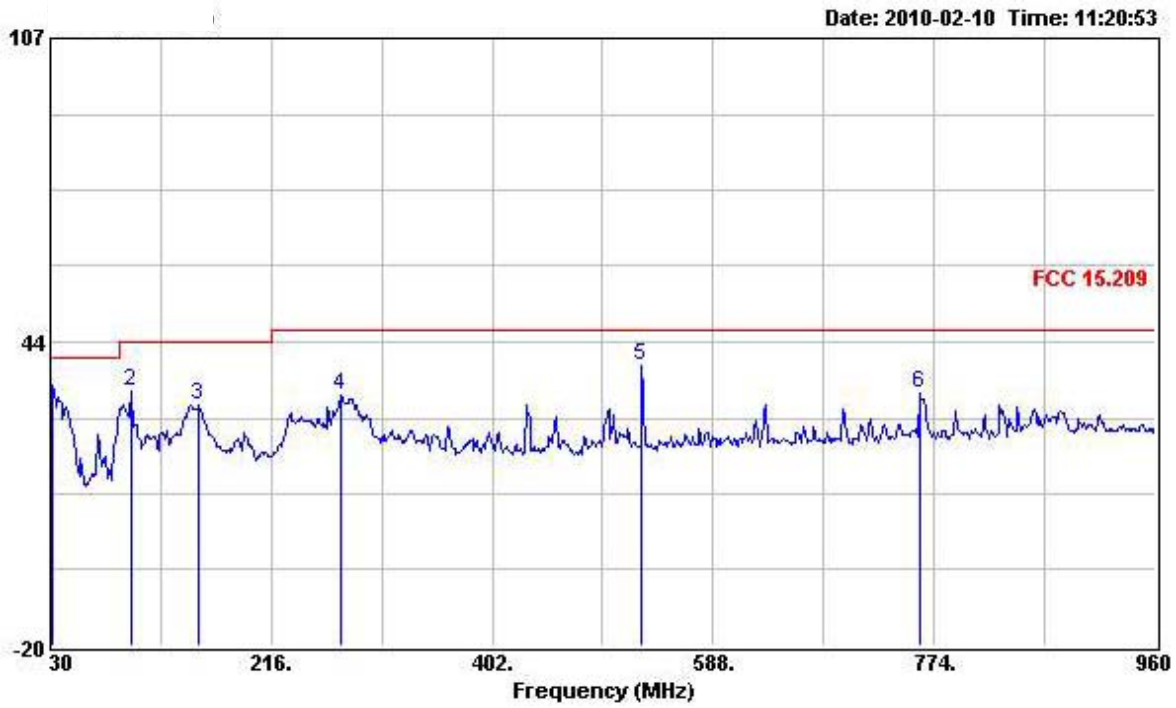
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Distance: 3m

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	
1	31.860	34.51	-5.49	40.00	48.91	0.52	32.64	Peak
2	98.820	33.18	-10.32	43.50	54.12	1.03	32.61	Peak
3	155.550	30.20	-13.30	43.50	51.20	1.37	32.53	Peak
4	274.590	32.31	-13.69	46.00	49.78	1.91	32.36	Peak
5	527.550	38.68	-7.32	46.00	49.60	3.00	31.97	Peak
6	761.910	32.78	-13.22	46.00	41.11	3.90	31.76	Peak

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

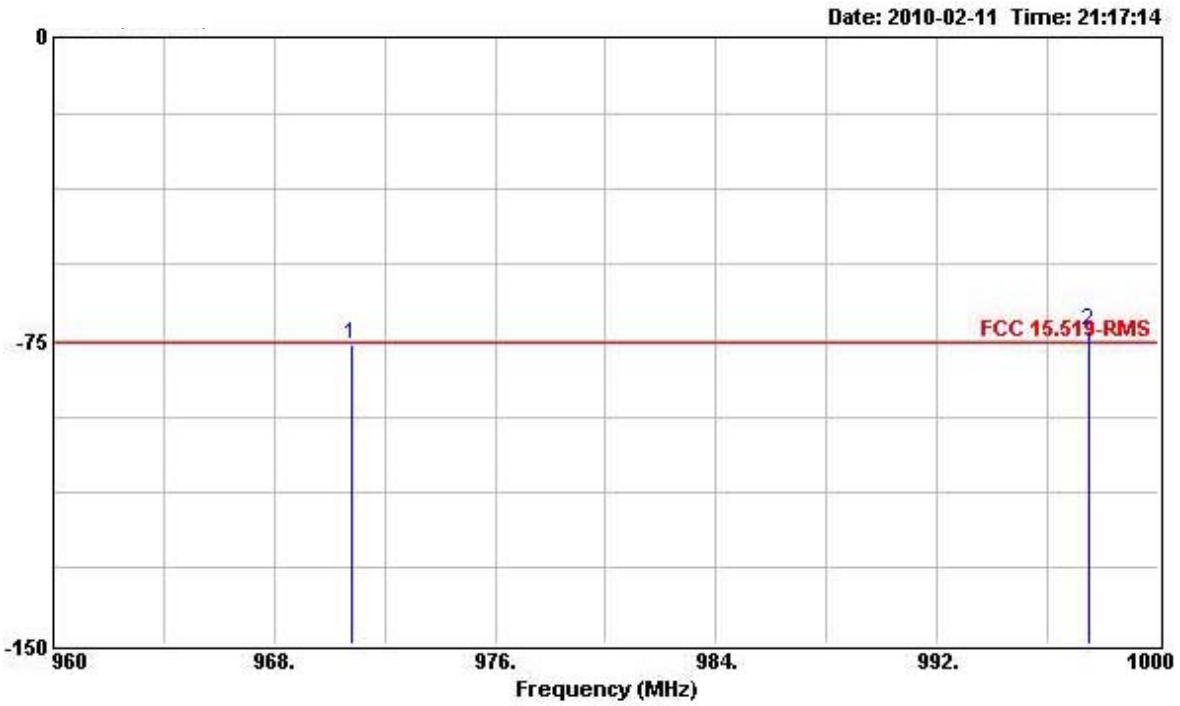
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Radiated Emissions (960MHz~1GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 3m

Horizontal

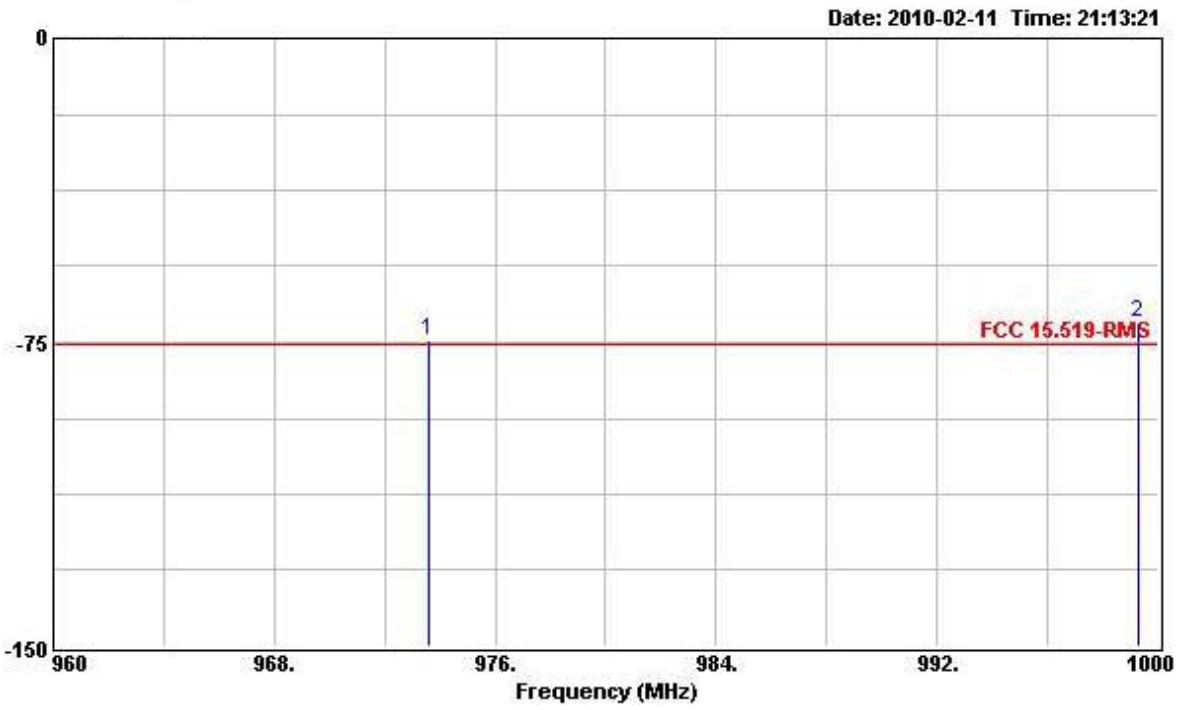


	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	970.800	-75.84	-0.54	-75.30	-69.98	4.43	31.40	
2 X	997.520	-72.46			-67.04	4.21	30.99	

Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 3m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 2) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Test Distance: 3m

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1 X	973.560	-74.55			-68.74	4.41	31.36	
2 X	999.280	-70.23			-64.84	4.19	30.96	

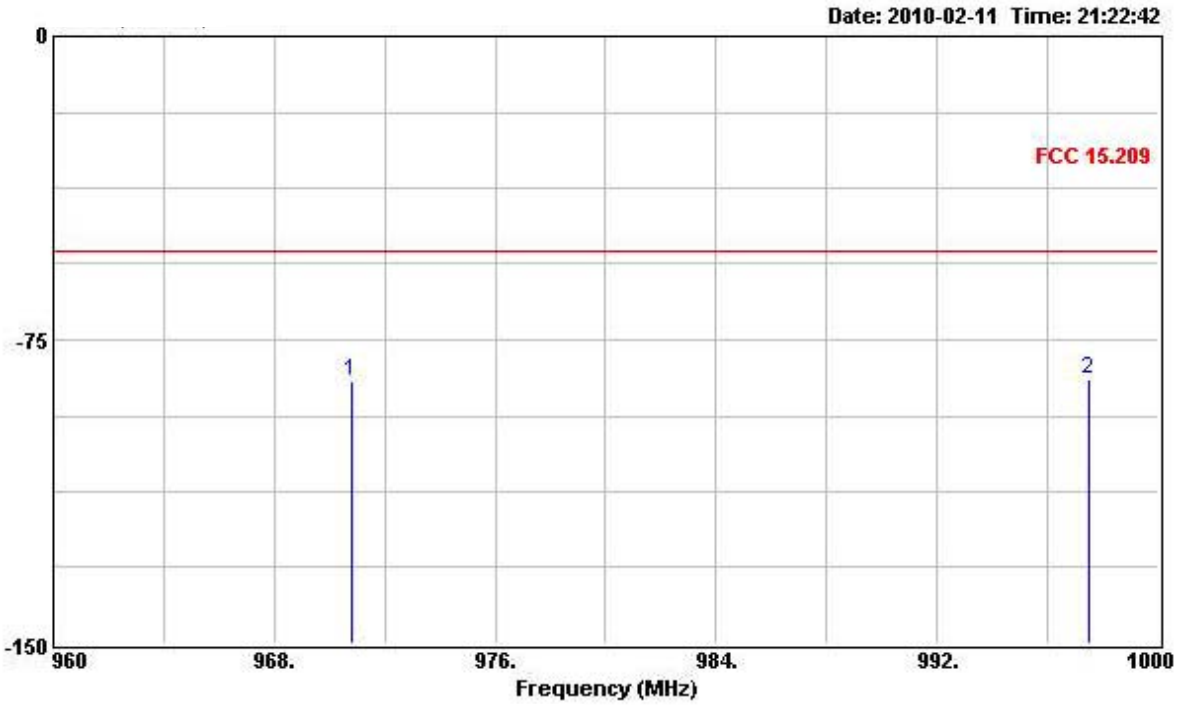
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 3m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 1, 2) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Radiated Emissions with terminated antenna port (960MHz~1GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 3m

Horizontal



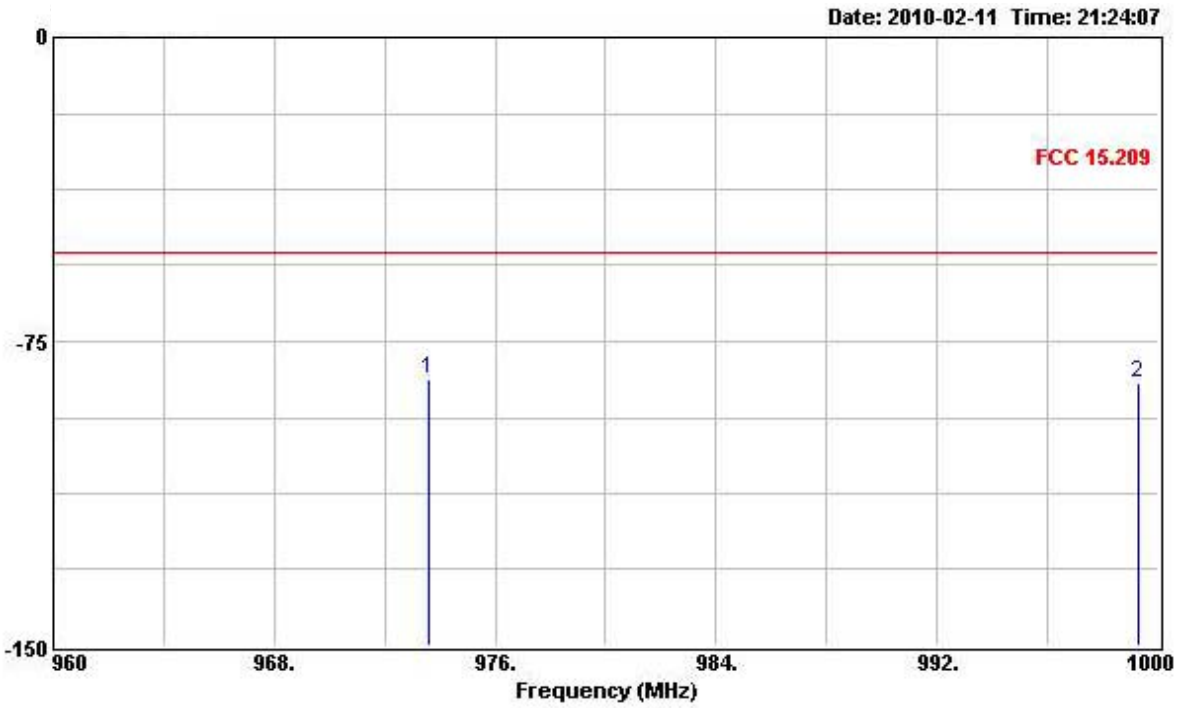
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	970.800	-85.43	-32.43	-53.00	-79.57	4.43	31.40	Peak
2	997.520	-84.88	-31.88	-53.00	-79.46	4.21	30.99	Peak

Note: For digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

QP limit line @ 3m (above 960MHz) = 54 (dBuV/m) -107 = -53 dBm/m

Test Distance: 3m

Vertical



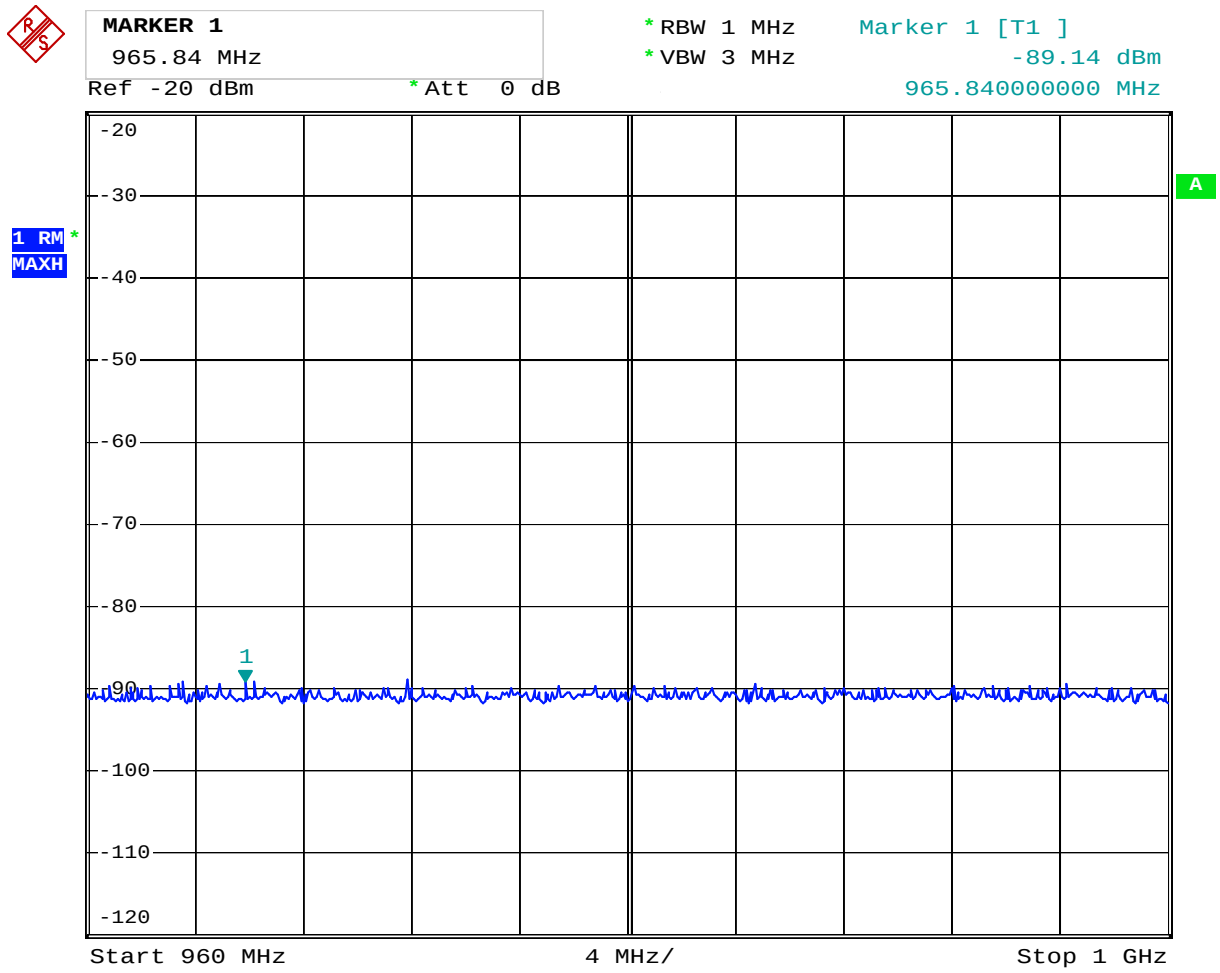
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	973.560	-84.08	-31.08	-53.00	-78.27	4.41	31.36	Peak
2	999.280	-85.07	-32.07	-53.00	-79.68	4.19	30.96	Peak

Note: For digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

QP limit line @ 3m (above 960MHz) = 54 (dBuV/m) -107 = -53 dBm/m

Conducted Antenna Port Emissions (960MHz~1GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)



Date: 11.FEB.2010 13:31:00

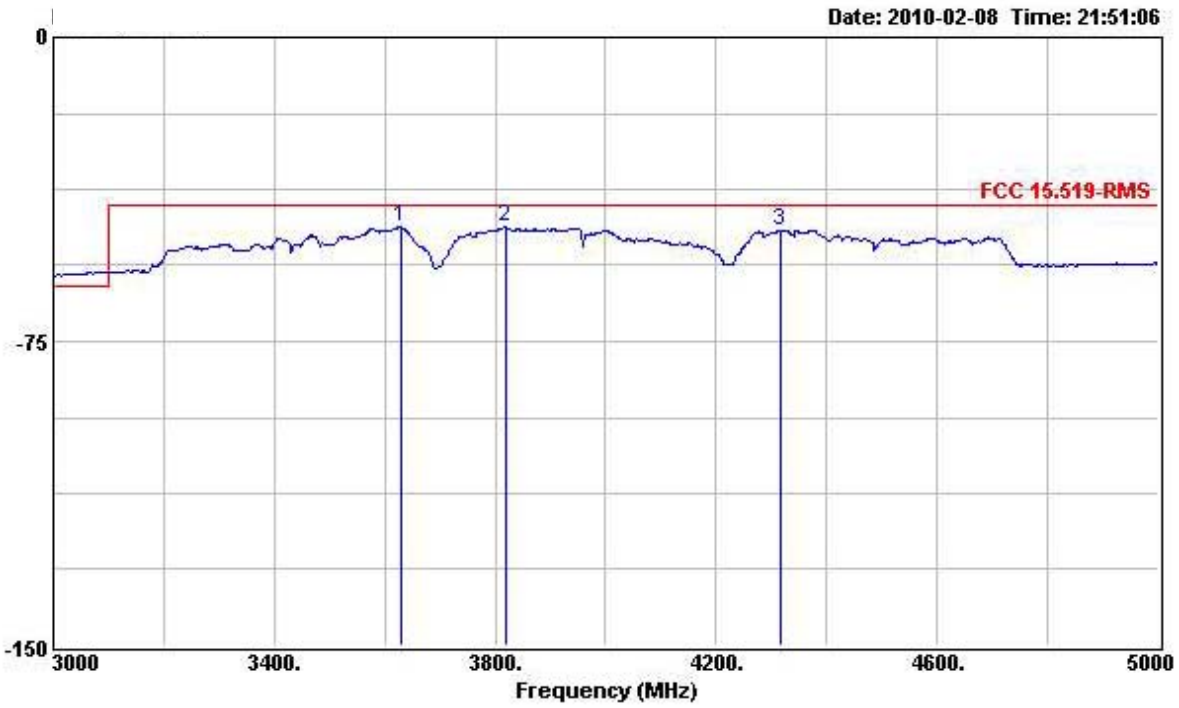
Note: Conducted antenna port measurements made with 1MHz RBW/3MHz VBW (RMS detector) at 50 ohm impedance. 1 msec averaging time were used for these frequencies per bin point measurements.

For radiated emissions from fundamental emission (3m bore sight)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 3m

Horizontal



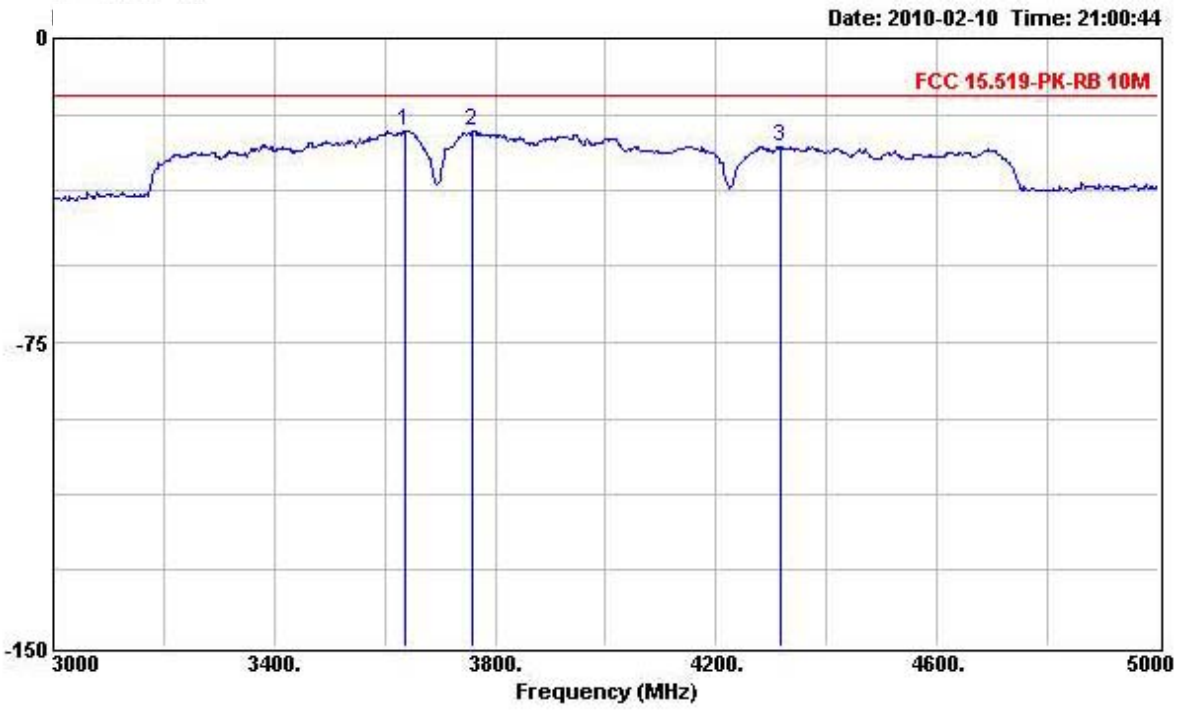
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	3628.000	-46.84	-5.54	-41.30	-51.28	4.53	32.22	
2	3820.000	-46.85	-5.55	-41.30	-51.75	4.62	32.31	
3	4318.000	-47.51	-6.21	-41.30	-53.19	4.85	32.11	

Note:

1. Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 3m distance. 1 msec averaging time were used for these frequencies per bin point measurements.
2. Antenna height 1 to 4 meters, 1 meter steps, bore sighted to EUT.
3. There are the absorber on ground plane between the antenna tower and turntable.

Test Distance: 3m

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	3636.000	-22.78	-8.81	-13.97	-27.22	4.53	32.22	Peak
2	3758.000	-22.71	-8.74	-13.97	-27.45	4.60	32.28	Peak
3	4318.000	-26.67	-12.70	-13.97	-32.35	4.85	32.11	Peak

Note:

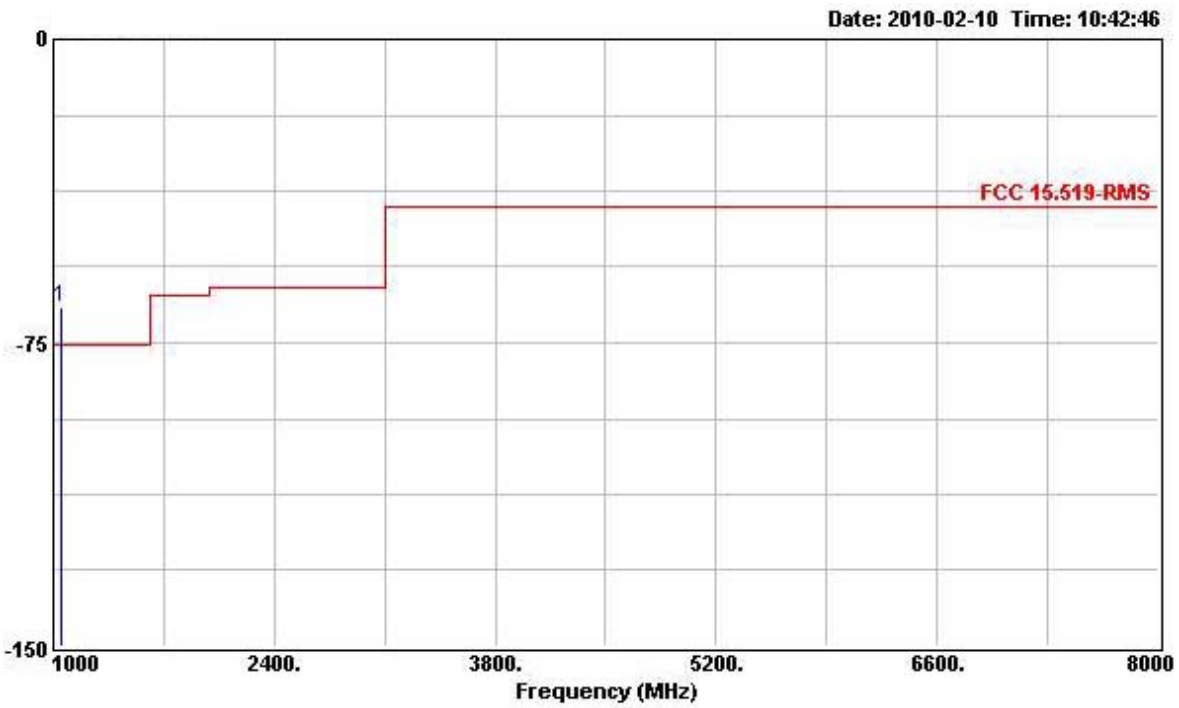
1. Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 3m distance. 1 msec averaging time were used for these frequencies per bin point measurements.
2. Antenna height 1 to 4 meters, 1 meter steps, bore sighted to EUT.
3. There are the absorber on ground plane between the antenna tower and turntable.

Radiated Emissions (1GHz~8GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

Horizontal

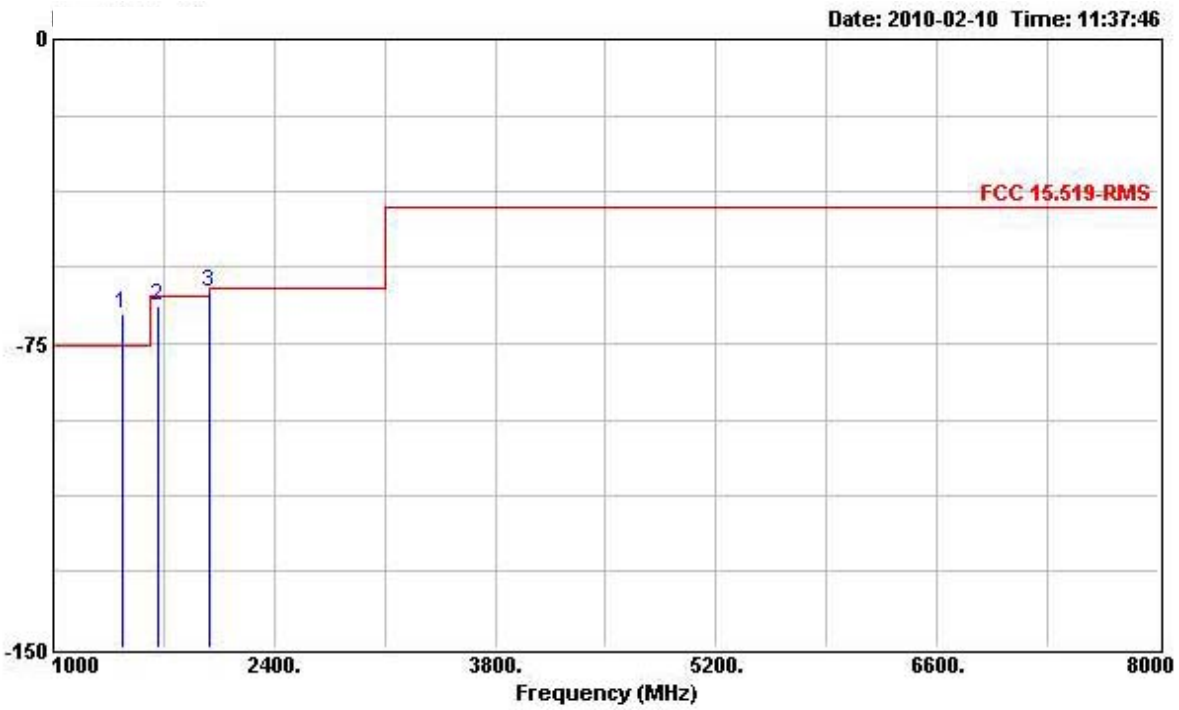


	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1 X	1049.000	-66.21			-58.52	2.07	34.10	

Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 1) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Test Distance: 1m

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1 X	1441.000	-67.56			-62.50	2.43	32.95	
2	1658.000	-65.63	-2.33	-63.30	-61.96	2.67	32.67	
3	1994.000	-62.12	-0.82	-61.30	-60.31	3.03	32.57	

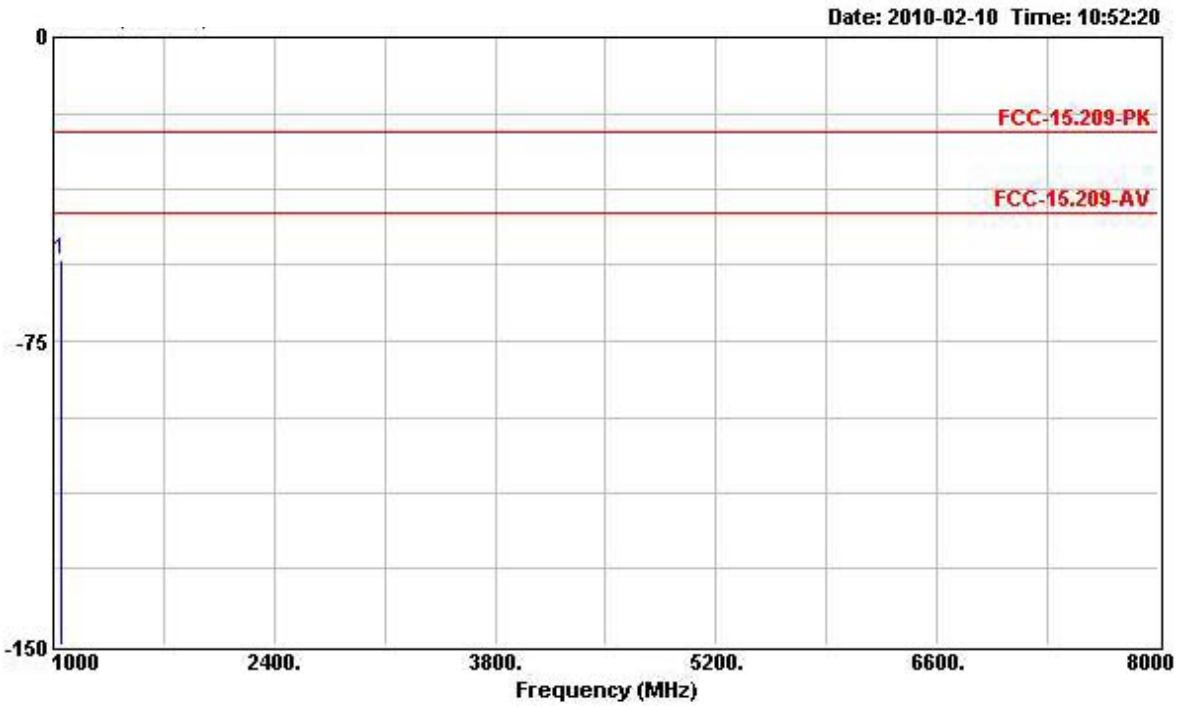
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 1) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Radiated Emissions with terminated antenna port (1GHz~8GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

Horizontal



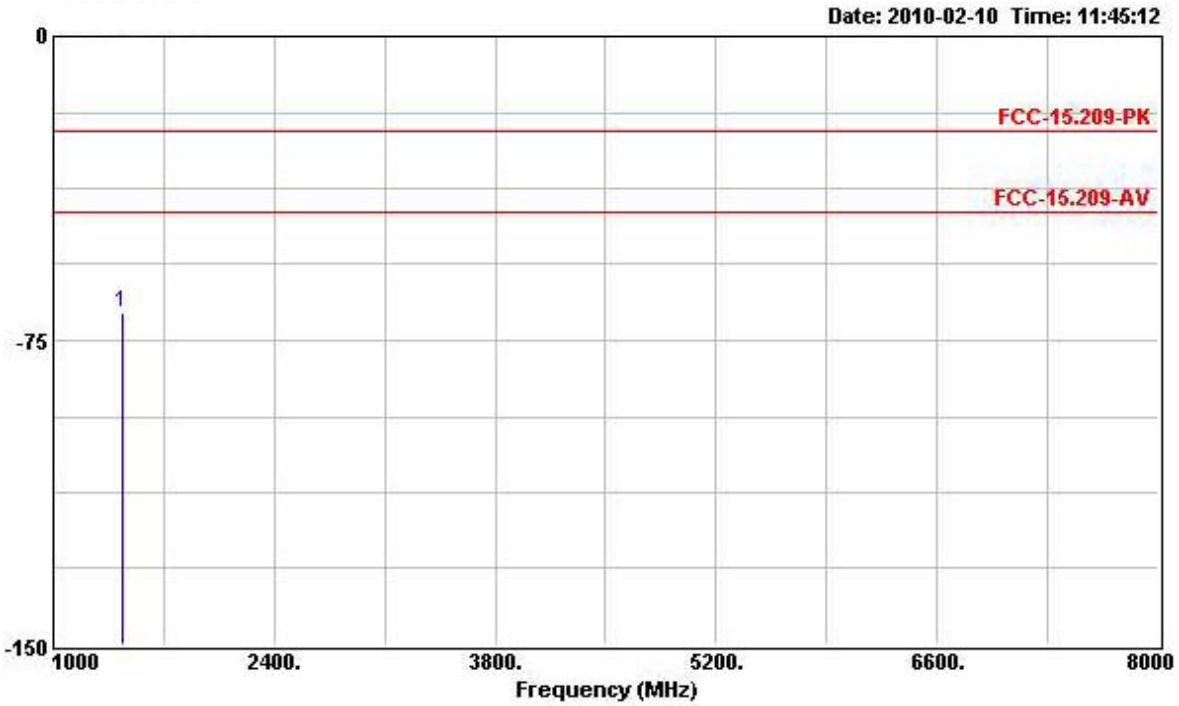
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	1049.000	-54.95	-31.49	-23.46	-47.26	2.07	34.10	Peak

Note:

1. Digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.
2. From 3m to 1m: Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Average limit line @ 1m (above 960MHz) = 54 (dBuV/m) + distance extrapolation factor [9.54 dB] = 63.54 (dBuV/m); Then dBuV/m – 107 dB = dBm/m;
   Average limit line @ 1m (above 960MHz) = 63.54 (dBuV/m) -107 = -43.46 dBm/m
   Peak limit line @ 1m (above 960MHz) = average limit line +20 dB = -23.46 dBm/m

Test Distance: 1m

Vertical



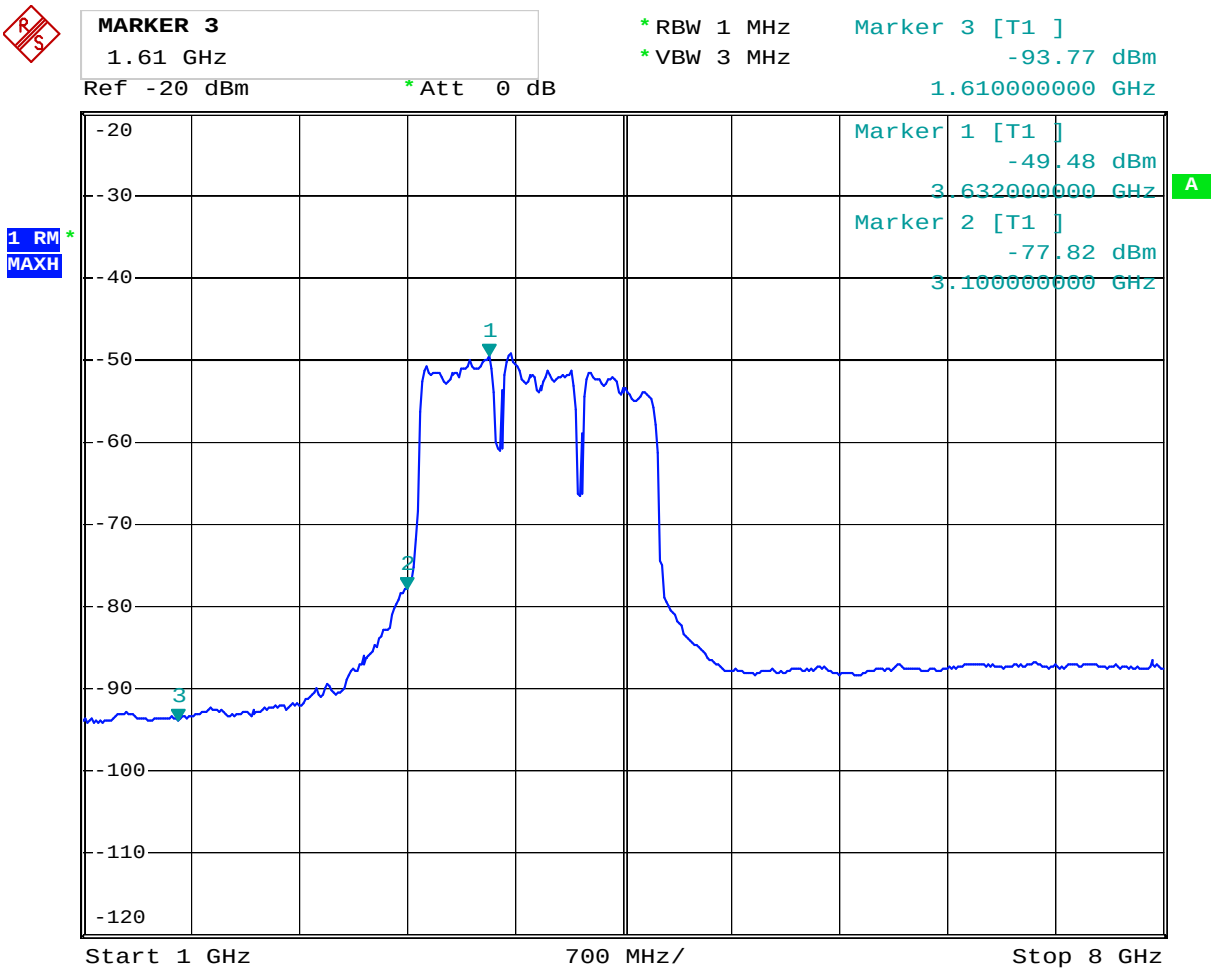
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	1441.000	-68.31	-44.85	-23.46	-63.25	2.43	32.95	Peak

Note:

1. Digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.
2. From 3m to 1m: Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Average limit line @ 1m (above 960MHz) = 54 (dBuV/m) + distance extrapolation factor [9.54 dB] = 63.54 (dBuV/m); Then dBuV/m – 107 dB = dBm/m;
   Average limit line @ 1m (above 960MHz) = 63.54 (dBuV/m) -107 = -43.46 dBm/m
   Peak limit line @ 1m (above 960MHz) = average limit line +20 dB = -23.46 dBm/m

Conducted Antenna Port Emissions (1GHz~8GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)



Note:

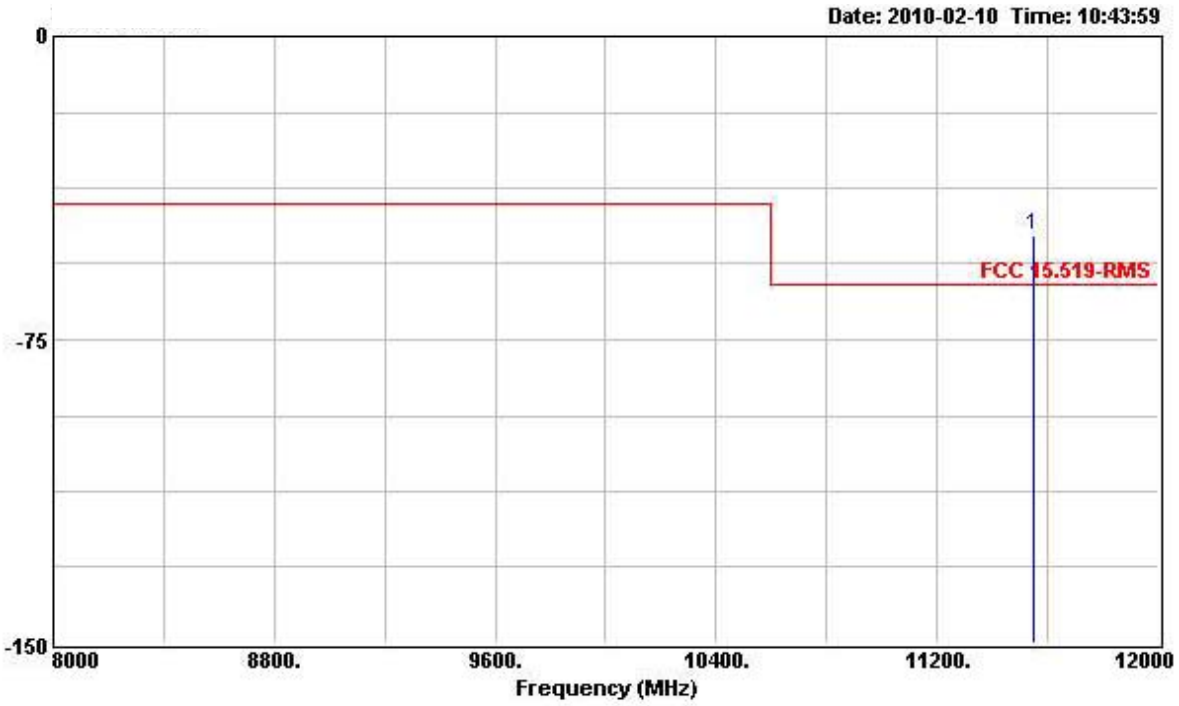
Conducted antenna port measurements made with 1MHz RBW/3MHz VBW (RMS detector) at 50 ohm impedance. 1 msec averaging time were used for these frequencies per bin point measurements.

Radiated Emissions (8GHz~12GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

Horizontal

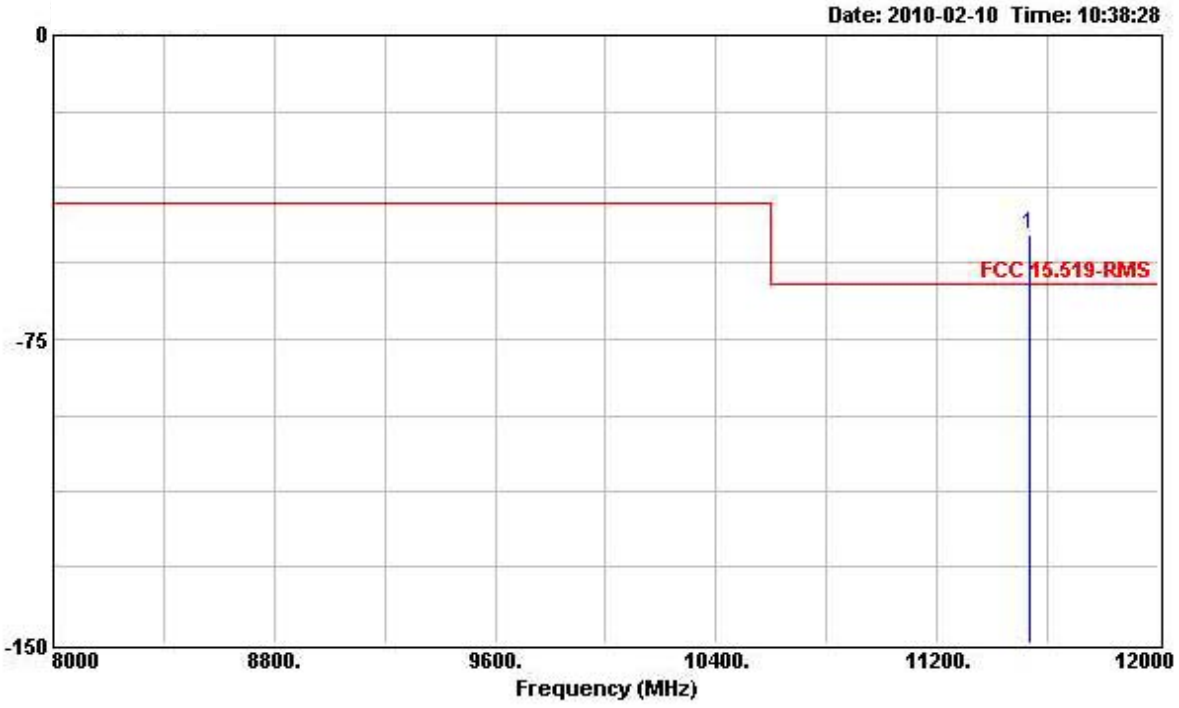


	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	X11548.000	-49.11			-65.82	8.30	31.26	

Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 1) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Test Distance: 1m

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	X11532.000	-49.17			-65.93	8.30	31.21	

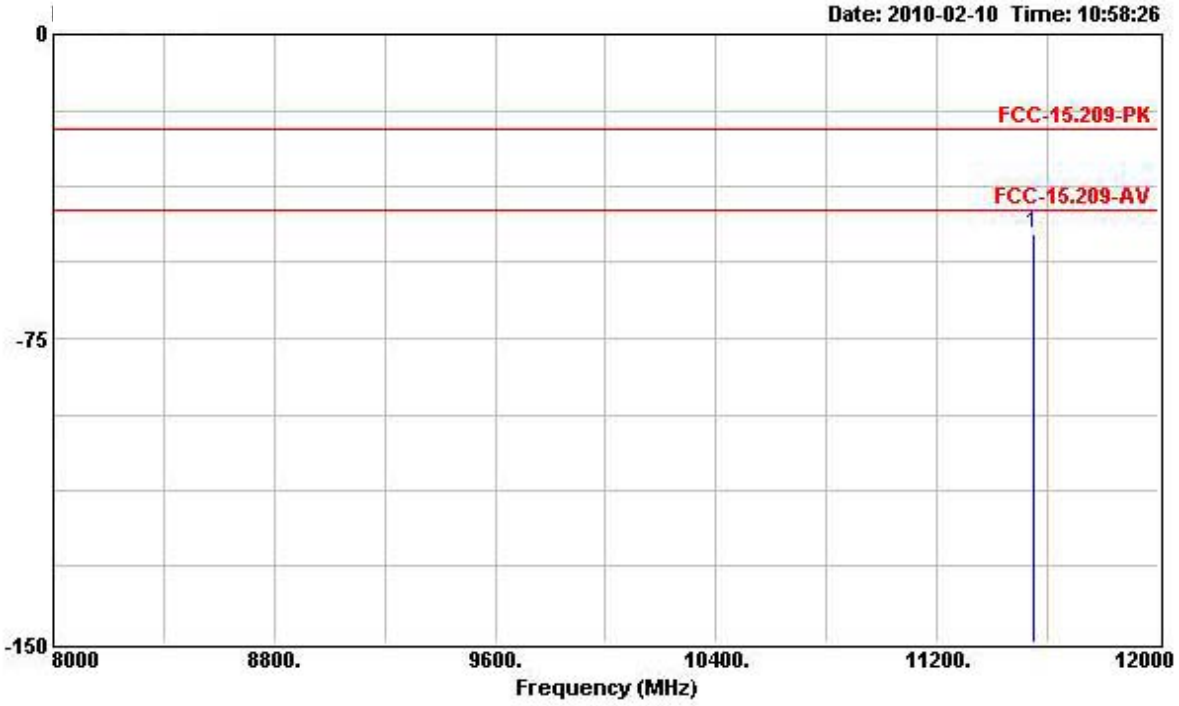
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 1) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.

Radiated Emissions with terminated antenna port (8GHz~12GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

Horizontal



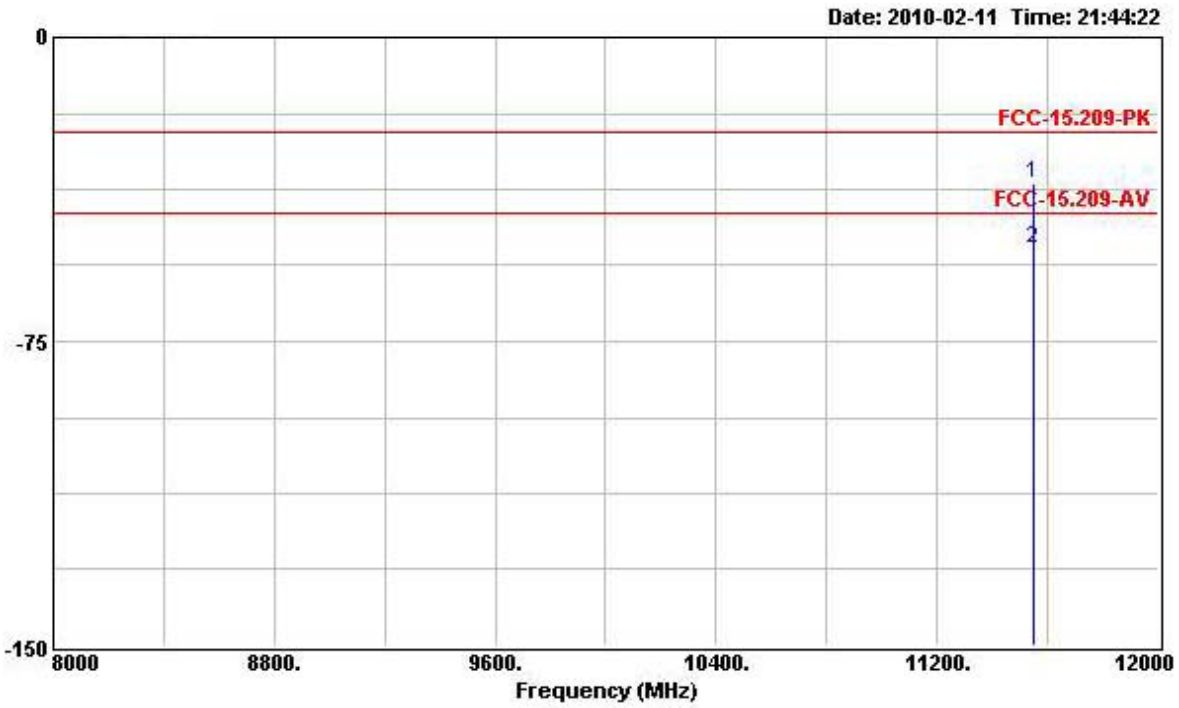
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	11548.000	-49.15	-25.69	-23.46	-65.86	8.30	31.26	Peak

Note:

1. Digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.
2. From 3m to 1m: Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Average limit line @ 1m (above 960MHz) = 54 (dBuV/m) + distance extrapolation factor [9.54 dB] = 63.54 (dBuV/m); Then dBuV/m – 107 dB = dBm/m;
   Average limit line @ 1m (above 960MHz) = 63.54 (dBuV/m) -107 = -43.46 dBm/m
   Peak limit line @ 1m (above 960MHz) = average limit line +20 dB = -23.46 dBm/m

Test Distance: 1m

Vertical



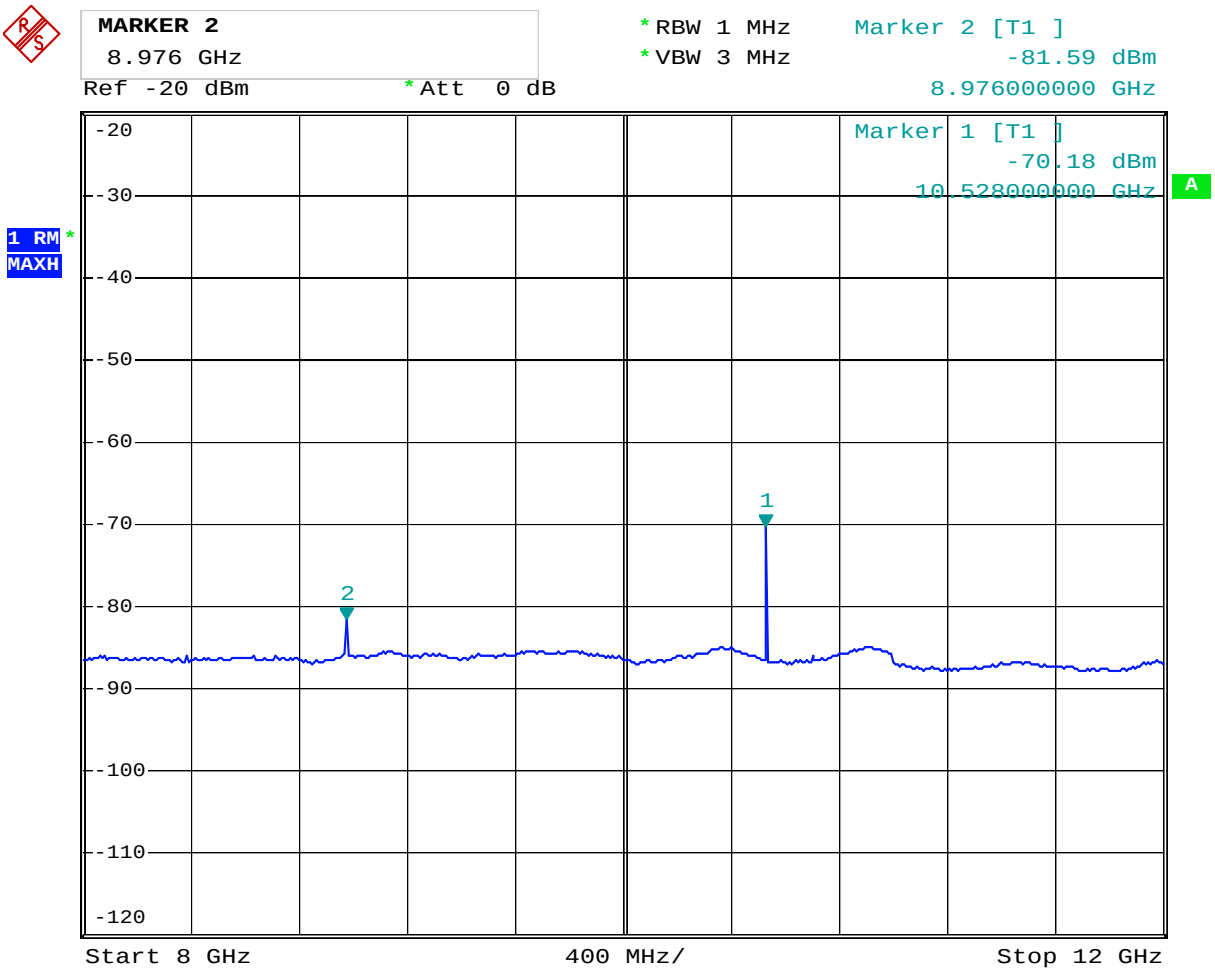
	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	11548.000	-35.87	-12.41	-23.46	-52.58	8.30	31.26	Peak
2	11548.000	-52.07	-8.61	-43.46	-68.78	8.30	31.26	Average

Note:

1. Digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15, Subpart C, §15.209.
2. From 3m to 1m: Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Average limit line @ 1m (above 960MHz) = 54 (dBuV/m) + distance extrapolation factor [9.54 dB] = 63.54 (dBuV/m); Then dBuV/m – 107 dB = dBm/m;
   Average limit line @ 1m (above 960MHz) = 63.54 (dBuV/m) -107 = -43.46 dBm/m
   Peak limit line @ 1m (above 960MHz) = average limit line +20 dB = -23.46 dBm/m

Conducted Antenna Port Emissions (8GHz~12GHz)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)



Note:

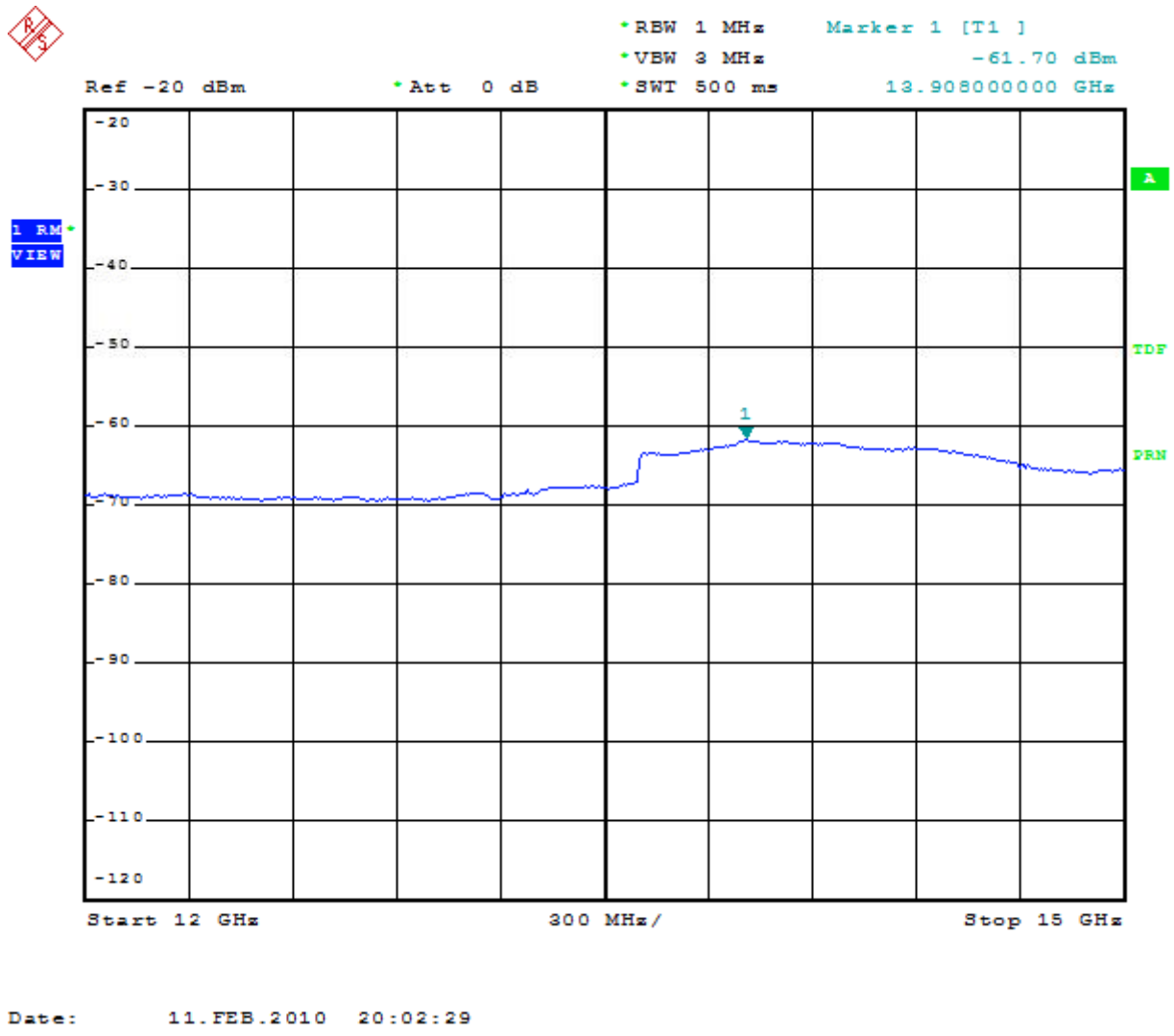
Conducted antenna port measurements made with 1MHz RBW/3MHz VBW (RMS detector) at 50 ohm impedance. 1 msec averaging time were used for these frequencies per bin point measurements.

Radiated Emissions (12GHz~15GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

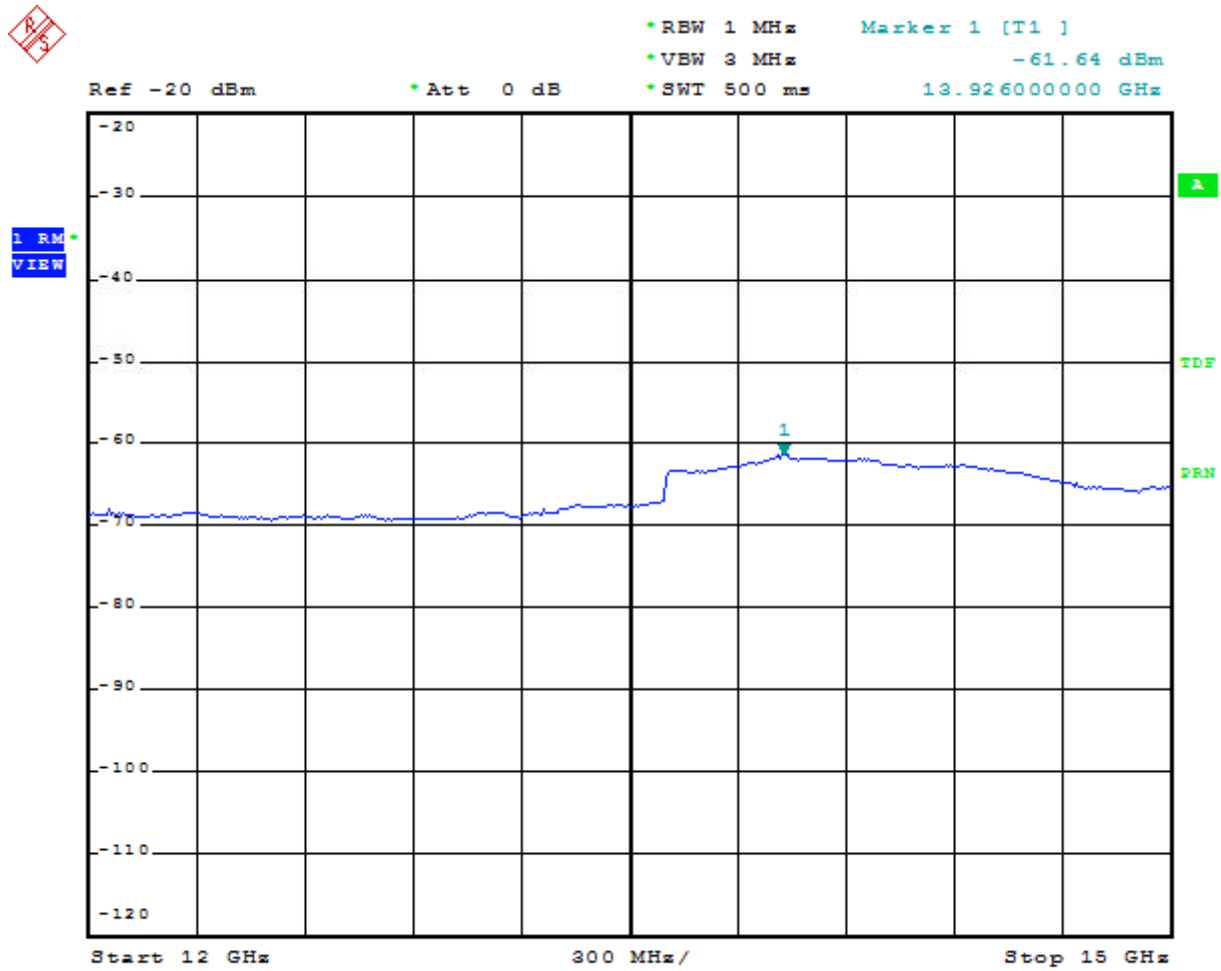
Horizontal



Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Test Distance: 1m

Vertical



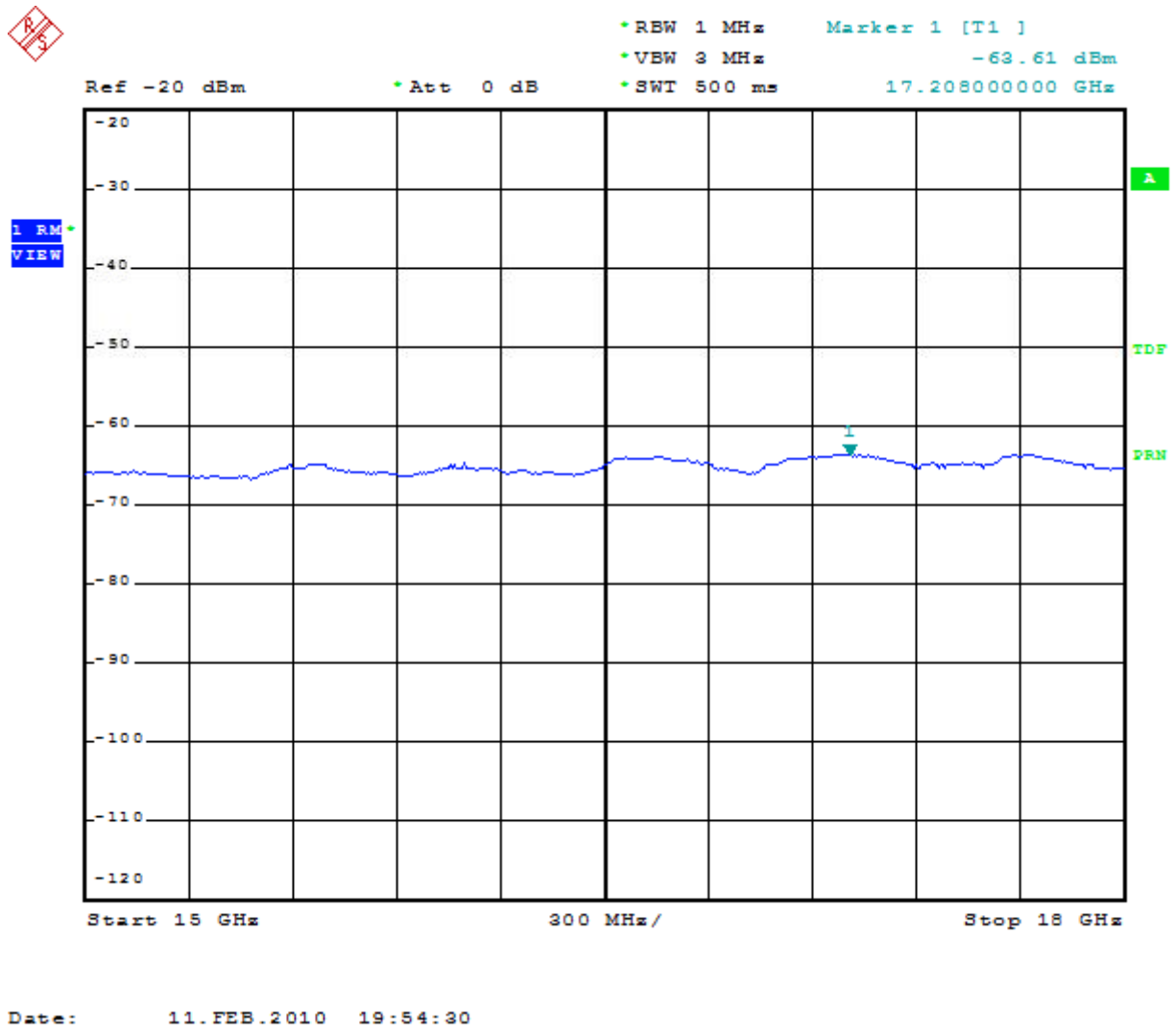
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Radiated Emissions (15GHz~18GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

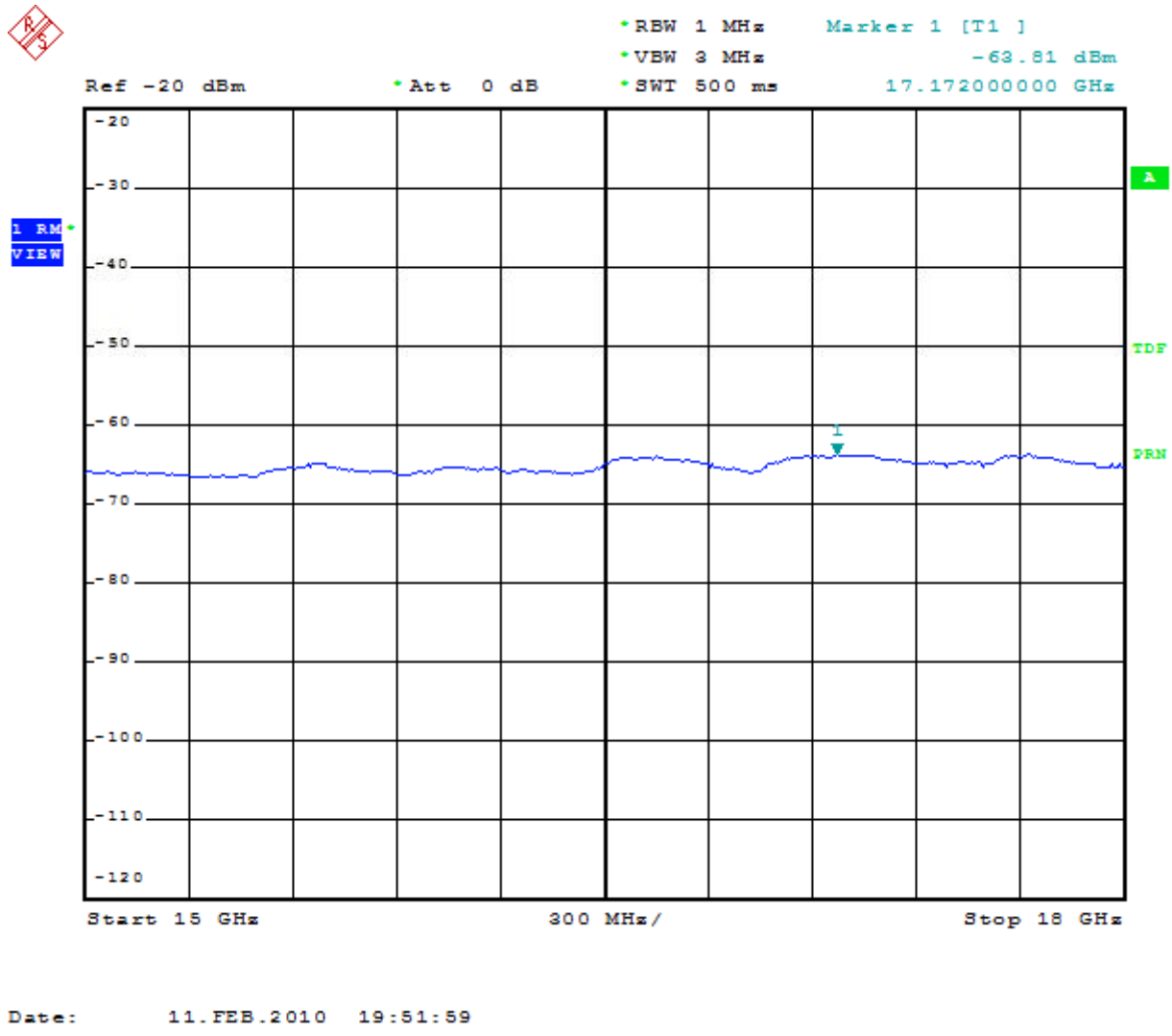
Horizontal



Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Test Distance: 1m

Vertical



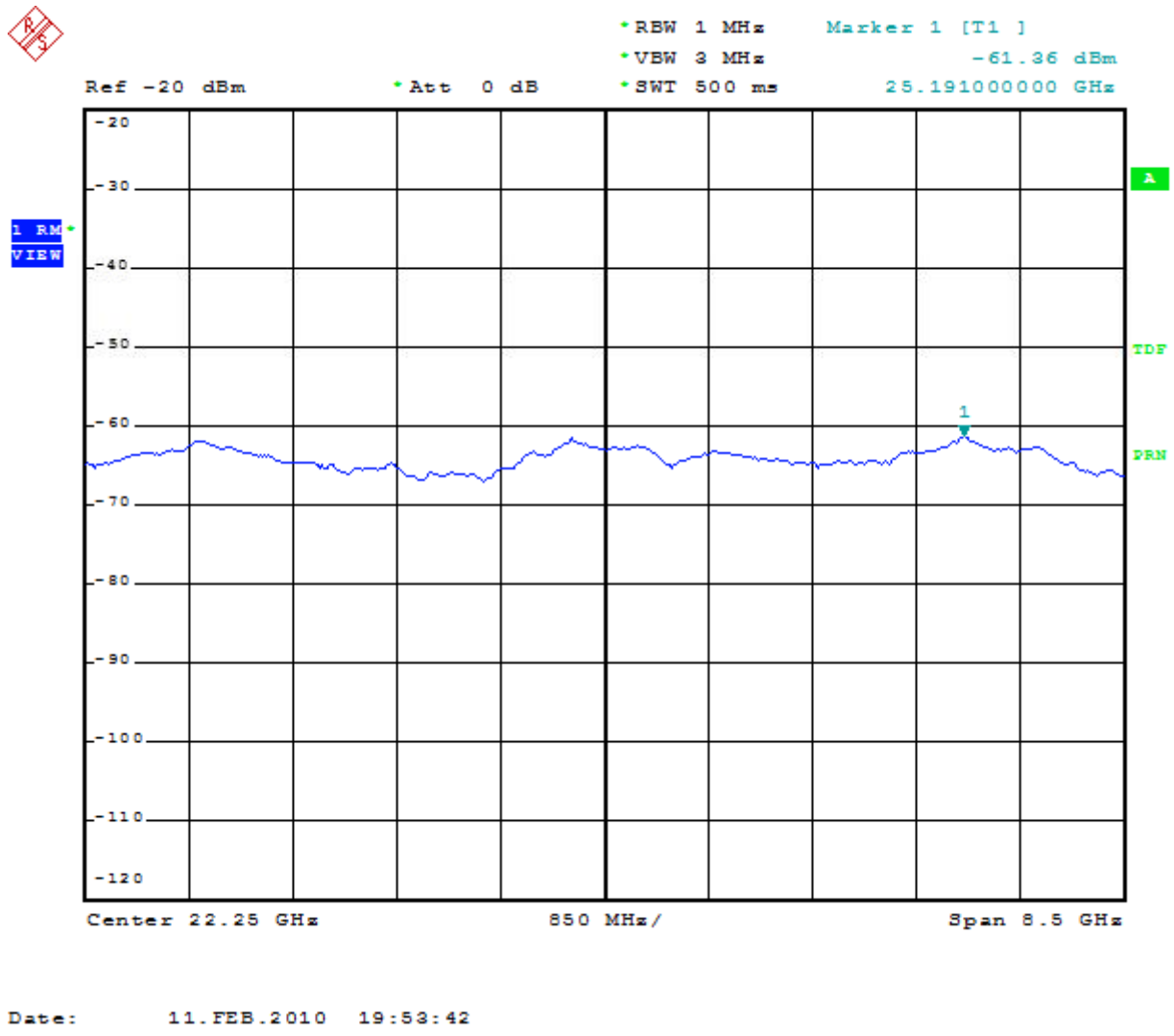
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Radiated Emissions (18GHz~26.5GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 0.5m

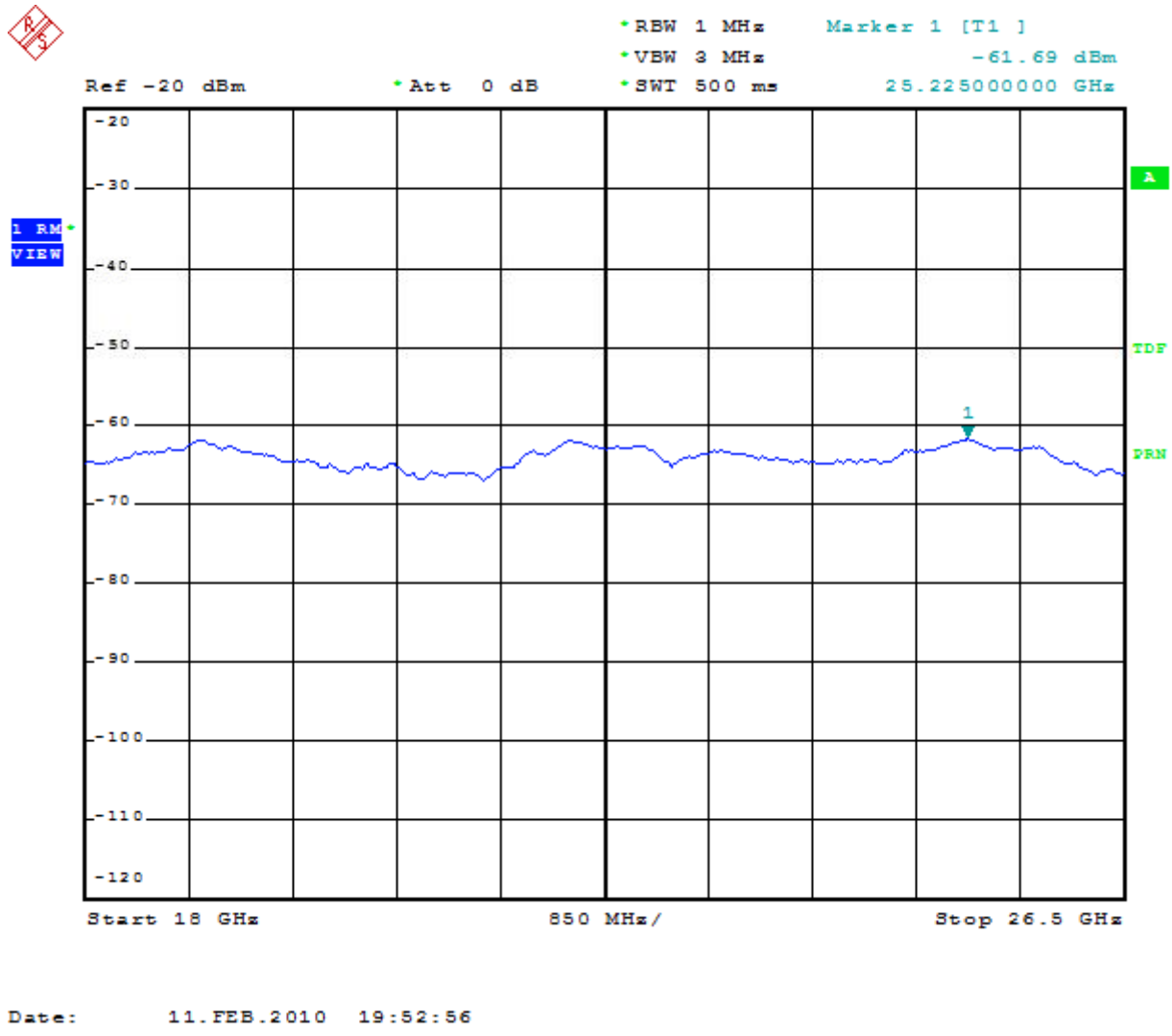
Horizontal



Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 0.5m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Test Distance: 0.5m

Vertical



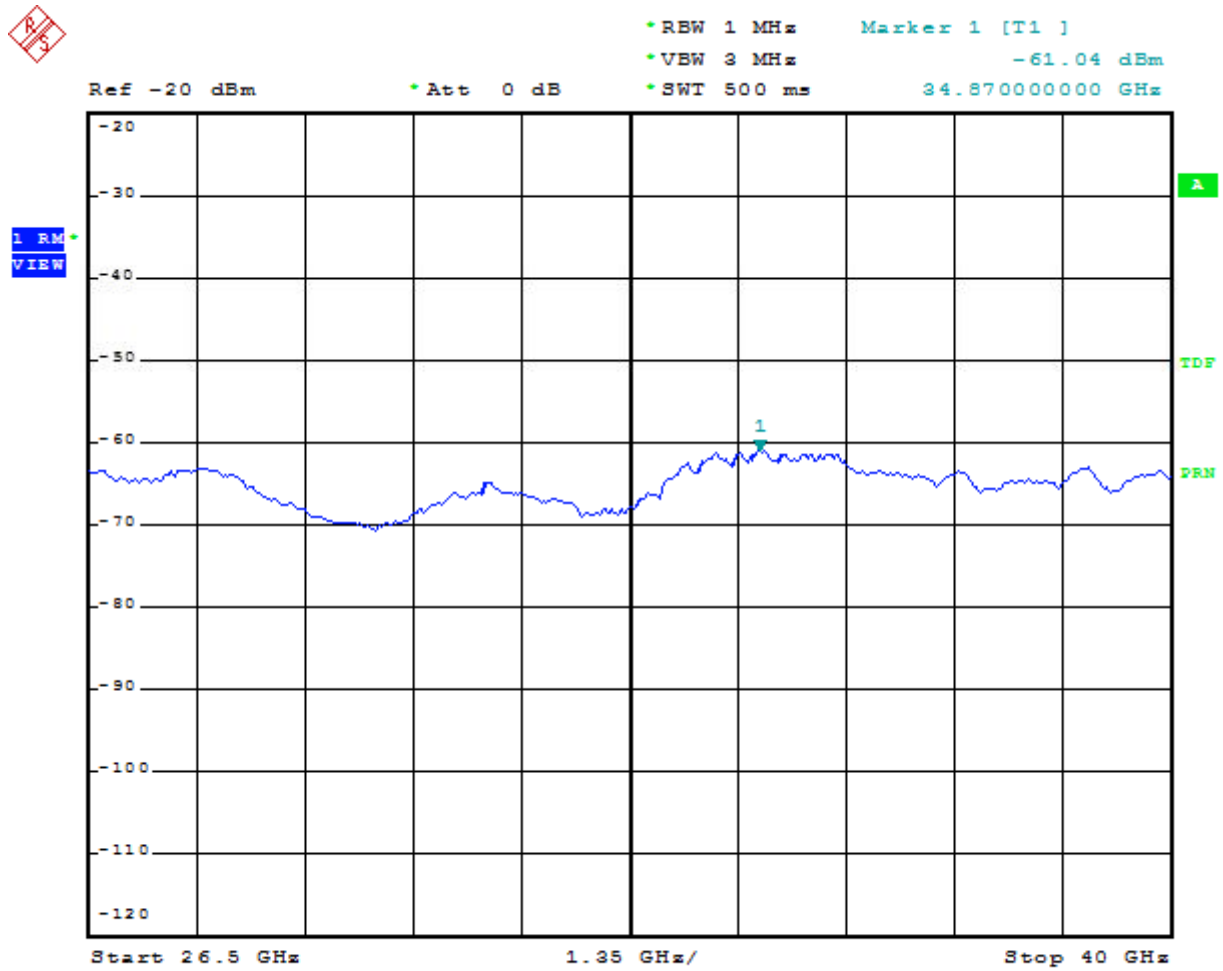
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 0.5m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Radiated Emissions (26.5GHz~40GHz Emissions)

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 0.5m

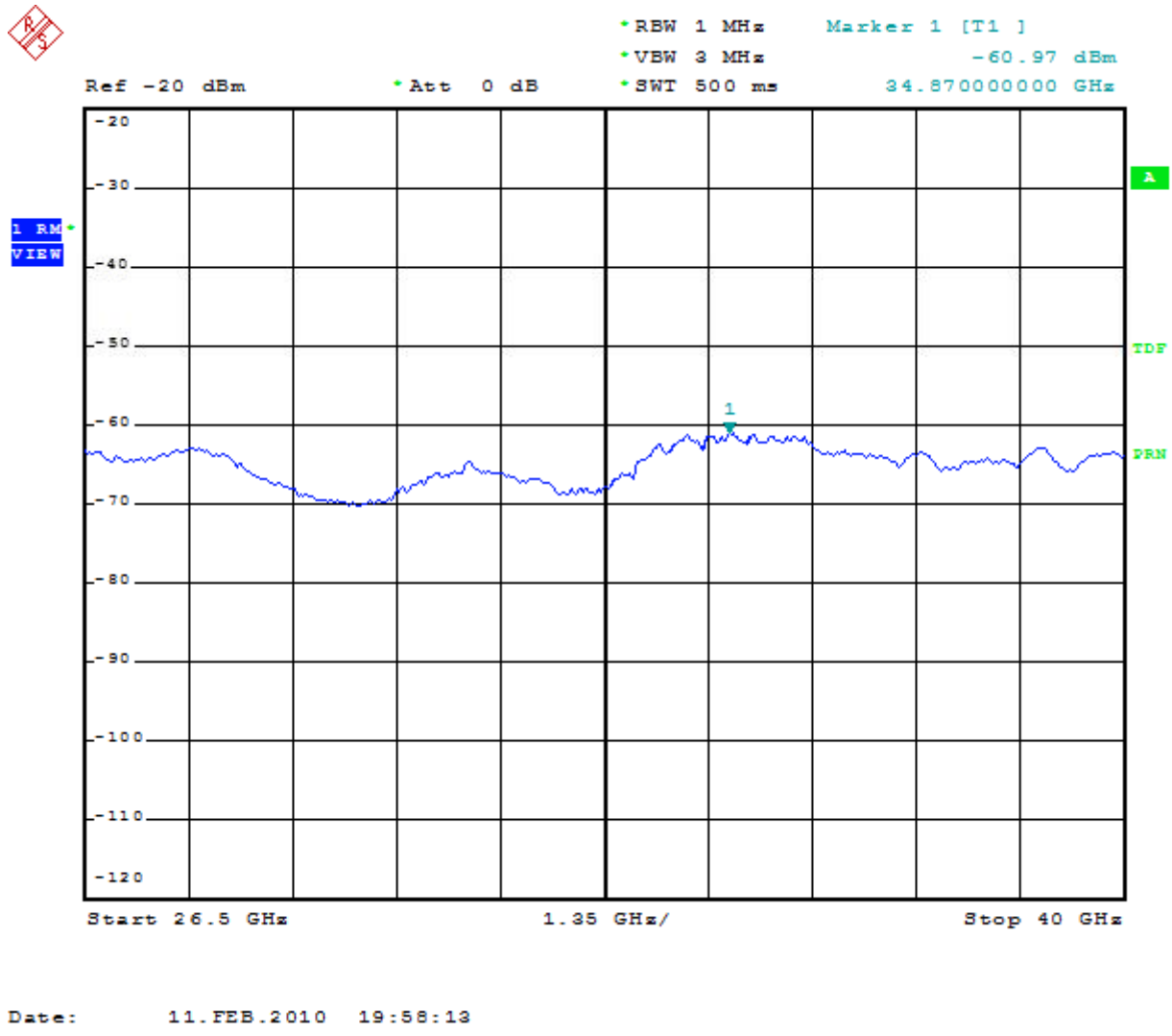
Horizontal



Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 0.5m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Test Distance: 0.5m

Vertical



Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 0.5m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

3.5. Radiated Emissions in GPS Bands Measurement

3.5.1. Limit

In addition to the radiated emission limits specified in the table in paragraph 3.5.1 of this report, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz.

Freq. (MHz)	EIRP (dBm)
1164-1240	-85.3
1559-1610	-85.3

Note 1: This may be converted to a peak field strength level at 3 meters using E(dBuV/m) = P(dBm EIRP) + 95.2 dB.

Note 2: Extrapolation factor when test distance other than 3m. (in accordance with 47 CFR 15.31 (f) (2))

2.1. Form 3m to 1m. Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

2.2. From 3m to 0.5m. Distance extrapolation factor = 20 log (specific distance [3m] / test distance [0.5m]) (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].

3.5.2. Measuring Instruments and Setting

Please refer to equipments list in section 4 of this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	0 dB
RBW / VBW	47 CFR Section 15.519(d) 10 kHz / 1kHz for RMS for Average, 1 msec averaging time were used for these measurement frequencies. 47 CFR Section 15.521(c) (47 CFR Section 15.209 (a)) 1MHz/1MHz for peak, 1MHz/10Hz for Average. (in accordance with ANSI C63.4)

3.5.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable that is non-conductive material (glass fiber) and 0.8 meter above ground. The EUT was flush on the back of the tabletop. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1 meter far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between 1 meter and 4 meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scanning (from 1 M to 4 M) and then the

turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. Measurements frequencies were maximized using a spectrum analyzer with RMS detector capabilities. A spectrum analyzer was used for the final measurements utilizing an RMS detector at the frequencies with the largest amplitudes. The prescribed RBW of 10 kHz and VBW of 10 kHz, and a 1 msec averaging time were used for these measurements.
6. Per 47 CFR, Part 15, Subpart F, §15.521(c) (§15.209) all digital emissions from the transmitter not intended to be radiated from the antenna port meet the 15.209 subpart C limits.

3.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 3.4.4.

3.5.5. Test Deviation

There is no deviation with the original standard.

3.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode and TFC 1 and data rate is 53.3Mbps.

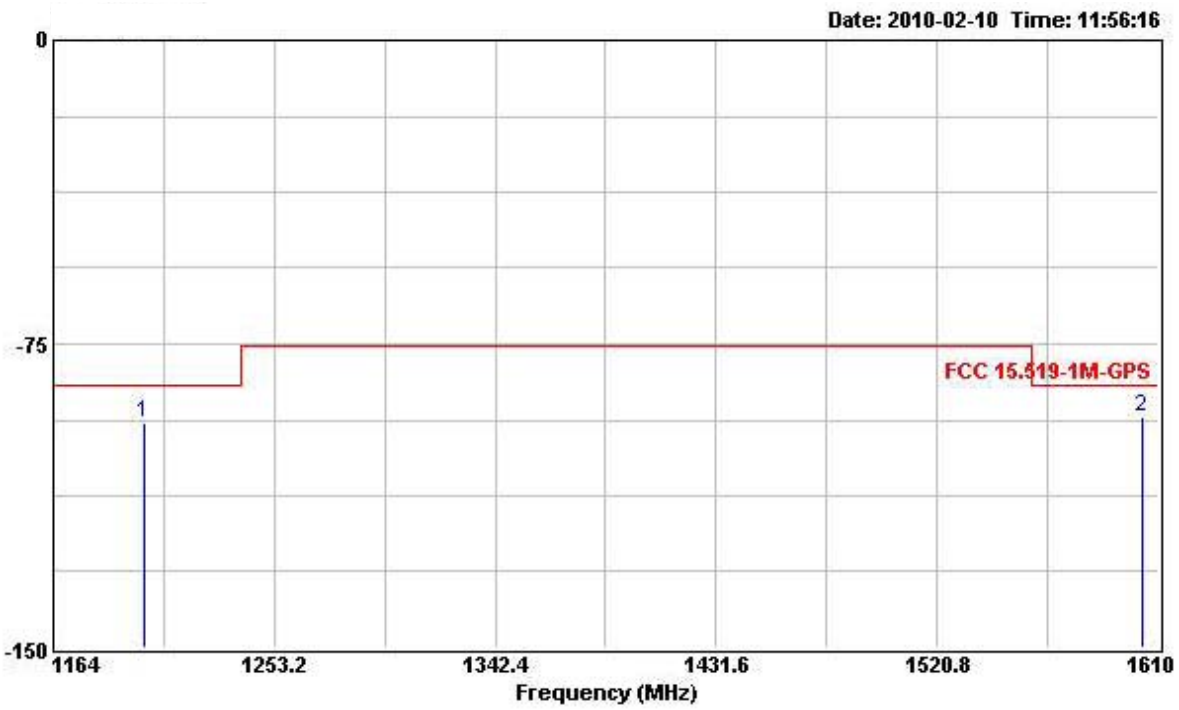
3.5.7. Results for Radiated Emissions in GPS Bands

Radiated Emissions (1164 MHz to 1240 MHz and 1559 MHz to 1610 MHz) GPS Bands

Temperature	24 °C	**Humidity**	54 %
Test Engineer	Vic	**Configurations**	Band Group 1 (TFC 1)

Test Distance: 1m

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	1201.020	-94.32	-9.02	-85.30	-87.67	2.21	33.64	
2	1603.760	-92.86	-7.56	-85.30	-88.91	2.63	32.69	

Note: Measurements made with 10kHz RBW/10kHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Test Distance: 1m

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	1206.370	-94.42	-9.12	-85.30	-87.77	2.21	33.64	
2	1575.210	-92.97	-7.67	-85.30	-88.83	2.59	32.70	

Note: Measurements made with 10kHz RBW/10kHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

3.6. Peak Emissions within a 50 MHz Bandwidth Measurement

3.6.1. Limit

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_M. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, EIRP limit has to be adjusted by the resolution bandwidth ratio of 20log(RBW/50) dB, where RBW is the resolution bandwidth used for the measurement expressed in MHz. In addition, This may be converted to a peak field strength level at 3 meters using E(dBuV/m) = P(dBm EIRP) + 95.2 dB.

Peak EIRP limit dBm (RB / VB : 50MHz)	Peak EIRP limit dBm (RB / VB: 10MHz)
0	-13.97

3.6.2. Measuring Instruments and Setting

Please refer to equipments list in section 4 of this report. The following table is the setting of the spectrum analyzer.

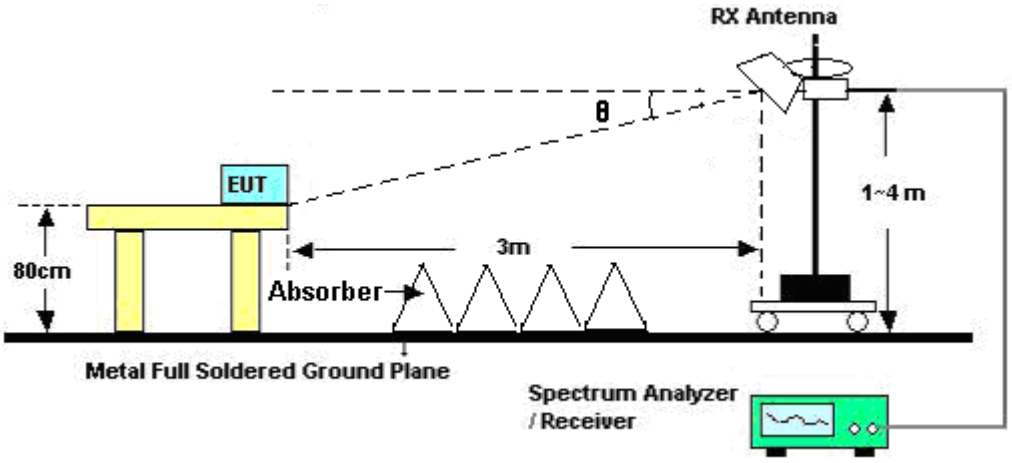
Spectrum Parameter	Setting
Attenuation	Auto
Sweep Time	Auto
RBW / VBW	10MHz / 10MHz for Peak

3.6.3. Test Procedures

1. The EUT was placed on the top of the turntable that is non-conductive material (glass fiber) and 0.8 meter above ground. The EUT was flush on the back of the tabletop. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. The horn receiving antenna was varied between 1 meter and 4 meters, 1 meter step above ground while maintaining bore sigh alignment to find the maximum emissions field strength of both horizontal and vertical polarization.
3. For maximum peak emission amplitude, the antenna tower was scanning (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading and was used to determine the frequency at which the highest radiated emission occurs, f_M.
4. The individual UWB bandwidths were measured for each BAND_ID (n_b) of the UWB spectrum. Both horizontal and vertical polarizations were taken into account to determine the full UWB BW on the maximized (in azimuth and elevation) signals.

5. A spectrum analyzer was used for the final measurement utilizing a peak detector at the frequency with the largest amplitude. The prescribed resolution bandwidth of 50 MHz was not supported by the spectrum analyzer. However, when a peak measurement is required, The resolution bandwidth for this measurement was set to 10 MHz, and the measurement was centered on the frequency at which the highest radiated emission occurred, f_M. The video bandwidth was 10 MHz.

3.6.4. Test Setup Layout



Note: The Horn Antenna maintaining bore sight alignment.

$$\theta=\tan^{-1}\left(\frac{\text{The Antenna's Height} - \text{The Table's Height}}{\text{The Test Distance}}\right)$$

3.6.5. Test Deviation

There is no deviation with the original standard.

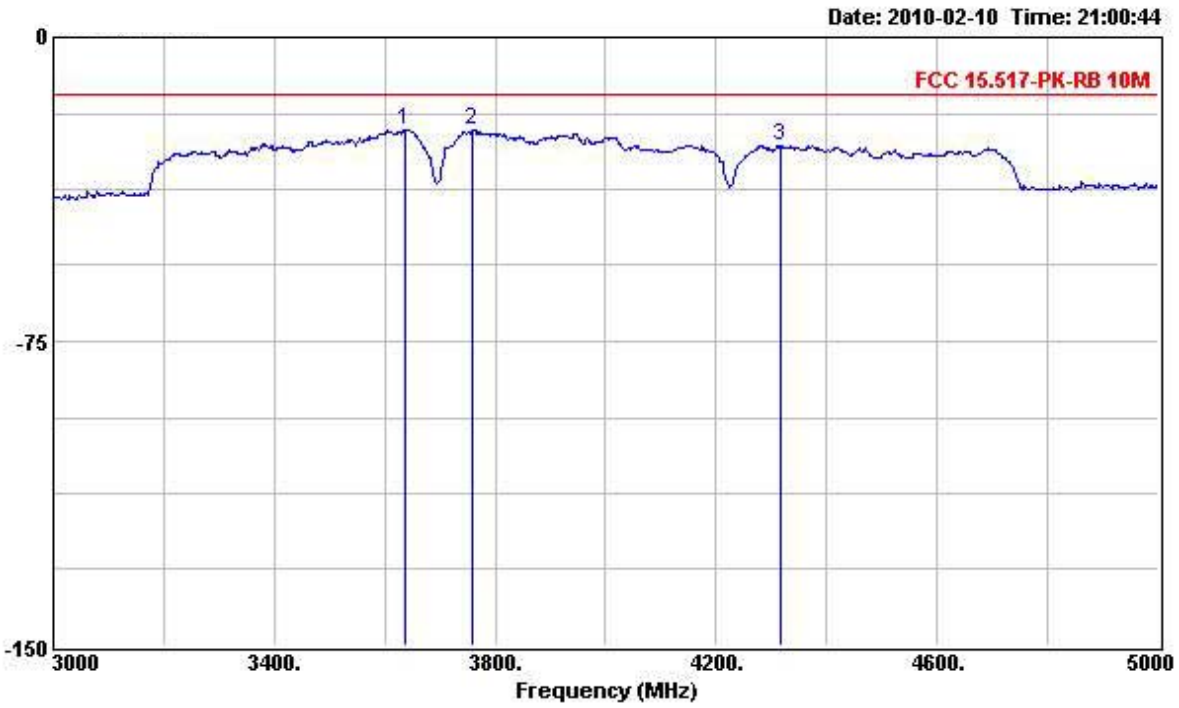
3.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode and TFC 1 and data rate is 53.3Mbps.

3.6.7. Test Result of Peak Emissions within a 50 MHz Bandwidth

Temperature	24 °C	Humidity	54 %
Test Engineer	Vic	Configurations	Band Group 1 (TFC 1)

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	
1	3636.000	-22.78	-8.81	-13.97	-27.22	4.53	32.22	Peak
2	3758.000	-22.71	-8.74	-13.97	-27.45	4.60	32.28	Peak
3	4318.000	-26.67	-12.70	-13.97	-32.35	4.85	32.11	Peak

Note:

1. Test distance: 3m, both vertical and horizontal polarization has been investigated, and vertical is the worse case.
2. Antenna height 1 to 4 meters, 1 meter steps, bore sighted to EUT.
3. There are the absorber on ground plane between the antenna tower and turntable.
4. From 3.1~10.6GHz band, max EIRP is -22.71 dBm (EIRP) @ RBW 10MHz, transfer to -8.74 dBm (EIRP) @ RBW 50MHz.

3.6.8. Labeling and Instruction Manual Requirements

UWB systems operating under the provisions of this section shall bear the following or similar statement in a conspicuous location on the device or in the instruction manual supplied with the device.
“This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.”

In addition to the above requirements, a UWB device subject to certification shall be labeled as followed in a conspicuous location on the device:
“This device complied with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”
(1) Where a device is constructed in two or more sections connected by wires
and marketed together, the statement specified directly above this section is required to be affixed only to the main control unit.
(2) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

The users’ manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

3.7. Antenna Requirements

3.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

3.7.2. Antenna Connector Construction

Please refer to section 2.1 in this test report, No external antenna connector complied with the requirements.

4. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Sep. 01, 2009	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Jan. 19, 2010	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Feb. 24, 2009	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz – 30MHz	May 05, 2009	Conduction (CO01-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	Conduction (CO01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 31, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100666	DC ~ 30GHz	Aug. 05, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2009	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Feb. 13, 2009	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 25, 2009	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2009*	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is two year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH01-HY	30 MHz - 1 GHz	May 04, 2009	Radiation (03CH01-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 24, 2010	Radiation (03CH01-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 21, 2009	Radiation (03CH01-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Feb. 02, 2010	Radiation (03CH01-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Sep. 26, 2009	Radiation (03CH01-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 28, 2009	Radiation (03CH01-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.11, 2010	Radiation (03CH01-HY)
Turn Table	HD	DS 420	420/648/00	0 - 360 degree	N/A	Radiation (03CH01-HY)
Antenna Mast	HD	MA 240	240/558/00	1 m - 4 m	N/A	Radiation (03CH01-HY)
RF Cable-R03m	Jye Bao	RG142	CB019	30 MHz - 1 GHz	Jan. 05, 2010	Radiation (03CH01-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Jan. 05, 2010	Radiation (03CH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH01-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Apr. 06, 2009*	Radiation (03CH01-HY)

Note: Calibration Interval of instruments listed above is two year.

5. TEST LOCATION

SHIJR	ADD	: 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	: 886-2-2696-2468
	FAX	: 886-2-2696-2255
HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	: 886-3-327-3456
	FAX	: 886-3-318-0055
LINKOU	ADD	: No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	: 886-2-2601-1640
	FAX	: 886-2-2601-1695
DUNGHU	ADD	: No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	: 886-2-2631-4739
	FAX	: 886-2-2631-9740
JUNGHE	ADD	: 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	: 886-2-8227-2020
	FAX	: 886-2-8227-2626
NEIHU	ADD	: 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	: 886-2-2794-8886
	FAX	: 886-2-2794-9777
JHUBEI	ADD	: No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	: 886-3-656-9065
	FAX	: 886-3-656-9085

6. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-100107

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 07, 2010

P1, total 21 pages