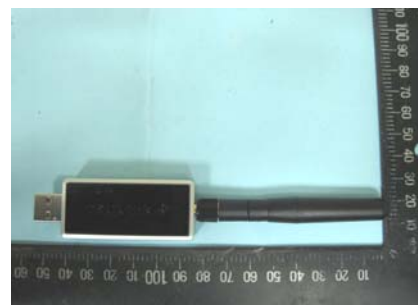


FCC RADIO TEST REPORT

Applicant's company	Lastar, Inc.
Applicant Address	3555 Kettering Blvd, Moraine, Ohio, United States 45439.
FCC ID	WGK1PUWBHSTBG3
Manufacturer's company	GOOD WAY TECHNOLOGY CO., LTD
Manufacturer Address	3F,No.135,Lane 235 Pau Chiao Rd., Hsin Tien, Taipei County, Taiwan

Product Name	UWB Wireless BG1/BG3 Host Adapter
Brand Name	TruLink
Model Name	81663, 29591, 29598, 81667
Test Rule Part(s)	47 CFR FCC Part 15 Subpart F § 15.519
Test Freq. Range	3100 ~ 10600MHz
Received Date	Oct. 20, 2009
Final Test Date	Oct. 30, 2009
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.6



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.



ILAC MRA

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History of This Test Report

Original Issue Date: Nov. 12, 2009

Report No.: FR9O3110

☒ No additional attachment.

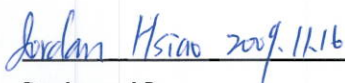
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name : UWB Wireless BG1/BG3 Host Adapter
Brand Name : TruLink
Model Name : 81663, 29591, 29598, 81667
Applicant : Lastar, Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart F § 15.519

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 20, 2009 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.



Reviewed By:

Jordan Hsiao

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart F				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	9.04 dB
4.2	15.519(a)	Operational Limitations	Complies	-
4.3	15.519(b)	UWB Bandwidth	Complies	-
4.4	15.519(c)/15.209	Radiated Emissions	Complies	0.16 dB
4.5	15.519(d)	Radiated Emissions in GPS Bands	Complies	1.79 dB
4.5	15.519(e)	Peak Emissions within a 10 MHz Bandwidth	Complies	-
4.7	15.517(f)	Labeling Requirements	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	$\pm 2.3\text{dB}$	Confidence levels of 95%
UWB Bandwidth	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	$\pm 0.8\text{dB}$	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated Emissions / in GPS Bands (1GHz~18GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Temperature	$\pm 0.7^{\circ}\text{C}$	Confidence levels of 95%
Humidity	$\pm 3.2\%$	Confidence levels of 95%
DC / AC Power Source	$\pm 1.4\%$	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description	
Power Type	From Host System	
Modulation	Multi-band OFDM (QPSK / DCM)	
Operation Frequency Range	3168 ~ 4752 MHz; 6336 ~ 7920 MHz	
10 dB Bandwidth	513.7 MHz	
RF Output Rating	For band group#1 77.10 dBuV/m @ 3 meters For band group#3 78.09 dBuV/m @ 3 meters	
Carrier Frequencies	Please refer to section 3.3	
Antenna	Antenna Gain	Band Group1 : 3.16dBi Band Group3 : 4.65dBi
	Antenna Type	Ultra-Wide Band Dipole Antenna
	P/N	81XXAA15.G05 (TYPE-A)

3.2. Accessories

N/A

3.3. Table for Carrier Frequencies

Band Group	BAND_ID (nb)	Lower Frequency (MHz)	Center Frequency (MHz)	Upper Frequency (MHz)
1	1	3168	3432	3696
	2	3696	3960	4224
	3	4224	4488	4752
3	7	6336	6600	6864
	8	6864	7128	7392
	9	7392	7656	7920

3.4. 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.

For Band Group 1

Test Items	Mode	TFC	BAND_ID (nb)
AC Power Line Conducted Emissions	Normal Link	-	-
UWB Bandwidth	CTX	5, 6, 7	1, 2, 3
Radiated Emissions 9kHz~960MHz	Normal Link	-	-
Radiated Emissions above 960MHz	CTX	1	1, 2, 3
Peak Emissions within a 10 MHz Bandwidth	CTX	1	1, 2, 3

Note: CTX=continuously transmitting

For Band Group 3

Test Items	Mode	TFC	BAND_ID (nb)
AC Power Line Conducted Emissions	Normal Link	-	-
UWB Bandwidth	CTX	5, 6, 7	7, 8, 9
Radiated Emissions 9kHz~960MHz	Normal Link	-	-
Radiated Emissions above 960MHz	CTX	1	7, 8, 9
Peak Emissions within a 10 MHz Bandwidth	CTX	1	7, 8, 9

Note: CTX=continuously transmitting

3.5. Table for Parameters of Test Software Setting

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 of the final end product.

For Band Group 1

Test Software Version	UWBPhyTest			
TFC	BAND_ID (nb)			Power Parameters
	1	2	3	TPC
1	V	V	V	5

For Band Group 3

Test Software Version	UWBPhyTest			
TFC	BAND_ID (nb)			Power Parameters
	7	8	9	TPC
1	V	V	V	9

3.6. Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Description
TruLink	81663	All the models are identical, the difference model served as marketing strategy.
	29591	
	29598	
	81667	

3.7. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	480872	IC 4086	-
CO04-HY	Conduction	Hwa Ya	480872	IC 4086	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

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

Please refer section 6 for Test Site Address.

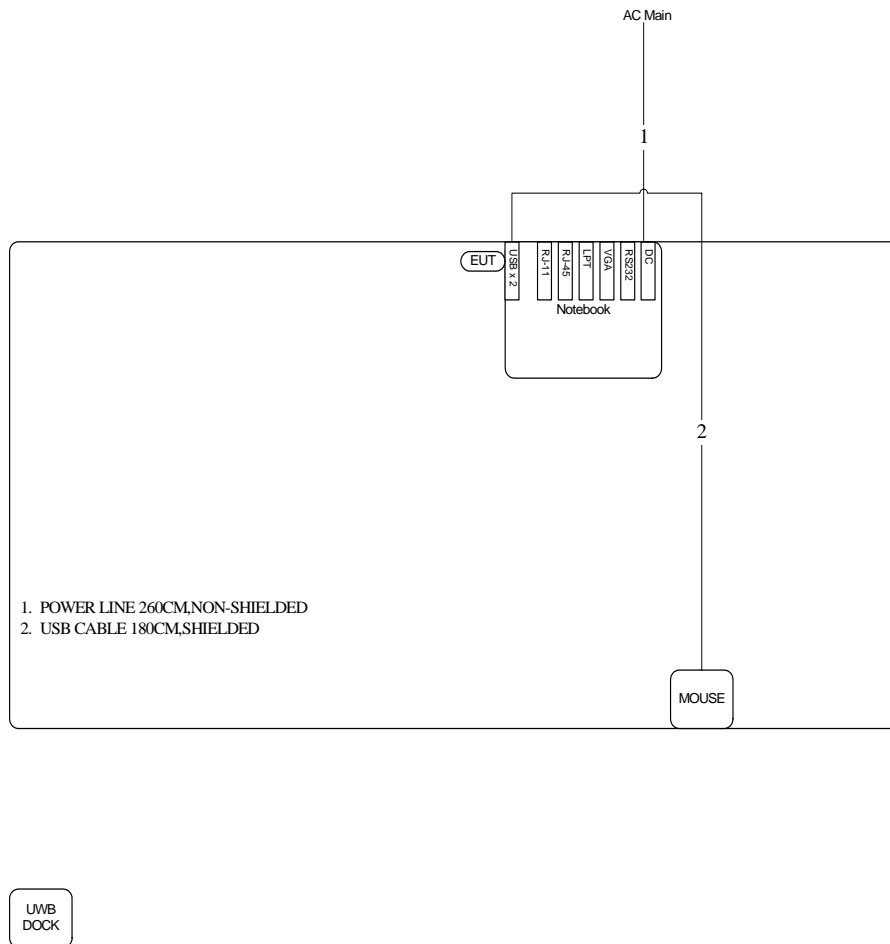
3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	1200	E2K4965AGNM
LCD Monitor	HP	FW660AA	N/A
Mouse	iCooky	AMS0706W	DoC
Wireless USB Display Adapter	GoodWay	WK9006R1	N/A

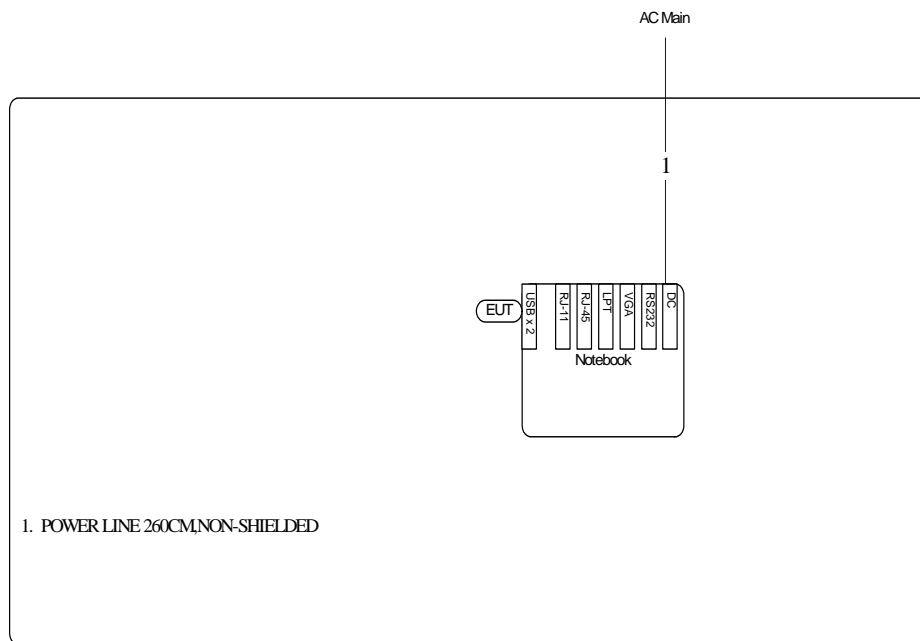
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

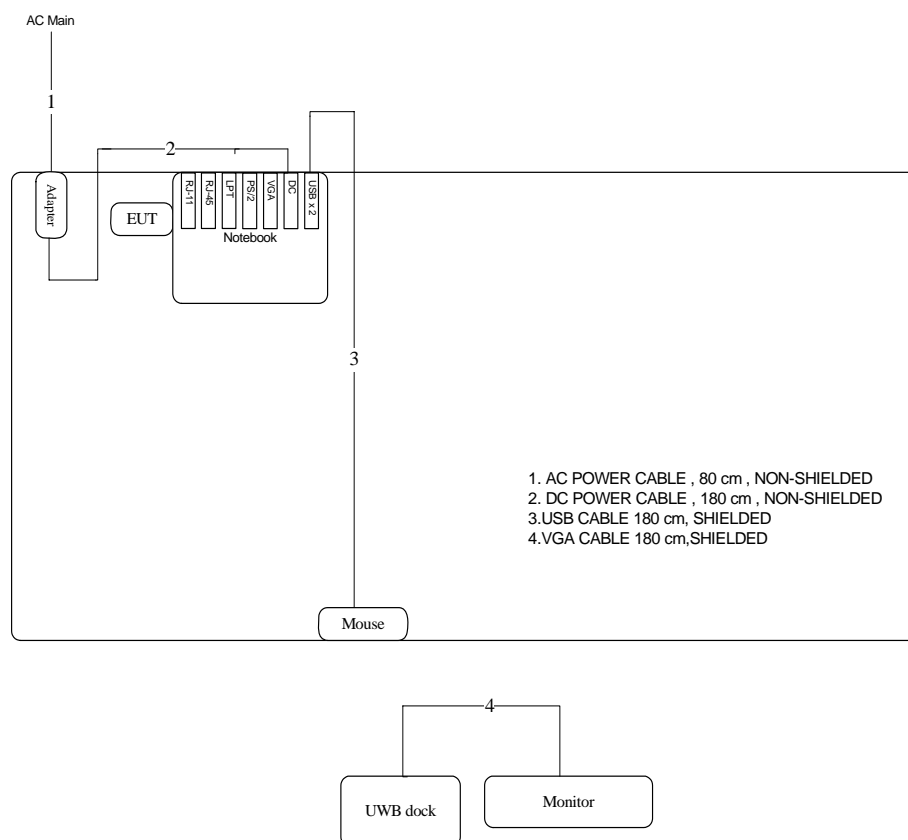
30MHz~960MHz



Above 960MHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product 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

4.1.2. Measuring Instruments and Setting

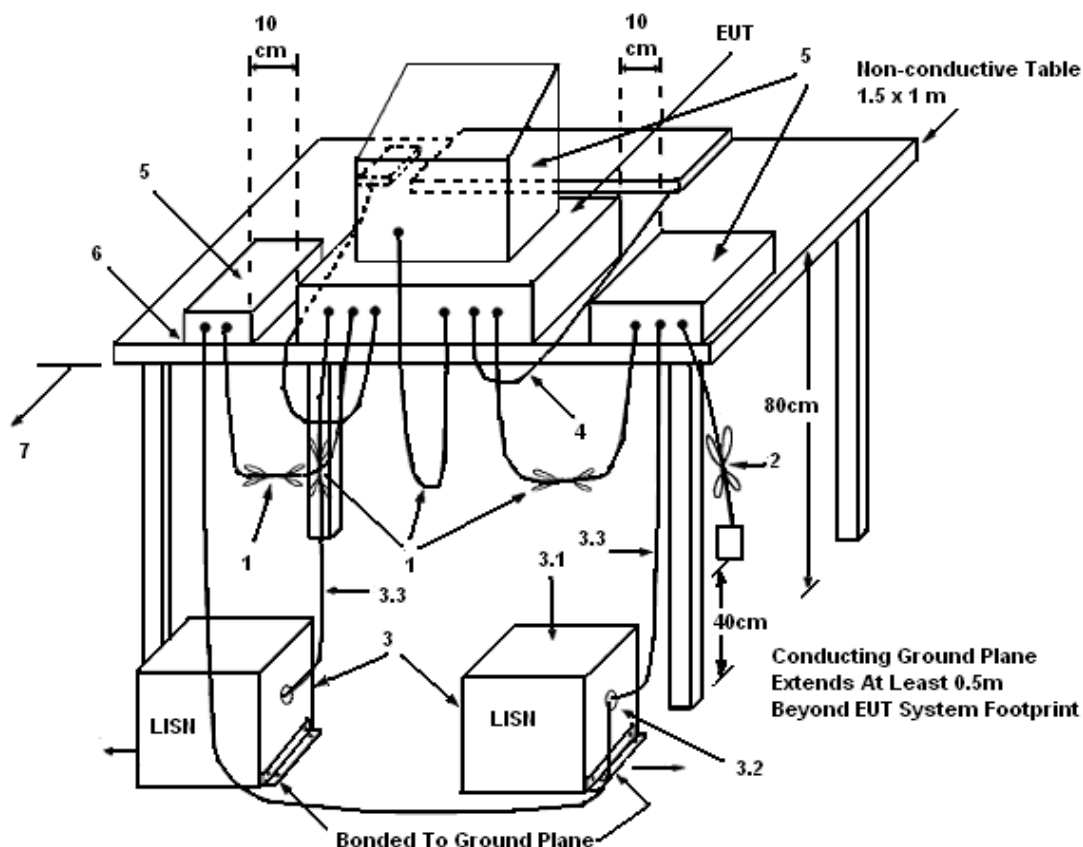
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. 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.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. 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.

4.1.5. Test Deviation

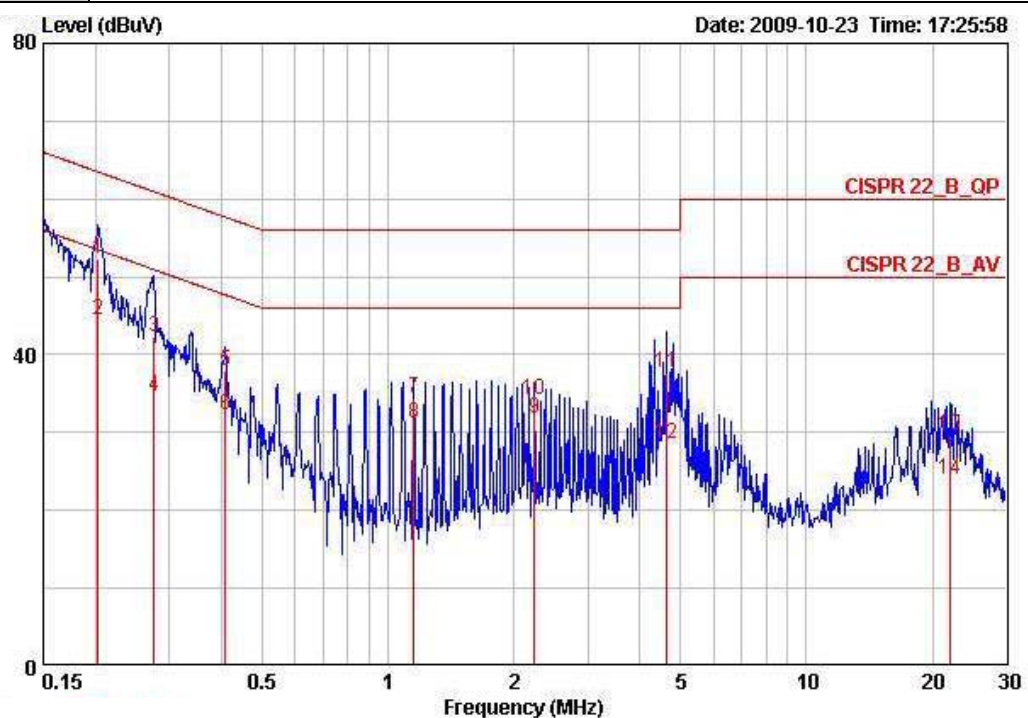
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

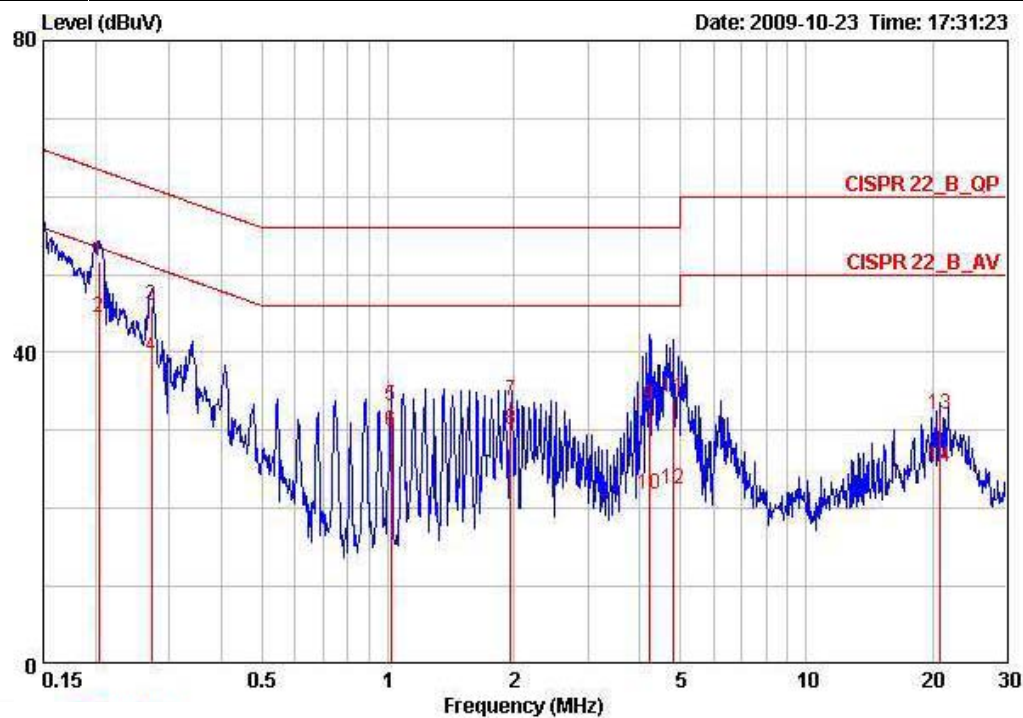
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	54%
Test Engineer	Howar Sung	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.20289	52.38	-11.11	63.49	52.13	0.05	0.20	QP
2	0.20289	44.45	-9.04	53.49	44.20	0.05	0.20	AVERAGE
3	0.27587	42.27	-18.67	60.94	42.03	0.04	0.20	QP
4	0.27587	34.69	-16.25	50.94	34.45	0.04	0.20	AVERAGE
5	0.40831	37.98	-19.70	57.68	37.75	0.03	0.20	QP
6	0.40831	32.36	-15.32	47.68	32.13	0.03	0.20	AVERAGE
7	1.153	34.42	-21.58	56.00	34.22	0.03	0.17	QP
8	1.153	31.07	-14.93	46.00	30.87	0.03	0.17	AVERAGE
9	2.237	31.84	-14.16	46.00	31.58	0.06	0.20	AVERAGE
10	2.237	34.16	-21.84	56.00	33.90	0.06	0.20	QP
11	4.611	37.68	-18.32	56.00	37.24	0.14	0.30	QP
12	4.611	28.51	-17.49	46.00	28.07	0.14	0.30	AVERAGE
13	22.047	29.66	-30.34	60.00	28.20	0.96	0.50	QP
14	22.047	23.89	-26.11	50.00	22.43	0.96	0.50	AVERAGE

Temperature	24°C	Humidity	54%
Test Engineer	Howar Sung	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20396	51.56	-11.89	63.45	51.28	0.08	0.20	QP
2	0.20396	44.39	-9.06	53.45	44.11	0.08	0.20	AVERAGE
3	0.27152	46.04	-15.04	61.07	45.76	0.08	0.20	QP
4	0.27152	39.39	-11.69	51.07	39.11	0.08	0.20	AVERAGE
5	1.017	33.19	-22.81	56.00	32.92	0.07	0.20	QP
6	1.017	29.97	-16.03	46.00	29.70	0.07	0.20	AVERAGE
7	1.967	33.70	-22.30	56.00	33.42	0.09	0.19	QP
8	1.967	30.05	-15.95	46.00	29.77	0.09	0.19	AVERAGE
9	4.202	33.17	-22.83	56.00	32.72	0.15	0.30	QP
10	4.202	21.72	-24.28	46.00	21.27	0.15	0.30	AVERAGE
11	4.822	34.27	-21.73	56.00	33.78	0.19	0.30	QP
12	4.822	22.48	-23.52	46.00	21.99	0.19	0.30	AVERAGE
13	20.831	32.08	-27.92	60.00	30.71	0.87	0.50	QP
14	20.831	25.27	-24.73	50.00	23.90	0.87	0.50	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Operational Limitations

4.2.1. Test Result of Operation Restriction

Operation Restriction	Informed the applicant	Not applicable	User Manual Informed	Passed
<input checked="" type="checkbox"/> 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.]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(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.]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(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.]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(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.]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

4.3. UWB Bandwidth Measurement

4.3.1. 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.

4.3.2. Measuring Instruments and Setting

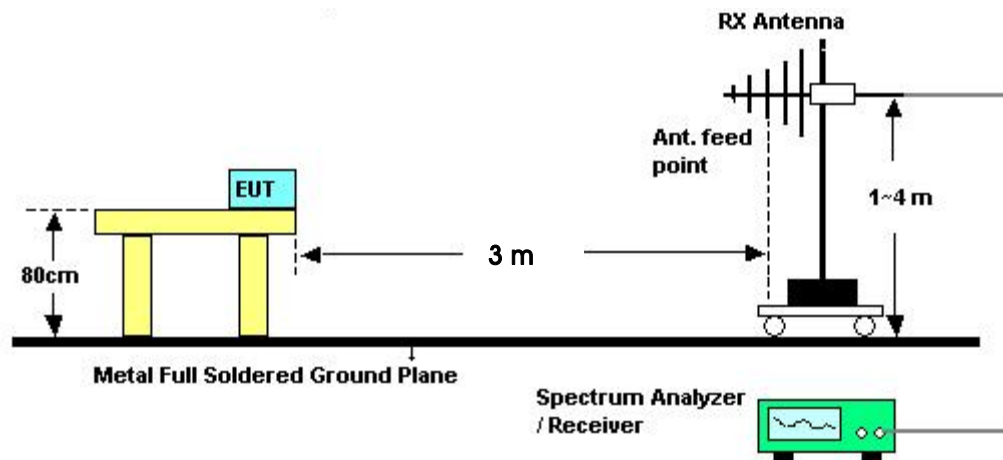
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
RB / VB	10 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

1. The EUT was placed on the top of the turntable 0.8 meter above ground. 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 one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
3. For maximum emission amplitude, the antenna tower was scan (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.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

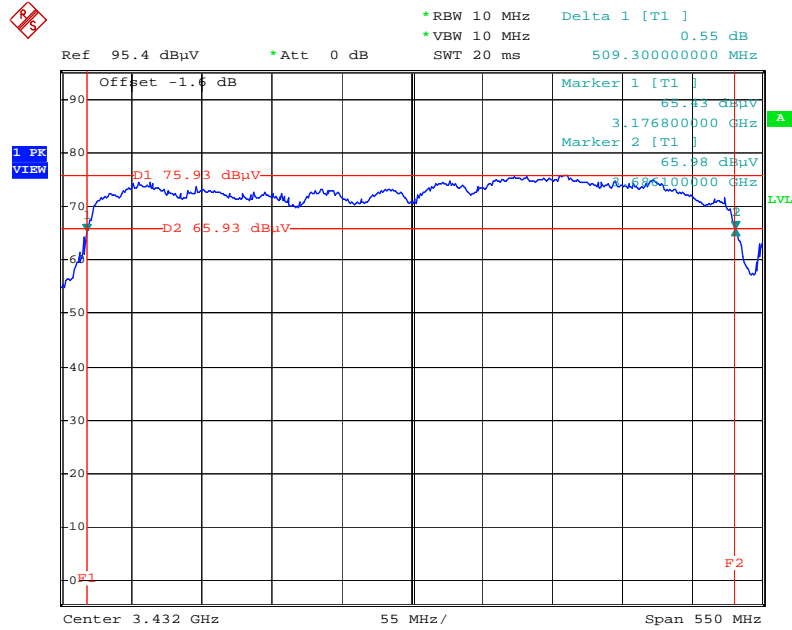
4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of UWB Bandwidth

UWB Bandwidth on BAND_ID (nb) 1

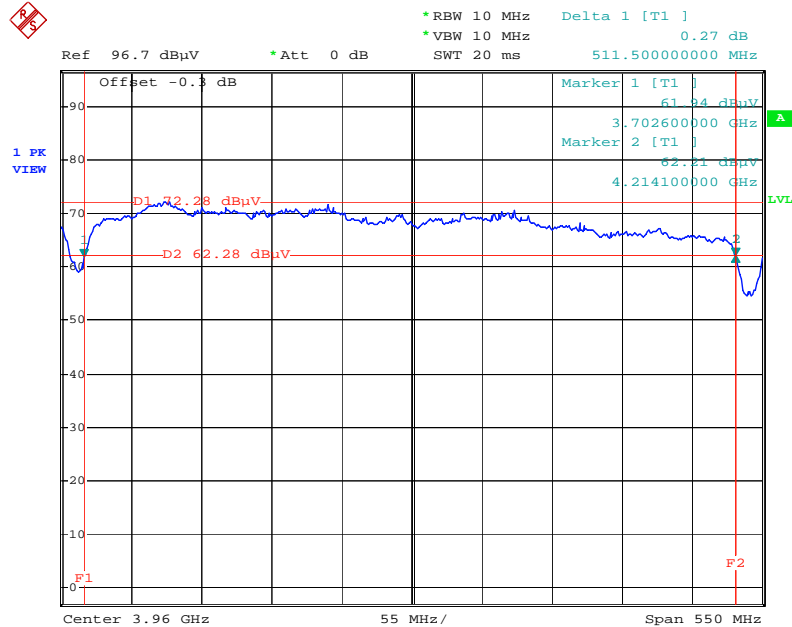
UWB BW = 509.3 MHz



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UWB Bandwidth on BAND_ID (nb) 2

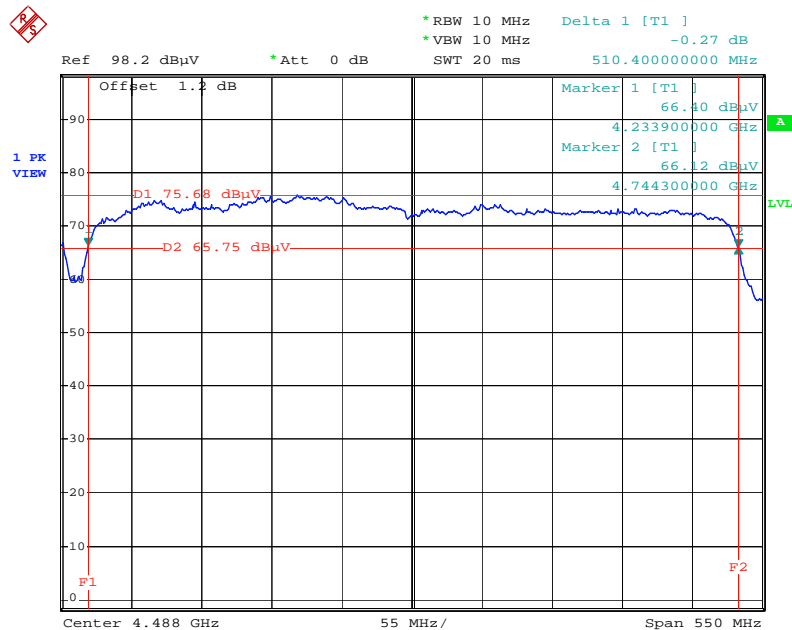
UWB BW = 511.5 MHz



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UWB Bandwidth on BAND_ID (nb) 3

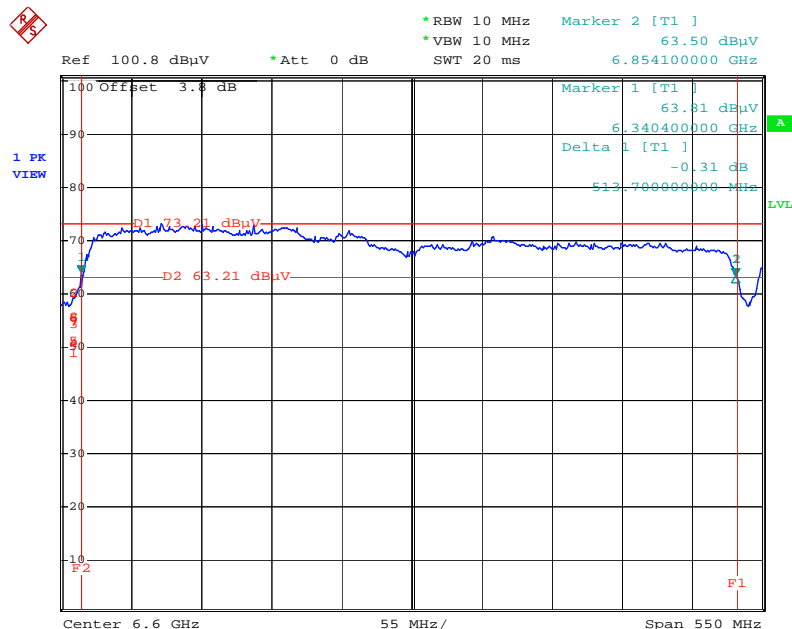
UWB BW = 510.4 MHz



Date: 27.OCT.2009 11:09:49

UWB Bandwidth on BAND_ID (nb) 7

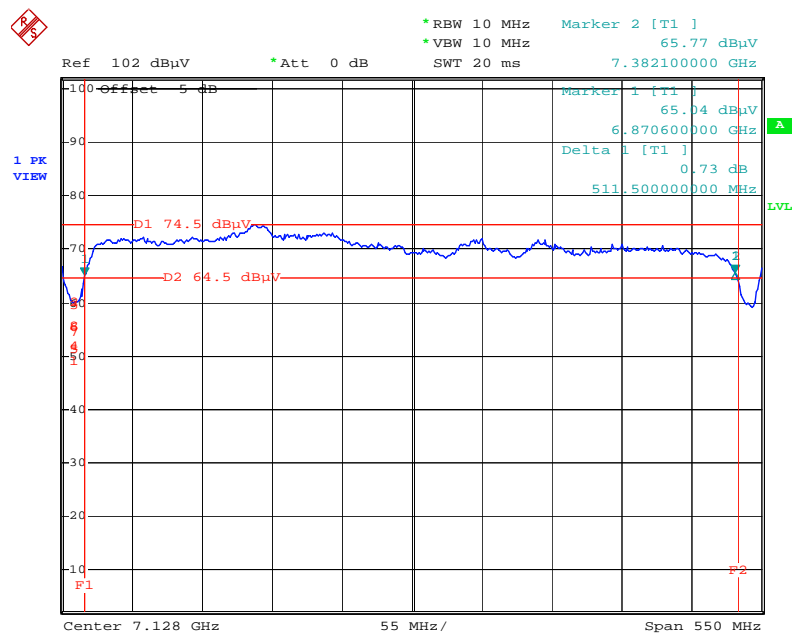
UWB BW = 513.7 MHz



Date: 27.OCT.2009 20:45:36

UWB Bandwidth on BAND_ID (nb) 8

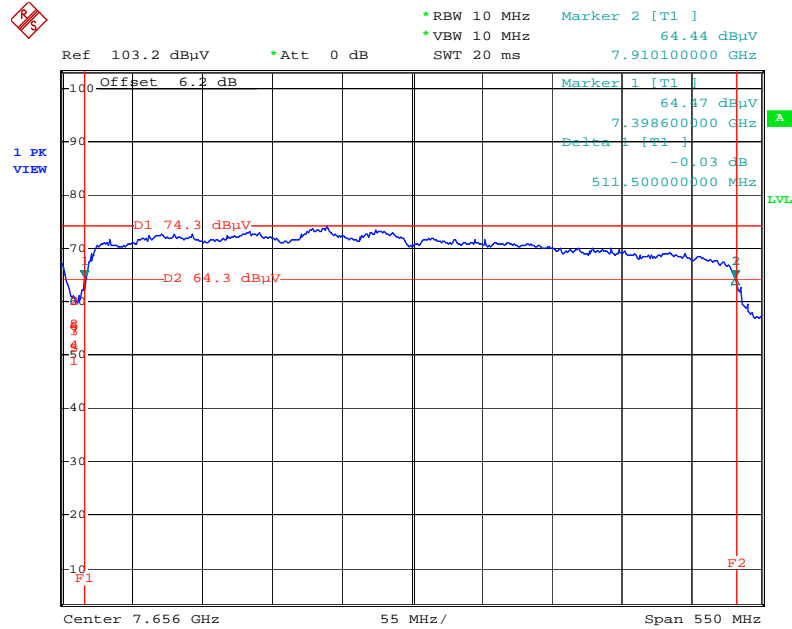
UWB BW = 511.5 MHz



Date: 27.OCT.2009 20:32:11

UWB Bandwidth on BAND_ID (nb) 9

UWB BW =511.5 MHz



Date: 27.OCT.2009 20:51:11

4.4. Radiated Emissions Measurement

4.4.1. Limit

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

The radiated emissions above 960 MHz from a device shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Freq. (MHz)	EIRP (dBm)	E- Field (dB μ V/m) at 3m	E- Field (dB μ V/m) at 1m	E- Field (dB μ V/m) at 0.5m
960-1610	-75.3	19.9	29.44	35.46
1610-1990	-63.3	31.9	41.44	47.46
1990-3100	-61.3	33.9	43.44	49.46
3100-10600	-41.3	53.9	63.44	69.46
10600 above	-61.3	33.9	43.44	49.46

Note 1: This may be converted to a peak field strength level at 3 meters using $E(\text{dB}\mu\text{V/m}) = P(\text{dBm EIRP}) + 95.2 \text{ dB}$.

Note 2: Above 960MHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m. Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB]. form 3m to 0.5m. Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [0.5m]})$ (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].

From 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.

4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	0 dB
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic or 40 GHz
RB / VB	1MHz / 3MHz for RMS for Average, 1 msec averaging time were used for these measurement frequencies

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

4.4.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. 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 for measured the frequency range below 960 MHz and antenna tower was placed below 1 meters far away from the turntable for measured the frequency range above 960 MHz
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 one meter and four 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 scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. The measurements made over the frequency range from 9 kHz to 960 MHz were maximized using an EMI receiver with peak detector capabilities. Measurements of the radiated field from 9 kHz to 960 MHz were made with the measurement antenna located a distance of 3 meters from the EUT. 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 1GHz.
6. Measurements above 960 MHz 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

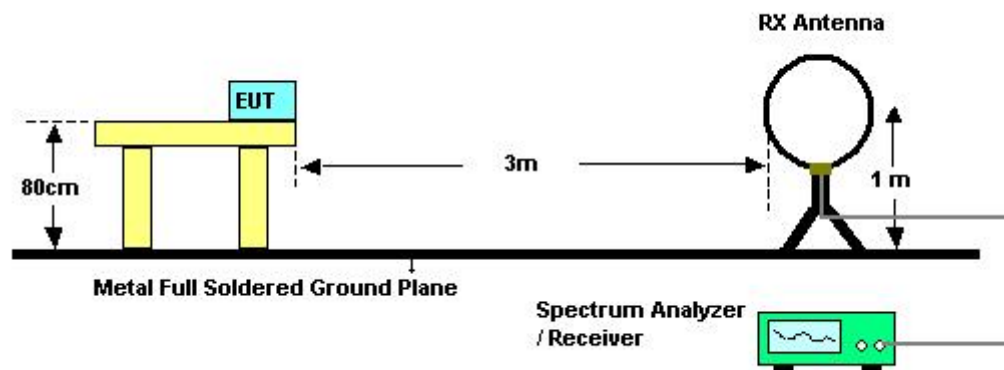
1 msec averaging time were used for these measurements. Measurements of the radiated field at frequencies above 960 MHz were made with the measurement antenna located a distance of below 1 meter from the EUT.

7. The spectrum between 9 kHz and 960 MHz contained no intentional radiation and lies below the limits. The spectrum from 960MHz to 18GHz 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.
8. 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.
9. 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.

4.4.4. Test Setup Layout

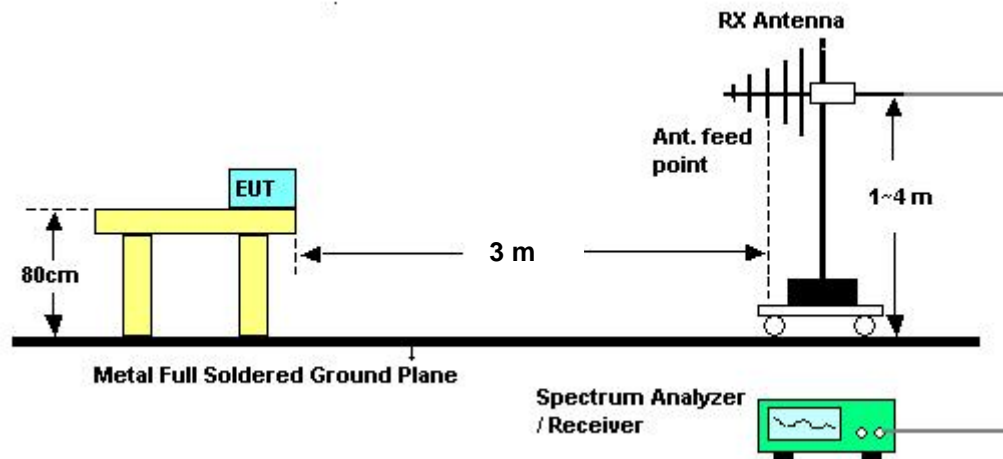
For radiated emissions below 30MHz

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



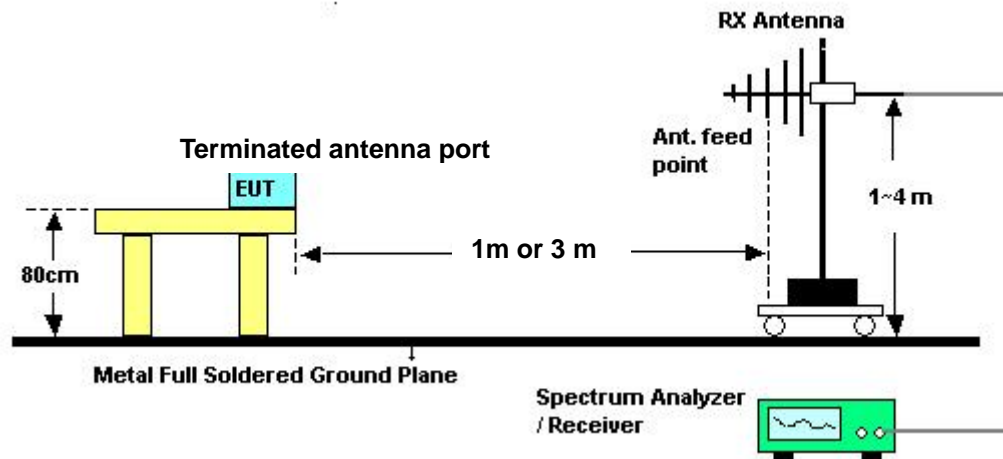
For radiated emissions from 30MHz~960MHz

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

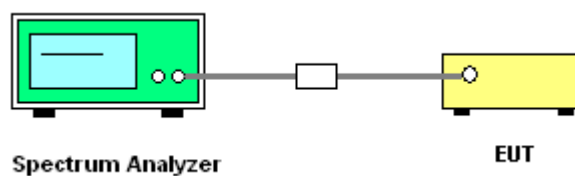


For radiated emissions above 960MHz

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)



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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 = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

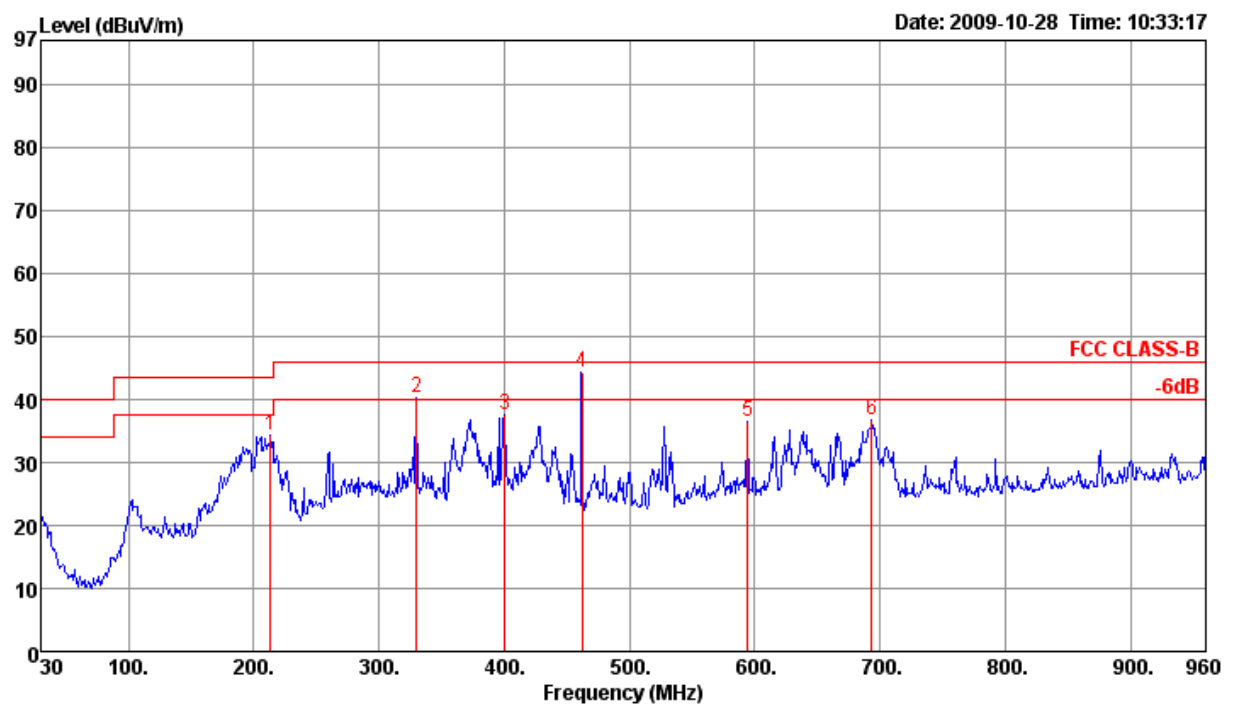
Limit line = specific limits (dBuV) + distance extrapolation factor.

4.4.8. Results of Radiated Emissions (30MHz~960MHz)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Normal Link

The distance: 3m

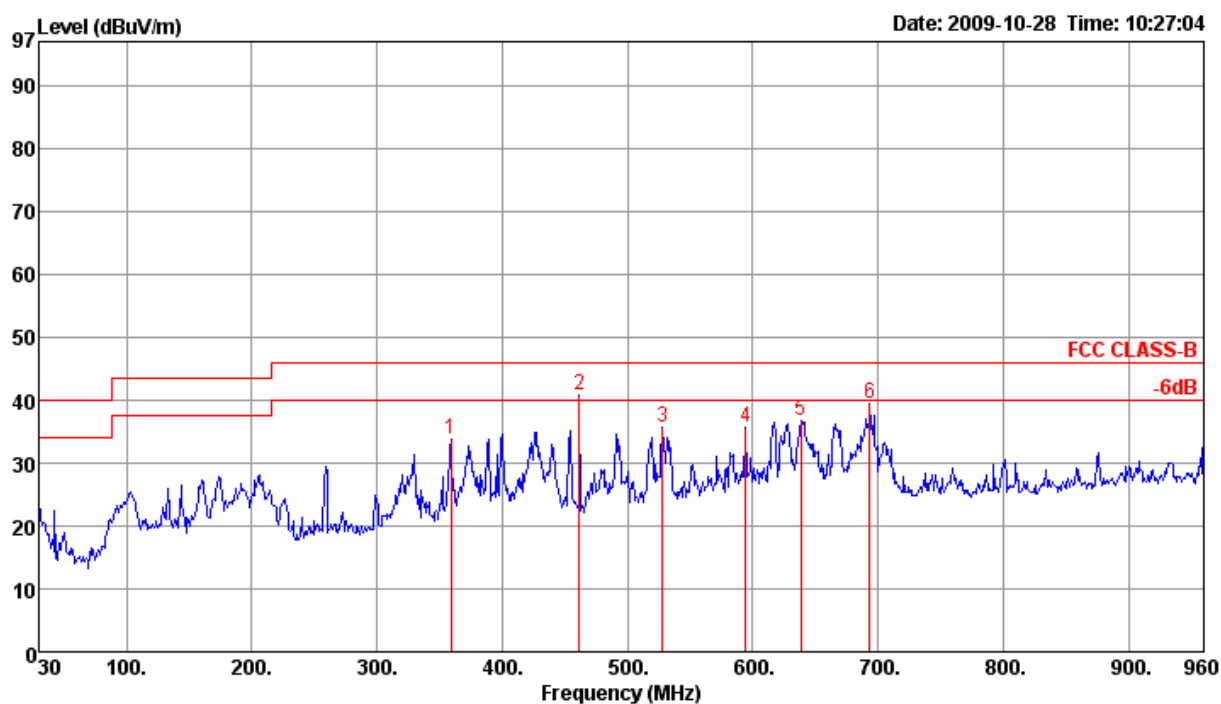
Horizontal



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	213.33	34.20	43.50	-9.30	49.47	1.75	27.07	10.05	0	100	Peak	HORIZONTAL
2 p	329.73	40.27	46.00	-5.73	51.05	2.16	27.11	14.17	0	100	Peak	HORIZONTAL
3	400.54	37.63	46.00	-8.37	46.85	2.31	27.61	16.08	0	100	Peak	HORIZONTAL
4 q	461.98	44.25	46.00	-1.75	52.50	2.62	27.90	17.03	120	100	QP	HORIZONTAL
5	594.54	36.50	46.00	-9.50	43.01	2.89	28.10	18.70	0	100	Peak	HORIZONTAL
6	693.48	36.67	46.00	-9.33	42.28	3.33	28.01	19.07	0	100	Peak	HORIZONTAL

The distance: 3m

Vertical



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	358.83	33.67	46.00	-12.33	43.80	2.22	27.31	14.96	0	400	Peak	VERTICAL
2	461.65	40.72	46.00	-5.28	48.97	2.62	27.90	17.03	0	400	Peak	VERTICAL
3	527.61	35.61	46.00	-10.39	43.02	2.75	28.10	17.94	0	400	Peak	VERTICAL
4	594.54	35.59	46.00	-10.41	42.10	2.89	28.10	18.70	0	400	Peak	VERTICAL
5	638.19	36.66	46.00	-9.34	42.70	3.13	28.06	18.89	0	400	Peak	VERTICAL
6	693.48	39.49	46.00	-6.51	45.10	3.33	28.01	19.07	0	400	Peak	VERTICAL

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.

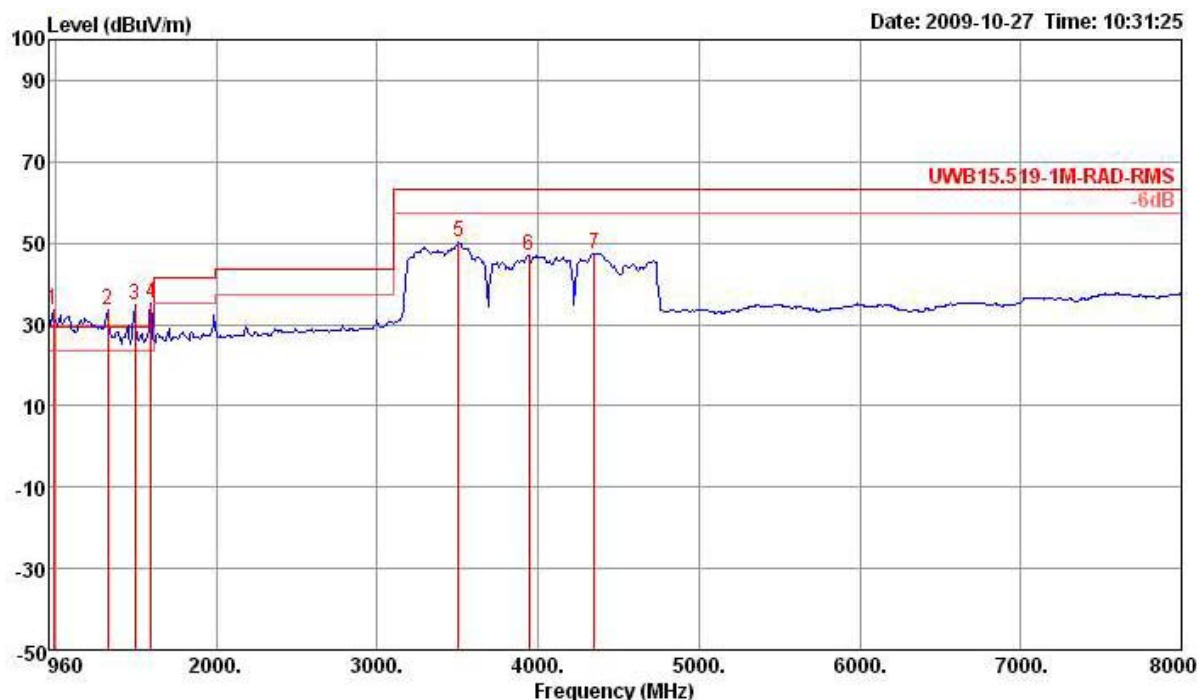
4.4.9. Results for Radiated Emissions (960MHz~40GHz Emissions from the UWB transmission)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 1

The distance: 1m

Horizontal

UWB Radiated Emissions 960 MHz to 8 GHz



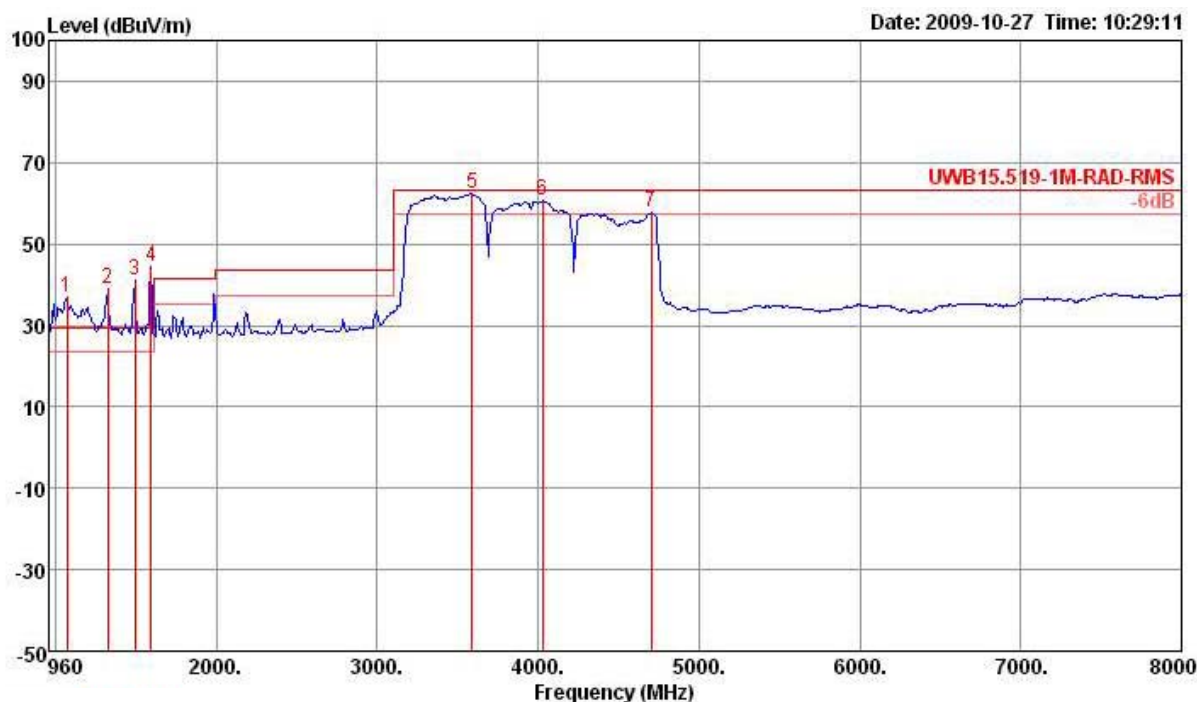
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 *	988.16	33.50	29.44	4.06	43.95	1.60	24.30	36.35	0	100	Peak	HORIZONTAL
2 *	1326.08	33.38	29.44	3.94	42.32	1.96	24.96	35.86	0	100	Peak	HORIZONTAL
3 *	1495.04	34.89	29.44	5.45	43.01	2.12	25.30	35.54	0	100	Peak	HORIZONTAL
4 p	1593.60	35.14	29.44	5.70	42.68	2.20	25.70	35.44	0	100	Peak	HORIZONTAL
5	3508.48	50.20	63.44	-13.24	51.96	3.38	30.15	35.29	0	100	Peak	HORIZONTAL
6	3944.96	46.90	63.44	-16.54	46.20	3.59	32.24	35.13	0	100	Peak	HORIZONTAL
7	4353.28	47.55	63.44	-15.89	46.38	3.84	32.43	35.10	0	100	Peak	HORIZONTAL

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, 3, 4) 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.

The distance: 1m

Vertical

UWB Radiated Emissions 960 MHz to 8 GHz



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1 *	1072.64	36.91	29.44	7.47	47.01	1.74	24.47	36.31	0	100 Peak	VERTICAL
2 *	1326.08	38.97	29.44	9.53	47.91	1.96	24.96	35.86	0	100 Peak	VERTICAL
3 *	1495.04	41.07	29.44	11.63	49.17	2.12	25.32	35.54	0	100 Peak	VERTICAL
4 p	1593.60	44.40	29.44	14.96	51.94	2.20	25.70	35.44	0	100 Peak	VERTICAL
5 !	3592.96	62.29	63.44	-1.15	63.61	3.43	30.52	35.27	0	100 Peak	VERTICAL
6 !	4029.44	60.58	63.44	-2.86	59.57	3.63	32.49	35.11	0	100 Peak	VERTICAL
7 !	4705.28	57.73	63.44	-5.71	56.03	3.95	32.81	35.06	0	100 Peak	VERTICAL

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, 3, 4) 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.

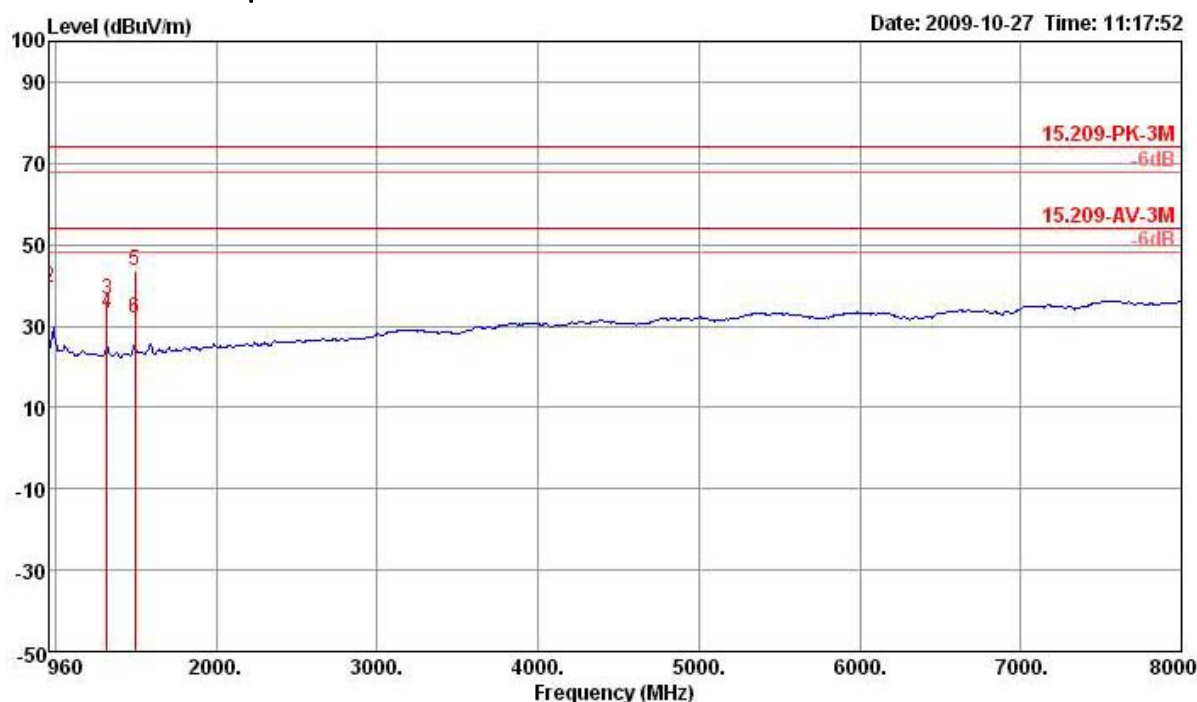
Radiated Emissions with terminated antenna port (960MHz~8GHz)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 1

The distance: 3m

Horizontal

Terminated antenna port:



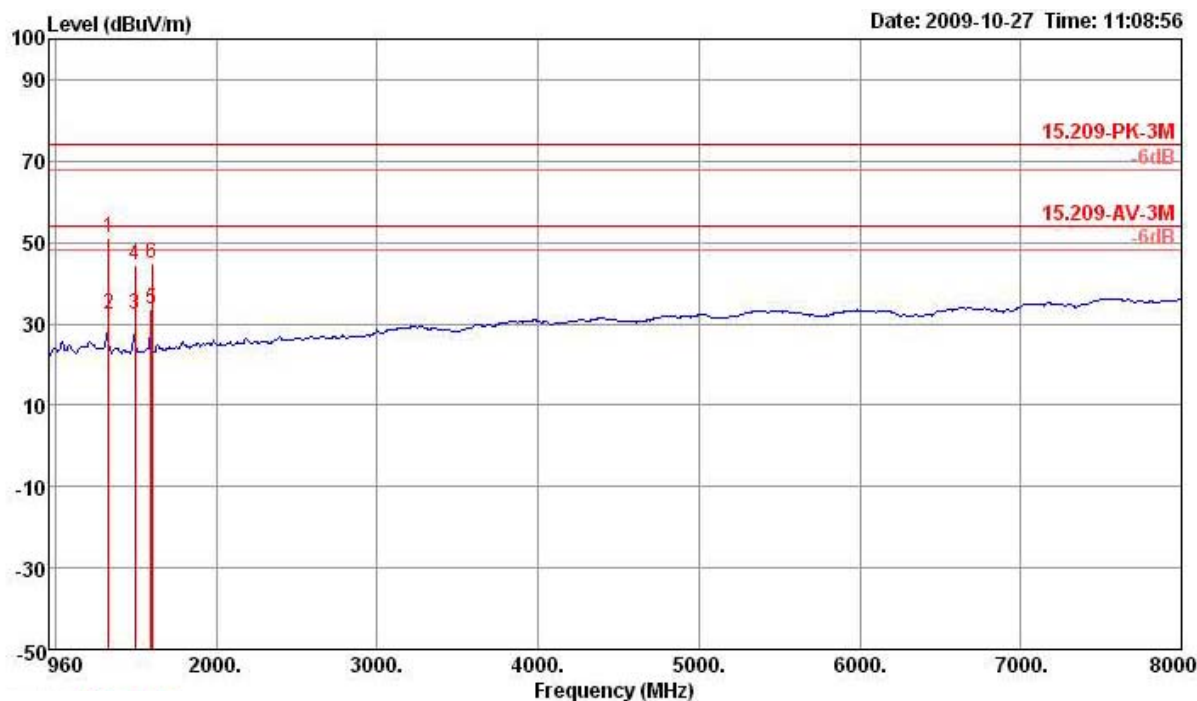
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	960.03	32.54	54.00	-21.46	43.34	1.50	24.00	36.30	202	100 Average	HORIZONTAL
2	960.29	39.30	74.00	-34.70	50.10	1.50	24.00	36.30	202	100 Peak	HORIZONTAL
3	1319.93	36.36	74.00	-37.64	45.30	1.96	24.96	35.86	322	131 Peak	HORIZONTAL
4 a	1320.01	33.15	54.00	-20.85	42.09	1.96	24.96	35.86	322	131 Average	HORIZONTAL
5 p	1493.44	43.73	74.00	-30.27	51.85	2.12	25.30	35.54	118	100 Peak	HORIZONTAL
6	1494.00	31.70	54.00	-22.30	39.82	2.12	25.30	35.54	118	100 Average	HORIZONTAL

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.

The distance: 3m

Vertical

Terminated antenna port:



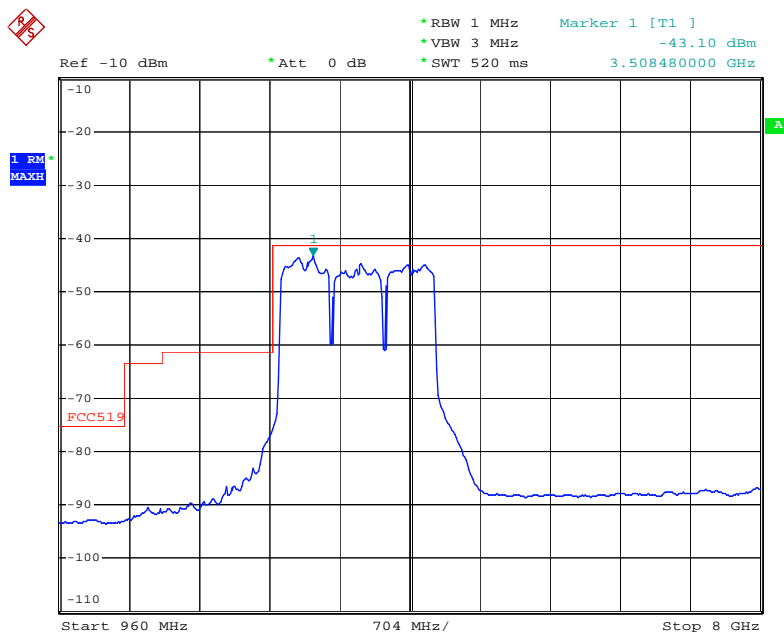
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1 p	1329.60	50.98	74.00	-23.02	59.85	1.96	24.99	35.82	190	100 Peak	VERTICAL
2	1329.70	32.17	54.00	-21.83	41.04	1.96	24.99	35.82	190	100 Average	VERTICAL
3	1494.18	32.11	54.00	-21.89	40.21	2.12	25.32	35.54	90	100 Average	VERTICAL
4	1494.22	44.60	74.00	-29.40	52.70	2.12	25.32	35.54	90	100 Peak	VERTICAL
5 a	1594.42	33.43	54.00	-20.57	40.97	2.20	25.70	35.44	97	100 Average	VERTICAL
6	1598.78	44.89	74.00	-29.11	52.43	2.20	25.70	35.44	97	100 Peak	VERTICAL

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.

Conducted Antenna Port Emissions (960MHz~8GHz)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 1

Conducted antenna port:



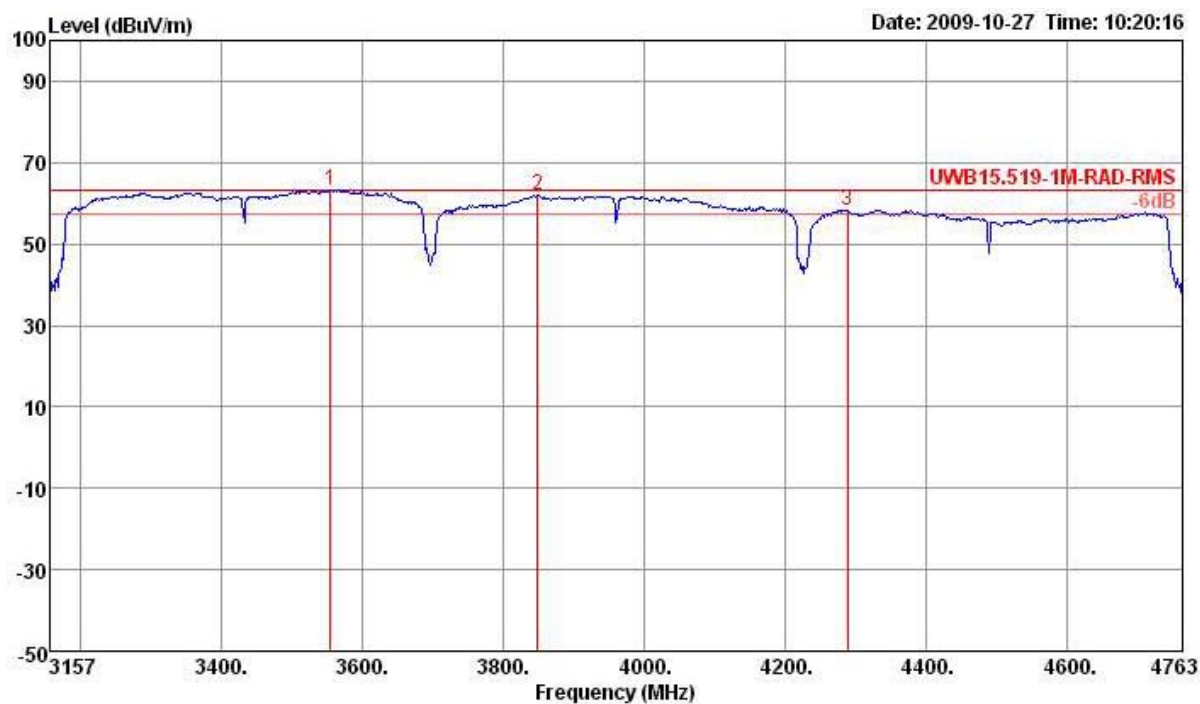
Date: 30.OCT.2009 18:42:33

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

The distance: 1m

Vertical

UWB Radiated Emissions 3 GHz to 5 GHz

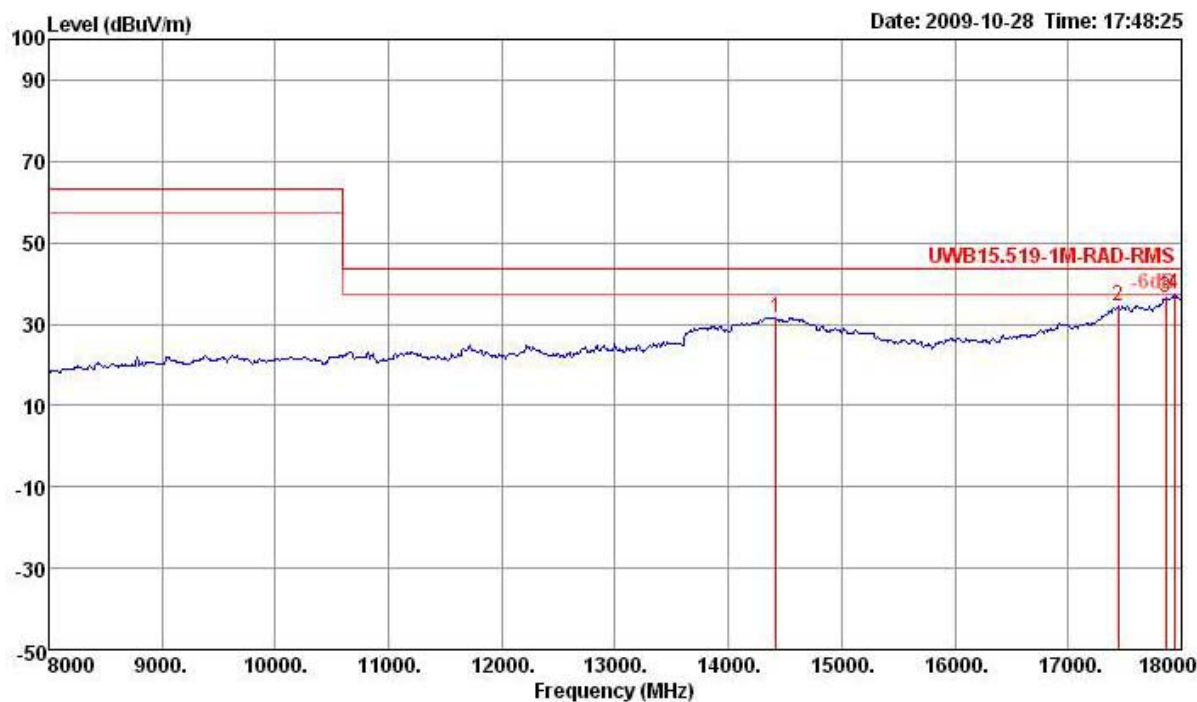


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	3555.20	63.28	63.44	-0.16	64.89	3.41	30.26	35.28	73	100	Peak	VERTICAL
2 !	3848.90	61.87	63.44	-1.57	61.69	3.54	31.81	35.17	78	100	Peak	VERTICAL
3 !	4287.80	58.35	63.44	-5.09	57.22	3.79	32.44	35.10	110	100	Peak	VERTICAL

The distance: 1m

Horizontal

UWB Radiated Emissions 8 GHz to 18 GHz



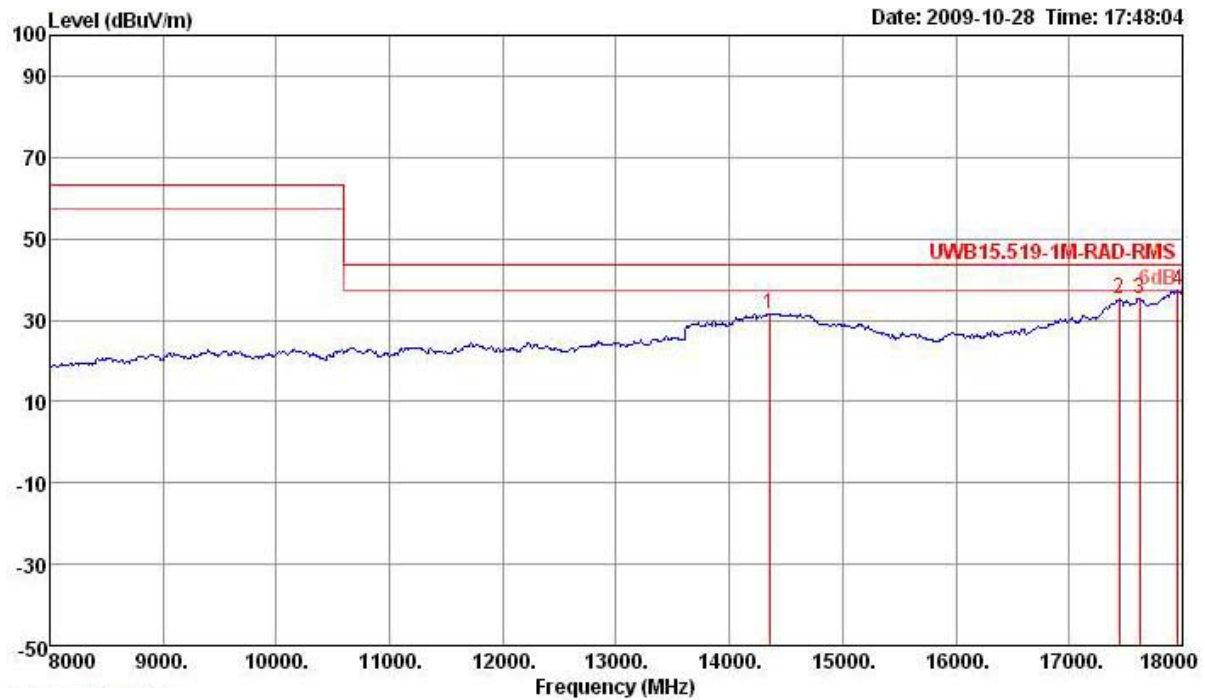
	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	14420.00	31.62	43.44	-11.82	16.12	7.48	42.18	34.16	360	99 Peak	HORIZONTAL
2	17440.00	34.46	43.44	-8.98	16.46	9.63	43.23	34.86	360	99 Peak	HORIZONTAL
3	17860.00	36.39	43.44	-7.05	16.62	8.82	45.92	34.97	360	99 Peak	HORIZONTAL
4 p	17940.00	37.47	43.44	-5.97	17.51	8.59	46.36	34.99	360	99 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 8 GHz to 18 GHz



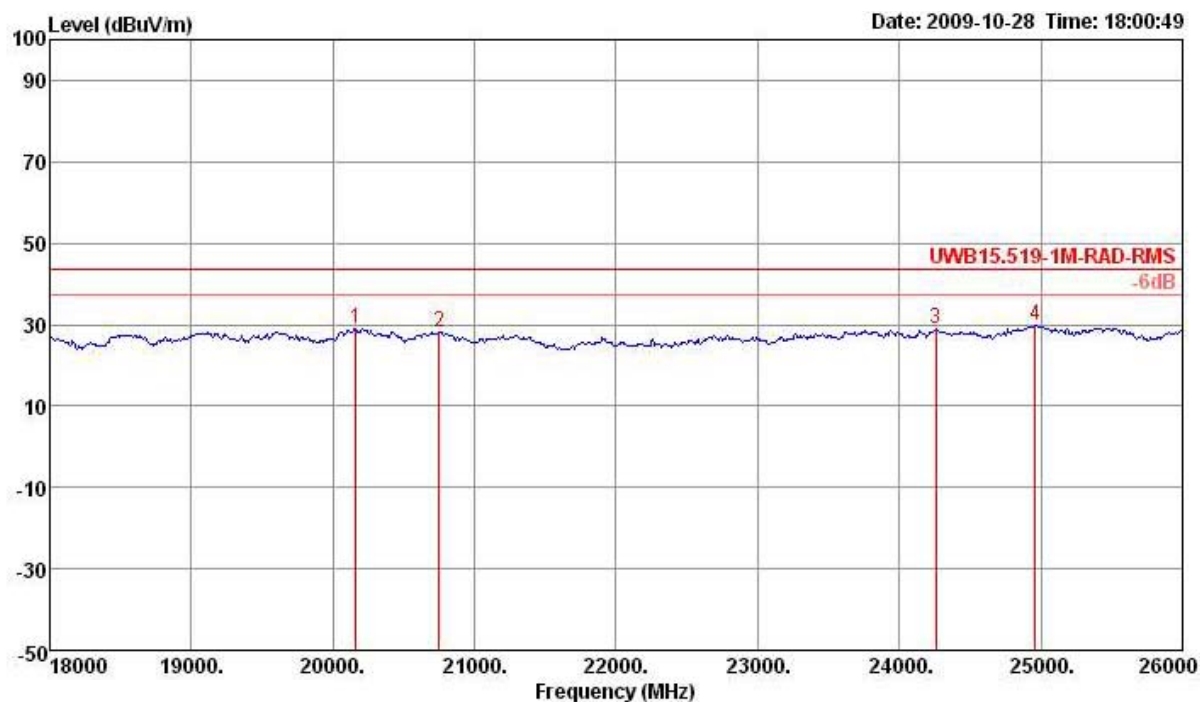
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	14350.00	31.50	43.44	-11.94	16.09	7.45	42.05	34.09	0	99 Peak	VERTICAL
2	17440.00	35.03	43.44	-8.41	17.03	9.63	43.23	34.86	0	99 Peak	VERTICAL
3	17620.00	35.26	43.44	-8.18	16.23	9.58	44.37	34.92	0	99 Peak	VERTICAL
4 p	17960.00	37.29	43.44	-6.15	17.17	8.51	46.58	34.97	0	99 Peak	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.

The distance: 1m

Horizontal

UWB Radiated Emissions 18 GHz to 26 GHz



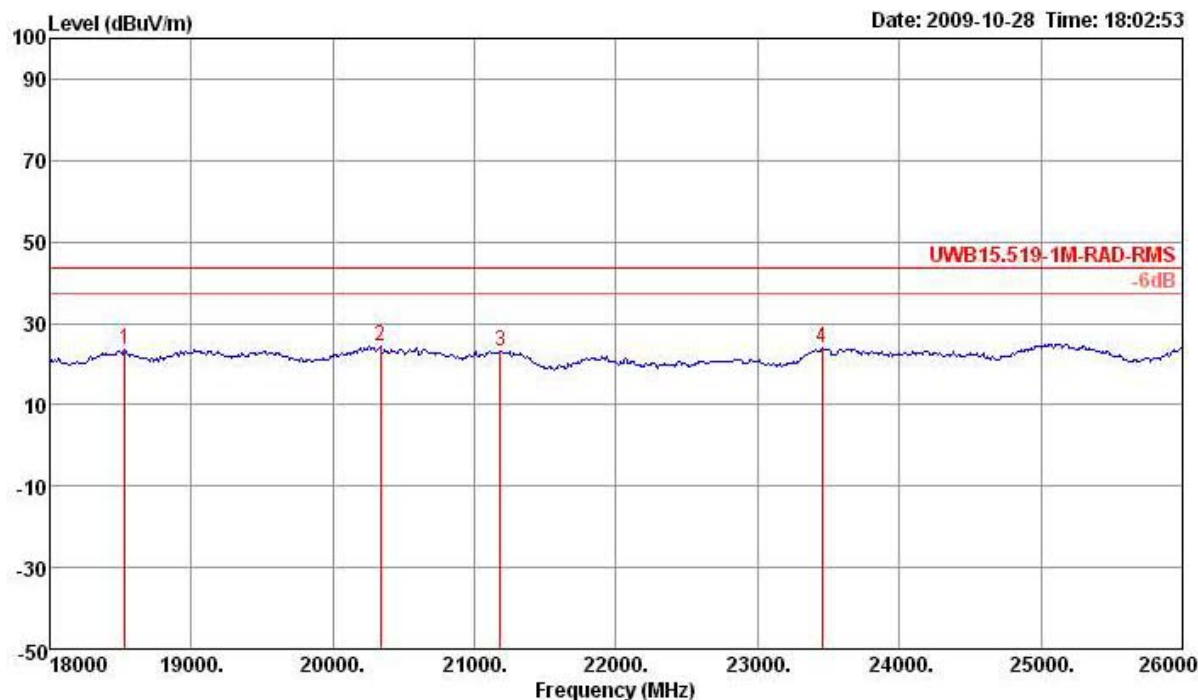
	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	20160.00	28.98	43.44	-14.46	18.87	7.73	37.99	35.61	52	100 Peak	HORIZONTAL
2	20752.00	28.31	43.44	-15.13	18.40	7.47	37.93	35.49	52	100 Peak	HORIZONTAL
3	24256.00	29.00	43.44	-14.44	19.13	6.20	39.52	35.85	52	100 Peak	HORIZONTAL
4 p	24960.00	29.93	43.44	-13.51	20.39	6.34	39.31	36.11	52	100 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 18 GHz to 26 GHz



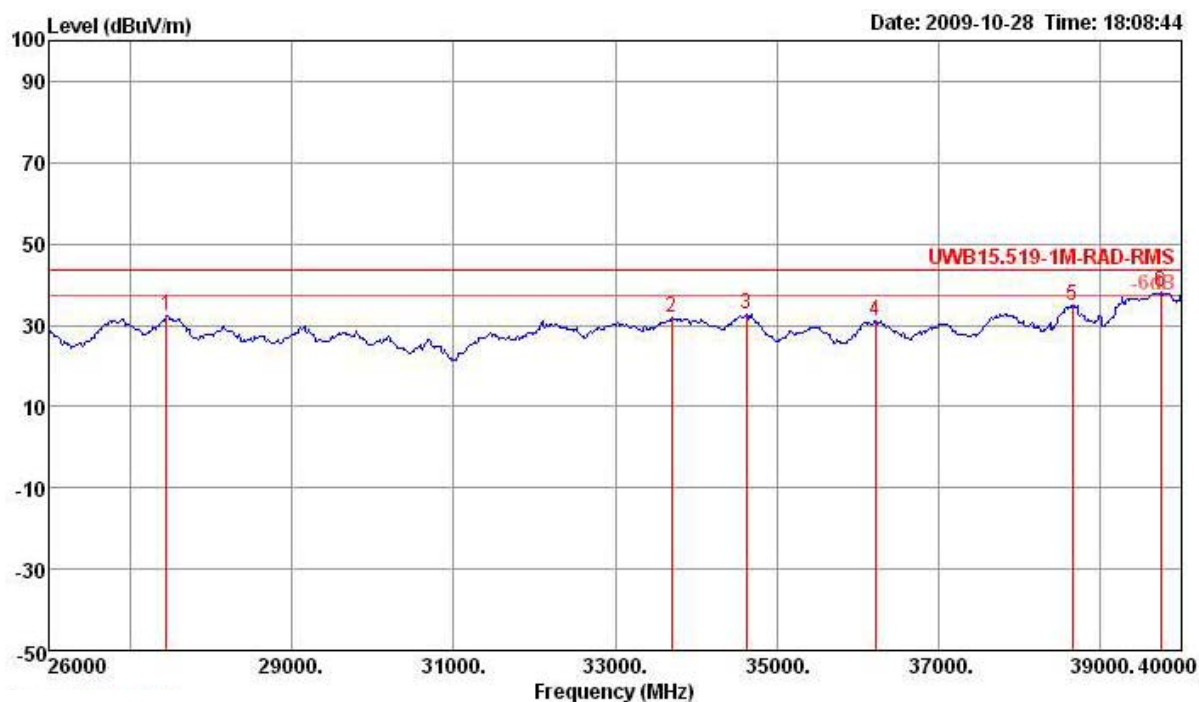
	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	18528.00	23.54	43.44	-19.90	12.69	7.40	37.95	34.50	360	100 Peak	VERTICAL
2 p	20336.00	24.49	43.44	-18.95	14.37	7.66	37.97	35.51	360	100 Peak	VERTICAL
3	21184.00	23.10	43.44	-20.34	13.84	6.91	37.95	35.60	360	100 Peak	VERTICAL
4	23456.00	24.06	43.44	-19.38	14.14	5.64	39.60	35.32	360	100 Peak	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.

The distance: 1m

Horizontal

UWB Radiated Emissions 26 GHz to 40 GHz



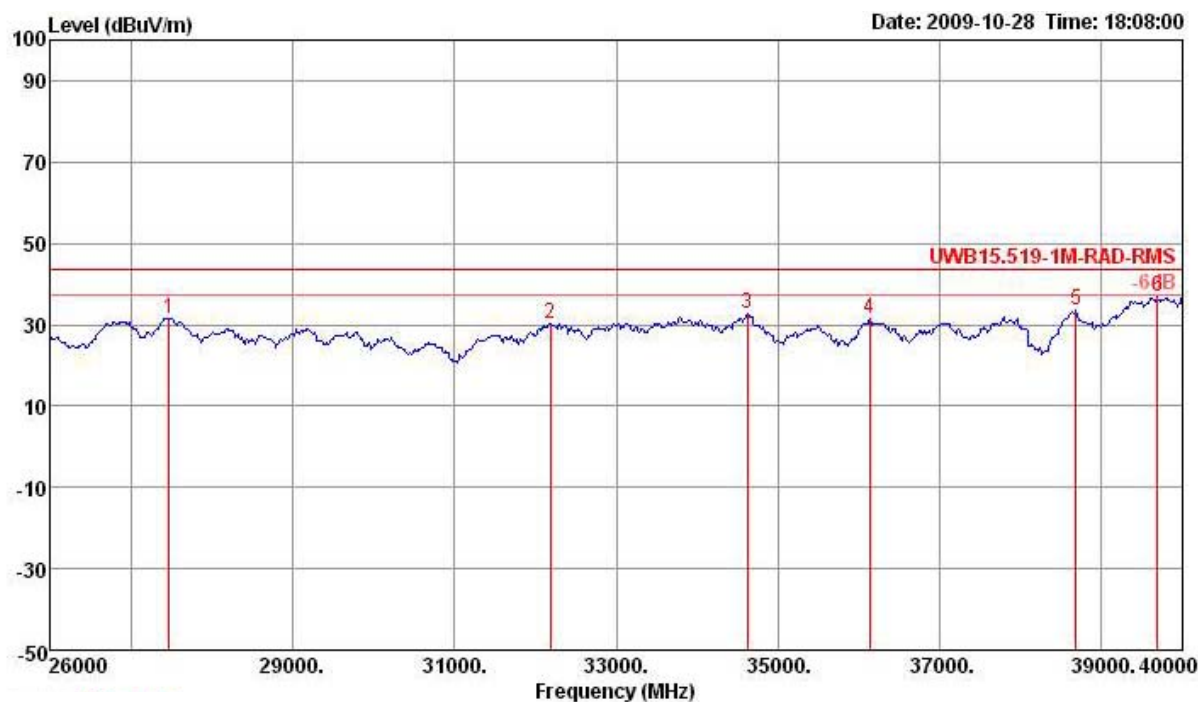
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	27456.00	32.49	43.44	-10.95	18.15	6.35	39.57	31.58	340	100 Peak	HORIZONTAL
2	00.00	31.69	43.44	-11.75	18.90	5.71	41.46	34.38	340	100 Peak	HORIZONTAL
3	24.00	32.66	43.44	-10.78	21.04	5.75	41.75	35.88	340	100 Peak	HORIZONTAL
4	20.00	31.24	43.44	-12.20	21.36	6.89	42.38	39.39	340	100 Peak	HORIZONTAL
5	56.00	34.92	43.44	-8.52	18.61	10.15	43.60	37.44	340	100 Peak	HORIZONTAL
6	48.00	37.96	43.44	-5.48	13.27	10.21	43.28	28.80	340	100 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 26 GHz to 40 GHz



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	27470.00	31.66	43.44	-11.78	17.32	6.38	39.57	31.61	0	100 Peak	VERTICAL
2	32188.00	30.28	43.44	-13.16	17.00	5.18	41.23	33.13	0	100 Peak	VERTICAL
3	34624.00	32.60	43.44	-10.84	20.98	5.75	41.75	35.88	0	100 Peak	VERTICAL
4	36136.00	31.30	43.44	-12.14	21.70	6.77	42.30	39.47	0	100 Peak	VERTICAL
5	38684.00	33.56	43.44	-9.88	17.09	10.15	43.60	37.28	0	100 Peak	VERTICAL
6	39200.00	36.96	43.44	-6.48	12.81	10.13	43.29	29.27	0	100 Peak	VERTICAL

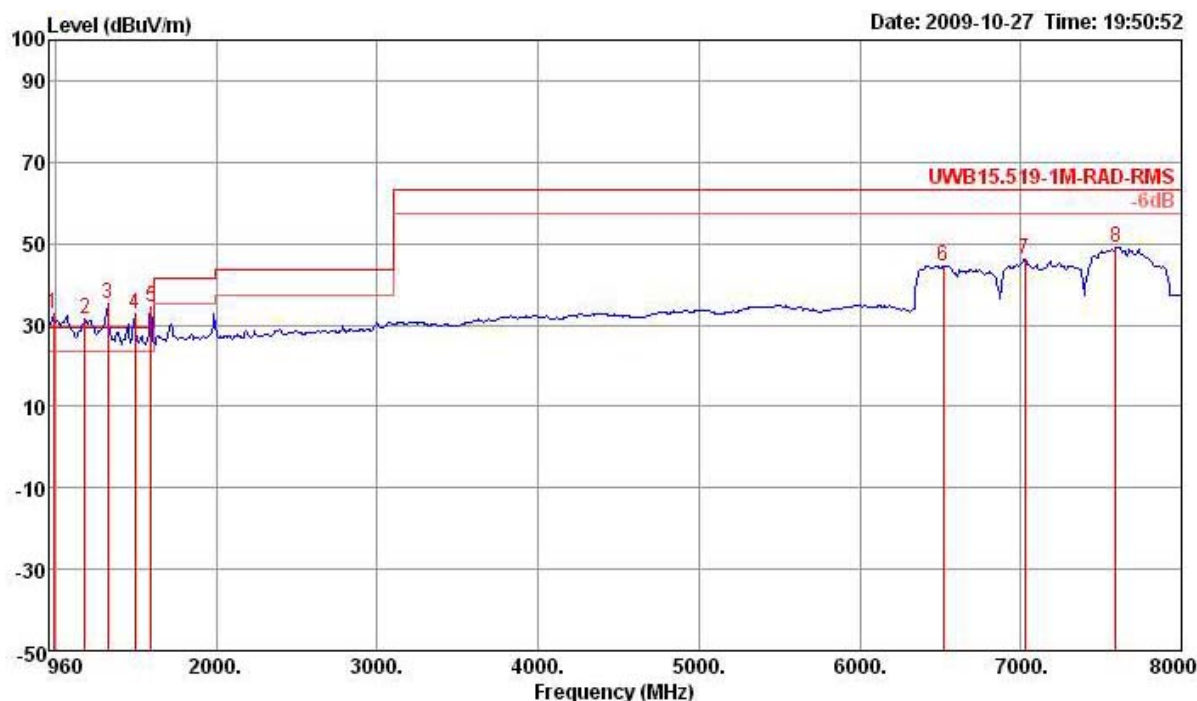
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements.

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 3

The distance: 1m

Horizontal

UWB Radiated Emissions 960 MHz to 8 GHz



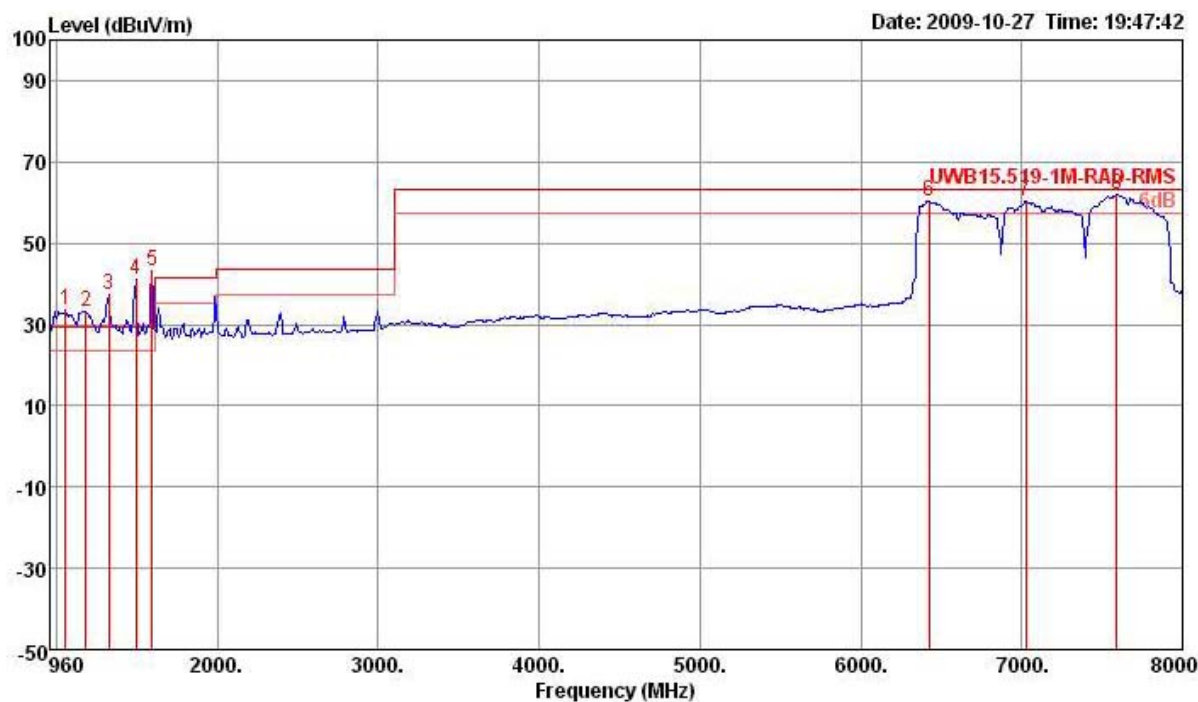
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 *	988.16	32.69	29.44	3.25	43.14	1.60	24.30	36.35	0	100	Peak	HORIZONTAL
2 *	1185.28	31.47	29.44	2.03	41.02	1.85	24.68	36.08	0	100	Peak	HORIZONTAL
3 p	1326.08	35.40	29.44	5.96	44.34	1.96	24.96	35.86	0	100	Peak	HORIZONTAL
4 *	1495.04	32.73	29.44	3.29	40.85	2.12	25.30	35.54	0	100	Peak	HORIZONTAL
5 *	1593.60	34.50	29.44	5.06	42.04	2.20	25.70	35.44	0	100	Peak	HORIZONTAL
6	6521.60	44.58	63.44	-18.86	40.74	4.78	34.36	35.30	0	100	Peak	HORIZONTAL
7	7028.48	46.12	63.44	-17.32	41.05	5.14	35.33	35.40	0	100	Peak	HORIZONTAL
8	7591.68	49.13	63.44	-14.31	42.95	5.22	36.38	35.42	0	100	Peak	HORIZONTAL

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, 3, 4, 5) 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.

The distance:1m

Vertical

UWB Radiated Emissions 960 MHz to 8 GHz



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1 *	1058.56	33.67	29.44	4.23	43.80	1.74	24.44	36.31	360	100 Peak	VERTICAL
2 *	1185.28	33.15	29.44	3.71	42.70	1.85	24.68	36.08	360	100 Peak	VERTICAL
3 *	1326.08	37.15	29.44	7.71	46.09	1.96	24.96	35.86	360	100 Peak	VERTICAL
4 *	1495.04	40.89	29.44	11.45	48.99	2.12	25.32	35.54	360	100 Peak	VERTICAL
5 p	1593.60	43.26	29.44	13.82	50.80	2.20	25.70	35.44	360	100 Peak	VERTICAL
6 !	6423.04	60.32	63.44	-3.12	56.56	4.72	34.32	35.28	360	100 Peak	VERTICAL
7 !	7028.48	60.35	63.44	-3.09	55.28	5.14	35.33	35.40	360	100 Peak	VERTICAL
8 !	7591.68	62.09	63.44	-1.35	55.91	5.22	36.38	35.42	360	100 Peak	VERTICAL

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, 3, 4, 5) 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.

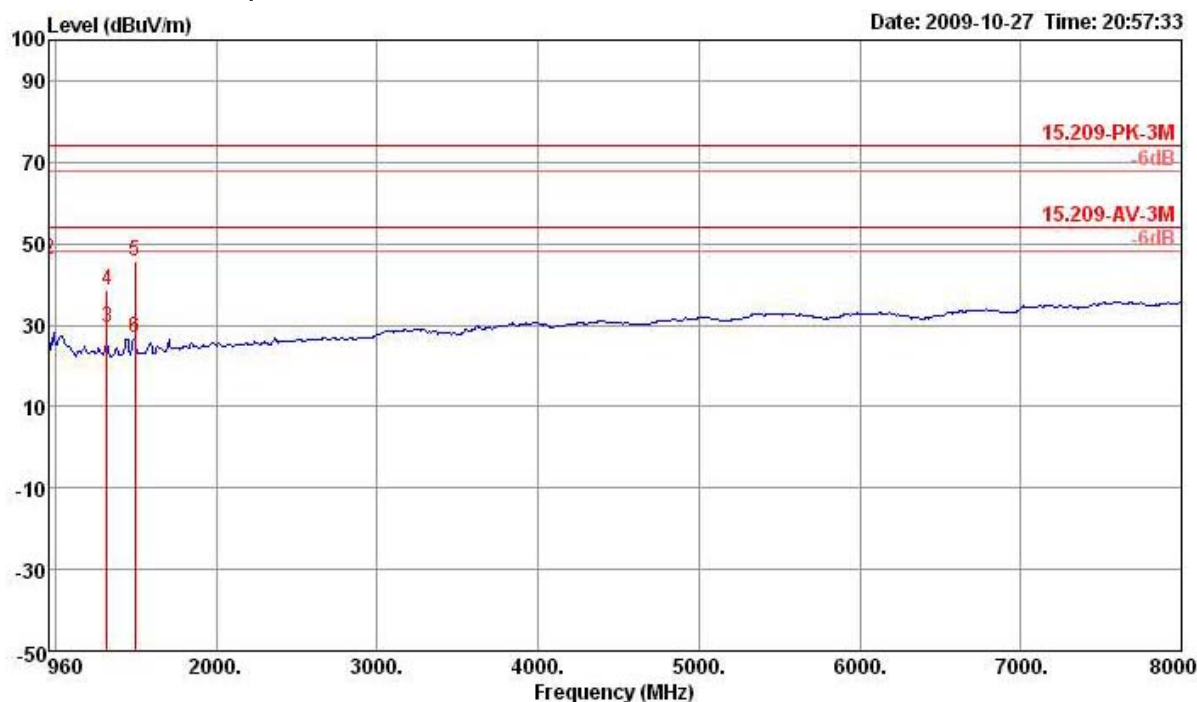
Radiated Emissions with terminated antenna port (960MHz~8GHz)

Temperature	25.8℃	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 3

The distance: 3m

Horizontal

Terminated antenna port:



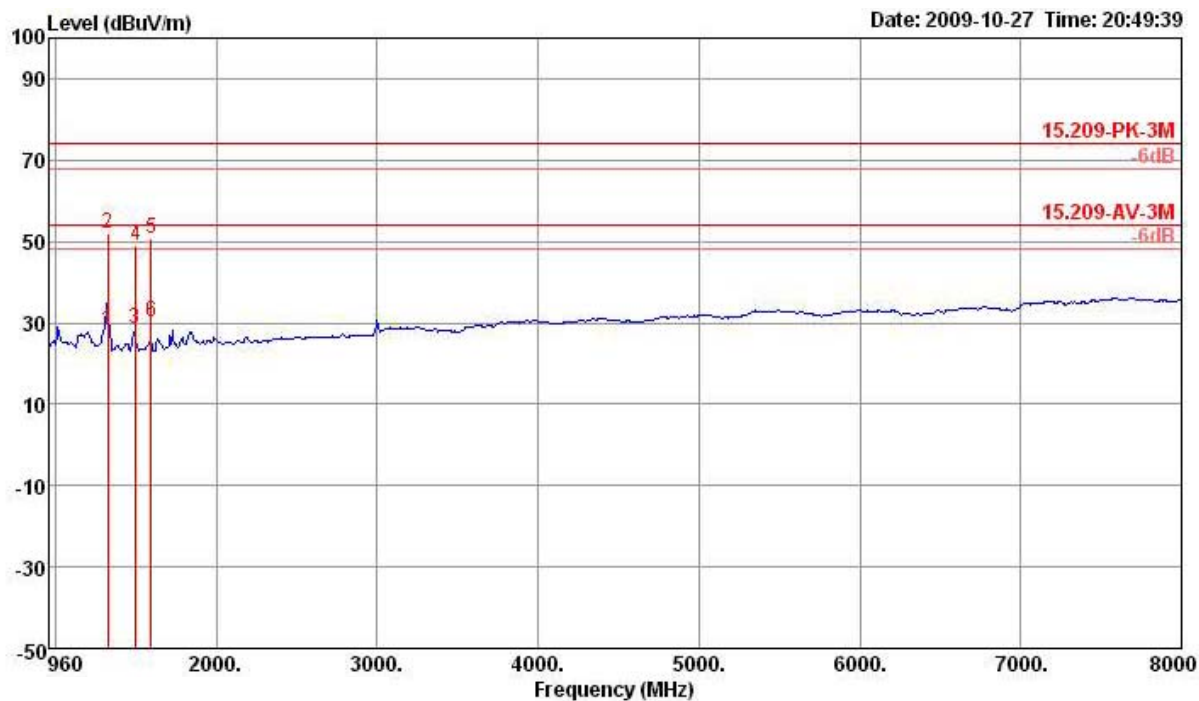
		Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	a	960.03	31.21	54.00	-22.79	42.01	1.50	24.00	36.30	211	100 Average	HORIZONTAL
2	p	960.36	46.30	74.00	-27.70	57.10	1.50	24.00	36.30	211	100 Peak	HORIZONTAL
3		1320.02	29.43	54.00	-24.57	38.37	1.96	24.96	35.86	309	126 Average	HORIZONTAL
4		1320.03	38.73	74.00	-35.27	47.67	1.96	24.96	35.86	309	126 Peak	HORIZONTAL
5		1494.48	45.89	74.00	-28.11	54.01	2.12	25.30	35.54	89	100 Peak	HORIZONTAL
6		1494.76	27.02	54.00	-26.98	35.14	2.12	25.30	35.54	89	100 Average	HORIZONTAL

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.

The distance: 3m

Vertical

Terminated antenna port:



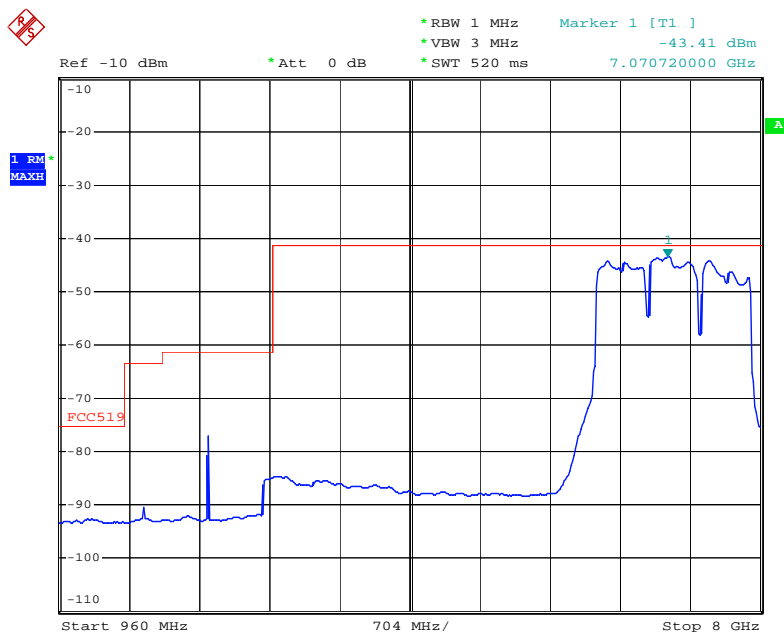
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	1326.01	28.11	54.00	-25.89	37.05	1.96	24.96	35.86	171	100 Average	VERTICAL
2 p	1326.07	51.90	74.00	-22.10	60.84	1.96	24.96	35.86	171	100 Peak	VERTICAL
3	1497.64	28.59	54.00	-25.41	36.63	2.12	25.38	35.54	95	142 Average	VERTICAL
4	1499.32	49.07	74.00	-24.93	57.11	2.12	25.38	35.54	95	142 Peak	VERTICAL
5	1594.35	50.78	74.00	-23.22	58.32	2.20	25.70	35.44	87	100 Peak	VERTICAL
6 a	1595.47	30.10	54.00	-23.90	37.64	2.20	25.70	35.44	87	100 Average	VERTICAL

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.

Conducted Antenna Port Emissions (960MHz~8GHz)

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 3

Conducted antenna port:



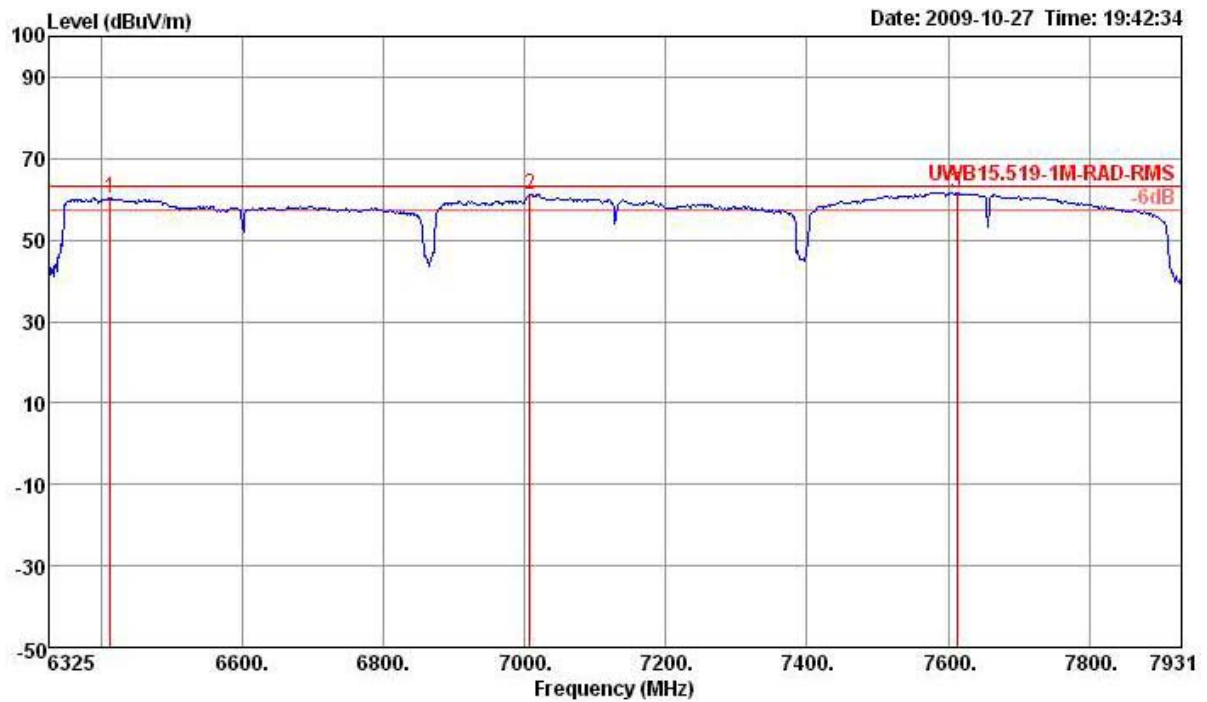
Date: 30.OCT.2009 18:41:53

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

The distance: 1m

Horizontal

UWB Radiated Emissions 6.2 GHz to 8.2 GHz



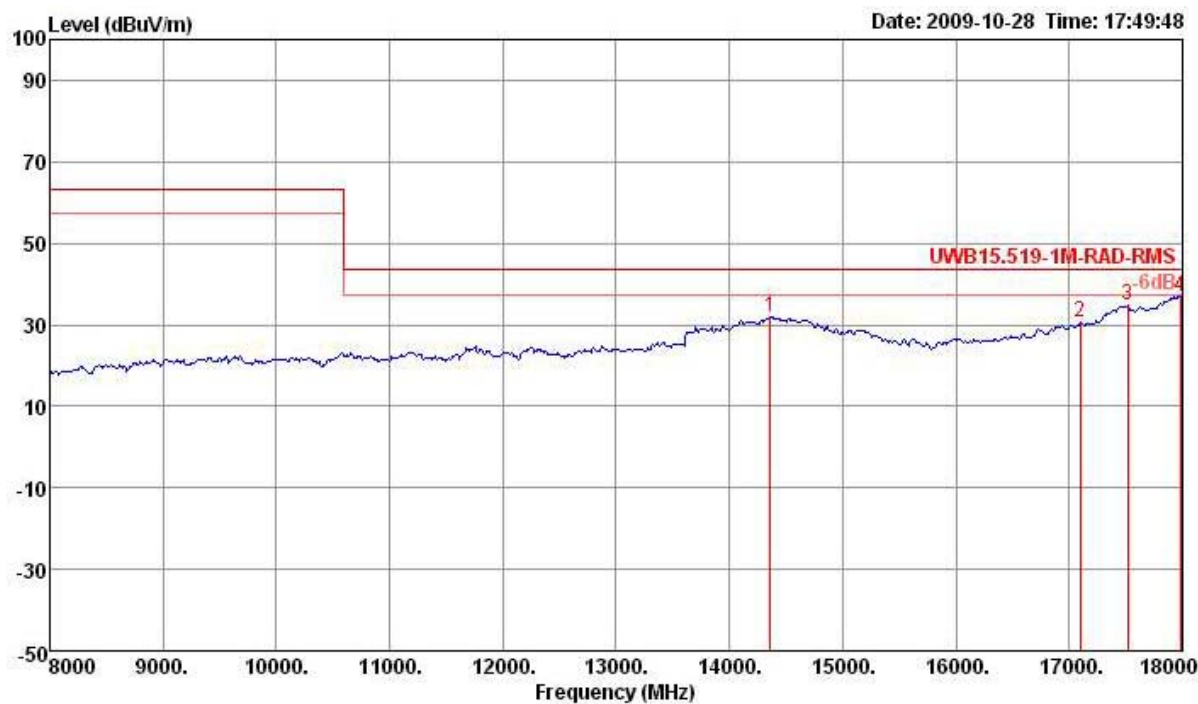
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 !	6411.90	60.26	63.44	-3.18	56.51	4.71	34.32	35.28	212	100	Peak	VERTICAL
2 !	7007.00	61.29	63.44	-2.15	56.26	5.13	35.30	35.40	39	103	Peak	VERTICAL
3 p	7612.00	61.72	63.44	-1.72	55.53	5.22	36.39	35.42	190	100	Peak	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.

The distance: 1m

Horizontal

UWB Radiated Emissions 8 GHz to 18 GHz



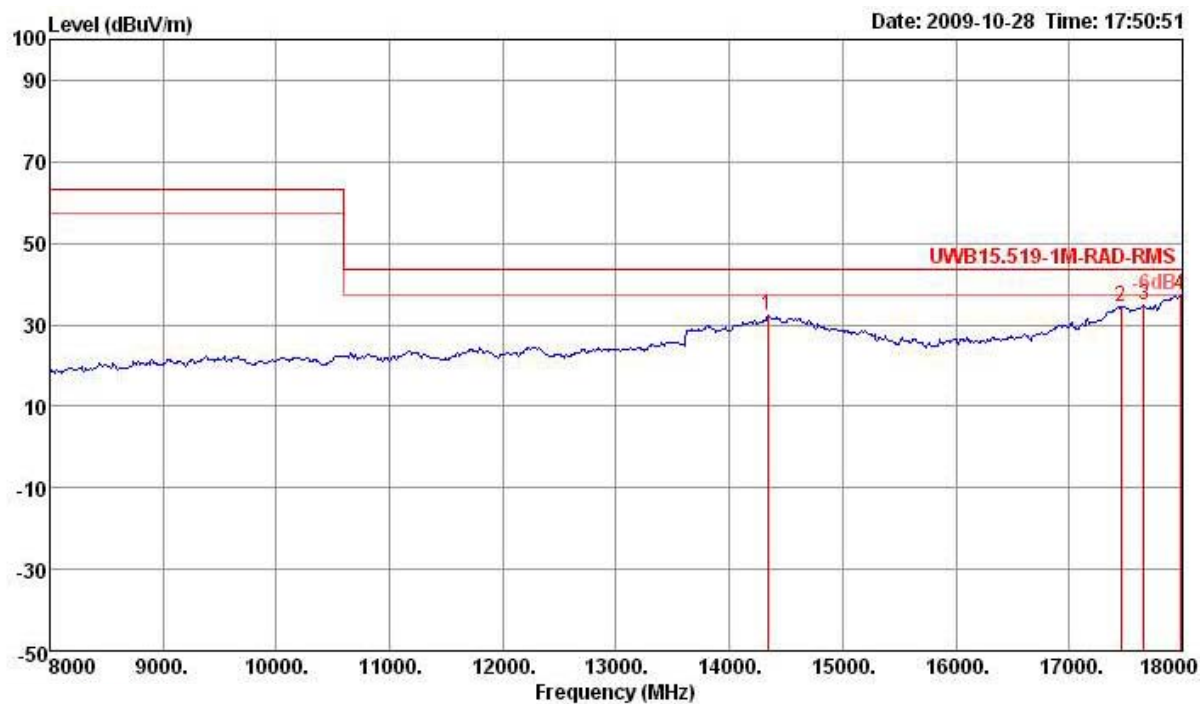
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	14360.00	31.78	43.44	-11.66	16.36	7.46	42.05	34.09	-1	99 Peak	HORIZONTAL
2	00.00	30.81	43.44	-12.63	15.53	8.52	41.36	34.60	-1	99 Peak	HORIZONTAL
3	20.00	34.61	43.44	-8.83	16.04	9.77	43.71	34.91	-1	99 Peak	HORIZONTAL
4	80.00	36.94	43.44	-6.50	16.71	8.51	46.69	34.97	-1	99 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 8 GHz to 18 GHz



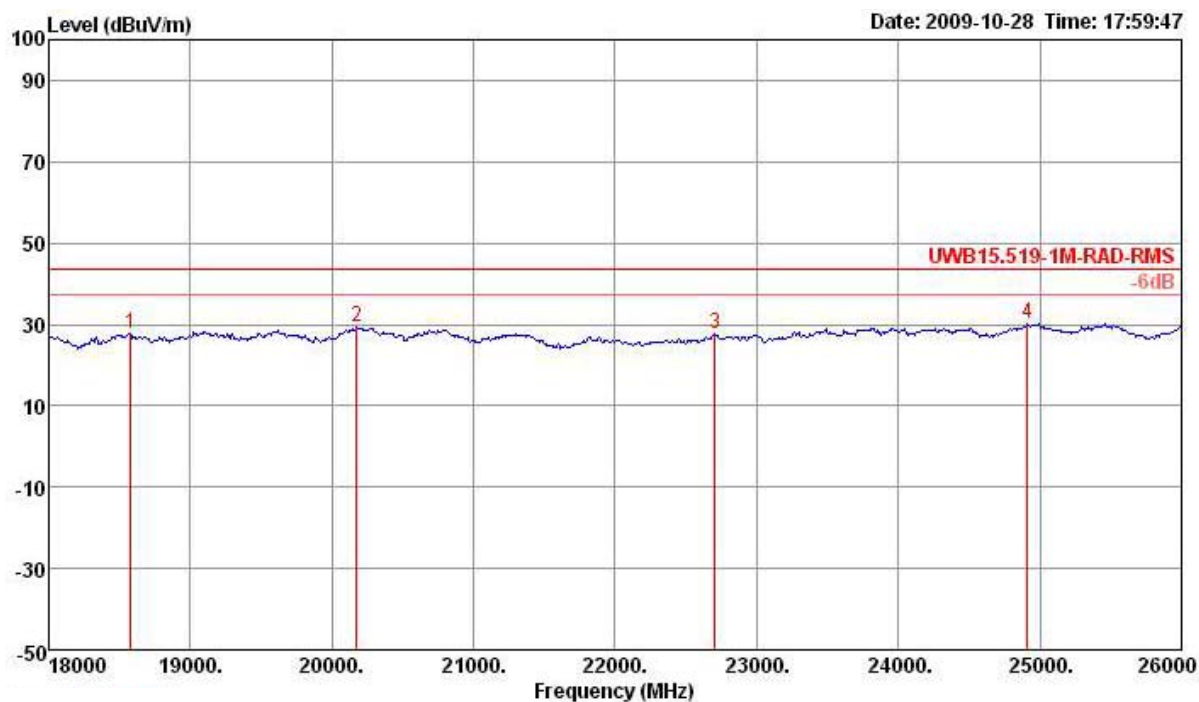
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	14340.00	32.23	43.44	-11.21	16.83	7.45	42.02	34.07	360	100 Peak	VERTICAL
2	17460.00	34.43	43.44	-9.01	16.31	9.68	43.32	34.88	360	100 Peak	VERTICAL
3	17660.00	34.99	43.44	-8.45	15.90	9.43	44.59	34.93	360	100 Peak	VERTICAL
4 p	17980.00	37.26	43.44	-6.18	17.03	8.51	46.69	34.97	360	100 Peak	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.

The distance: 1m

Horizontal

UWB Radiated Emissions 18 GHz to 26 GHz



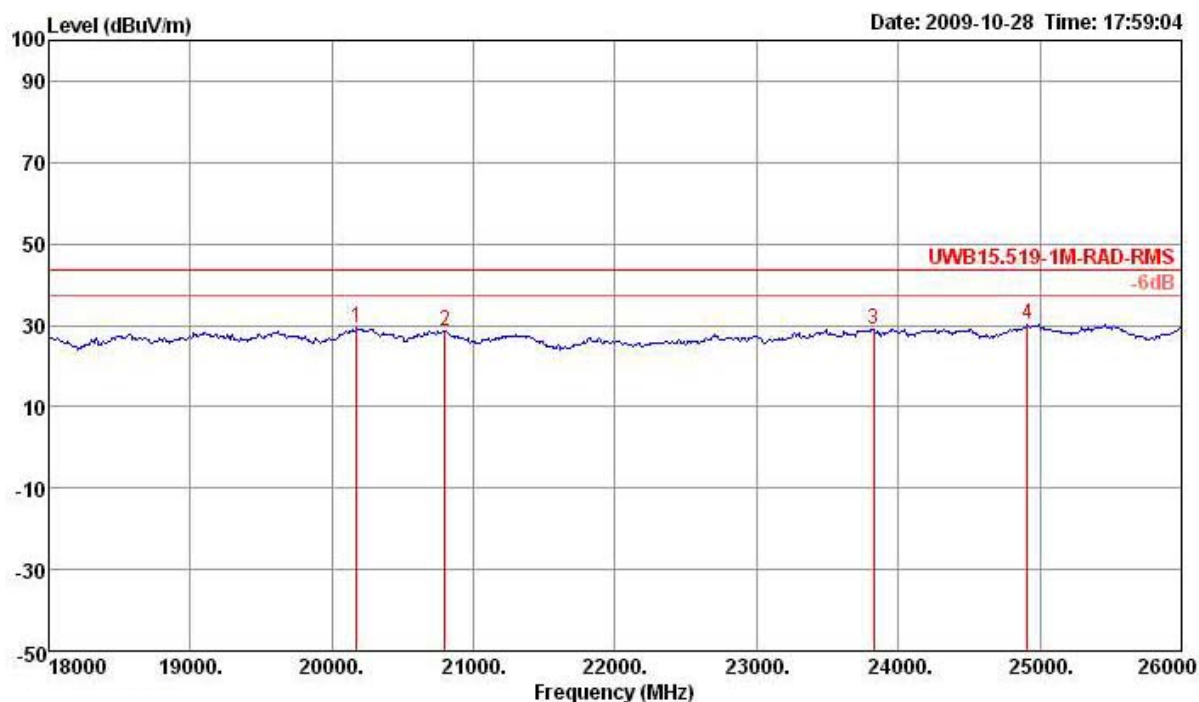
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	18576.00	27.79	43.44	-15.65	16.85	7.47	37.96	34.49	360	100 Peak	HORIZONTAL
2	20176.00	29.31	43.44	-14.13	19.21	7.72	37.98	35.60	360	100 Peak	HORIZONTAL
3	22704.00	27.60	43.44	-15.84	18.70	5.34	39.18	35.62	360	100 Peak	HORIZONTAL
4	24912.00	30.36	43.44	-13.08	20.82	6.33	39.33	36.12	360	100 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 18 GHz to 26 GHz



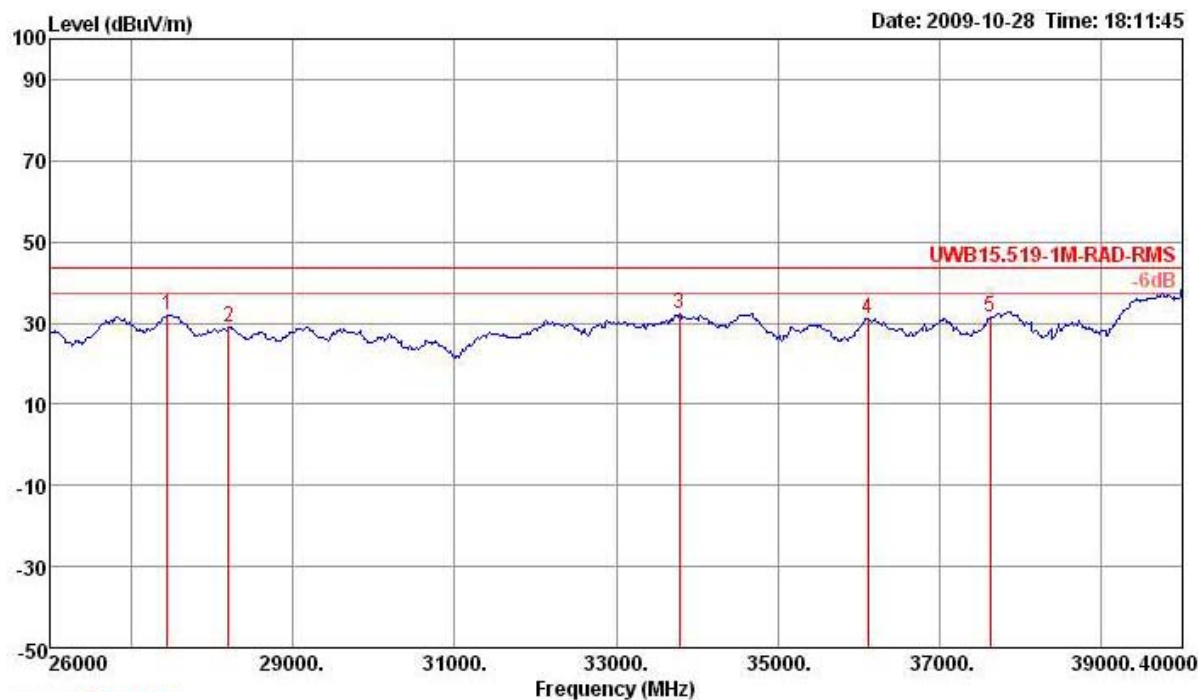
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	20176.00	29.31	43.44	-14.13	19.21	7.72	37.98	35.60	0	100 Peak	VERTICAL
2	20800.00	28.54	43.44	-14.90	18.71	7.43	37.92	35.52	0	100 Peak	VERTICAL
3	23824.00	29.16	43.44	-14.28	19.02	5.97	39.60	35.43	0	100 Peak	VERTICAL
4 p	24912.00	30.36	43.44	-13.08	20.82	6.33	39.33	36.12	0	100 Peak	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.

The distance: 1m

Horizontal

UWB Radiated Emissions 26 GHz to 40 GHz



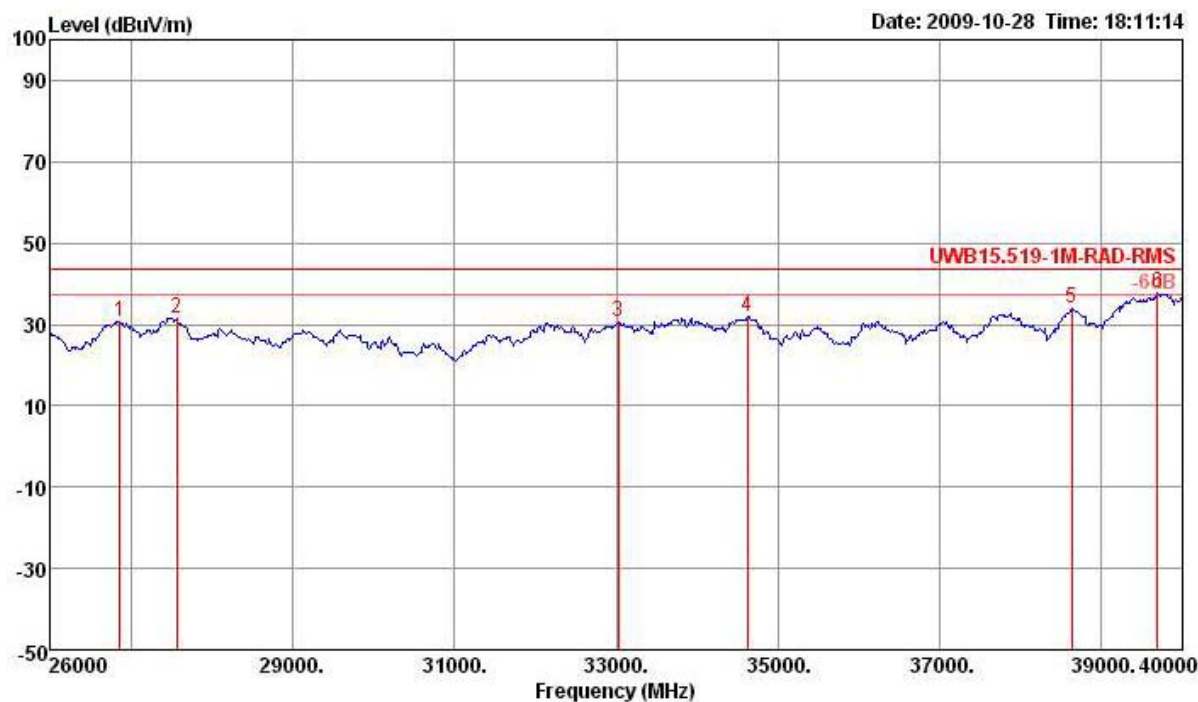
	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	27456.00	32.02	43.44	-11.42	17.68	6.35	39.57	31.58	360	100 Peak	HORIZONTAL
2	28212.00	29.16	43.44	-14.28	16.85	5.60	39.65	32.94	360	100 Peak	HORIZONTAL
3	33784.00	32.49	43.44	-10.95	19.65	5.88	41.47	34.51	360	100 Peak	HORIZONTAL
4	36108.00	31.21	43.44	-12.23	21.72	6.70	42.28	39.49	360	100 Peak	HORIZONTAL
5	37620.00	31.40	43.44	-12.04	19.88	8.54	43.50	40.52	360	100 Peak	HORIZONTAL
6 p	40000.00	39.48	43.44	-3.96	12.50	10.44	43.20	26.66	360	100 Peak	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.

The distance: 1m

Vertical

UWB Radiated Emissions 26 GHz to 40 GHz



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	26868.00	30.73	43.44	-12.71	16.45	5.59	39.54	30.85	360	100 Peak	VERTICAL
2	27568.00	31.57	43.44	-11.87	17.52	6.28	39.58	31.81	360	100 Peak	VERTICAL
3	33028.00	30.44	43.44	-13.00	17.69	4.78	41.35	33.38	360	100 Peak	VERTICAL
4	34624.00	32.09	43.44	-11.35	20.47	5.75	41.75	35.88	360	100 Peak	VERTICAL
5	38628.00	33.94	43.44	-9.50	17.79	10.14	43.61	37.60	360	100 Peak	VERTICAL
6 p	39692.00	37.68	43.44	-5.76	13.53	10.13	43.29	29.27	360	100 Peak	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.

4.5. Radiated Emissions in GPS Bands Measurement

4.5.1. Limit

In addition to the radiated emission limits specified in the table in paragraph 4.5.1 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)	E- Field (dB μ V/m) at 3m	E- Field (dB μ V/m) at 1m	E- Field (dB μ V/m) at 0.5m
1164-1240	-85.3	9.9	19.44	25.46
1559-1610	-85.3	9.9	19.44	25.46

Note 1: This may be converted to a peak field strength level at 3 meters using $E(\text{dB}\mu\text{V/m}) = P(\text{dBm EIRP}) + 95.2 \text{ dB}$.

Note 2: Above 960MHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m. Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB); Limit line = specific limits (dB μ V) + distance extrapolation factor [9.54 dB]. from 3m to 0.5m. Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [0.5m]})$ (dB); Limit line = specific limits (dB μ V) + distance extrapolation factor [15.56 dB].

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	0 dB
RB / VB	10 kHz / 10kHz for RMS for Average, 1 msec averaging time were used for these measurement frequencies

4.5.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1 meters 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 one meter and four 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 scan (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.

4.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.4.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

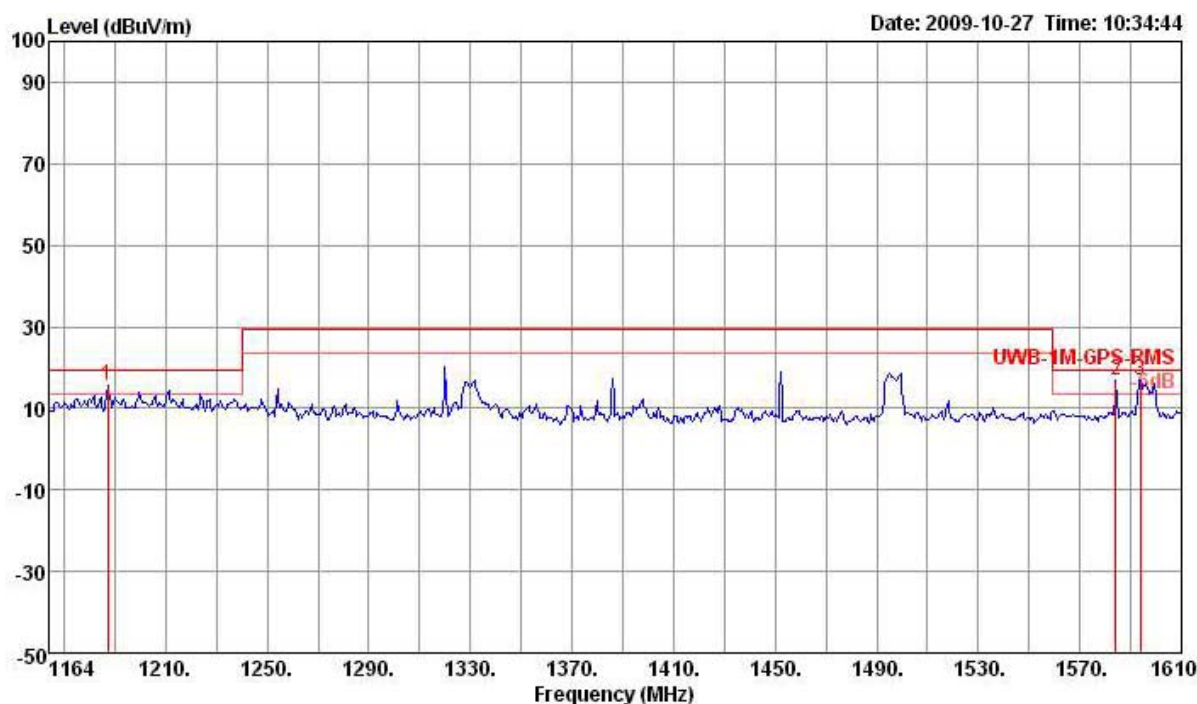
The EUT was programmed to be in continuously transmitting mode.

4.5.7. Results for Radiated Emissions in GPS Bands

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 1

The distance: 1m

Horizontal

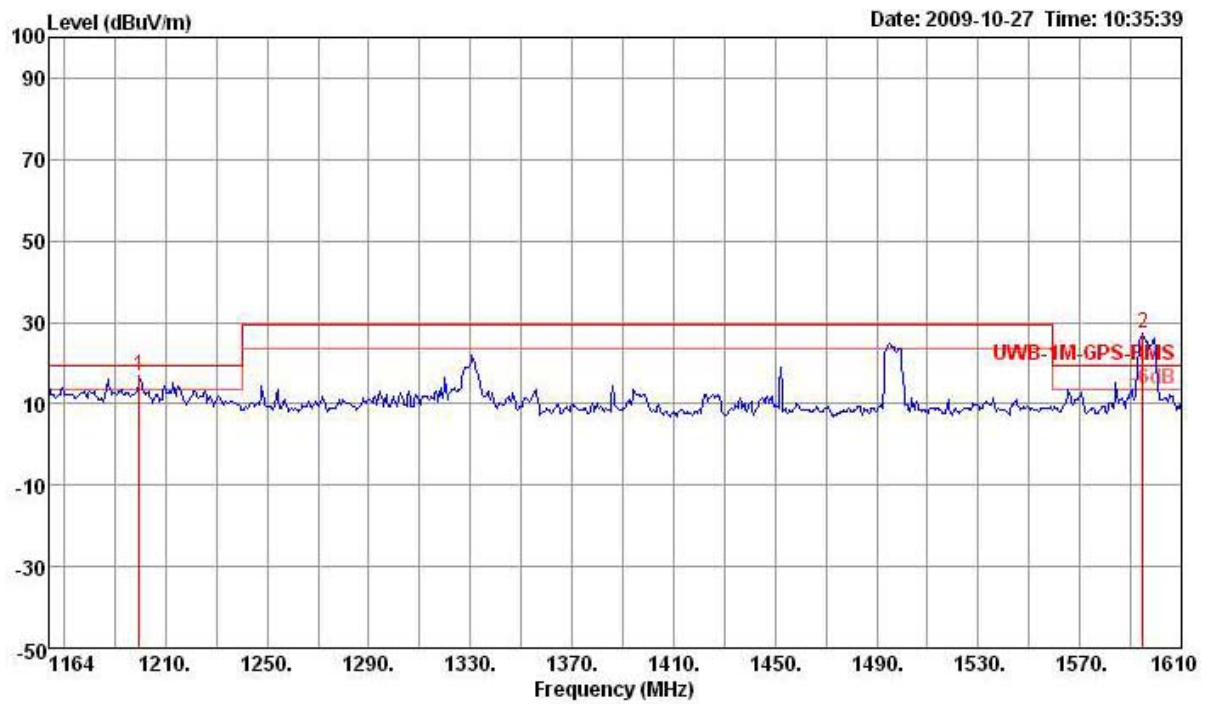


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1 !	1187.19	15.65	19.44	-3.79	25.20	1.85	24.68	36.08	360	100 Peak	HORIZONTAL
2 !	1584.13	16.78	19.44	-2.66	24.34	2.18	25.70	35.44	360	100 Peak	HORIZONTAL
3 ~	1593.94	17.05	19.44	-2.39	24.59	2.20	25.70	35.44	360	100 Peak	HORIZONTAL

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.

The distance: 1m

Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	1199.68	16.97	19.44	-2.47	26.49	1.85	24.71	36.08	0	100	Peak	VERTICAL
2	1594.84	27.37	19.44	7.93	34.91	2.20	25.70	35.44	0	100	Peak	VERTICAL

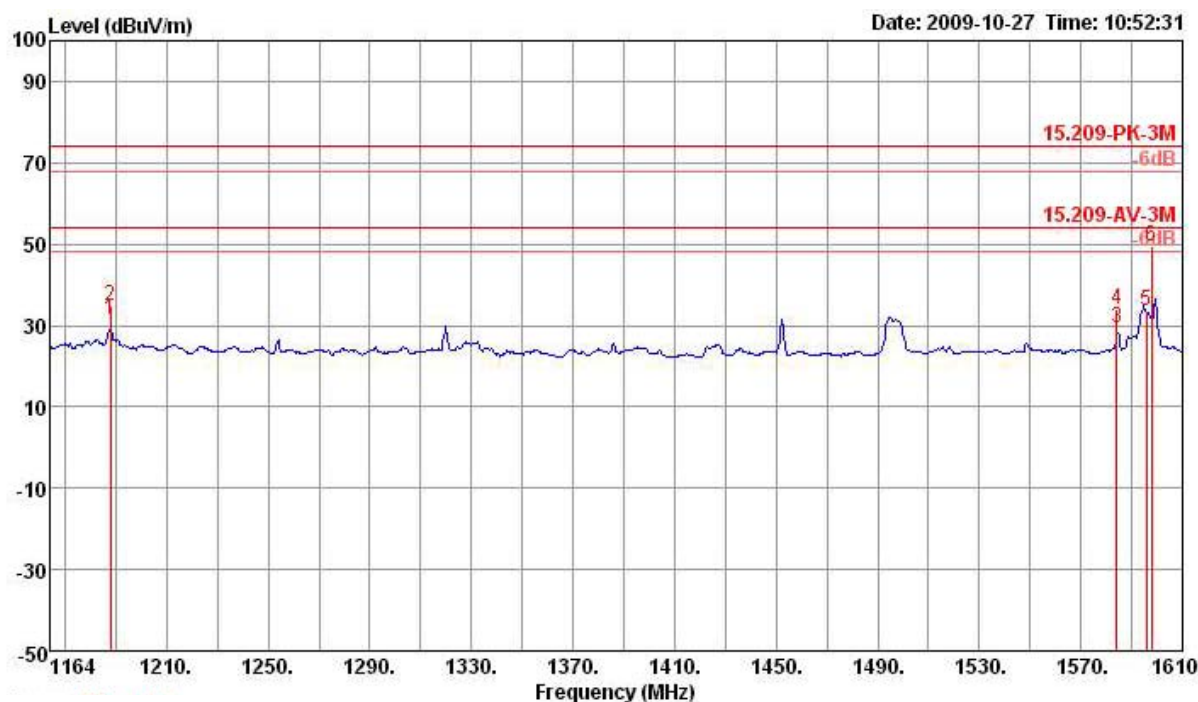
Note: Measurements made with 1 MHz RBW/3MHz VBW (RMS detector) at 1m distance. 1 msec averaging time were used for these frequencies per bin point measurements. Emissions (Mark 3) from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in 47 CFR, Part 15,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

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

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 1

The distance: 1m

Horizontal

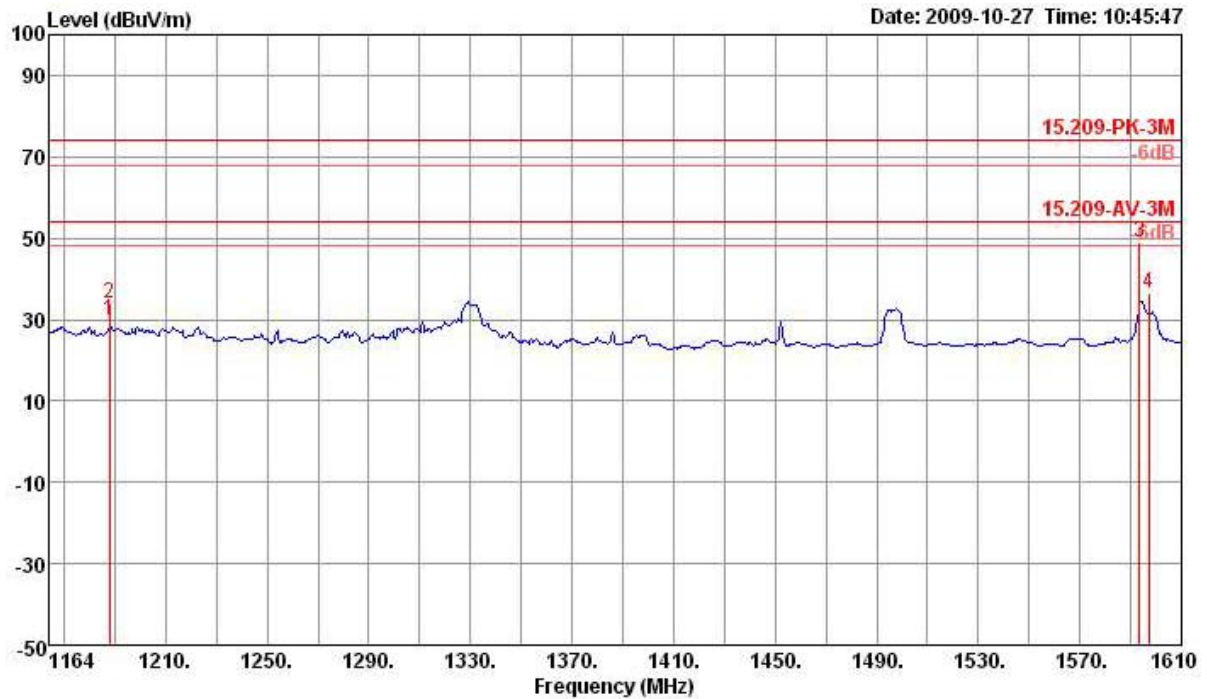


	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	1187.98	31.46	54.00	-22.54	41.01	1.85	24.68	36.08	334	142	Average	HORIZONTAL
2	1188.00	34.66	74.00	-39.34	44.21	1.85	24.68	36.08	334	142	Peak	HORIZONTAL
3	1584.00	29.48	54.00	-24.52	37.04	2.18	25.70	35.44	2	100	Average	HORIZONTAL
4	1584.00	34.03	74.00	-39.97	41.59	2.18	25.70	35.44	2	100	Peak	HORIZONTAL
5 a	1595.84	33.41	54.00	-20.59	40.95	2.20	25.70	35.44	288	100	Average	HORIZONTAL
6 p	1597.96	49.47	74.00	-24.53	57.01	2.20	25.70	35.44	288	100	Peak	HORIZONTAL

Note: 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.

The distance: 1m

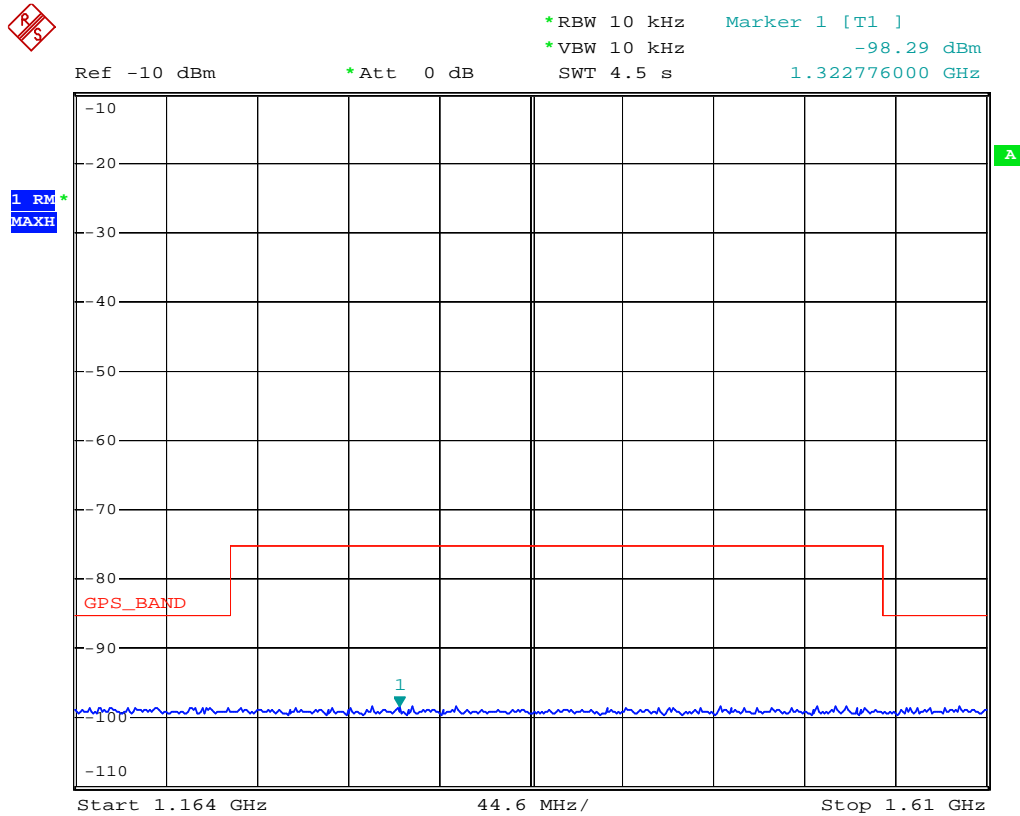
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	1187.98	29.97	54.00	-24.03	39.52	1.85	24.68	36.08	125	107 Average	VERTICAL
2	1188.00	34.05	74.00	-39.95	43.60	1.85	24.68	36.08	125	107 Peak	VERTICAL
3 p	1593.40	49.18	74.00	-24.82	56.72	2.20	25.70	35.44	279	100 Peak	VERTICAL
4 a	1597.24	36.45	54.00	-17.55	43.99	2.20	25.70	35.44	279	100 Average	VERTICAL

Note: 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.

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 1



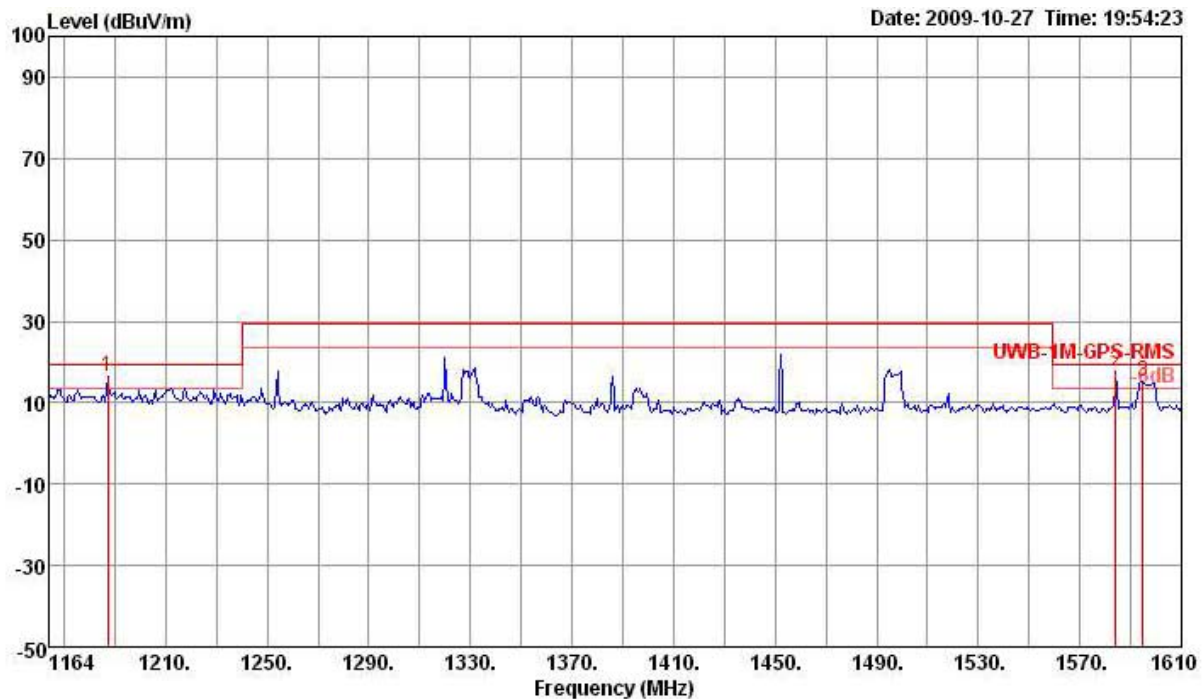
Date: 30.OCT.2009 18:38:40

Conducted antenna port measurements made with 10 kHz RBW/ 1kHz VBW at 1m distance, 1 msec averaging time were used for these frequencies per bin point measurements.

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 3

The distance: 1m

Horizontal

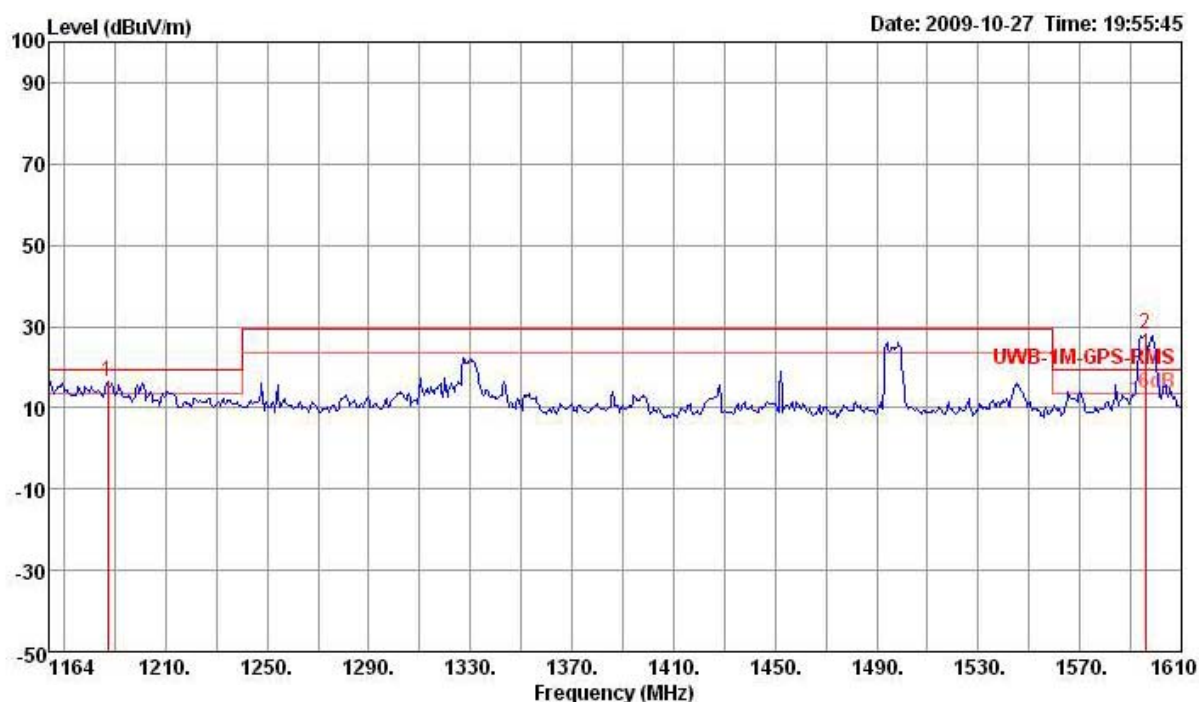


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1 !	1187.19	16.29	19.44	-3.15	25.84	1.85	24.68	36.08	0	100 Peak	HORIZONTAL
2 p	1584.13	17.65	19.44	-1.79	25.21	2.18	25.70	35.44	0	100 Peak	HORIZONTAL
3 !	1594.84	15.33	19.44	-4.11	22.87	2.20	25.70	35.44	0	100 Peak	HORIZONTAL

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.

The distance: 1m

Vertical



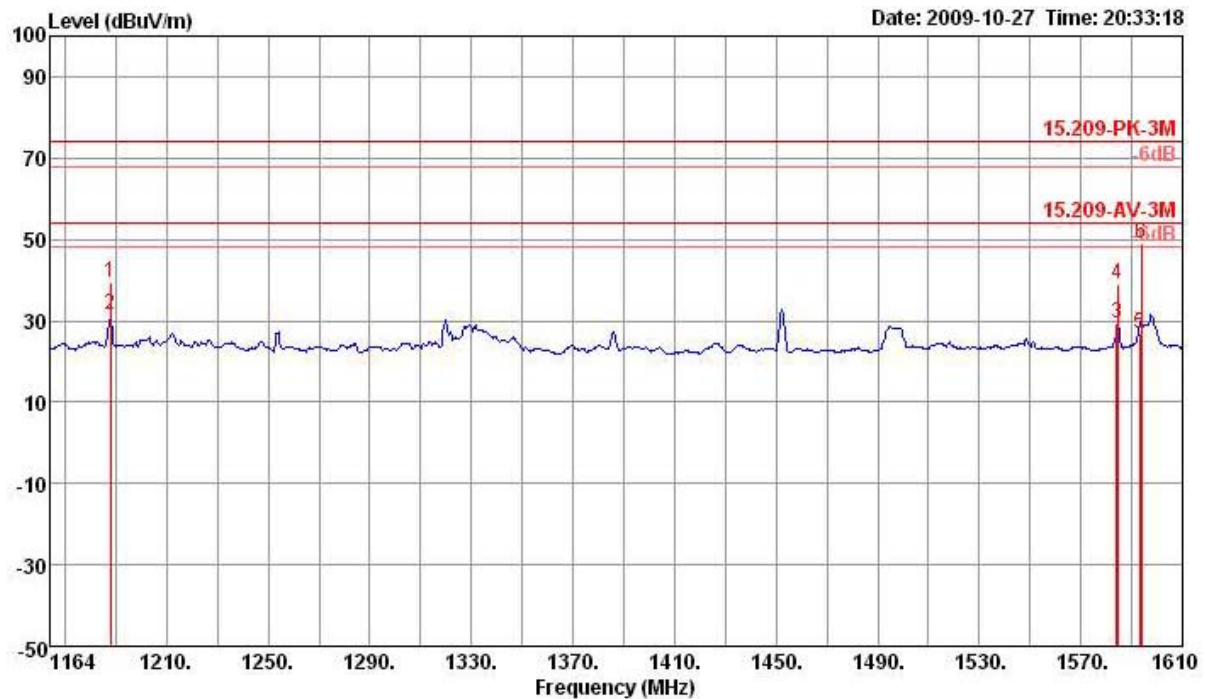
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 !	1187.19	16.58	19.44	-2.86	26.13	1.85	24.68	36.08	0	100	Peak	VERTICAL
2 p	1595.73	28.06	19.44	8.62	35.60	2.20	25.70	35.44	0	100	Peak	VERTICAL

Note: Measurements made with 10 kHz RBW/ 10 kHz VBW (RMS detector) at 1m 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.

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 3

The distance: 3m

Horizontal

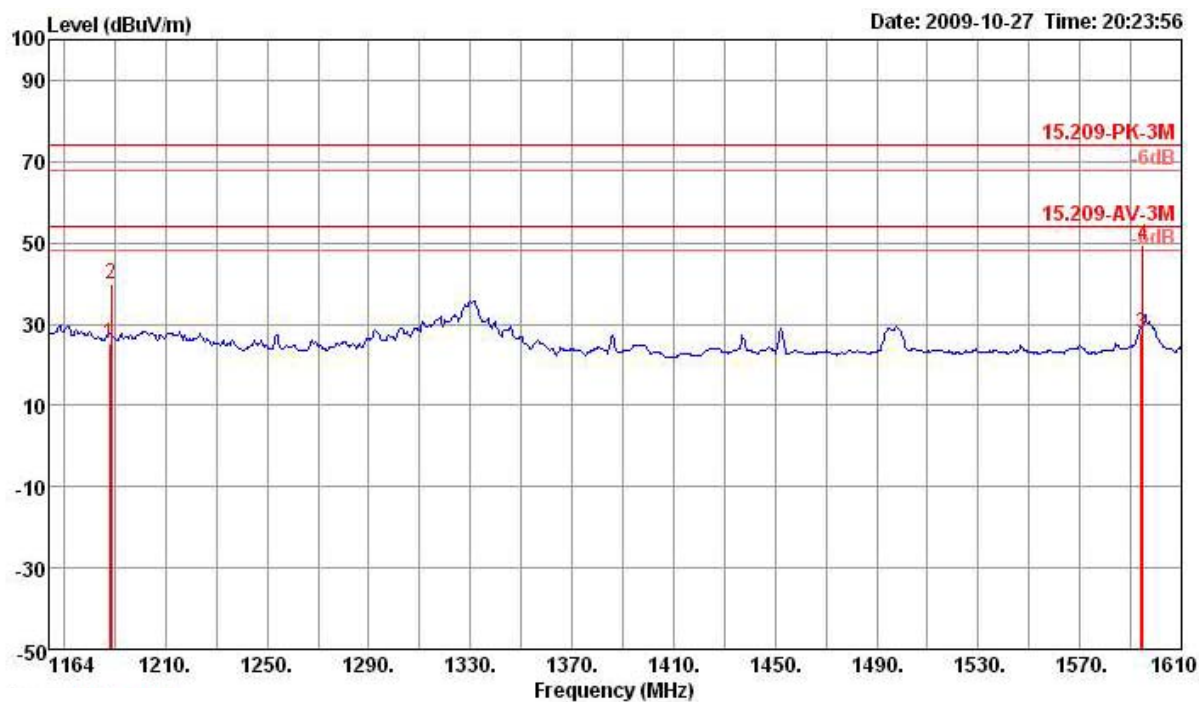


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	1187.98	39.41	74.00	-34.59	48.96	1.85	24.68	36.08	343	140 Peak	HORIZONTAL
2 a	1188.02	31.31	54.00	-22.69	40.86	1.85	24.68	36.08	343	140 Average	HORIZONTAL
3	1584.02	29.39	54.00	-24.61	36.95	2.18	25.70	35.44	303	111 Average	HORIZONTAL
4	1584.31	39.11	74.00	-34.89	46.67	2.18	25.70	35.44	303	111 Peak	HORIZONTAL
5	1593.10	27.08	54.00	-26.92	34.62	2.20	25.70	35.44	111	100 Average	HORIZONTAL
6 p	1593.71	48.91	74.00	-25.09	56.45	2.20	25.70	35.44	111	100 Peak	HORIZONTAL

Note: 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.

The distance: 3m

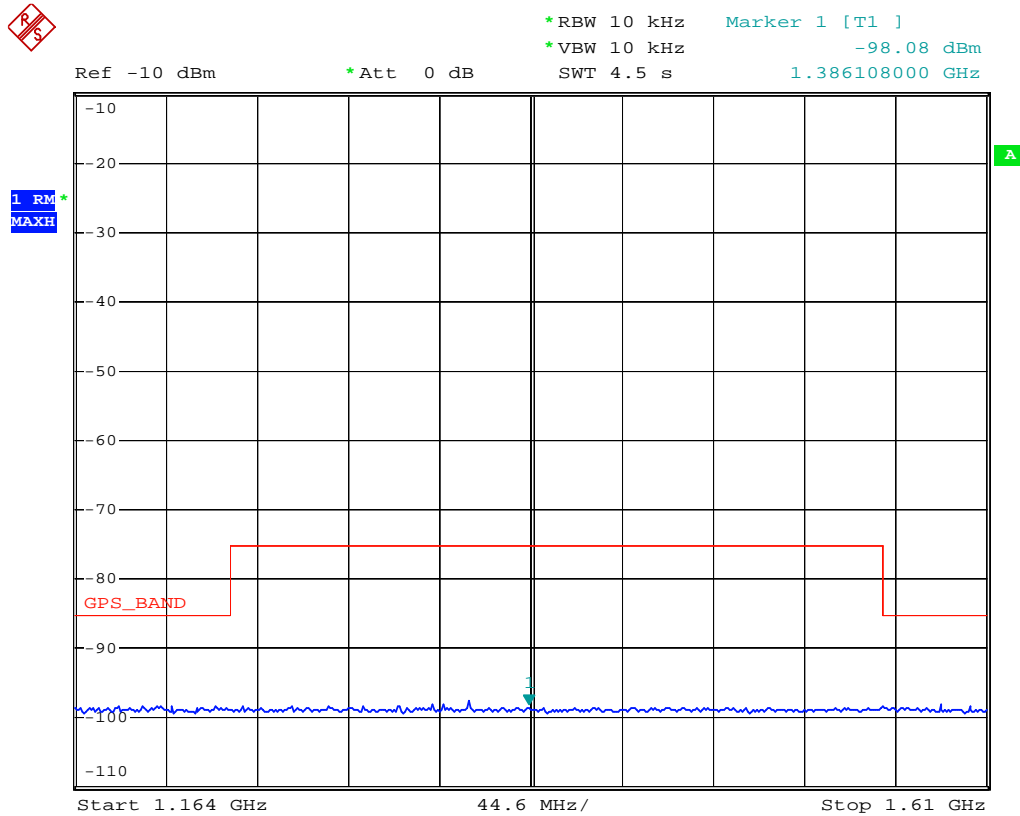
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preampl	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	1187.99	25.04	54.00	-28.96	34.59	1.85	24.68	36.08	216	100 Average	VERTICAL
2	1188.53	39.73	74.00	-34.27	49.28	1.85	24.68	36.08	216	100 Peak	VERTICAL
3 a	1594.12	27.72	54.00	-26.28	35.26	2.20	25.70	35.44	262	100 Average	VERTICAL
4 p	1594.92	49.54	74.00	-24.46	57.08	2.20	25.70	35.44	262	100 Peak	VERTICAL

Note: 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.

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	ALL BAND / Band group 3



Date: 30.OCT.2009 18:38:09

Conducted antenna port measurements made with 10 kHz RBW/ 1kHz VBW at 1m distance, 1 msec averaging time were used for these frequencies per bin point measurements.

4.6. Peak Emissions within a 10 MHz Bandwidth Measurement

4.6.1. Limit

There is a limit on the peak level of the emissions contained within a 10 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. 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 $20\log(\text{RBW}/50)$ 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 $E(\text{dB}\mu\text{V}/\text{m}) = P(\text{dBm EIRP}) + 95.2 \text{ dB}$. And Peak emission shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m. Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB); Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB]

Peak EIRP limit dBm (RB / VB : 50MHz)	Peak EIRP limit dBm (RB / VB: 10MHz)	E- Field (dB μ V/m) at 3m (RB / VB: 10MHz)	E- Field (dB μ V/m) at 1m (RB / VB: 10MHz)
0	-13.97	81.23	90.77

4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Sweep Time	Auto
RB / VB	10MHz / 10MHz for Peak

4.6.3. Test Procedures

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1 meters far away from the turntable.
2. The horn receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
3. For maximum peak emission amplitude, the antenna tower was scan (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, fM.
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, fM. The video bandwidth was 10 MHz.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.3.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

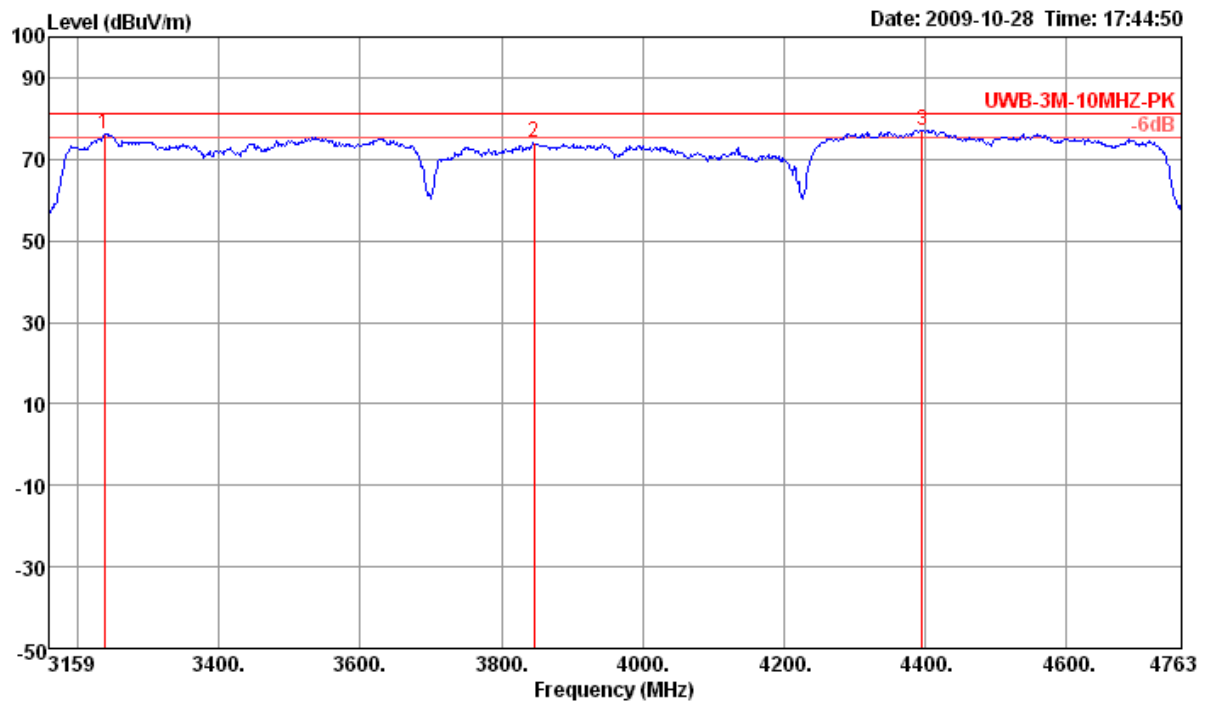
4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Peak Emissions within a 10 MHz Bandwidth

Temperature	25.8°C	Humidity	56%
Test Engineer	Alan Huang	Configurations	Band group 1

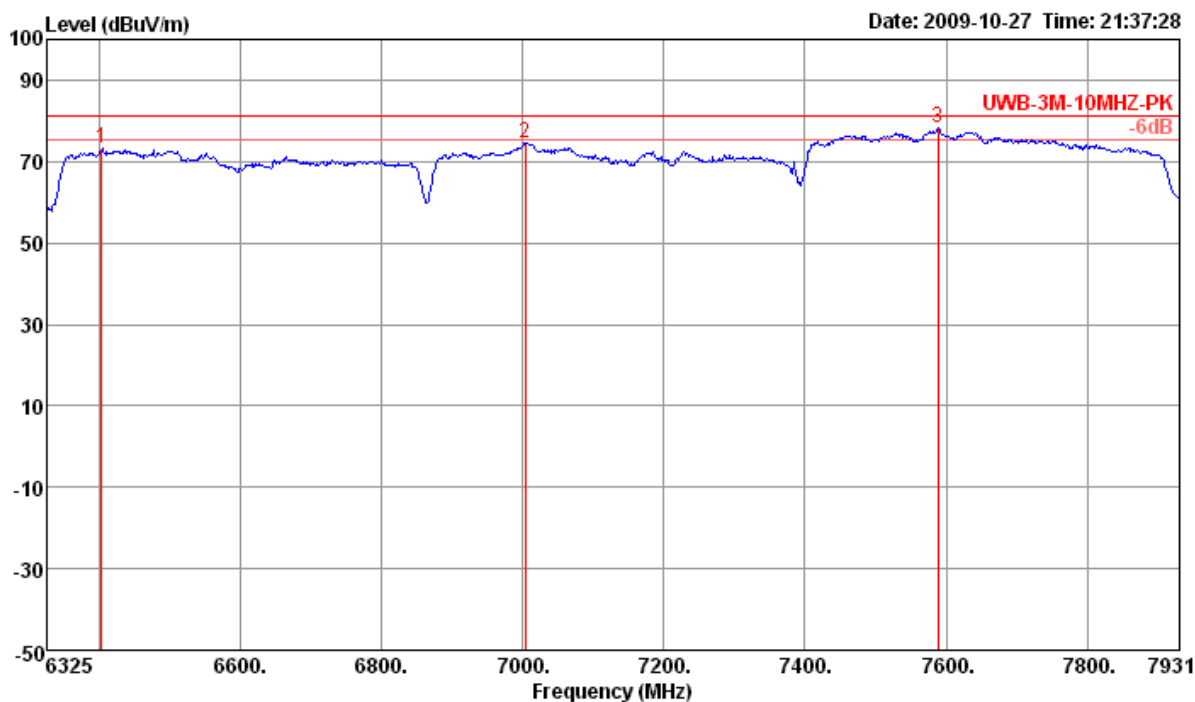
Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 !	3238.20	76.19	81.23	-5.04	78.34	3.20	30.00	35.35	342	100	Peak	VERTICAL
2	3845.60	73.96	81.23	-7.27	73.87	3.54	31.72	35.17	205	100	Peak	VERTICAL
3 p	4395.60	77.10	81.23	-4.13	75.91	3.87	32.42	35.10	265	101	Peak	VERTICAL

Temperature	23°C	Humidity	51%
Test Engineer	Alan Huang	Configurations	Band group 3

Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	6403.10	73.16	81.23	-8.07	69.41	4.71	34.32	35.28	164	120	Peak	VERTICAL
2	7003.70	74.54	81.23	-6.69	69.51	5.13	35.30	35.40	189	107	Peak	VERTICAL
3 p	7588.90	78.09	81.23	-3.14	71.91	5.22	36.38	35.42	361	105	Peak	VERTICAL

4.7. Labeling and Instruction Manual Requirements

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.

4.8. Antenna Requirements

4.8.1. 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.

4.8.2. Antenna Connector Construction

Please refer to section 3.1 in this test report, antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 15, 2009	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 23, 2009	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2009	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2009	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz – 30MHz	Jun. 11, 2009	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 07, 2009	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 23, 2009	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 21, 2009	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Apr. 06, 2009*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100023	9 kHz - 30 GHz	Feb. 02, 2009	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 12, 2009	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 28, 2009	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.16, 2009	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Jan. 05, 2009	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Jan. 05, 2009	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Nov. 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)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 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)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2008	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2008	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.

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

6. 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 2 nd 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

7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : LI190-070110

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, 2007 to January 09, 2010
Accredited Scope	: Testing Field, see described in the Appendix Accreditation Program for Designated Testing Laboratory for Commodities Inspection
Specific Accreditation Program	: Accreditation Program for Telecommunication Equipment Testing Laboratory



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

PI, total 9 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.