FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003 TEST REPORT

For

RFID UHF MODULE PCB ASSEMBLY

Model : RU-888-0

Data Applies To : RU-888-0XX
(X: 0~F for different marketing purpose only)

Trade Name : MTI

Issued for

MICROELECTRONICS TECHNOLOGY INC.

No.1,Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	08/11/2010	Initial Issue	All Page 56	Kate Shi

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1. TEST REPORT CERTIFICATION

Applicant	：	MICROELECTRONICS TECHNOLOGY INC.
Address	：	No.1,Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan, R.O.C.
Equipment Under Test	：	RFID UHF MODULE PCB ASSEMBLY
Model	：	RU-888-0
Data Applies To	：	RU-888-0XX (X: 0~F for different marketing purpose only)
Trade Name	：	MTI
Tested Date	：	July 26 ~ August 11, 2010

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Alex Chiu
Director

Reviewed by:

Gundam Lin
Team Leader

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	RFID UHF MODULE PCB ASSEMBLY
Model Number	RU-888-0
Data Applies To	RU-888-0XX (X: 0~F for different marketing purpose only)
Received Date	July 26, 2010
Frequency Range	902MHz to 928MHz
Transmit Power	24.16dBm (0.2606W)
Channel Spacing	500kHz
Channel Number	50 Channels
Type of Modulation	FHSS-ASK
Frequency Selection	by software / firmware
Antenna Type	Patch Antenna, Antenna Gain : 6dBic (3.85dBi)
Power Source	5.0VDC(From Notebook PC, Powered From Host Device)
I/O Port	Mini USB port × 1, RS232 port × 1

Remark :

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

2. For more details, please refer to the User's manual of the EUT.

3. This submittal(s) (test report) is intended for FCC ID: MAD-RU-888-0 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

4. The showed series model as the same except for different the marketing purpose.

5. Channel Number

Frequency Range 902.75 MHz ~ 927.25 MHz					
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
1	902.75	21	912.75	41	922.75
2	903.25	22	913.25	42	923.25
3	903.75	23	913.75	43	923.75
4	904.25	24	914.25	44	924.25
5	904.75	25	914.75	45	924.75
6	905.25	26	915.25	46	925.25
7	905.75	27	915.75	47	925.75
8	906.25	28	916.25	48	926.25
9	906.75	29	916.75	49	926.75
10	907.25	30	917.25	50	927.25
11	907.75	31	917.75		
12	908.25	32	918.25		
13	908.75	33	918.75		
14	909.25	34	919.25		
15	909.75	35	919.75		
16	910.25	36	920.25		
17	910.75	37	920.75		
18	911.25	38	921.25		
19	911.75	39	921.75		
20	912.25	40	922.25		

3. DESCRIPTION OF TEST MODES

The EUT(RU-888-0) had been tested under operating condition.

No.	Test Modes
1	RS232 mode (worst)
2	USB mode

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	902.75
Middle	914.75
High	927.25

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47, 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Open Area Test Site (OATS No.3) / Radiated Emission, 30 to 200 MHz	+/- 3.9267
Open Area Test Site (OATS No.3) / Radiated Emission, 200 to 1000 MHz	+/- 3.6899
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.6878
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 3.0885
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 26.5GHz	+/- 3.2000
Conducted Emission, 9kHz to 30MHz	+/- 1.7468

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	DELL	Latitude D610	CN-0XD762-48643 -637-1743	E2K24BNHM
2	Mouse	HP	M-UAE96	390938-001	---

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. All of the function are under run.
2. Start test.
3. Setup all computers like the setup diagram.
4. TX Mode:

   Select frequency :902.75MHz / 914.75MHz / 927.25MHz
5. All of the functions are under run.
6. Start test.

7. FCC PART 15.247 REQUIREMENTS

7.1 20dB BANDWIDTH FOR HOPPING

LIMITS

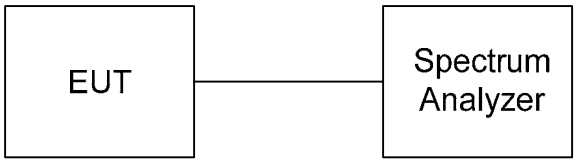
§15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

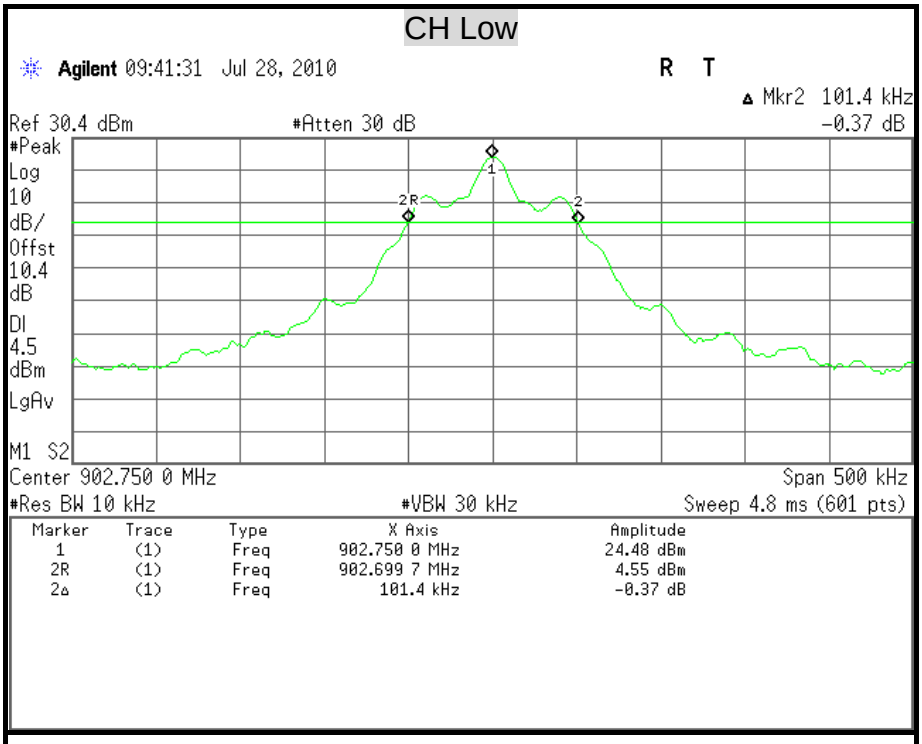
The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.

TEST RESULTS

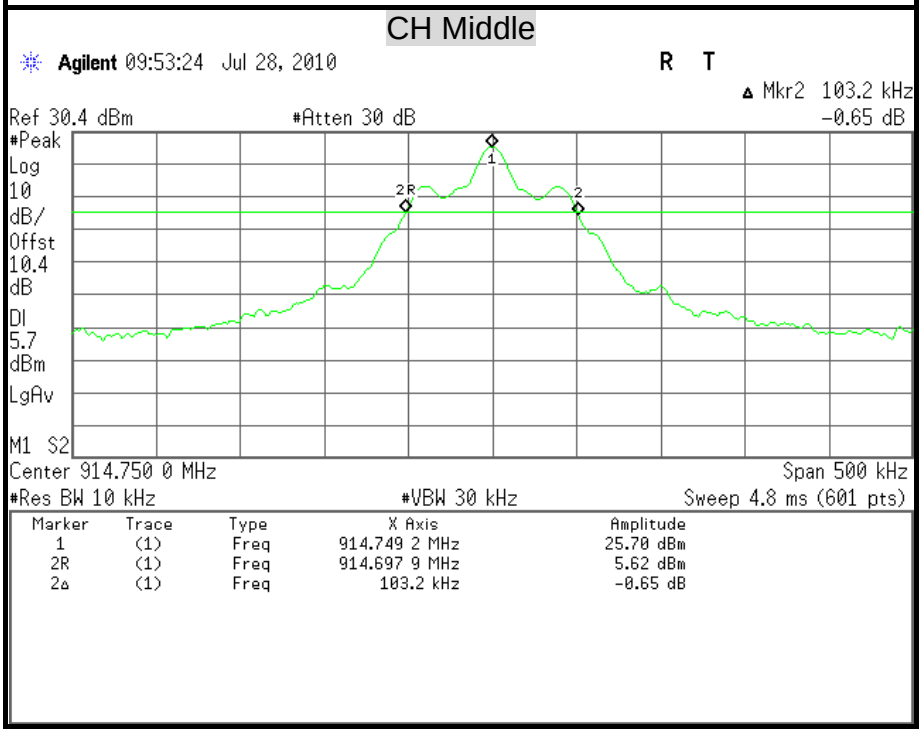
Channel	Channel Frequency (MHz)	20dB Bandwidth (KHz)	Limit (KHz)	Pass / Fail
Low	902.75	101.4	＜250	N/A
Middle	914.75	103.2	＜250	N/A
High	927.25	103.2	＜250	N/A

20dB BANDWIDTH

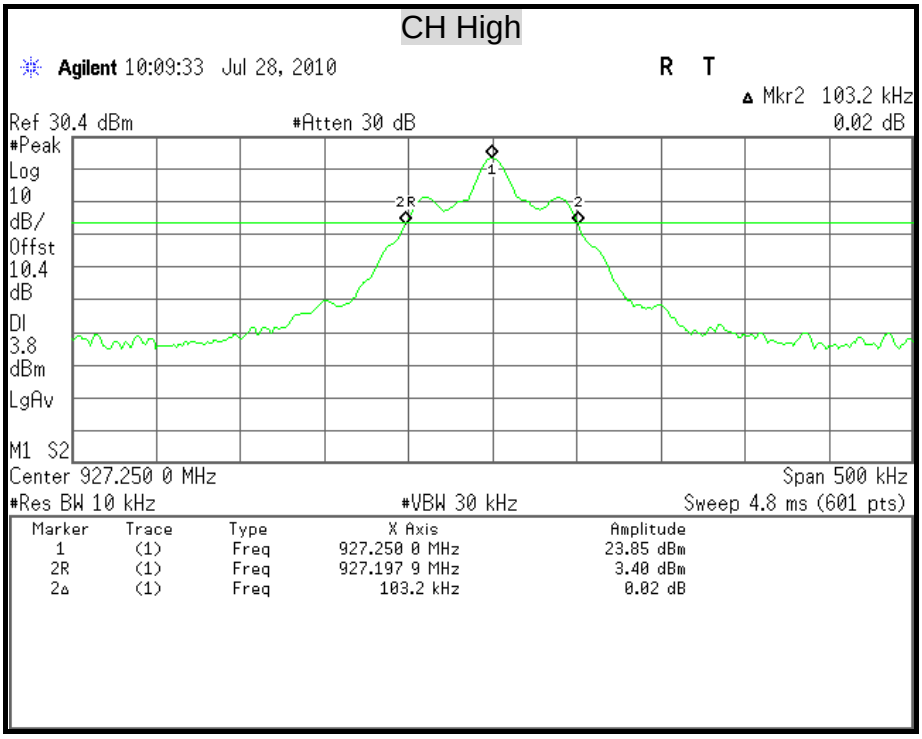
CH Low



CH Middle



CH High



7.2 MAXIMUM PEAK OUTPUT POWER

LIMITS

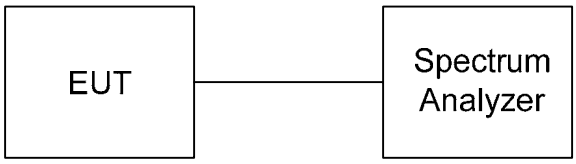
§15.247(b)(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The RF power output was measured with a spectrum analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, a spectrum analyzer was used to record the shape of the transmit signal.

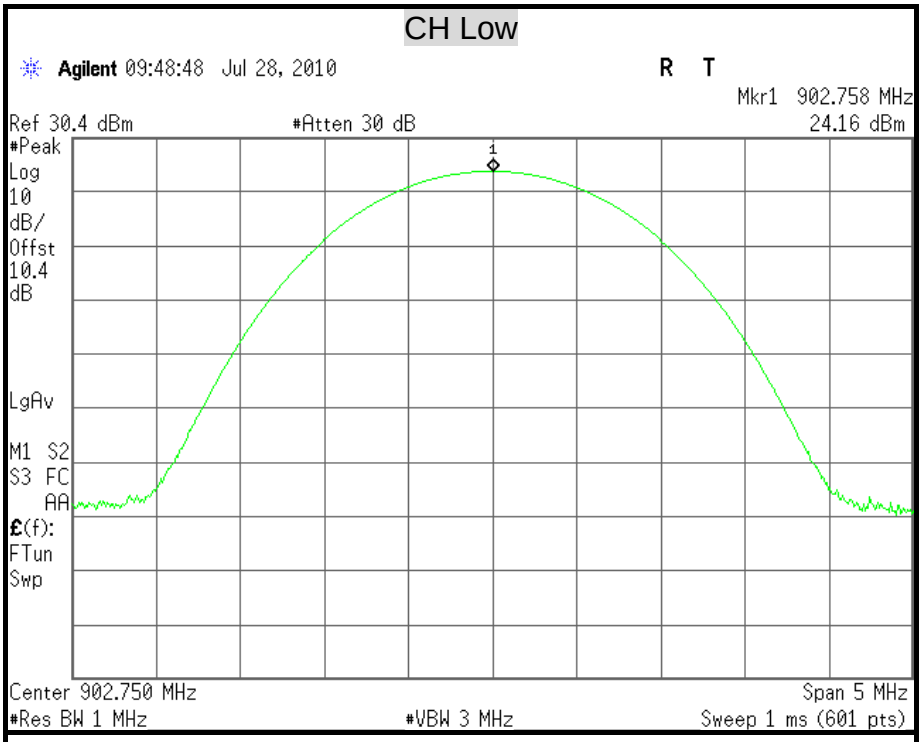
TEST RESULTS

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power (W)	Peak Power Limit		Pass / Fail
				(dBm)	(W)	
Low	902.75	24.16	0.2606	30	1	PASS
Middle	914.75	23.80	0.2399	30	1	PASS
High	927.25	23.99	0.2506	30	1	PASS

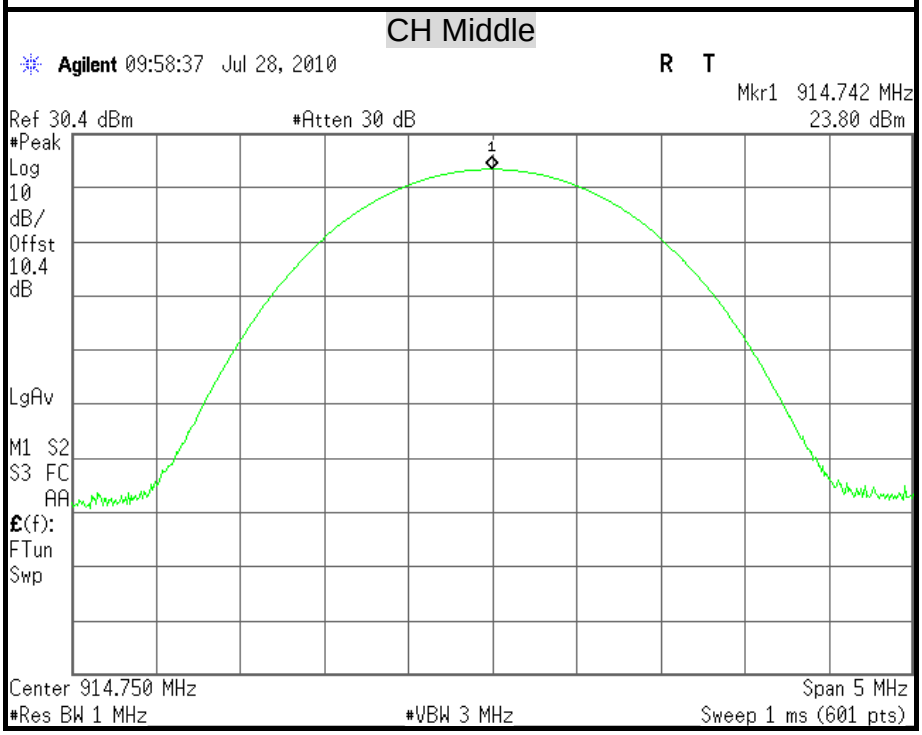
Remark: *The cable assembly insertion loss of 10.4 dB (including 10 dB pad and 0.4 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

MAXIMUM PEAK OUTPUT POWER

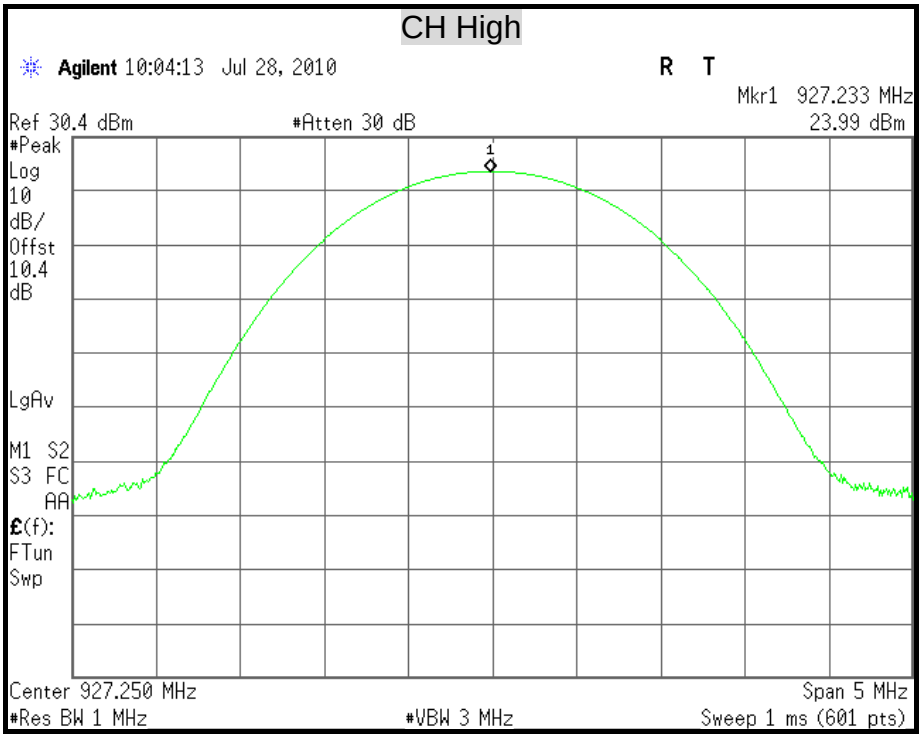
CH Low



CH Middle



CH High



7.3 HOPPING CHANNEL SEPARATION

LIMITS

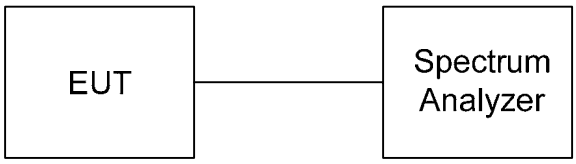
§15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier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

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

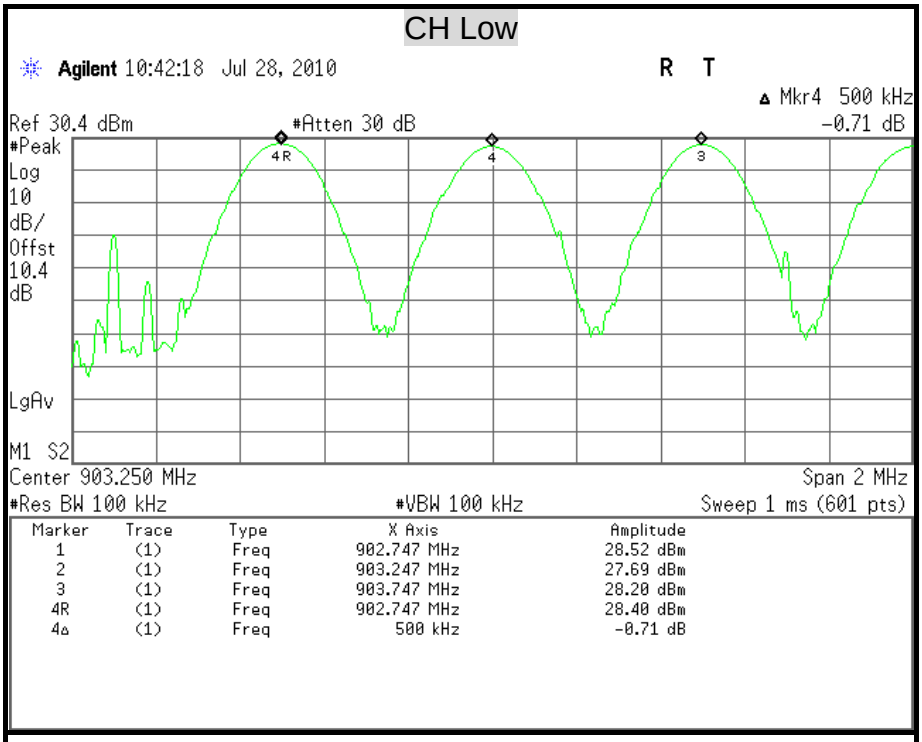
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

TEST RESULTS

Channel	Channel Frequency (MHz)	Adjacent Hopping Channel Separation (kHz)	20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
Low	902.75	500	101.4	25	PASS
Middle	914.75	500	103.2	25	PASS
High	927.25	500	103.2	25	PASS

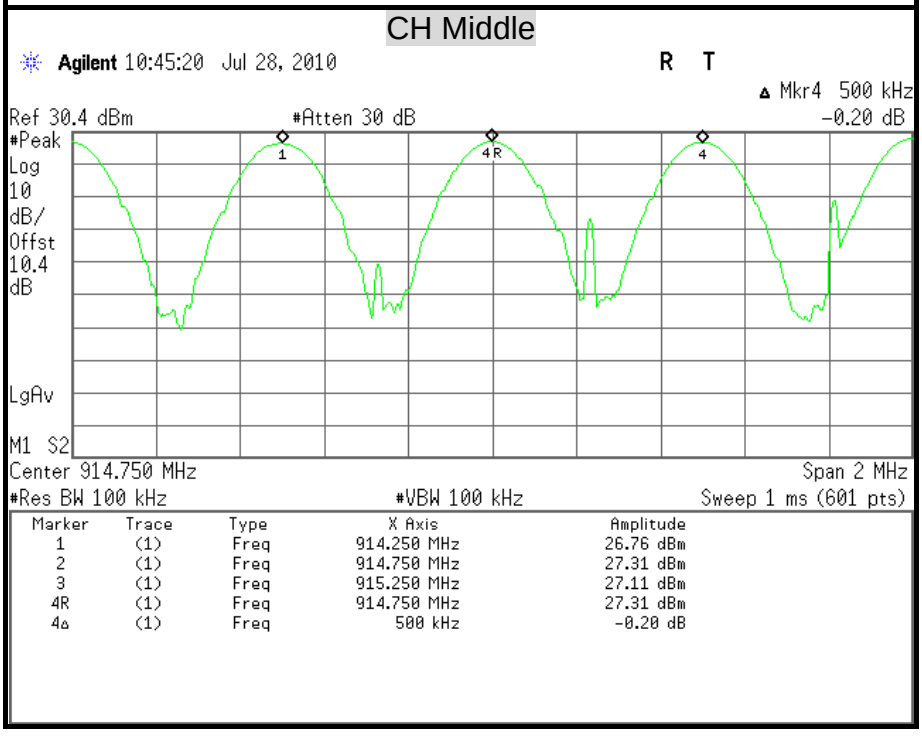
HOPPING CHANNEL SEPARATION

CH Low



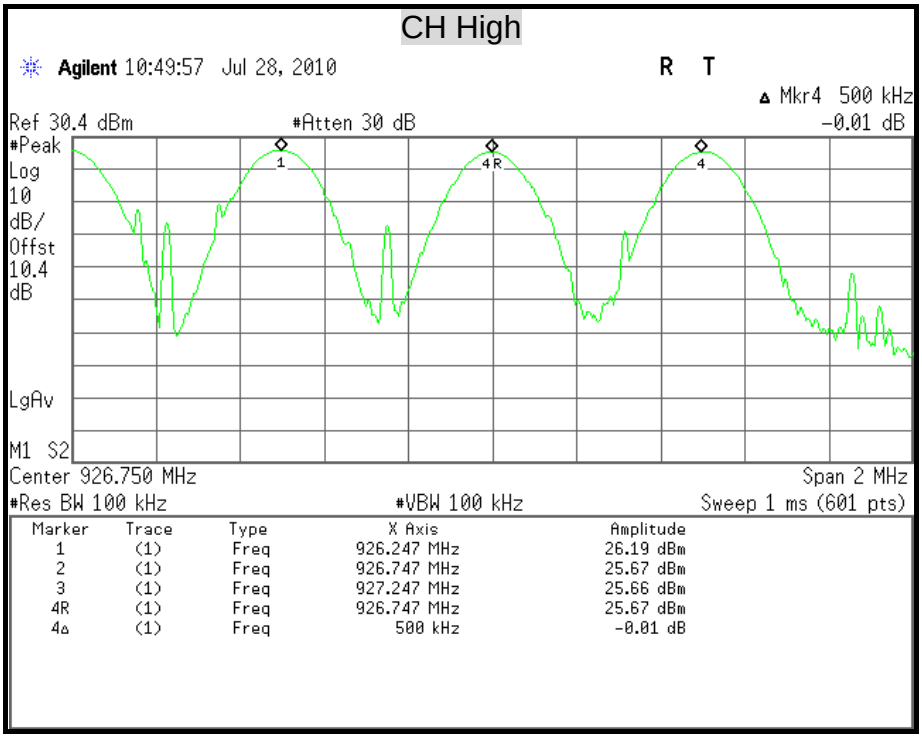
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	902.747 MHz	28.52 dBm
2	(1)	Freq	903.247 MHz	27.69 dBm
3	(1)	Freq	903.747 MHz	28.20 dBm
4R	(1)	Freq	902.747 MHz	28.40 dBm
4Δ	(1)	Freq	500 kHz	-0.71 dB

CH Middle



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	914.250 MHz	26.76 dBm
2	(1)	Freq	914.750 MHz	27.31 dBm
3	(1)	Freq	915.250 MHz	27.11 dBm
4R	(1)	Freq	914.750 MHz	27.31 dBm
4Δ	(1)	Freq	500 kHz	-0.20 dB

CH High



7.4 NUMBER OF HOPPING FREQUENCY USED

LIMITS

§15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

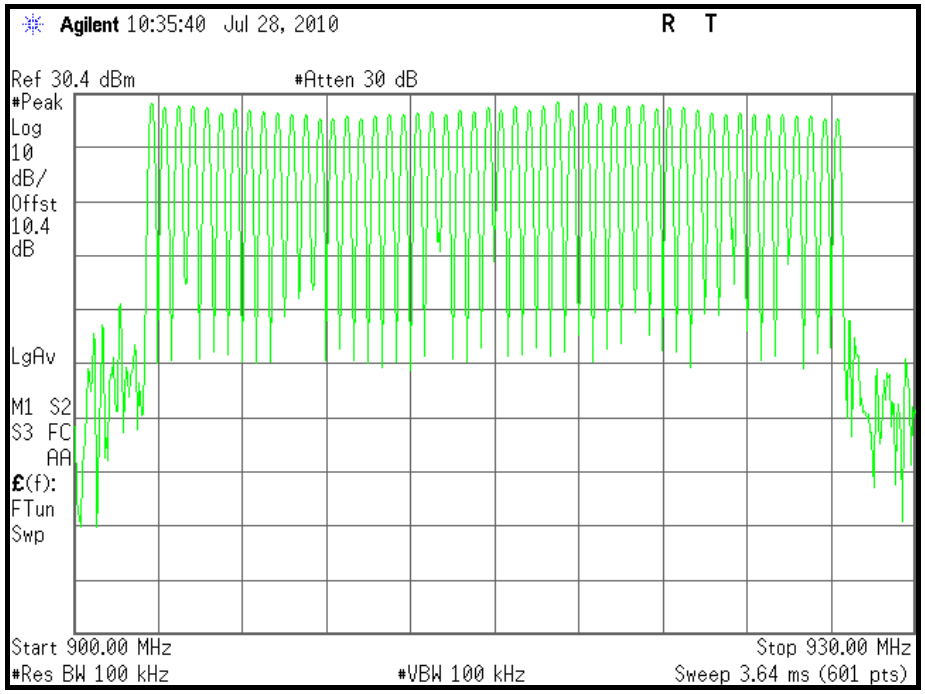
1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer on Max Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.

TEST RESULTS

Refer to the attached plot.

There are 50 hopping frequencies in a hopping sequence.

NUMBER OF HOPPING FREQUENCY USED



7.5 AVERAGE TIME OF OCCUPANCY

LIMITS

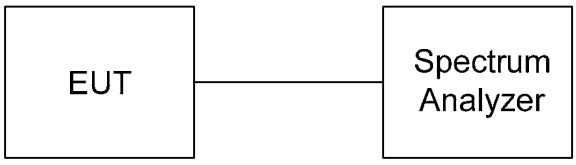
§15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan.

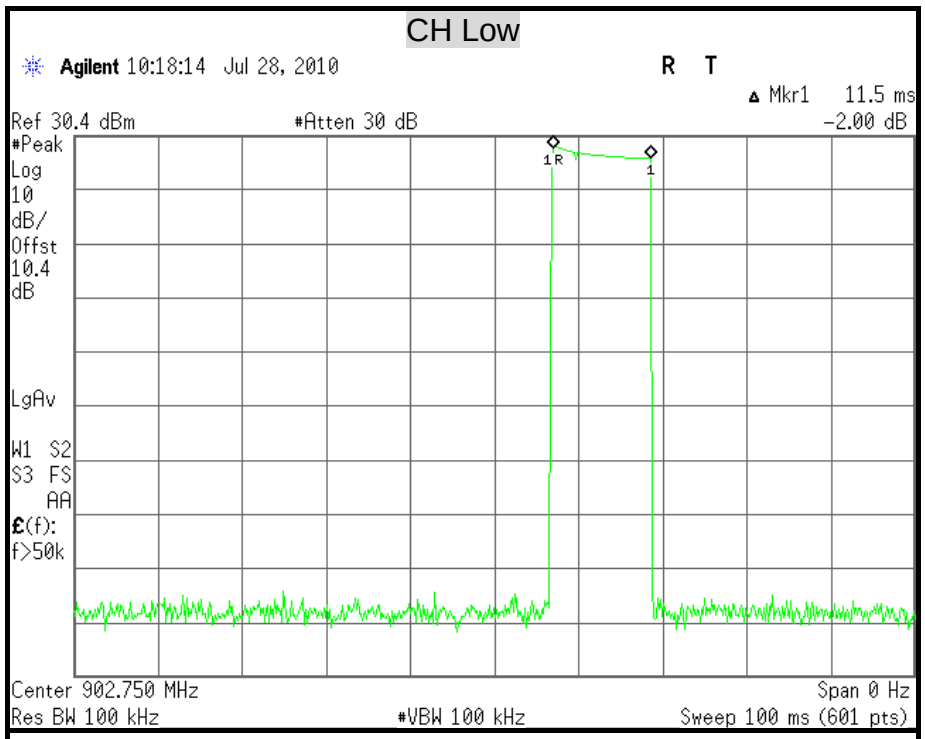
The number of pulses is measured in a slow scan.

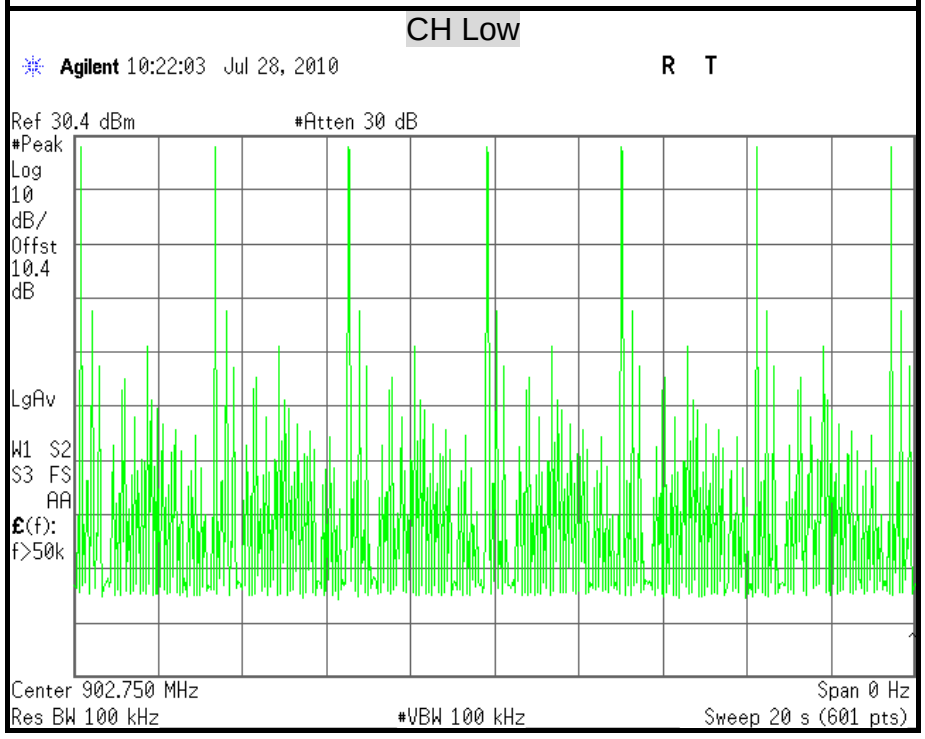
TEST RESULTS

Channel	Channel Frequency (MHz)	Pulse width (ms)	Number of Pulse in 20 Seconeds	Average Time of Occupancy (sec.)	Limit (sec)	Results
Low	902.75	11.5	7	0.0805	0.4	PASS
Middle	914.75	11.5	7	0.0805	0.4	PASS
High	927.25	11.5	7	0.0805	0.4	PASS

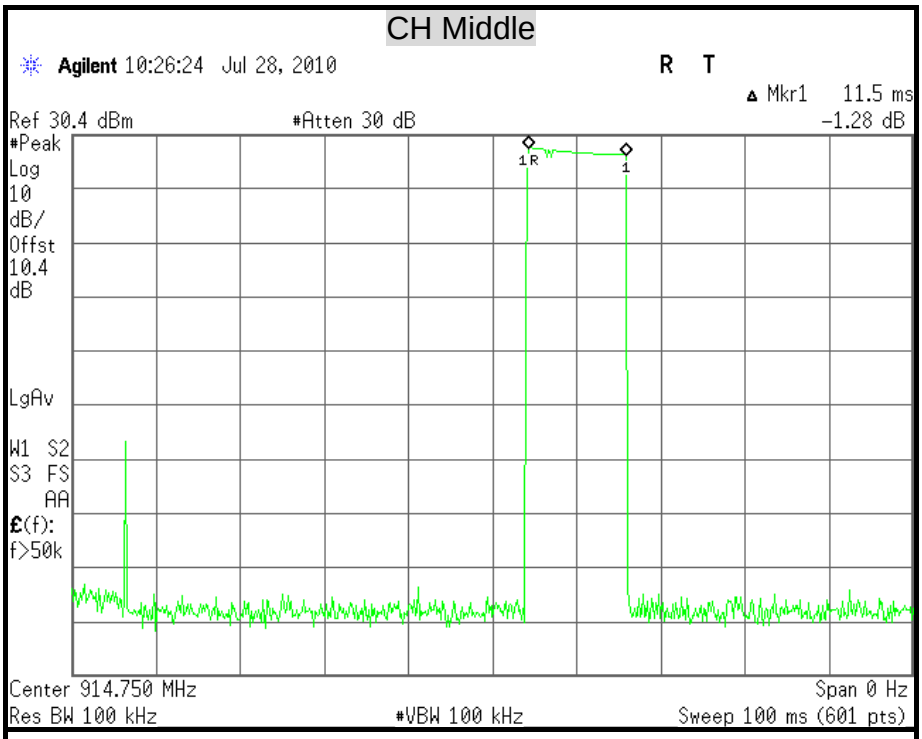
Ch Low:
Cycle = number channel × 0.4sec= 50 × 0.4 = 20sec
Average Time of Occupancy = pulse width × hopping number = 11.5 × 7 = 80.5 (ms)
Ch Middle:
Cycle = number channel × 0.4sec= 50 × 0.4 = 20sec
Average Time of Occupancy = pulse width × hopping number = 11.5 × 7 = 80.5 (ms)
Ch High:
Cycle = number channel × 0.4sec= 50 × 0.4 = 20sec
Average Time of Occupancy = pulse width × hopping number = 11.5 × 7 = 80.5 (ms)

PULSE WIDTH / NUMBER OF PULSES

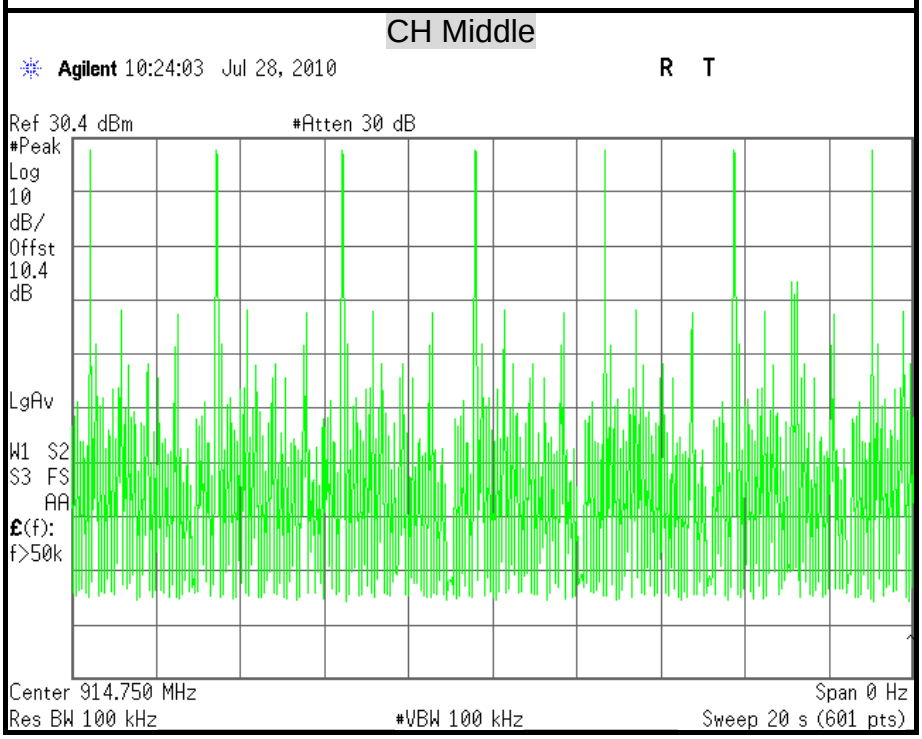




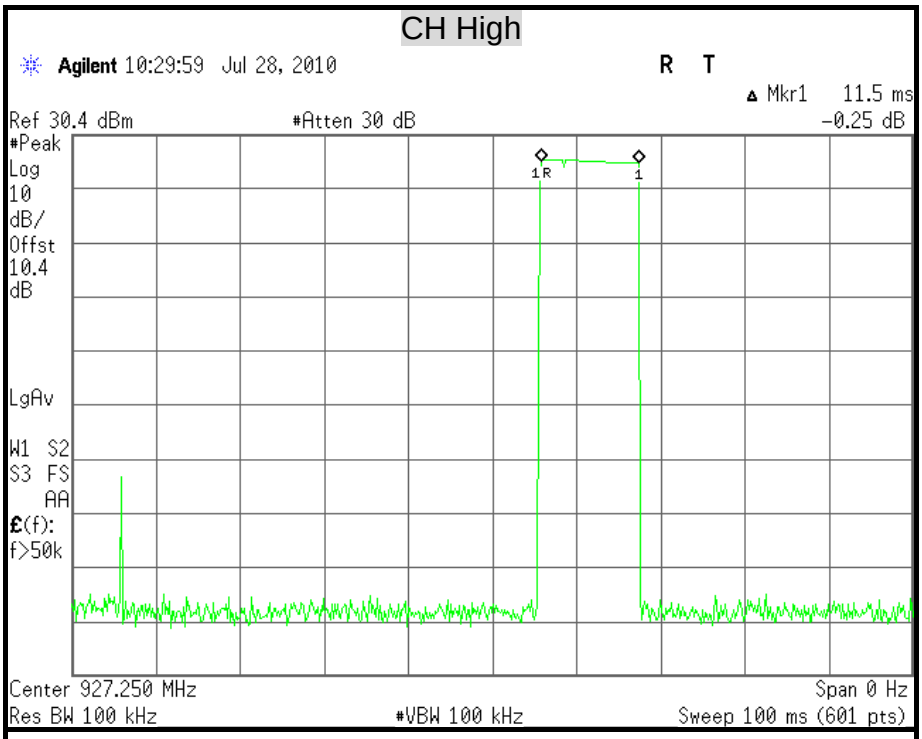
CH Middle



CH Middle



CH High



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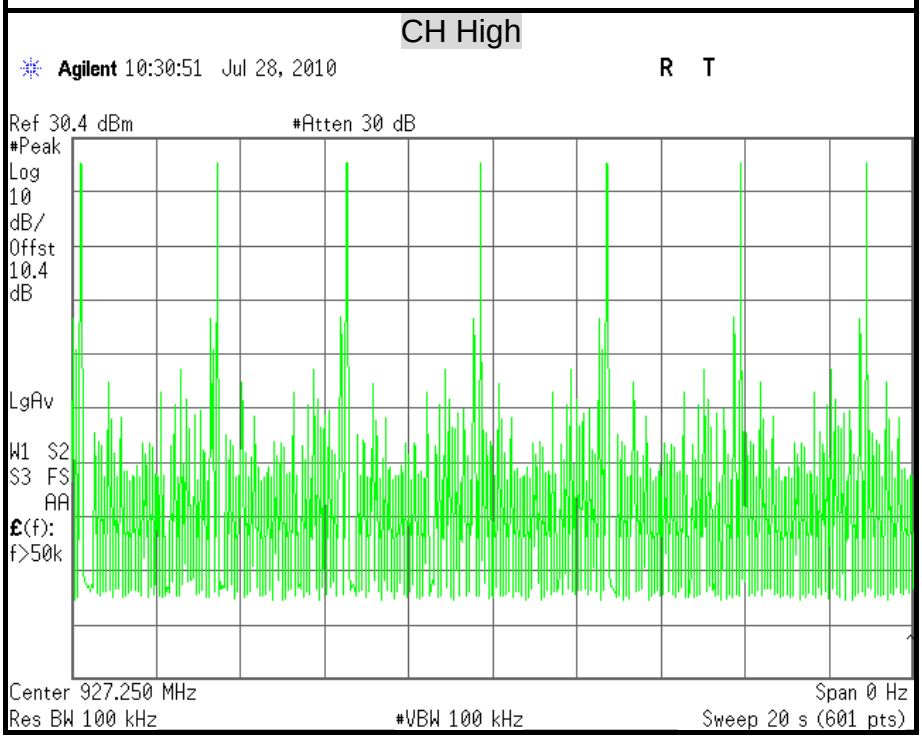


7.6 CONDUCTED SPURIOUS EMISSION

LIMITS

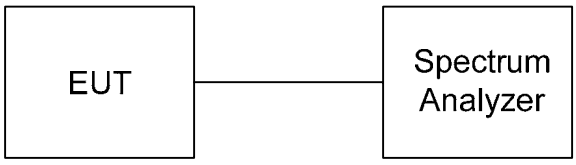
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	Agilent	E4446A	MY46180323	05/02/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

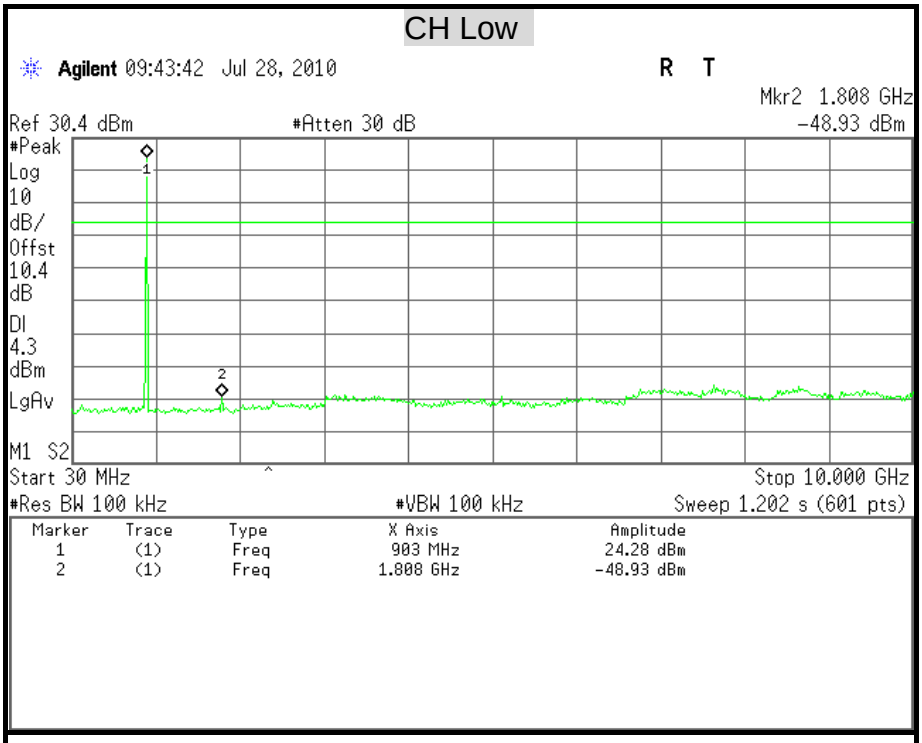
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

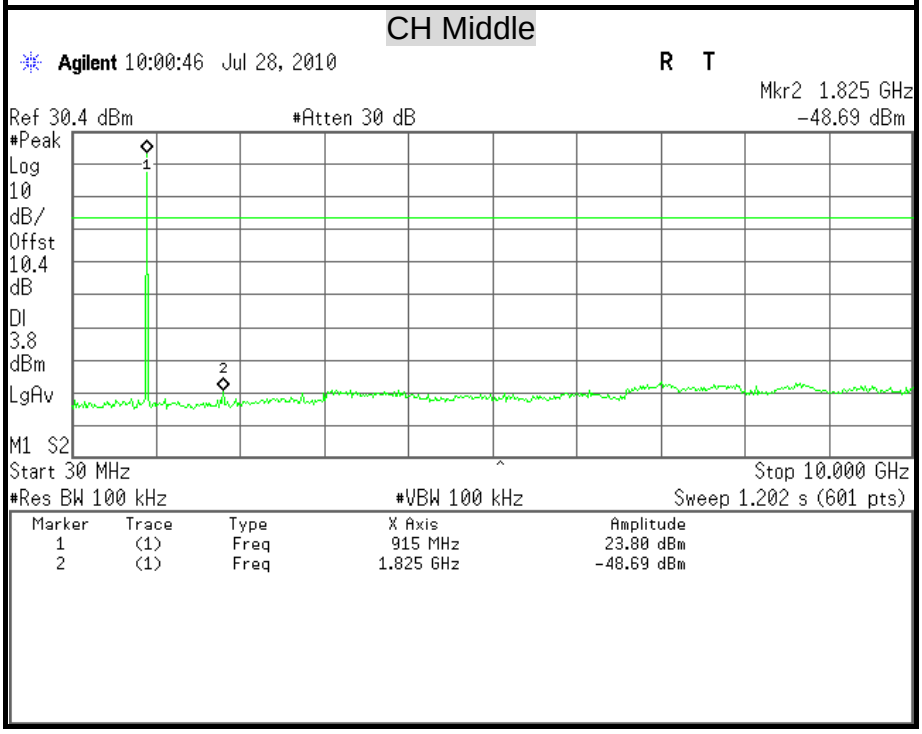
TEST RESULTS

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

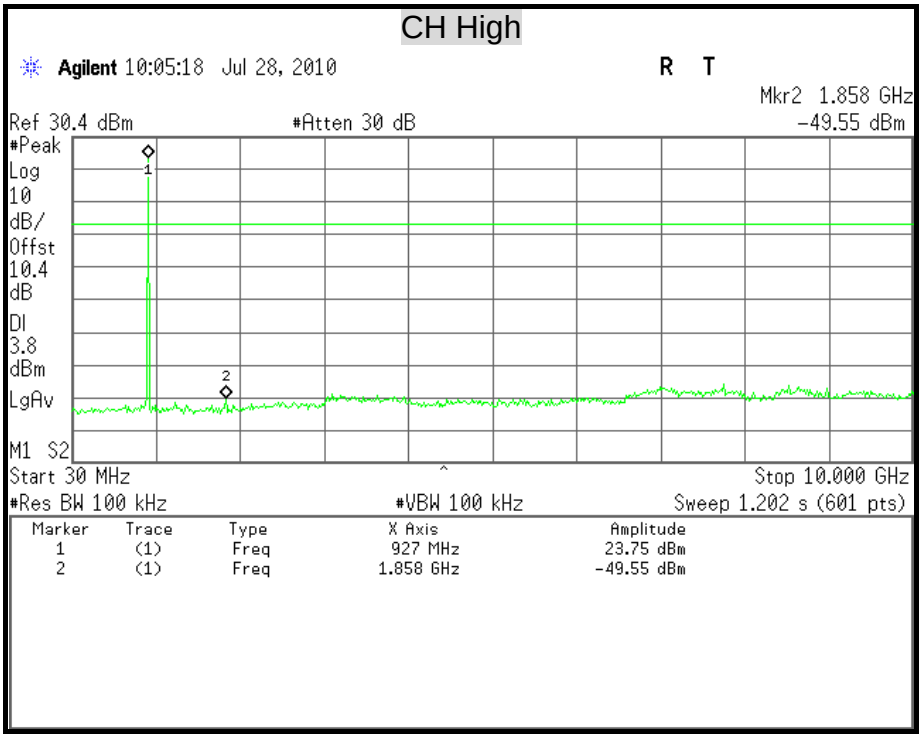
CH Low



CH Middle



CH High



7.7 RADIATED EMISSION

LIMITS

(1) § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

Remark:
1. [1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. [2] Above 38.6

(2) § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/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
Above 960	500	3

Remark: ***Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

966Chamber_A

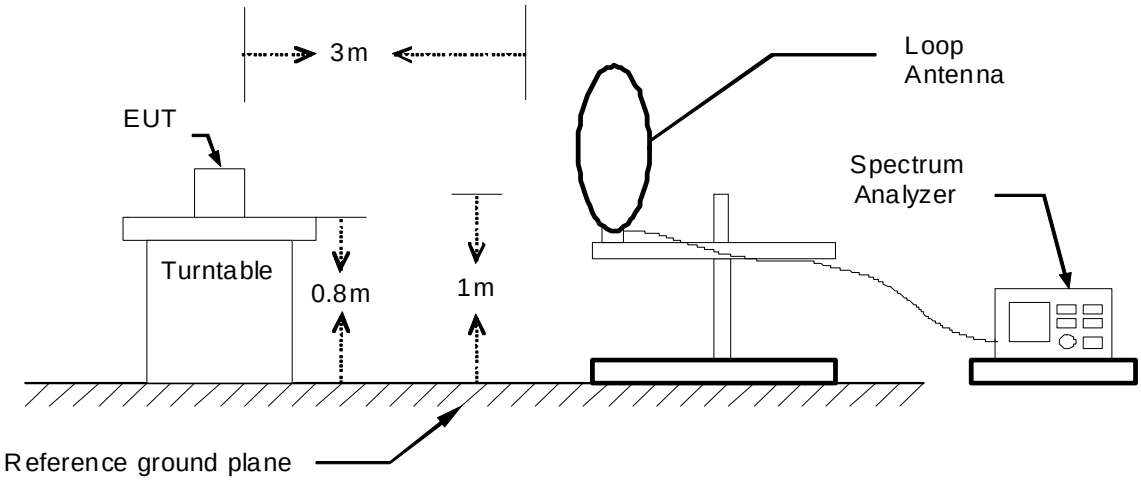
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	05/03/2011
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-249	11/12/2010
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00078732	07/05/2011
Pre-Amplifier	Agilent	8449B	3008A01471	08/02/2011
Pre-Amplifier	HP	8447F	2944A03748	09/24/2010
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31347	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31350	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31355	07/21/2011
LOOP Antenna	EMCO	6502	8905-2356	06/09/2011
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	009	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

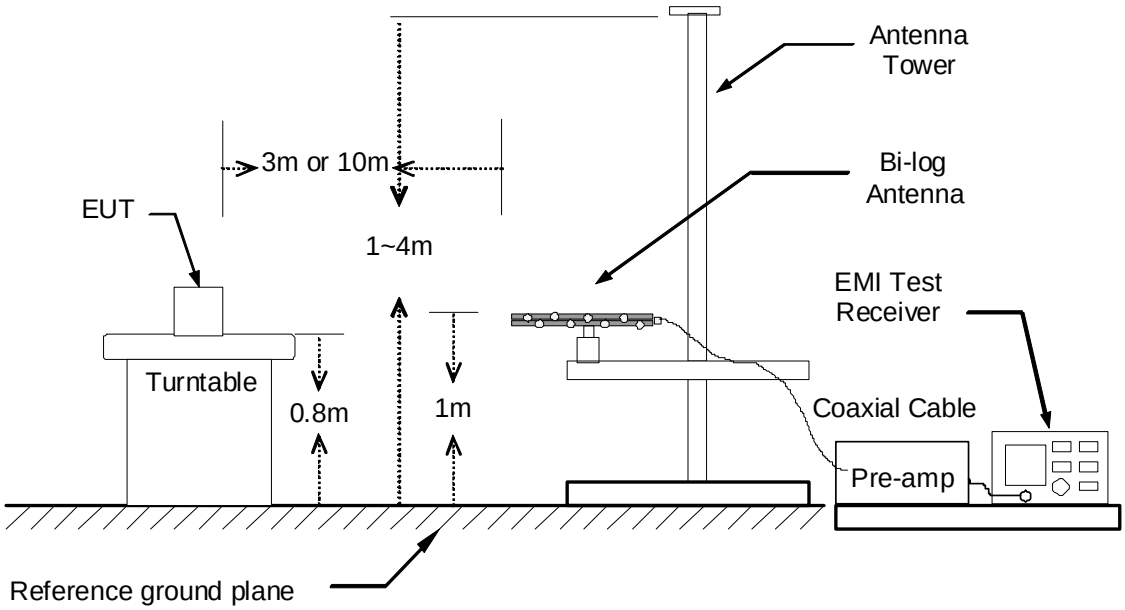
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

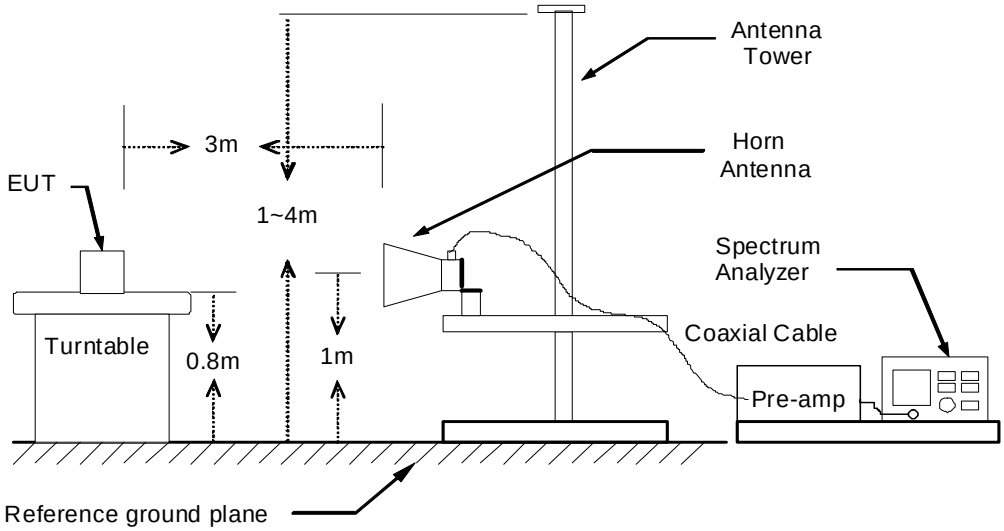
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark：

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH Low TX / RS232 mode (worst)	Temp. & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
96.93	52.14	-15.00	37.14	43.50	-6.36	Peak
182.29	52.90	-11.51	41.39	43.50	-2.11	QP
248.25	51.70	-10.74	40.96	46.00	-5.04	QP
339.43	51.70	-7.67	44.03	46.00	-1.97	QP
399.57	45.51	-5.85	39.67	46.00	-6.33	Peak
533.43	36.17	-2.90	33.27	46.00	-12.73	Peak
727.43	36.80	0.72	37.52	46.00	-8.48	Peak
798.24	37.01	2.00	39.01	46.00	-6.99	Peak

966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
44.55	43.20	-9.72	33.48	40.00	-6.52	QP
96.93	57.00	-15.00	42.00	43.50	-1.50	QP
182.29	49.84	-11.51	38.34	43.50	-5.16	Peak
248.25	48.57	-10.74	37.84	46.00	-8.16	Peak
339.43	46.29	-7.67	38.62	46.00	-7.38	Peak
399.57	45.44	-5.85	39.59	46.00	-6.41	Peak
823.46	34.97	2.50	37.47	46.00	-8.53	Peak
874.87	35.40	3.51	38.90	46.00	-7.10	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH Middle TX / RS232 mode (worst)	Temp. & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
67.83	42.81	-11.86	30.95	40.00	-9.05	Peak
96.93	51.73	-15.00	36.73	43.50	-6.77	Peak
187.14	50.40	-11.74	38.66	43.50	-4.84	QP
253.10	51.00	-10.56	40.44	46.00	-5.56	QP
339.43	53.50	-7.67	45.83	46.00	-0.17	QP
399.57	44.05	-5.85	38.21	46.00	-7.79	Peak
727.43	35.68	0.72	36.41	46.00	-9.59	Peak
874.87	31.05	3.51	34.56	46.00	-11.44	Peak

966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
46.49	45.44	-9.59	35.84	40.00	-4.16	Peak
96.93	56.99	-15.00	41.99	43.50	-1.51	QP
186.17	48.22	-11.70	36.52	43.50	-6.98	Peak
249.22	48.99	-10.70	38.29	46.00	-7.71	Peak
339.43	44.46	-7.67	36.79	46.00	-9.21	Peak
399.57	45.75	-5.85	39.90	46.00	-6.10	Peak
824.43	34.72	2.52	37.23	46.00	-8.77	Peak
874.87	34.25	3.51	37.75	46.00	-8.25	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH High TX / RS232 mode (worst)	Temp. & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
96.93	51.63	-15.00	36.63	43.50	-6.87	Peak
182.29	50.10	-11.51	38.59	43.50	-4.91	QP
253.10	50.60	-10.56	40.04	46.00	-5.96	QP
339.43	53.50	-7.67	45.83	46.00	-0.17	QP
399.57	44.60	-5.85	38.75	46.00	-7.25	Peak
450.01	40.38	-4.77	35.61	46.00	-10.39	Peak
727.43	35.85	0.72	36.57	46.00	-9.43	Peak
874.87	31.53	3.51	35.03	46.00	-10.97	Peak

966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
34.85	46.96	-10.81	36.16	40.00	-3.84	Peak
45.52	44.90	-9.65	35.25	40.00	-4.75	QP
96.93	56.80	-15.00	41.80	43.50	-1.70	QP
183.26	48.66	-11.55	37.11	43.50	-6.39	Peak
256.98	48.26	-10.42	37.83	46.00	-8.17	Peak
339.43	44.83	-7.67	37.17	46.00	-8.83	Peak
399.57	43.49	-5.85	37.65	46.00	-8.35	Peak
874.87	33.78	3.51	37.29	46.00	-8.71	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Above 1 GHz

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH Low	TEMP & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.50	46.67	---	-3.69	42.98	---	74.00	54.00	-11.02	Peak
1594.00	45.96	---	-2.30	43.66	---	74.00	54.00	-10.34	Peak
1805.50	44.50	---	-0.32	44.19	---	74.00	54.00	-9.81	Peak
1859.50	46.22	---	0.19	46.41	---	74.00	54.00	-7.59	Peak
2282.50	43.11	---	2.03	45.14	---	74.00	54.00	-8.86	Peak
3353.50	42.96	---	3.73	46.69	---	74.00	54.00	-7.31	Peak

966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.50	53.66	---	-3.69	49.97	---	74.00	54.00	-4.03	Peak
1517.50	48.29	---	-3.01	45.28	---	74.00	54.00	-8.72	Peak
1733.50	47.31	---	-0.99	46.32	---	74.00	54.00	-7.68	Peak
1859.50	46.36	---	0.19	46.55	---	74.00	54.00	-7.45	Peak
2498.50	44.82	---	2.43	47.25	---	74.00	54.00	-6.75	Peak
3115.00	42.77	---	3.48	46.25	---	74.00	54.00	-7.75	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)
7. *For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor*

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH Middle	TEMP & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1067.50	45.33	---	-4.47	40.86	---	74.00	54.00	-13.14	Peak
1328.50	46.73	---	-3.69	43.04	---	74.00	54.00	-10.96	Peak
1625.50	44.11	---	-2.00	42.11	---	74.00	54.00	-11.89	Peak
1859.50	45.52	---	0.19	45.71	---	74.00	54.00	-8.29	Peak
2161.00	43.17	---	1.80	44.97	---	74.00	54.00	-9.03	Peak
2422.00	42.64	---	2.29	44.93	---	74.00	54.00	-9.07	Peak

966 Chamber_A at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.50	53.71	---	-3.69	50.02	---	74.00	54.00	-3.98	Peak
1490.50	47.93	---	-3.20	44.73	---	74.00	54.00	-9.27	Peak
1625.50	47.58	---	-2.00	45.58	---	74.00	54.00	-8.42	Peak
1729.00	46.83	---	-1.03	45.79	---	74.00	54.00	-8.21	Peak
1864.00	47.78	---	0.23	48.01	---	74.00	54.00	-5.99	Peak
2489.50	44.26	---	2.41	46.68	---	74.00	54.00	-7.32	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)
7. *For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor*

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Rueyyan Lin
Model	RU-888-0	Test Date	2010/07/28
Test Mode	CH High	TEMP & Humidity	25.3°C, 48%

966 Chamber_A at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1072.00	45.76	---	-4.46	41.30	---	74.00	54.00	-12.70	Peak
1328.50	45.37	---	-3.69	41.68	---	74.00	54.00	-12.32	Peak
1855.00	44.70	---	0.15	44.85	---	74.00	54.00	-9.15	Peak
2440.00	42.33	---	2.32	44.65	---	74.00	54.00	-9.35	Peak
3277.00	42.82	---	3.65	46.47	---	74.00	54.00	-7.53	Peak
3808.00	40.99	---	4.71	45.70	---	74.00	54.00	-8.30	Peak

966 Chamber_A at 3Meter / Vertical

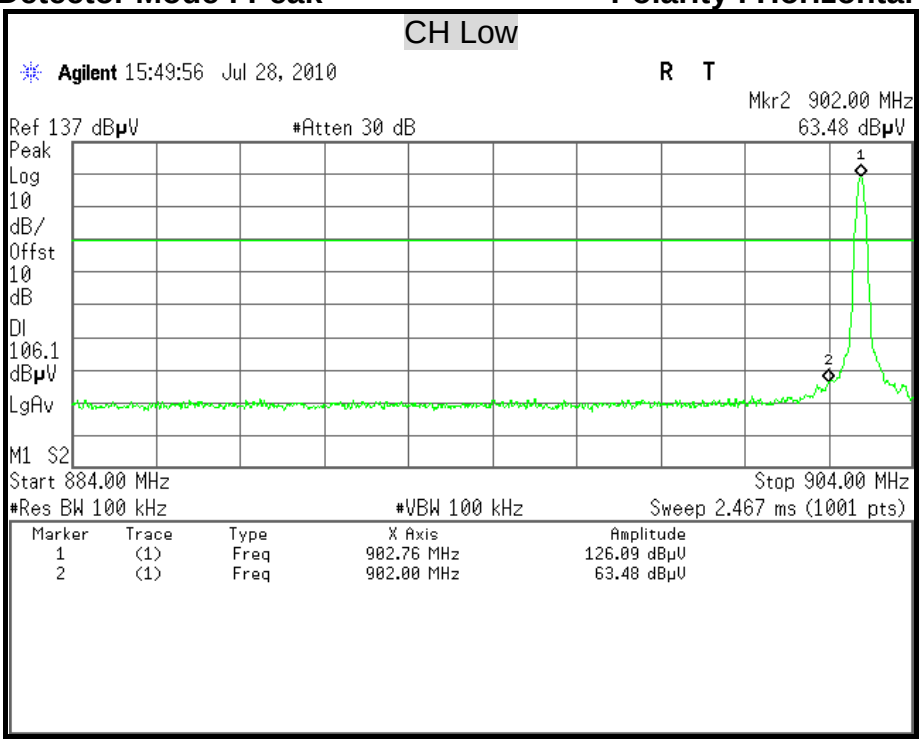
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.50	53.64	---	-3.69	49.95	---	74.00	54.00	-4.05	Peak
1594.00	47.99	---	-2.30	45.70	---	74.00	54.00	-8.30	Peak
1864.00	47.16	---	0.23	47.39	---	74.00	54.00	-6.61	Peak
2489.50	45.03	---	2.41	47.44	---	74.00	54.00	-6.56	Peak
2926.00	44.08	---	3.23	47.31	---	74.00	54.00	-6.69	Peak
3862.00	41.95	---	4.85	46.80	---	74.00	54.00	-7.20	Peak

Remark:

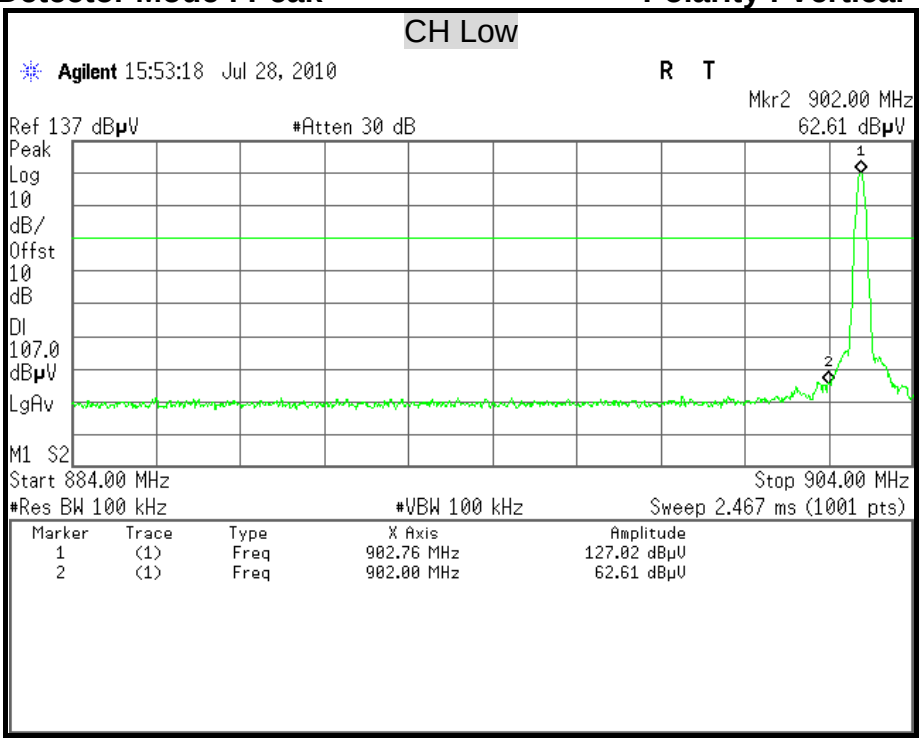
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.*
6. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)
7. *For Fundamental & Harmonics: Average Level = Peak Level + Duty Cycle Factor*

Restricted Band Edges

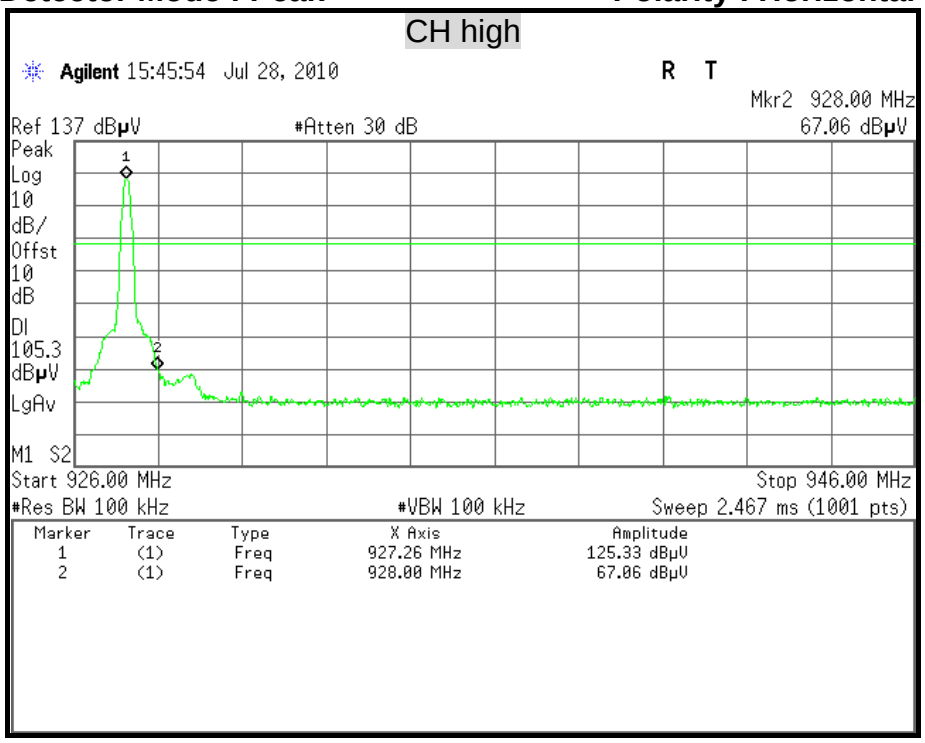
Detector Mode : Peak **Polarity : Horizontal**



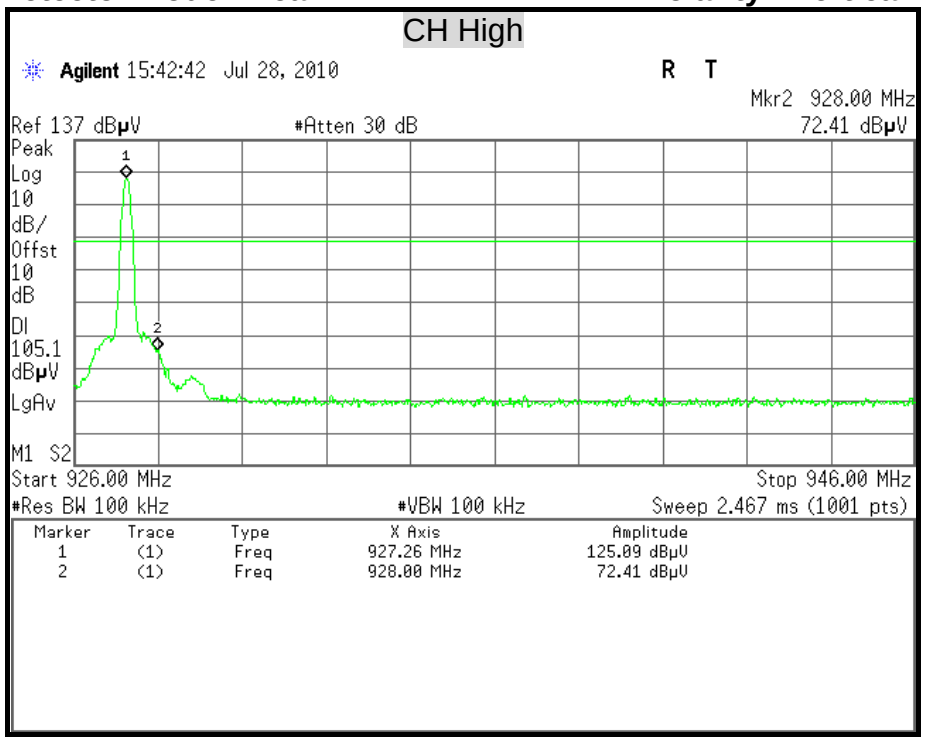
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Peak **Polarity : Vertical**



7.8 POWER LINE CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

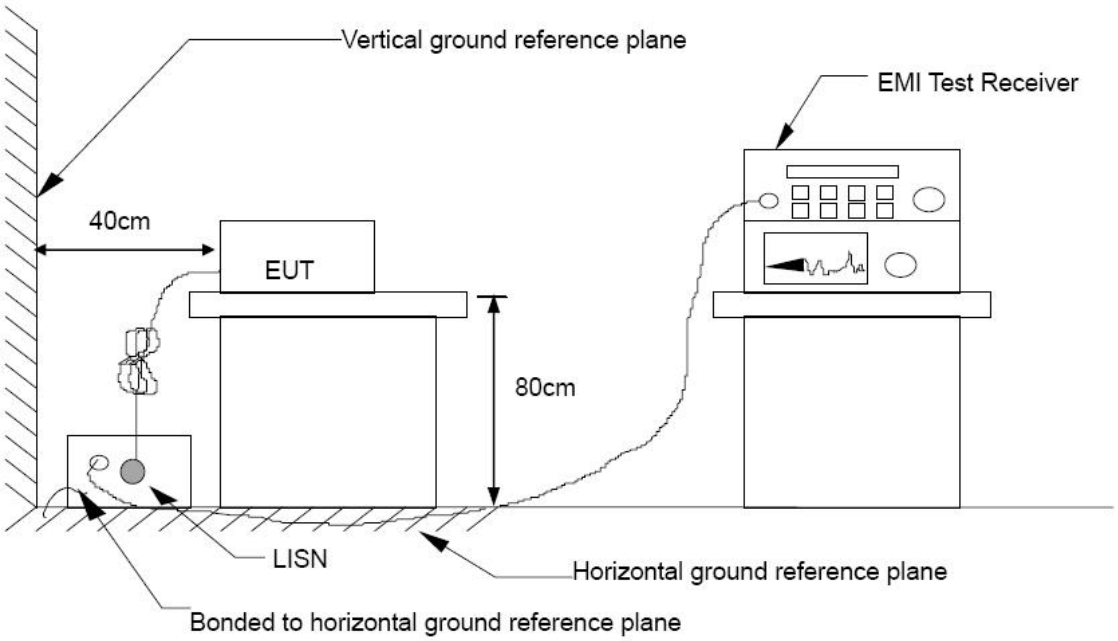
Frequency range (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

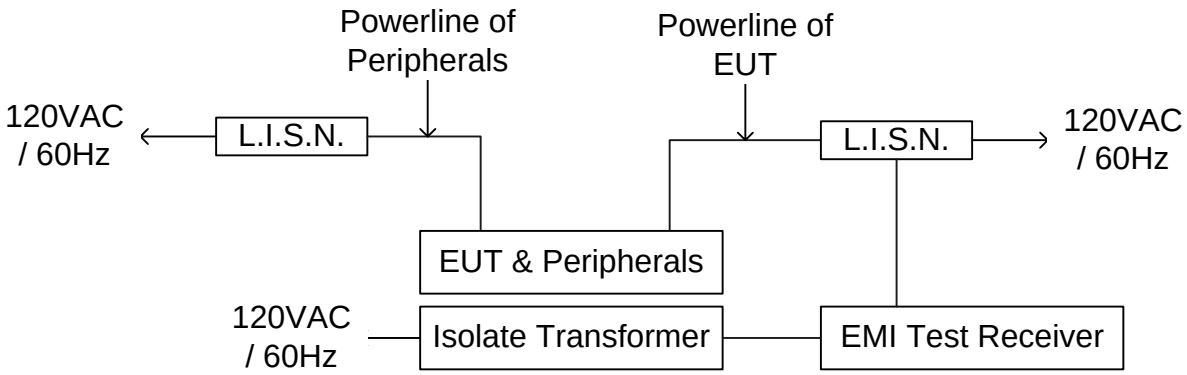
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/13/2010
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/22/2011
TEST RECEIVER	ROHDE & SCHWARZ	ESHS30	838550/003	01/28/2011
PULSE LIMIT	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2010
N Type Coaxial Cable	BELDEN	8268 M17/164	003	07/09/2011

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP





TEST PROCEDURE

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

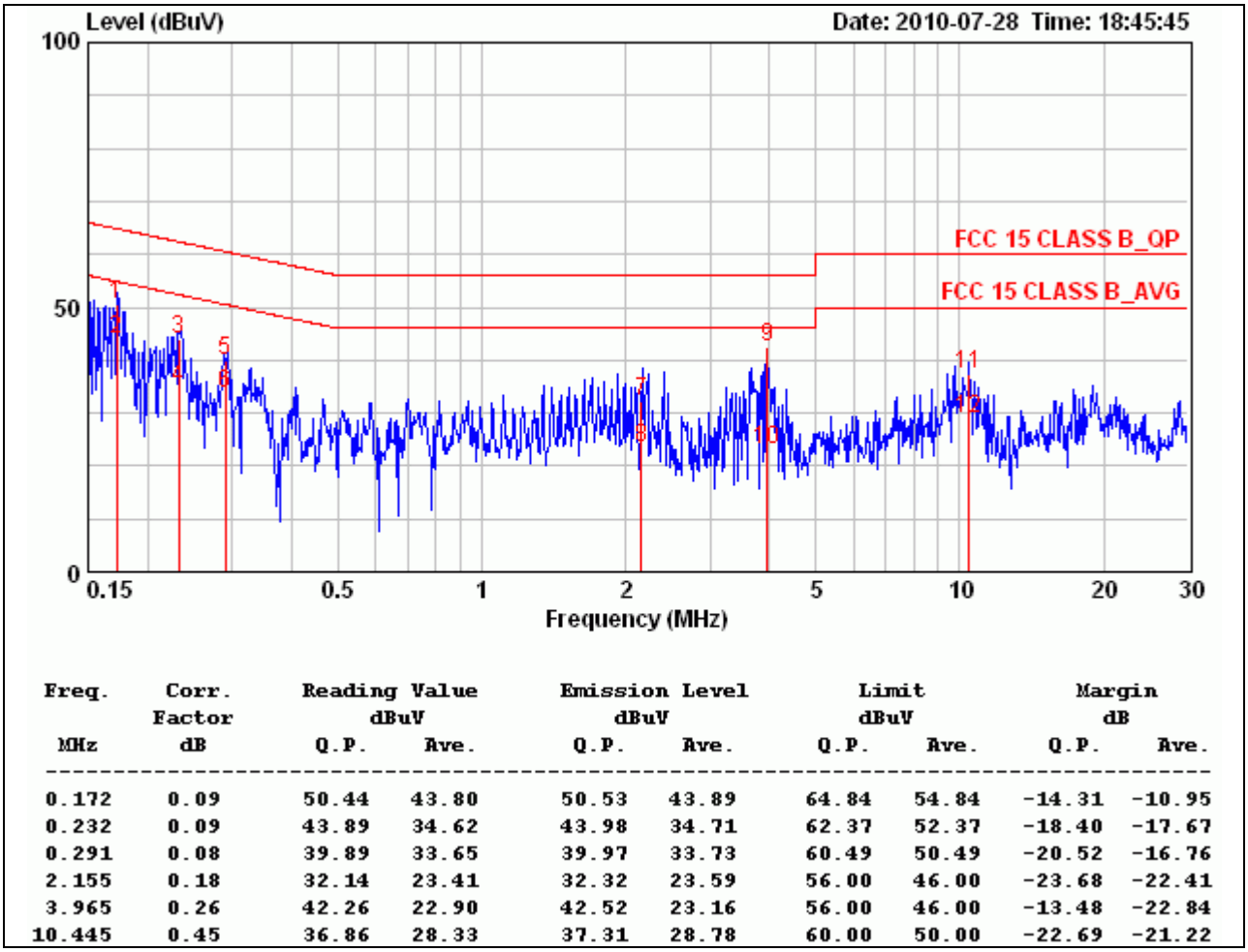
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Benny Wu
Model	RU-888-0	Test Date	2010/07/28
Test Mode	RS232 mode	Temp. & Humidity	24.9°C, 58%

LINE



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.172	0.09	50.44	43.80	50.53	43.89	64.84	54.84	-14.31	-10.95
0.232	0.09	43.89	34.62	43.98	34.71	62.37	52.37	-18.40	-17.67
0.291	0.08	39.89	33.65	39.97	33.73	60.49	50.49	-20.52	-16.76
2.155	0.18	32.14	23.41	32.32	23.59	56.00	46.00	-23.68	-22.41
3.965	0.26	42.26	22.90	42.52	23.16	56.00	46.00	-13.48	-22.84
10.445	0.45	36.86	28.33	37.31	28.78	60.00	50.00	-22.69	-21.22

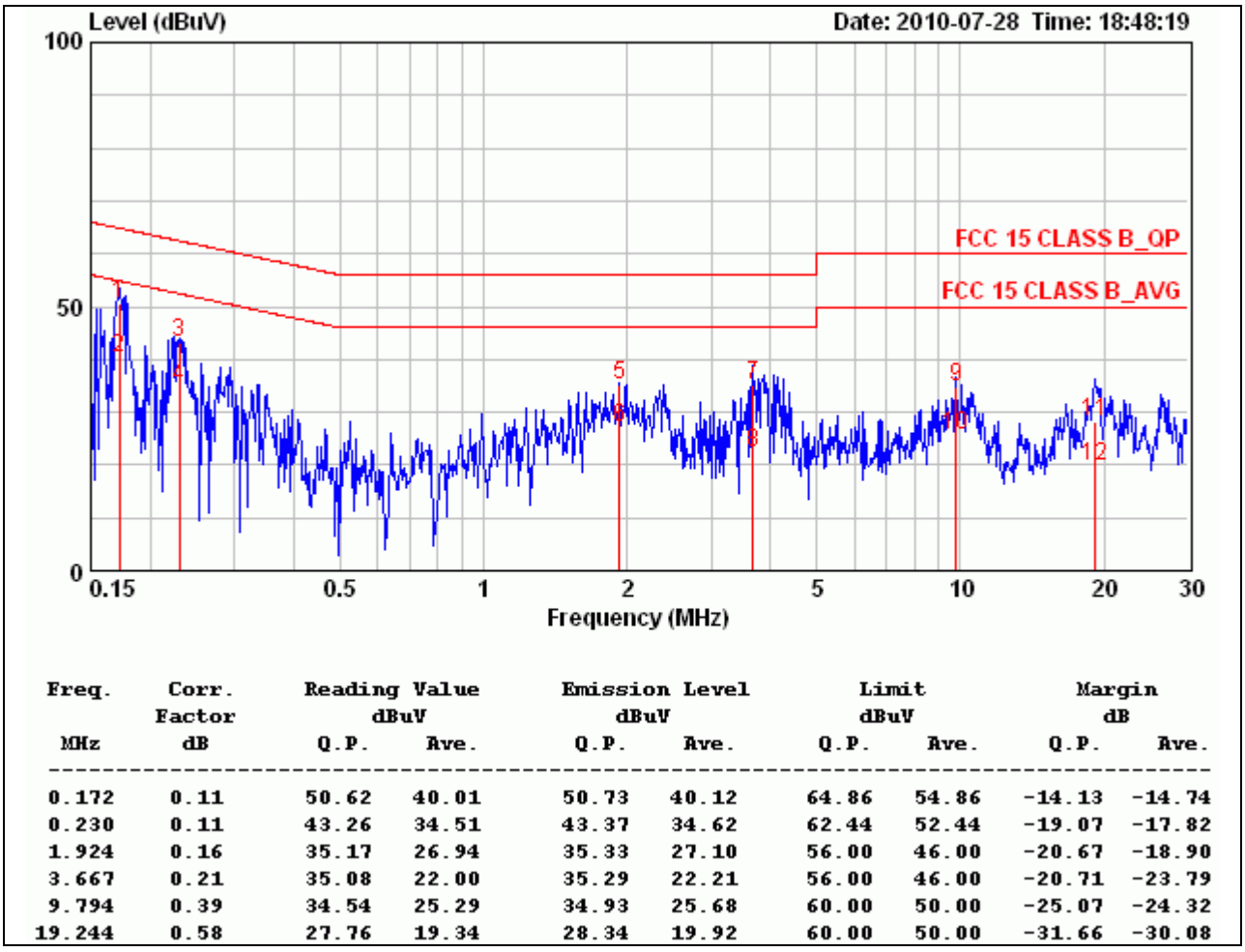
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Benny Wu
Model	RU-888-0	Test Date	2010/07/28
Test Mode	RS232 mode	Temp. & Humidity	24.9°C, 58%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.172	0.11	50.62	40.01	50.73	40.12	64.86	54.86	-14.13	-14.74
0.230	0.11	43.26	34.51	43.37	34.62	62.44	52.44	-19.07	-17.82
1.924	0.16	35.17	26.94	35.33	27.10	56.00	46.00	-20.67	-18.90
3.667	0.21	35.08	22.00	35.29	22.21	56.00	46.00	-20.71	-23.79
9.794	0.39	34.54	25.29	34.93	25.68	60.00	50.00	-25.07	-24.32
19.244	0.58	27.76	19.34	28.34	19.92	60.00	50.00	-31.66	-30.08

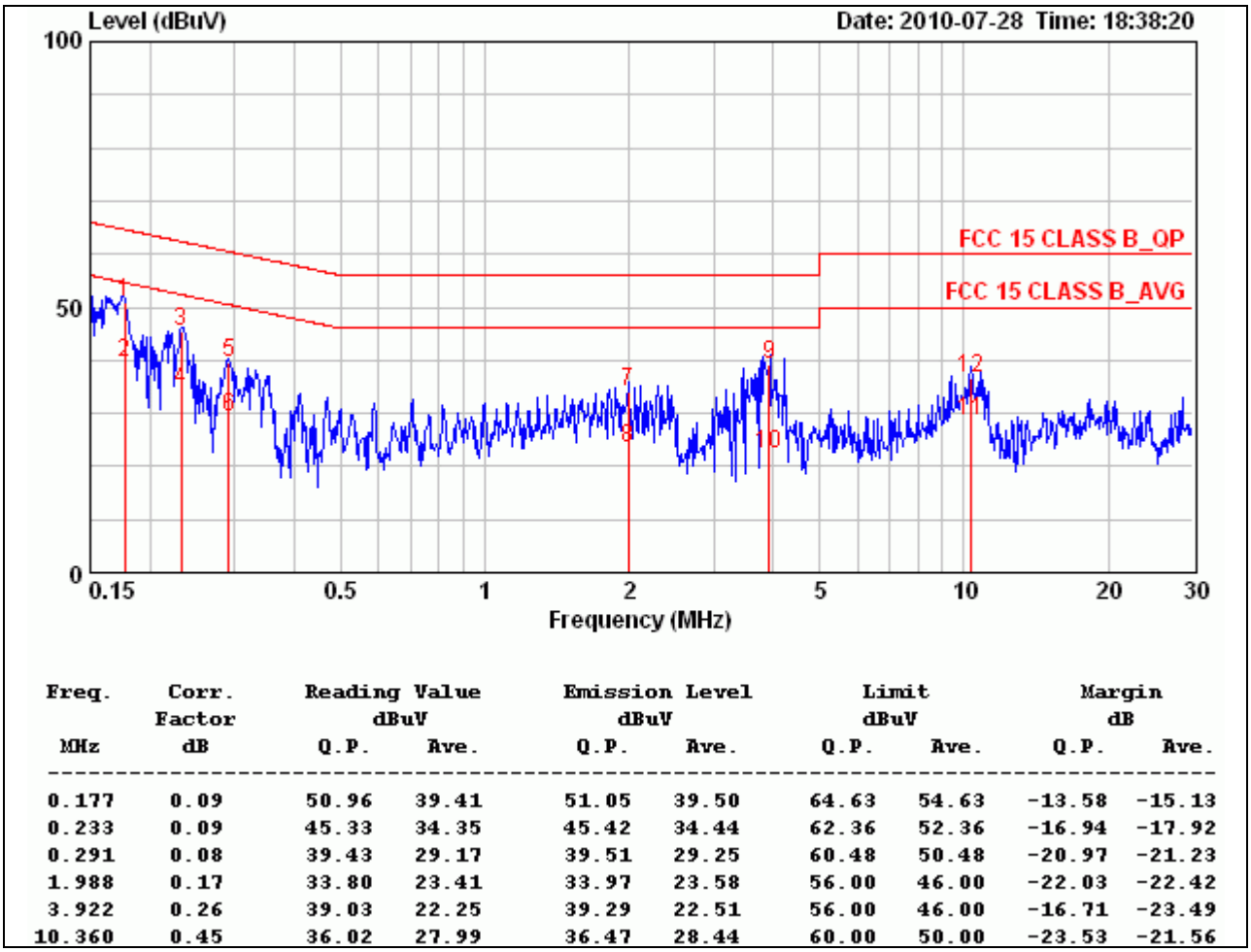
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Benny Wu
Model	RU-888-0	Test Date	2010/07/28
Test Mode	USB mode	Temp. & Humidity	24.9°C, 58%

LINE



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.177	0.09	50.96	39.41	51.05	39.50	64.63	54.63	-13.58	-15.13
0.233	0.09	45.33	34.35	45.42	34.44	62.36	52.36	-16.94	-17.92
0.291	0.08	39.43	29.17	39.51	29.25	60.48	50.48	-20.97	-21.23
1.988	0.17	33.80	23.41	33.97	23.58	56.00	46.00	-22.03	-22.42
3.922	0.26	39.03	22.25	39.29	22.51	56.00	46.00	-16.71	-23.49
10.360	0.45	36.02	27.99	36.47	28.44	60.00	50.00	-23.53	-21.56

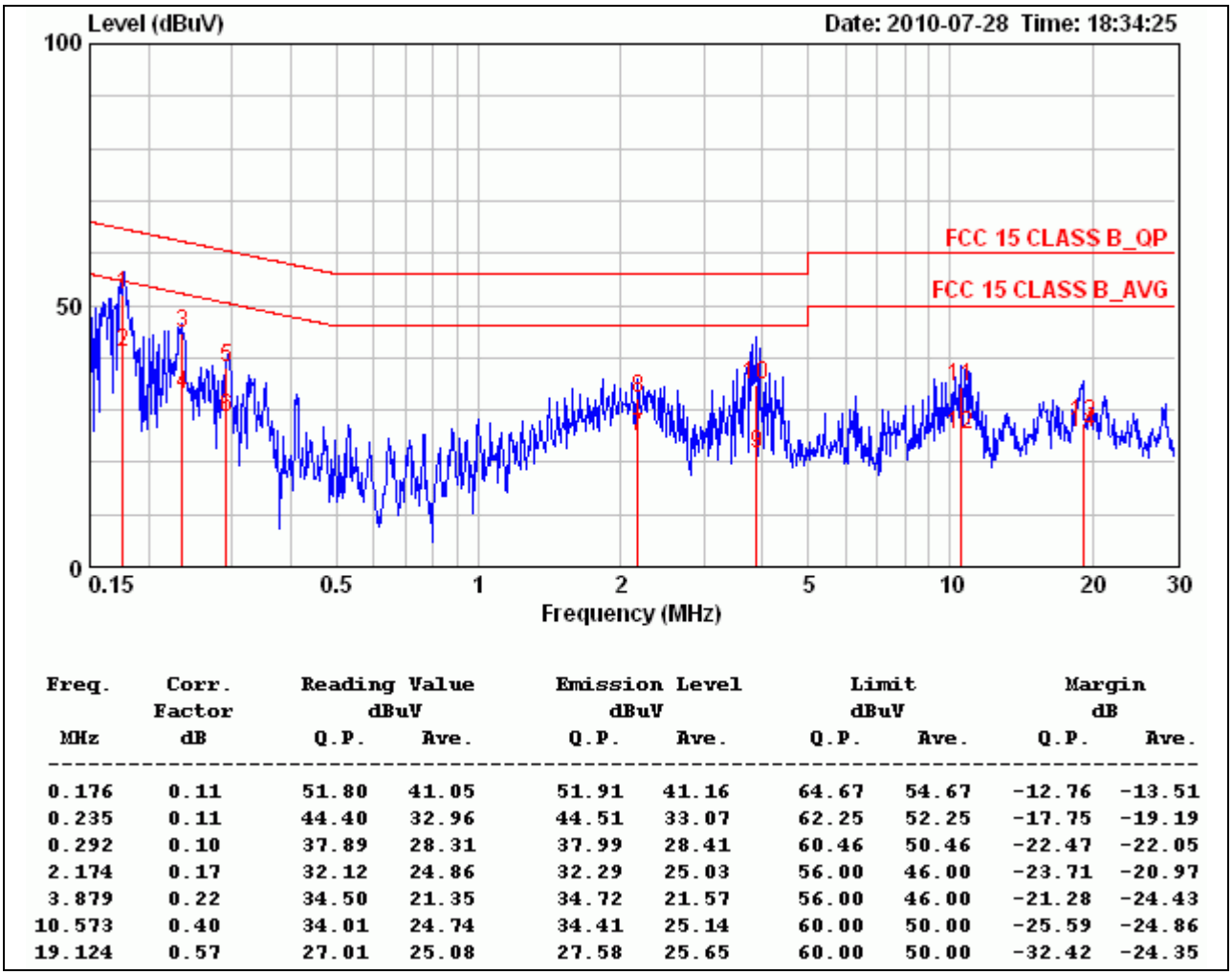
Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

Product Name	RFID UHF MODULE PCB ASSEMBLY	Test By	Benny Wu
Model	RU-888-0	Test Date	2010/07/28
Test Mode	USB mode	Temp. & Humidity	24.9°C, 58%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dB Q.P.	Margin dB Ave.
0.176	0.11	51.80	41.05	51.91	41.16	64.67	54.67	-12.76	-13.51
0.235	0.11	44.40	32.96	44.51	33.07	62.25	52.25	-17.75	-19.19
0.292	0.10	37.89	28.31	37.99	28.41	60.46	50.46	-22.47	-22.05
2.174	0.17	32.12	24.86	32.29	25.03	56.00	46.00	-23.71	-20.97
3.879	0.22	34.50	21.35	34.72	21.57	56.00	46.00	-21.28	-24.43
10.573	0.40	34.01	24.74	34.41	25.14	60.00	50.00	-25.59	-24.86
19.124	0.57	27.01	25.08	27.58	25.65	60.00	50.00	-32.42	-24.35

Remark:

1. Correction Factor = Insertion loss + cable loss

2. Margin value = Emission level – Limit value

APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate theenvironment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and
d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm2

LIMIT

Power Density Limit, S=1.0mW/cm2

TEST RESULTS

Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Numeric antenna gain (dB)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
3.85	20	24.16	2.43	0.6	0.125811

Remark: *For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*