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TEST REPORT

Product Name .....: Mobile Phone

Trademark .....: ÖWN

Model/Type reference.....: ÖWN S1

Listed Model(s) .....: ÖWN Fun

FCC ID.....: **2AEMYS3045**

Test Standards .....: **FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz**

Applicant .....: South Mobile Ltda

Address of applicant .....: Avenida Apoquindo 6410, Of. 803. Las Condes. Santiago – Chile

Date of Receipt .....: May 25, 2015

Date of Test Date.....: May 26, 2015 - Jun. 07, 2015

Data of issue. .....: Jun. 08, 2015

Test result	**Pass ***

* In the configuration tested, the EUT complied with the standards specified above

GENERAL DESCRIPTION OF EUT	
Equipment:	Mobile Phone
Model Name:	ÖWN S1, ÖWN Fun
Manufacturer:	South Mobile Ltda
Manufacturer Address:	Avenida Apoquindo 6410, Of. 803. Las Condes. Santiago – Chile
Power Rating:	DC 3.8V form 1600mAh by rechargeable battery or DC 5.0V form Input:100-240V~,50/60Hz Output: 5.0V⎓1000mA adapter

Compiled By: (Allen Wang)

Reviewed By: (Tony Wang)

Approved By: (Walter Chen)

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1. SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.4:2003: American National Standard for Testing Unlicensed Wireless Devices

KDB558074 D01 V03r03: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

1.2. Test Description

FCC PART 15 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen General Testing & Inspection Technology Co., Ltd.

Add: 1F, 2 Block,Jiaquan Building, Guanlan High-tech Park Baoan District, Shenzhen, Guangdong,China

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9783A

The 3m alternate test site of Shenzhen GTI Technology Co., Ltd.EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Aug, 2011.

FCC-Registration No.: 214666

Shenzhen GTI Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 214666, Sep 19, 2011

1.4. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the Shenzhen General Testing & Inspection Technology Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for General Testing & Inspection laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

2.2. General Description of EUT

Product Name:	Mobile Phone
Model/Type reference:	ÖWN S1
Listed model:	ÖWN Fun
Difference(s) of Model(s):	All the models are same except for sale to different clients. The model ÖWN S1 is selected for test
Power supply:	DC 3.8V from battery
Adapter information :	Model: ÖWN S1 Input: 100-240V, 50/60Hz 0.2A Output:DC5V⎓1000m A
Hardware version:	1490M_MM1_V1.0
Software version:	NC.OWNS3045.20150523
WIFI :	
Supported type:	802.11b/802.11g/802.11n(H20)/802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7
Channel separation:	5MHz
Antenna type:	FPC Antenna
Antenna gain:	1.6dBi
Bluetooth:	
Supported type:	Version 4.0 for low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Antenna type:	FPC Antenna
Antenna gain:	1.6dBi

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.3. Description of Test Modes

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

BT 4.0 Operation Frequency：

Channel	Frequency (MHz)
00	**2402**
02	2404
03	2406
⋮	⋮
19	**2440**
⋮	⋮
37	2476
38	2478
39	**2480**

WIFI Operation Frequency：

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	**2412**	8	2447
2	2417	**9**	**2452**
3	**2422**	10	2457
4	2427	**11**	**2462**
5	2432		
6	**2437**		
7	2442		

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.5 Mbps	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5 Mbps	3/9

2.4. Measurement Instruments List

Maximum Peak Output Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9030A	MY51380383	Oct 25,2015

Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9030A	MY51380383	Oct 25,2015

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrate until
1	LISN	R&S	ENV216	101112	Jan. 07, 2016
2	LISN	R&S	ENV216	101113	Jan. 07, 2016
3	EMI Test Receiver	R&S	ESCI	100920	Jan. 07, 2016
4	Cable	Schwarzbeck	AK9515E	33156	Jan. 07, 2016

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100967	Jan 07,2016
2	High pass filter	micro-tranics	HPM50111	34202	Jan 07,2016
3	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4180	Jan. 10,2016
4	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	Jan. 10,2016
5	Loop Antenna	LAPLAC	RF300	9138	Jan. 10,2016
6	Spectrum Analyzer	Rohde & Schwarz	FSU	100105	Jan 07,2016
7	Horn Antenna	Schwarzbeck	BBHA 9120D	648	Jan. 10,2016
8	Pre-Amplifier	HP	8447D	1937A03050	Jan. 07,2016
9	Pre-Amplifier	EMCI	EMC051835	980075	Jan. 07,2016
10	Antenna Mast	UC	UC3000	N/A	N/A
11	Turn Table	UC	UC3000	N/A	N/A
12	Cable Below 1GHz	Schwarzbeck	AK9515E	33155	Jan. 07,2016
13	Cable Above 1GHz	Hubersuhner	SUCOFLEX102	DA1580	Jan. 07,2016

Note: 1. The Cal.Interval was one year.
2. The cable loss has calculated in test result which connection between each test instruments.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emission (AC Main)

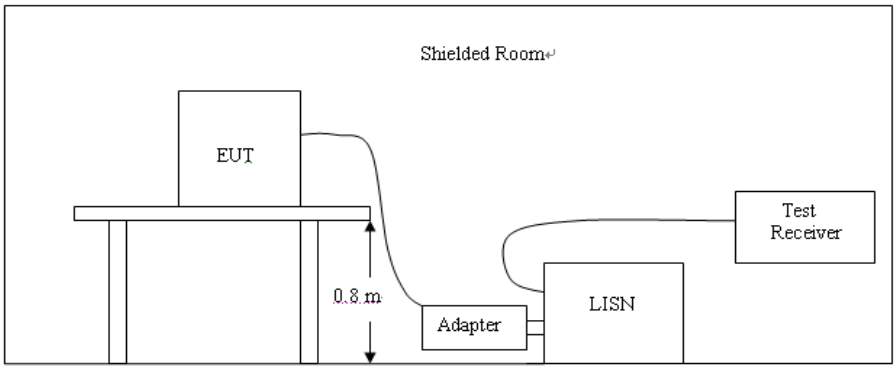
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4:2003.
2. Support equipment, if needed, was placed as per ANSI C63.4:2003
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4:2003
4. The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

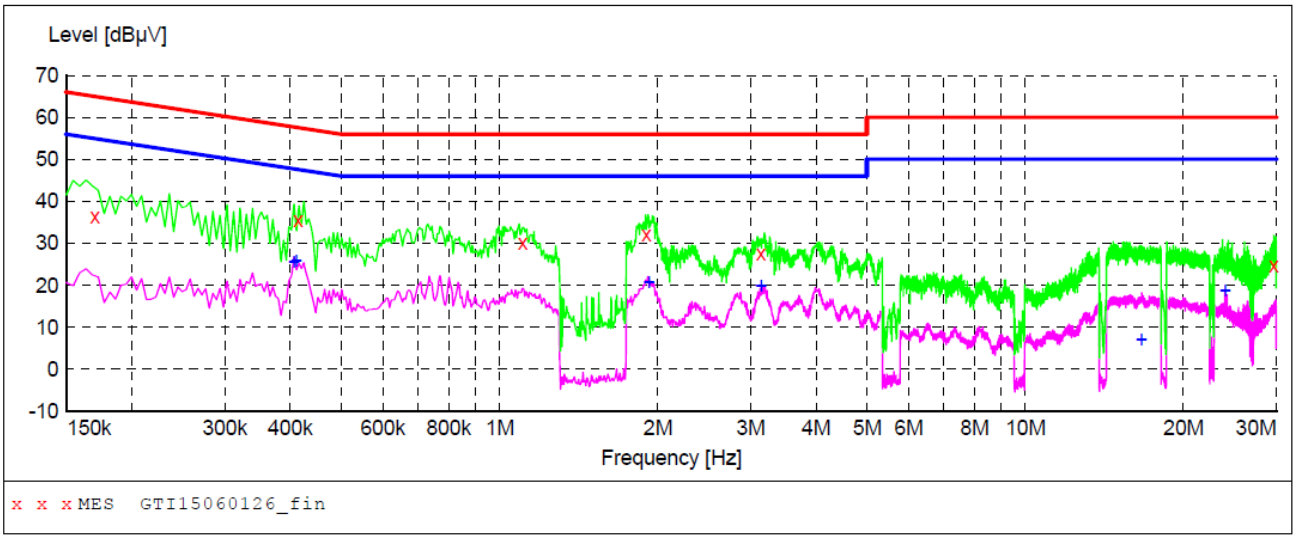
TEST RESULTS

Note: We tested all modes, recorded the worst case at wifi 802.11b mode

LINE	L

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "GTI15060126_fin"

6/1/2015 4:50PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.170000	36.50	9.9	65	28.5	QP	L1	GND
0.414000	35.40	9.9	58	22.2	QP	L1	GND
1.106000	30.20	10.2	56	25.8	QP	L1	GND
1.904000	32.10	10.4	56	23.9	QP	L1	GND
3.140000	27.70	10.5	56	28.3	QP	L1	GND
29.690000	24.60	11.1	60	35.4	QP	L1	GND

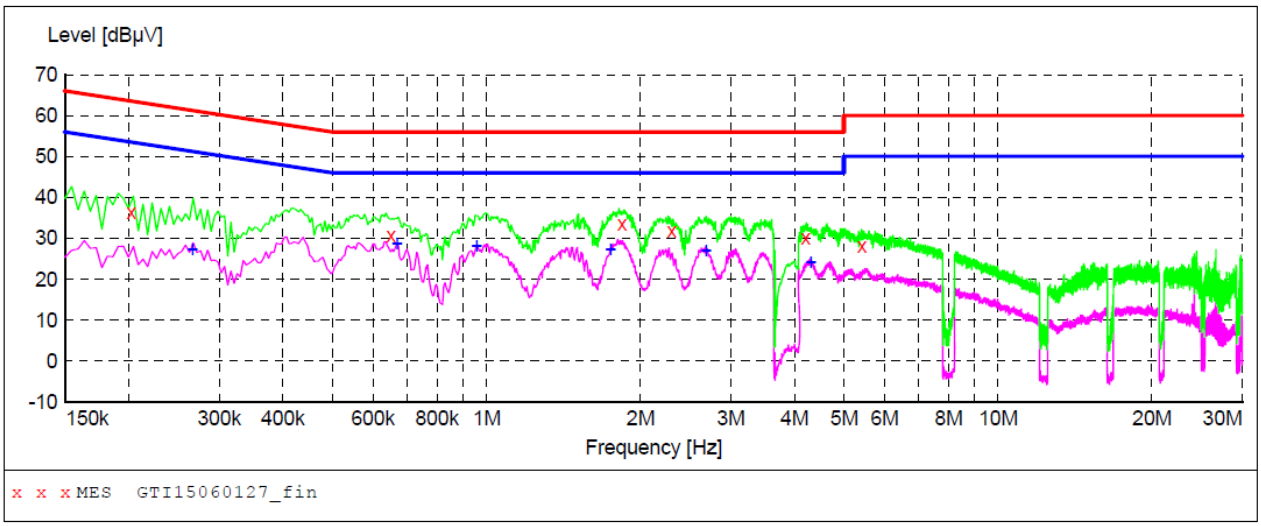
MEASUREMENT RESULT: "GTI15060126_fin2"

6/1/2015 4:50PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.406000	25.60	9.9	48	22.1	AV	L1	GND
0.410000	25.90	9.9	48	21.7	AV	L1	GND
1.922000	20.70	10.4	46	25.3	AV	L1	GND
3.146000	19.80	10.5	46	26.2	AV	L1	GND
16.610000	7.10	10.7	50	42.9	AV	L1	GND
24.002000	18.80	10.9	50	31.2	AV	L1	GND

LINE	N

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "GTI15060127_fin"

6/1/2015 4:55PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.202000	36.40	9.9	64	27.1	QP	N	GND
0.650000	30.70	10.0	56	25.3	QP	N	GND
1.838000	33.60	10.4	56	22.4	QP	N	GND
2.300000	31.90	10.4	56	24.1	QP	N	GND
4.208000	30.10	10.6	56	25.9	QP	N	GND
5.420000	28.10	10.6	60	31.9	QP	N	GND

MEASUREMENT RESULT: "GTI15060127_fin2"

6/1/2015 4:55PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.266000	27.20	9.9	51	24.0	AV	N	GND
0.668000	28.60	10.0	46	17.4	AV	N	GND
0.956000	28.00	10.1	46	18.0	AV	N	GND
1.748000	27.20	10.3	46	18.8	AV	N	GND
2.684000	27.00	10.5	46	19.0	AV	N	GND
4.304000	24.20	10.6	46	21.8	AV	N	GND

3.2. Radiated Emission

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz, VBW=3MHz for Peak Detector while the RBW=1MHz, VBW=10Hz for Average Detector, Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBuV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane..
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

Field Strength Calculation

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

FS = RA + AF + CL – AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

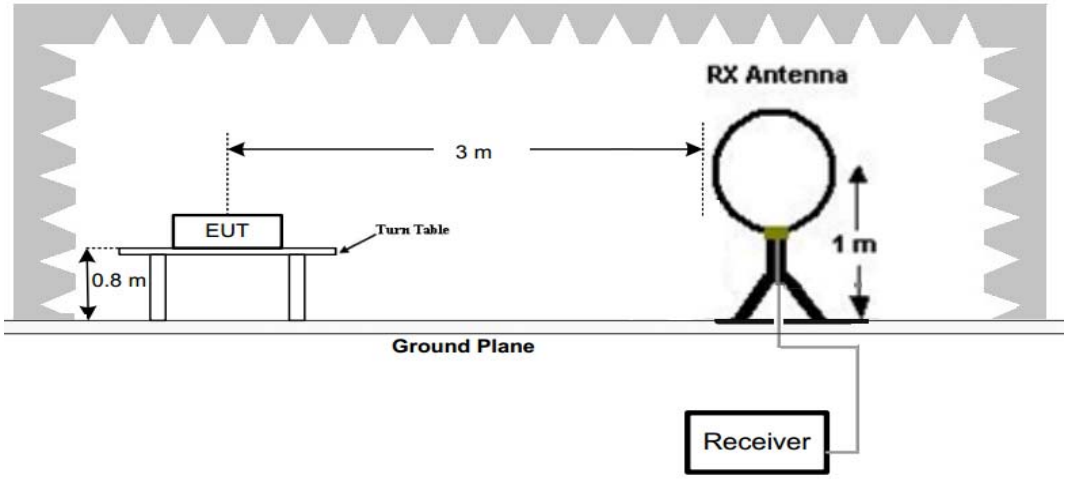
Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
150.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

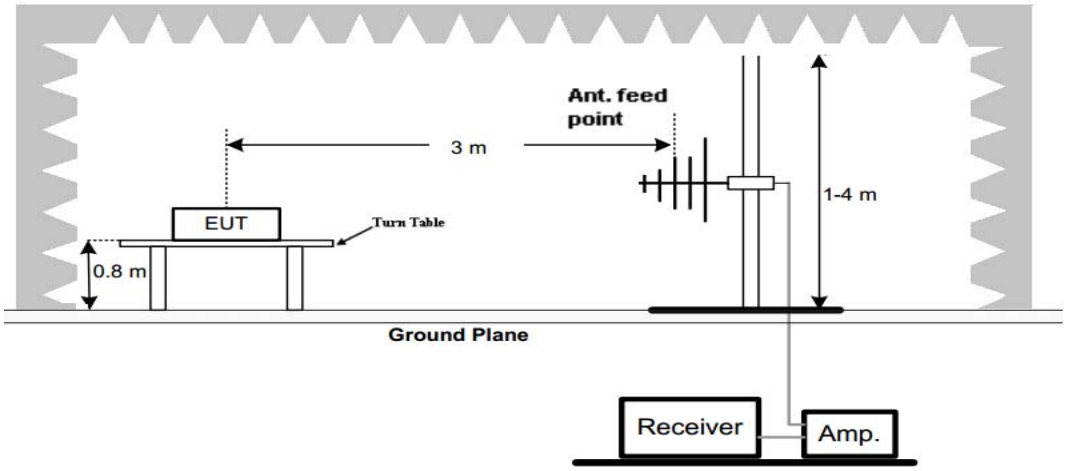
Test Configuration

For the actual test configuration, please refer to the related Item –EUT Test Photos.

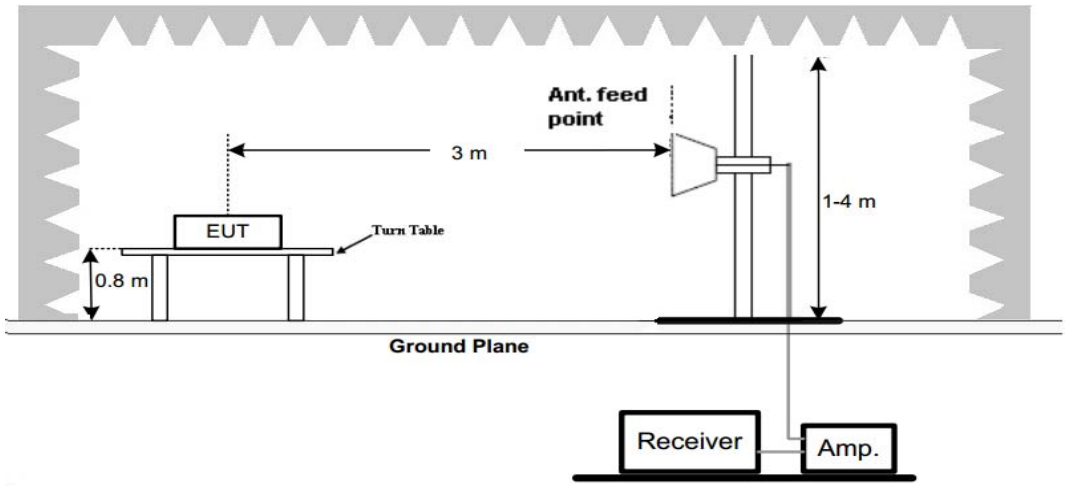
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



Test Results

Remark:

1. We tested three channels for each mode and recorded worst case at low channel of 802.11b and BT 4.0 mode below 1GHz

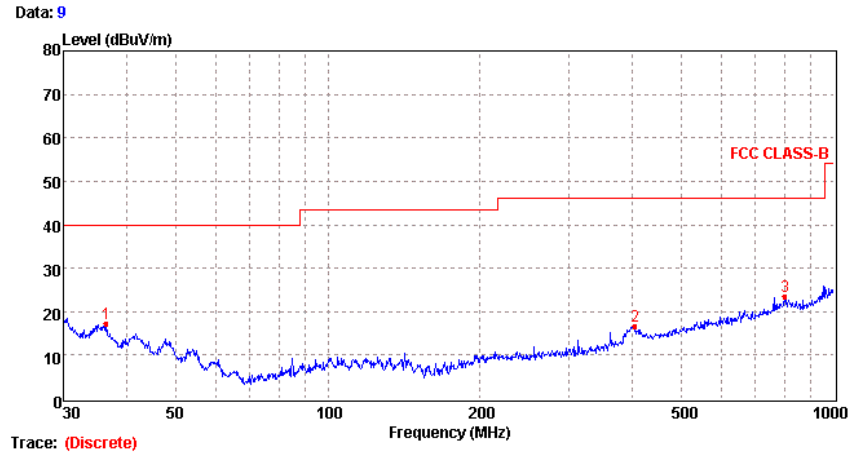
For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.39	51.41	95.78	44.37	QP	PASS
1.58	45.69	63.63	17.94	QP	PASS
13.75	57.22	69.54	12.32	QP	PASS
22.66	49.54	69.54	20.00	QP	PASS

For 30MHz-1GHz

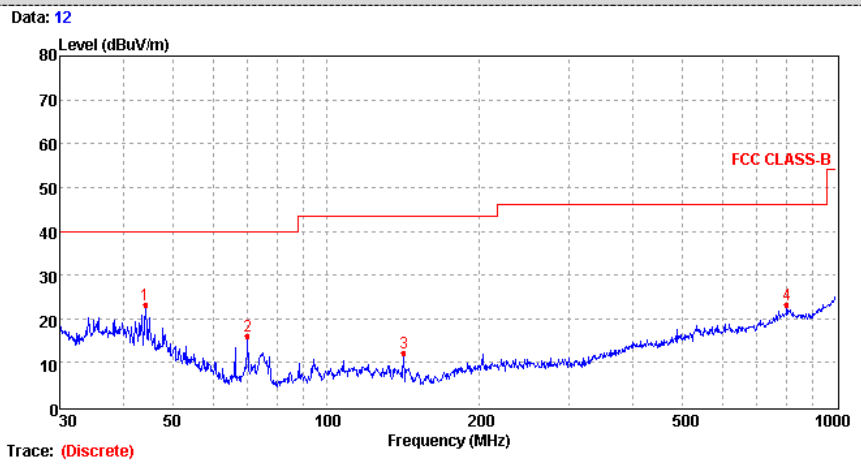
For 802.11B Low Channel

Horizontal



Mark	Frequency MHz	Level dBuV/m	Factor dB/m	Reading dBuV	Limit dBuV/m	Margin dB	Polarization	Detector
1	36.51	17.16	-11.28	28.44	40.00	22.84	HORIZONTAL	Peak
2	404.67	16.54	-13.13	29.67	46.00	29.46	HORIZONTAL	Peak
3	801.79	23.55	-7.24	30.79	46.00	22.45	HORIZONTAL	Peak

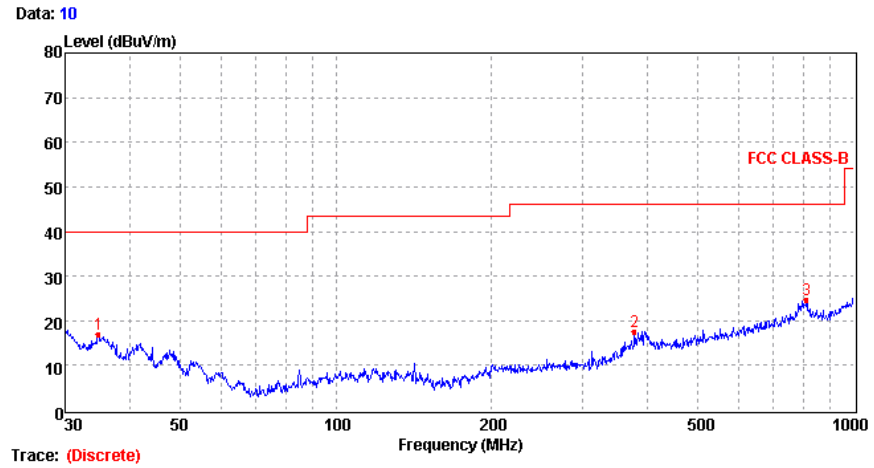
Vertical



Mark	Frequency MHz	Level dBuV/m	Factor dB/m	Reading dBuV	Limit dBuV/m	Margin dB	Polarization	Detector
1	44.12	23.33	-13.78	37.11	40.00	16.67	VERTICAL	Peak
2	70.09	16.17	-23.24	39.41	40.00	23.83	VERTICAL	Peak
3	141.83	12.08	-19.12	31.20	43.50	31.42	VERTICAL	Peak
4	801.79	23.30	-7.24	30.54	46.00	22.70	VERTICAL	Peak

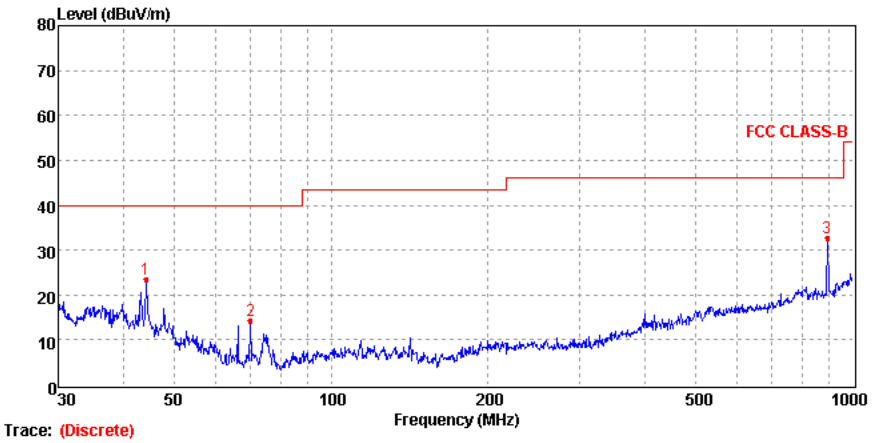
For BT 4.0 Low Channel

Horizontal



Mark	Frequency MHz	Level dBuV/m	Factor dB/m	Reading dBuV	Limit dBuV/m	Margin dB	Polarization	Detector
1	34.76	16.93	-10.48	27.41	40.00	23.07	HORIZONTAL	Peak
2	377.26	17.61	-14.13	31.74	46.00	28.39	HORIZONTAL	Peak
3	810.27	24.73	-7.21	31.94	46.00	21.27	HORIZONTAL	Peak

Vertical



Mark	Frequency MHz	Level dBuV/m	Factor dB/m	Reading dBuV	Limit dBuV/m	Margin dB	Polarization	Detector
1	44.12	23.53	-13.78	37.31	40.00	16.47	VERTICAL	Peak
2	70.09	14.16	-23.24	37.40	40.00	25.84	VERTICAL	Peak
3	893.86	32.59	-6.94	39.53	46.00	13.41	VERTICAL	Peak

For 1GHz to 25GHz

802.11b Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	56.89	PK	74.00	17.11	1	48	54.79	31.6	7.00	36.5	2.10
1	4824	46.70	AV	54.00	7.30	1	48	44.60	31.6	7.00	36.5	2.10
2	7236	51.72	PK	74.00	22.28	1	110	40.79	37.33	8.90	35.3	10.93
2	7236	42.12	AV	54.00	11.88	1	110	31.19	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	57.02	PK	74.00	16.98	1	120	54.92	31.60	7.00	36.50	2.10
1	4824	47.26	AV	54.00	6.74	1	120	45.16	31.60	7.00	36.50	2.10
2	7236	50.79	PK	74.00	23.21	1	145	39.86	37.33	8.90	35.30	10.93
2	7236	41.47	AV	54.00	12.53	1	145	30.54	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	57.51	PK	74.00	16.49	1.00	115	64.38	31.02	7.60	36.5	2.12
1	4874.00	47.81	AV	54.00	6.19	1.00	115	45.62	31.02	7.60	36.5	2.12
2	7311.00	52.33	PK	74.00	21.67	1.00	180	47.52	37.28	8.60	34.8	11.08
2	7311.00	42.27	AV	54.00	11.73	1.00	180	28.69	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	57.54	PK	74.00	16.46	1	110	55.42	31.02	7.60	36.5	2.12
1	4874.00	47.41	AV	54.00	6.59	1	110	45.29	31.02	7.60	36.5	2.12
2	7311.00	50.65	PK	74.00	23.35	1	181	39.57	37.28	8.60	34.8	11.08
2	7311.00	42.10	AV	54.00	11.90	1	181	31.02	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	58.84	PK	74.00	15.16	1	105	56.72	31.58	7.82	36.2	3.20
1	4924.00	47.01	AV	54.00	6.99	1	105	44.89	31.58	7.82	36.2	3.20
2	7386.00	49.91	PK	74.00	24.09	1	75	38.83	38.51	8.73	35.3	11.94
2	7386.00	40.84	AV	54.00	13.16	1	75	29.76	38.51	8.73	35.3	11.94

Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	55.83	PK	74.00	18.17	1	130	52.63	31.58	7.82	36.2	3.20
1	4924.00	46.81	AV	54.00	7.19	1	130	43.61	31.58	7.82	36.2	3.20
2	7386.00	51.66	PK	74.00	22.34	1	120	39.72	38.51	8.73	35.3	11.94
2	7386.00	41.54	AV	54.00	12.46	1	120	29.60	38.51	8.73	35.3	11.94

802.11g Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	55.47	PK	74.00	18.53	1	48	53.37	31.6	7.00	36.5	2.10
1	4824	45.54	AV	54.00	8.46	1	48	43.44	31.6	7.00	36.5	2.10
2	7236	49.39	PK	74.00	24.61	1	110	38.46	37.33	8.90	35.3	10.93
2	7236	40.64	AV	54.00	13.36	1	110	29.71	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	57.08	PK	74.00	16.92	1	120	54.98	31.60	7.00	36.50	2.10
1	4824	47.87	AV	54.00	6.13	1	120	45.77	31.60	7.00	36.50	2.10
2	7236	50.20	PK	74.00	23.80	1	145	39.27	37.33	8.90	35.30	10.93
2	7236	41.55	AV	54.00	12.45	1	145	30.62	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	56.64	PK	74.00	17.36	1	110	54.52	31.02	7.60	36.5	2.12
1	4874.00	45.38	AV	54.00	8.62	1	110	43.26	31.02	7.60	36.5	2.12
2	7311.00	50.43	PK	74.00	23.57	1	181	39.35	37.28	8.60	34.8	11.08
2	7311.00	40.48	AV	54.00	13.52	1	181	29.40	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	56.17	PK	74.00	17.83	1	105	54.05	31.02	7.60	36.5	2.12
1	4874.00	48.97	AV	54.00	5.03	1	105	46.85	31.02	7.60	36.5	2.12
2	7311.00	50.28	PK	74.00	23.72	1	75	39.20	37.28	8.60	34.8	11.08
2	7311.00	41.33	AV	54.00	12.67	1	75	30.25	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	54.71	PK	74.00	19.29	1	130	51.51	31.58	7.82	36.2	3.20
1	4924.00	46.41	AV	54.00	7.59	1	130	43.21	31.58	7.82	36.2	3.20
2	7386.00	50.17	PK	74.00	23.83	1	120	38.23	38.51	8.73	35.3	11.94
2	7386.00	39.47	AV	54.00	14.53	1	120	27.53	38.51	8.73	35.3	11.94

Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	55.70	PK	74.00	18.30	1	25	52.50	55.70	7.82	36.2	3.20
1	4924.00	49.20	AV	54.00	4.80	1	25	46.00	49.20	7.82	36.2	3.20
2	7386.00	50.45	PK	74.00	23.55	1	78	38.51	50.45	8.73	35.3	11.94
2	7386.00	41.28	AV	54.00	12.72	1	78	29.34	41.28	8.73	35.3	11.94

802.11n20 Mode (above 1GHz)

Frequency(MHz):				2412			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	55.02	PK	74.00	18.98	1.00	48	52.92	31.6	7.00	36.5	2.10
1	4824	47.14	AV	54.00	6.86	1.00	48	45.04	31.6	7.00	36.5	2.10
2	7236	48.68	PK	74.00	25.32	1.00	110	37.75	37.33	8.90	35.3	10.93
2	7236	39.17	AV	54.00	14.83	1.00	110	28.24	37.33	8.90	35.3	10.93

Frequency(MHz):				2412			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4824	57.15	PK	74.00	16.85	1.00	120	55.05	31.60	7.00	36.50	2.10
1	4824	48.29	AV	54.00	5.71	1.00	120	46.19	31.60	7.00	36.50	2.10
2	7236	51.72	PK	74.00	22.28	1.00	145	40.79	37.33	8.90	35.30	10.93
2	7236	42.08	AV	54.00	11.92	1.00	145	31.15	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	56.38	PK	74.00	17.62	1.00	105	54.26	56.38	7.60	36.5	2.12
1	4874.00	48.60	AV	54.00	5.40	1.00	105	46.48	48.60	7.60	36.5	2.12
2	7311.00	51.34	PK	74.00	22.66	1.00	75	40.26	51.34	8.60	34.8	11.08
2	7311.00	43.25	AV	54.00	10.75	1.00	75	32.17	43.25	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	55.81	PK	74.00	18.19	1.00	95	65.67	31.02	7.60	36.5	2.12
1	4874.00	46.81	AV	54.00	7.19	1.00	95	46.38	31.02	7.60	36.5	2.12
2	7311.00	49.58	PK	74.00	24.42	1.00	70	49.52	37.28	8.60	34.8	11.08
2	7311.00	40.81	AV	54.00	13.19	1.00	70	30.31	37.28	8.60	34.8	11.08

Frequency(MHz):				2462			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	54.54	PK	74.00	19.46	1.00	130	51.34	31.58	7.82	36.2	3.20
1	4924.00	44.86	AV	54.00	9.14	1.00	130	41.66	31.58	7.82	36.2	3.20
2	7386.00	50.00	PK	74.00	24.00	1.00	120	38.06	38.51	8.73	35.3	11.94
2	7386.00	40.91	AV	54.00	13.09	1.00	120	28.97	38.51	8.73	35.3	11.94

Frequency(MHz):				2462			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	55.47	PK	74.00	18.53	1.00	25	52.27	31.58	7.82	36.2	3.20
1	4924.00	48.58	AV	54.00	5.42	1.00	25	45.38	31.58	7.82	36.2	3.20
2	7386.00	50.12	PK	74.00	23.88	1.00	78	38.18	38.51	8.73	35.3	11.94
2	7386.00	41.67	AV	54.00	12.33	1.00	78	29.73	38.51	8.73	35.3	11.94

802.11n40 Mode (above 1GHz)

Frequency(MHz):				2422			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4844.00	52.33	PK	74.00	21.67	1.00	48	50.23	31.6	7.00	36.5	2.10
1	4844.00	44.44	AV	54.00	9.56	1.00	48	42.34	31.6	7.00	36.5	2.10
2	7266.00	47.26	PK	74.00	26.74	1.00	110	36.33	37.33	8.90	35.3	10.93
2	7266.00	38.17	AV	54.00	15.83	1.00	110	27.24	37.33	8.90	35.3	10.93

Frequency(MHz):				2422			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4844.00	54.04	PK	74.00	19.96	1.00	120	51.94	31.60	7.00	36.50	2.10
1	4844.00	43.95	AV	54.00	10.05	1.00	120	41.85	31.60	7.00	36.50	2.10
2	7266.00	48.77	PK	74.00	25.23	1.00	145	37.84	37.33	8.90	35.30	10.93
2	7266.00	37.87	AV	54.00	16.13	1.00	145	26.94	37.33	8.90	35.30	10.93

Frequency(MHz):				2437			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4844.00	53.14	PK	74.00	20.86	1.00	110	51.02	31.02	7.60	36.5	2.12
1	4844.00	42.86	AV	54.00	11.14	1.00	110	40.74	31.02	7.60	36.5	2.12
2	7266.00	46.62	PK	74.00	27.38	1.00	181	35.54	37.28	8.60	34.8	11.08
2	7266.00	37.80	AV	54.00	16.20	1.00	181	26.72	37.28	8.60	34.8	11.08

Frequency(MHz):				2437			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4874.00	52.28	PK	74.00	21.72	1.00	105	50.16	31.02	7.60	36.5	2.12
1	4874.00	44.04	AV	54.00	9.96	1.00	105	41.92	31.02	7.60	36.5	2.12
2	7311.00	48.19	PK	74.00	25.81	1.00	75	37.11	37.28	8.60	34.8	11.08
2	7311.00	40.13	AV	54.00	13.87	1.00	75	29.05	37.28	8.60	34.8	11.08

Frequency(MHz):				2452			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	53.15	PK	74.00	20.85	1.00	130	49.95	31.58	7.82	36.2	3.20
1	4924.00	42.57	AV	54.00	11.43	1.00	130	39.37	31.58	7.82	36.2	3.20
2	7386.00	45.80	PK	74.00	28.20	1.00	120	33.86	38.51	8.73	35.3	11.94
2	7386.00	37.19	AV	54.00	16.81	1.00	120	25.25	38.51	8.73	35.3	11.94

Frequency(MHz):				2452			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	53.29	PK	74.00	20.71	1.00	25	50.09	31.58	7.82	36.2	3.20
1	4924.00	45.80	AV	54.00	8.20	1.00	25	42.60	31.58	7.82	36.2	3.20
2	7386.00	49.17	PK	74.00	24.83	1.00	78	37.23	38.51	8.73	35.3	11.94
2	7386.00	39.42	AV	54.00	14.58	1.00	78	27.48	38.51	8.73	35.3	11.94

BT 4.0 Mode (above 1GHz)

Frequency(MHz):				2402			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4804.00	49.57	PK	74.00	24.43	1.00	90	47.67	31.42	7.00	36.5	2.10
1	4804.00	40.75	AV	54.00	13.25	1.00	90	38.85	31.42	7.00	36.5	2.10
2	7206.00	41.49	PK	74.00	32.51	1.00	100	30.89	37.03	8.90	35.3	10.93
2	7206.00	--	AV	--	--	--	--	--	--	--	--	--

Frequency(MHz):				2402			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4804.00	49.79	PK	74.00	24.21	1.00	120	47.89	31.60	7.00	36.50	2.10
1	4804.00	39.81	AV	54.00	14.19	1.00	120	37.91	31.60	7.00	36.50	2.10
2	7206.00	43.89	PK	74.00	30.11	1.00	115	33.29	37.33	8.90	35.30	10.93
2	7206.00	--	AV	--	--	--	--	--	--	--	--	--

Frequency(MHz):				2440			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4880.00	48.43	PK	74.00	25.57	1.00	170	46.37	31.02	7.60	36.5	2.12
1	4880.00	39.77	AV	54.00	14.23	1.00	170	37.71	31.02	7.60	36.5	2.12
2	7320.00	42.55	PK	74.00	31.45	1.00	95	31.63	37.28	8.60	34.8	11.08
2	7320.00	--	AV	--	--	--	--	--	--	--	--	--

Frequency(MHz):				2440			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4880.00	49.74	PK	74.00	24.26	1.00	180	47.68	31.02	7.60	36.5	2.12
1	4880.00	39.73	AV	54.00	14.27	1.00	180	37.67	31.02	7.60	36.5	2.12
2	7320.00	43.64	PK	74.00	30.36	1.00	95	32.72	37.28	8.60	34.8	11.08
2	7320.00	--	AV	--	--	--	--	--	--	--	--	--

Frequency(MHz):				2480			Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4960.00	50.58	PK	74.00	23.42	1.00	79	47.51	31.58	7.82	36.2	3.20
1	4960.00	39.93	AV	54.00	14.07	1.00	79	36.86	31.58	7.82	36.2	3.20
2	7340.00	41.76	PK	74.00	32.24	1.00	125	30.02	38.51	8.73	35.3	11.94
2	7340.00	--	AV	--	--	--	--	--	--	--	--	--

Frequency(MHz):				2480			Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4960.00	51.35	PK	74.00	22.65	1.00	125	48.28	31.58	7.82	36.2	3.20
1	4960.00	40.73	AV	54.00	13.27	1.00	125	37.66	31.58	7.82	36.2	3.20
2	7340.00	44.69	PK	74.00	29.31	1.00	130	32.95	38.51	8.73	35.3	11.94
2	7340.00	--	AV	--	--	--	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

3.3. Maximum Conducted Output Power

Limit

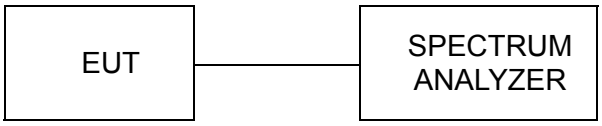
30dBm for digital modulation systems.

Test Procedure

- For Maximum conducted (average) output power
  1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the SPECTRUM.
  2. Ensure EUT transmitting with a duty cycle ≥ 98 %.
  3. Set SA as fellow:
     a) Center frequency: frequency to be tested.
     b) Span: ≥1.5 times the OBW.
     c) RBW:= 1-5% of the OBW, not to exceed 1 MHz.
     d) VBW: ≥ 3 x RBW.
     e) Sweep points: 8001
     f) Sweep time: auto
     g) Detector: RMS
     h) Trace: Average(100 traces)
  4. Allow trace to fully stabilize
  5. Use instrument's band power measurement function to integrate power in this band across a bandwidth OBW.
- Maximum peak conducted output power
  1. Set the RBW ≥ *DTS bandwidth*
  2. Set VBW ≥ 3 × RBW.
  3. Set span ≥ 3 x RBW
  4. Sweep time = auto couple.
  5. Detector = peak.
  6. Trace mode = max hold.
  7. Allow trace to fully stabilize.
  8. Use peak marker function to determine the peak amplitude level

Note: WIFI: Use the maximum (average) conducted output power test procedure
BT4.0: Use the maximum peak conducted output power test procedure

Test Configuration



Test Results

WIFI

Type	Channel	Output power AV(dBm)	Limit (dBm)	Result
802.11b	01	17.06	30.00	Pass
	06	17.09		
	11	17.03		
802.11g	01	14.23	30.00	Pass
	06	14.52		
	11	14.17		
802.11n(H20)	01	13.99	30.00	Pass
	06	14.56		
	11	14.21		
802.11n(H40)	03	12.19	30.00	Pass
	06	12.96		
	09	12.88		

Note: 1.The test results including the cable lose.

BT4.0

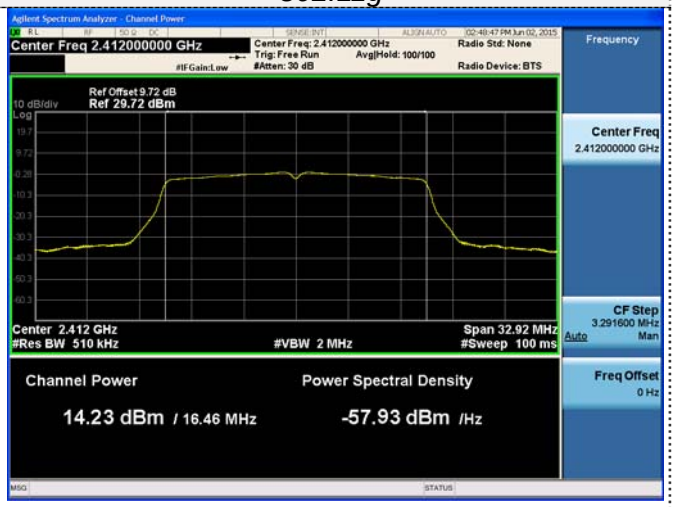
Type	Channel	Output power PK(dBm)	Limit (dBm)	Result
GFSK	00	-3.759	30.00	Pass
	19	-2.067		
	39	-2.930		

Note: The test results including the cable loss.

Test plot as follows:

802.11b

802.11g



CH01

CH01

CH06

CH06

CH11

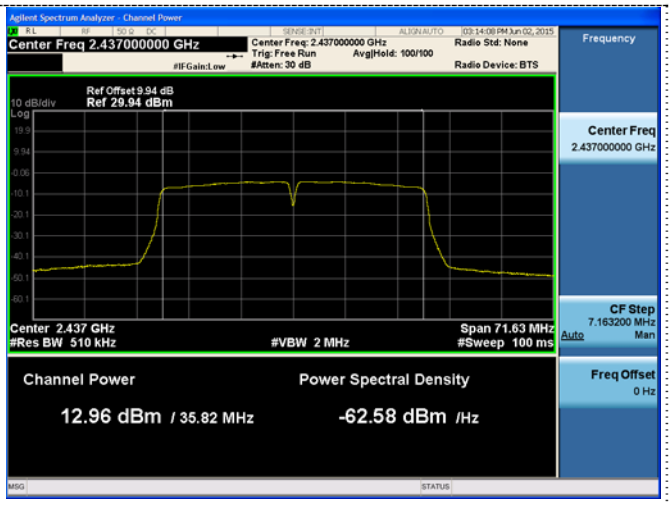
CH11

802.11n20

802.11n40

CH01

CH01



CH06

CH06

CH11

CH11

BT4.0

CH00

CH19

CH39

3.4. Power Spectral Density

Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

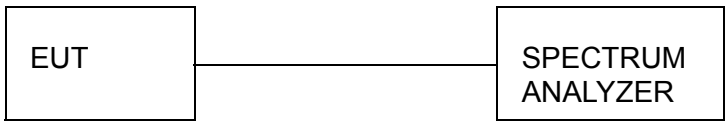
- Use this procedure when the maximum (average) conducted output power was used to demonstrate compliance to the output power limit.
  1. Set analyzer center frequency to DTS channel center frequency.
  2. Set span to at least 1.5 times the OBW
  3. RBW: 3 kHz ≤ RBW ≤ 100 kHz.
  4. VBW: ≥3 x RBW.
  5. Detector: power averaging (RMS)
  6. Sweep time: Auto couple.
  7. Swoop points: ≥ 2 × span / RBW.
  8. Trace mode = Average (100 traces)
  9. Use the peak marker function to determine the maximum power level.
  10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Note: This test procedure is used for WIFI in this report

- This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance to the output power limit.
  1. Set analyzer center frequency to DTS channel center frequency.
  2. Set the span to 1.5 times the DTS bandwidth.
  3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
  4. Set the VBW ≥ 3 × RBW.
  5. Detector = peak.
  6. Sweep time = auto couple.
  7. Trace mode = max hold.
  8. Allow trace to fully stabilize.
  9. Use the peak marker function to determine the maximum amplitude level within the RBW.
  10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

Note: This test procedure is used for bt 4.0 in this report

Test Configuration



Test Results

WIFI

Type	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-6.464	8.00	Pass
	06	-5.493		
	11	-5.173		
802.11g	01	-9.514	8.00	Pass
	06	-9.045		
	11	-9.520		
802.11n(HT20)	01	-10.963	8.00	Pass
	06	-9.191		
	11	-9.577		
802.11n(HT40)	03	-15.225	8.00	Pass
	06	-14.689		
	09	-14.134		

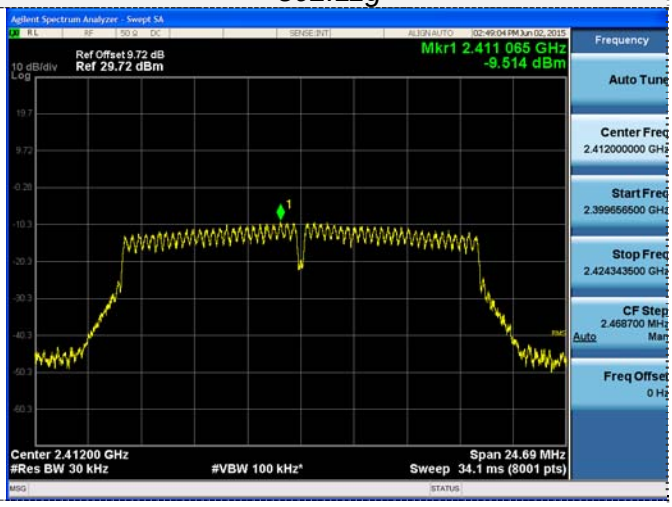
BT4.0

Type	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
BT4.0	00	-8.175	8.00	Pass
	19	-6.688		
	39	-7.332		

Test plot as follows:

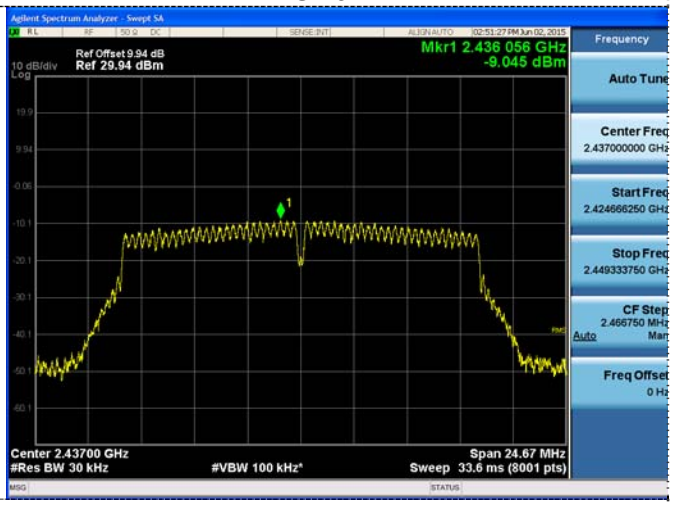
802.11b

802.11g



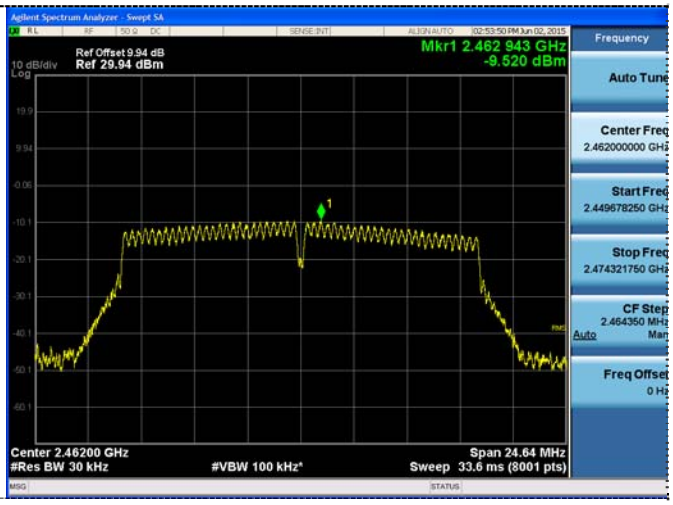
CH01

CH01



CH06

CH06



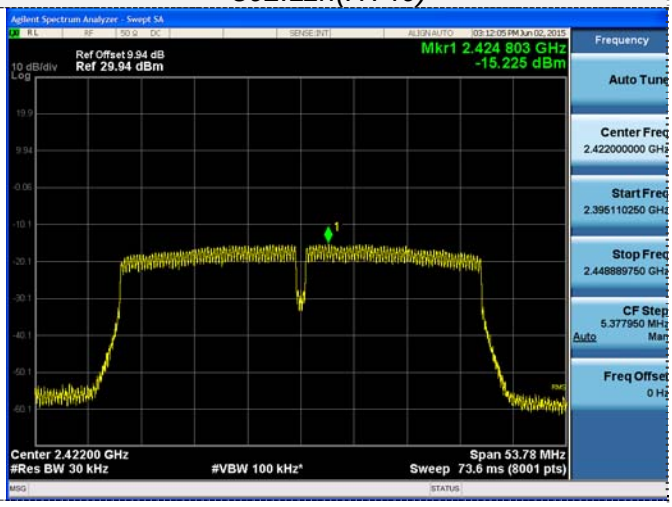
CH11

CH11

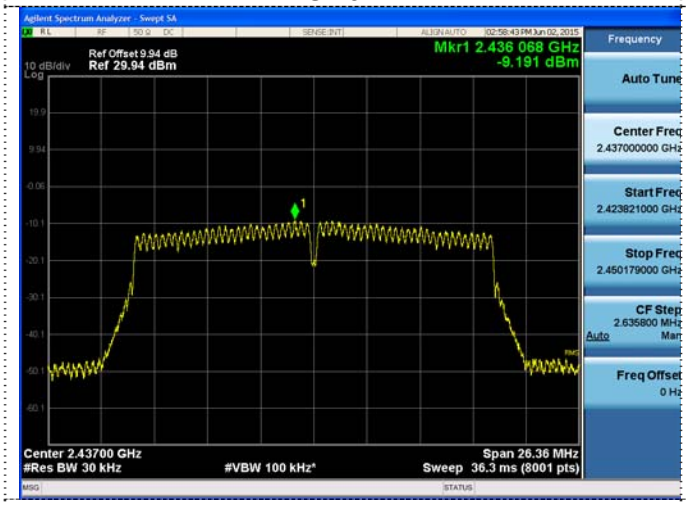
802.11n(HT20)

CH01

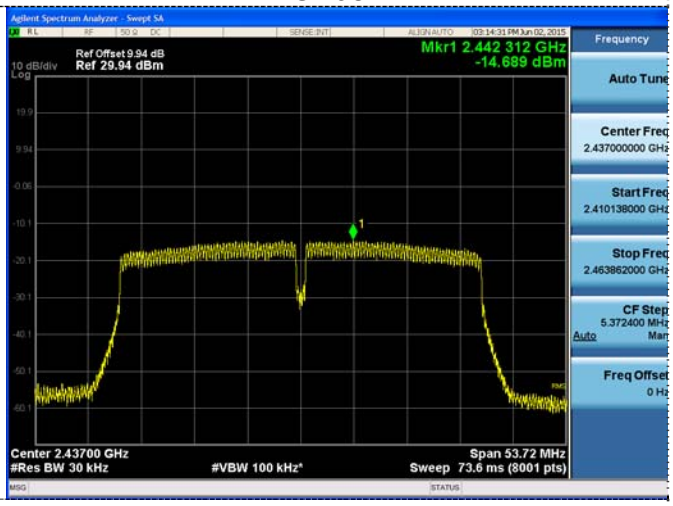
802.11n(HT40)



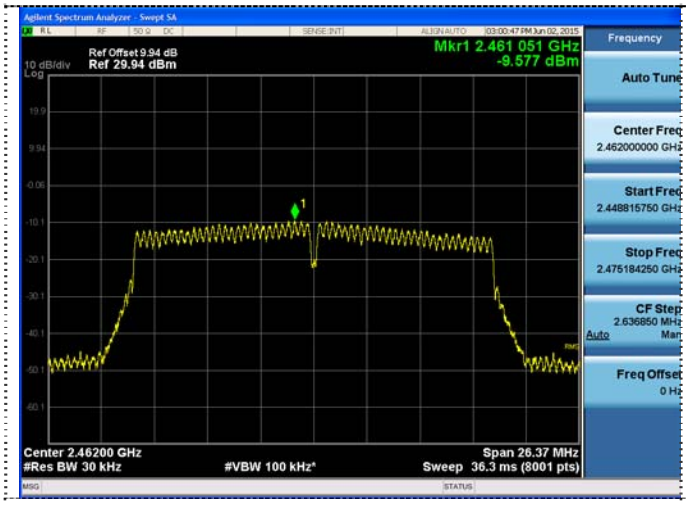
CH03



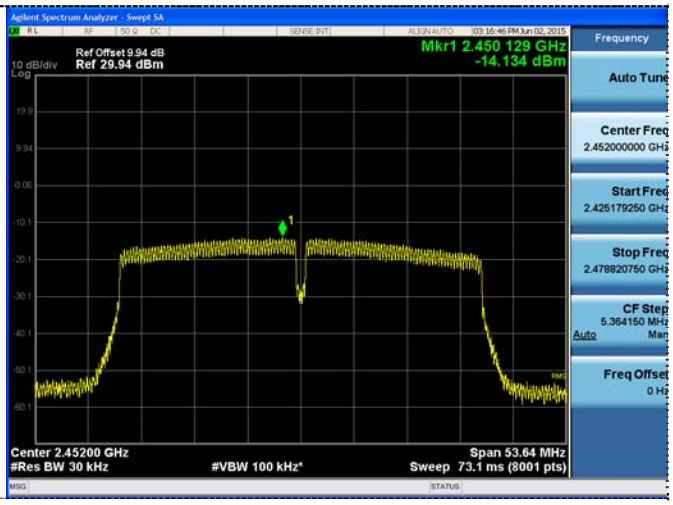
CH06



CH06



CH11



CH09

BT4.0

CH00

CH19

CH39

3.5. 6dB Bandwidth

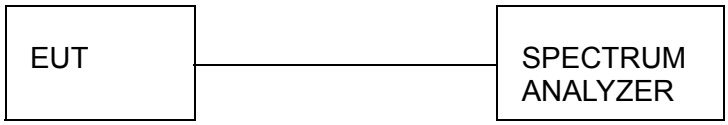
Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Set SA as follow:
   a) RBW: 100 kHz.
   b) VBW: ≥ 3 × RBW.
   c) Detector: Peak.
   d) Trace mode: max hold.
   e) Sweep: auto couple.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration



Test Results

WIFI

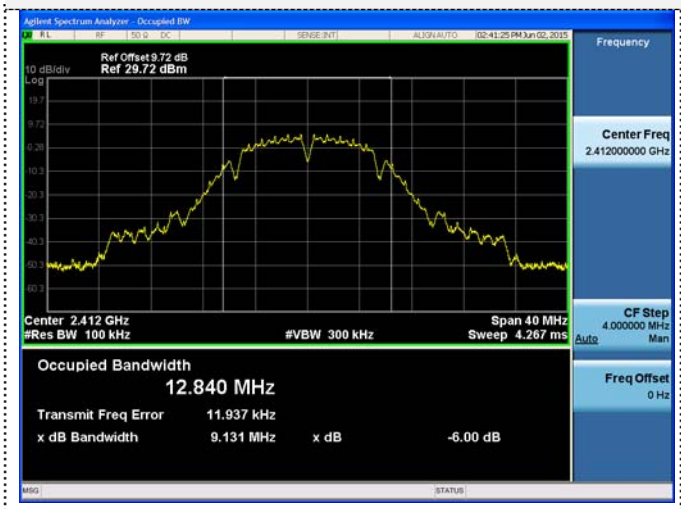
Type	Channel	6dB Bandwidth (MHz)	99% OBW (MHz)	Limit (KHz)	Result
802.11b	01	9.131	12.840	≥500	Pass
	06	9.132	12.879		
	11	9.506	13.015		
802.11g	01	16.39	16.458	≥500	Pass
	06	16.40	16.445		
	11	16.44	16.429		
802.11n(HT20)	01	17.60	17.569	≥500	Pass
	06	17.59	17.572		
	11	17.62	17.579		
802.11n(HT40)	03	36.33	35.853	≥500	Pass
	06	36.34	35.816		
	09	35.70	35.761		

BT4.0

Type	Channel	6dB Bandwidth (MHz)	99% OBW (MHz)	Limit (KHz)	Result
GFSK	00	0.6818	1.0253	≥500	Pass
	19	0.6948	1.0270		
	39	0.6900	1.0284		

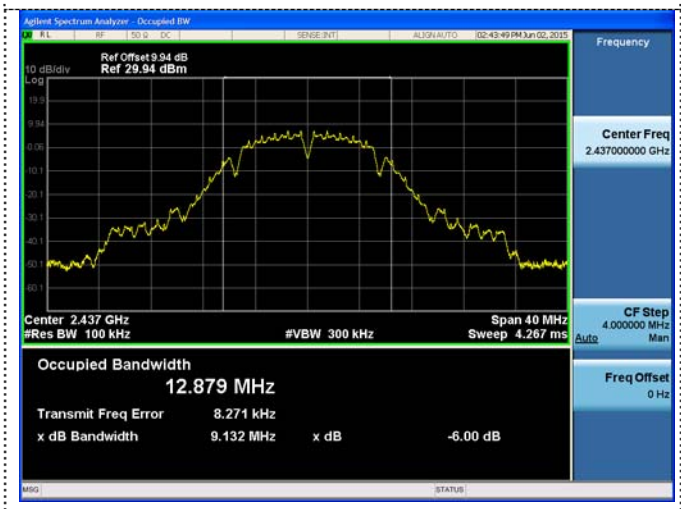
Test plot as follows:

802.11b



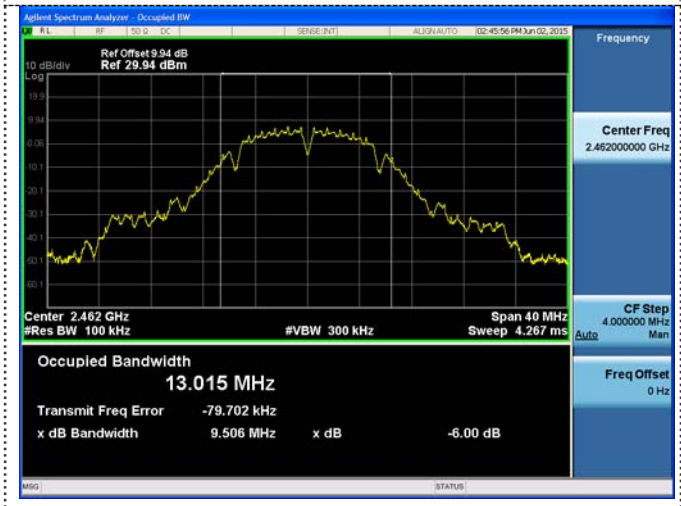
802.11g

CH01



CH01

CH06

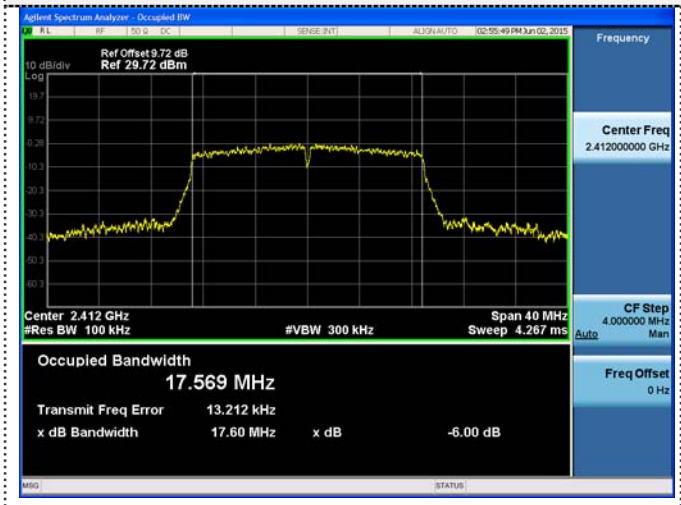


CH06

CH11

CH11

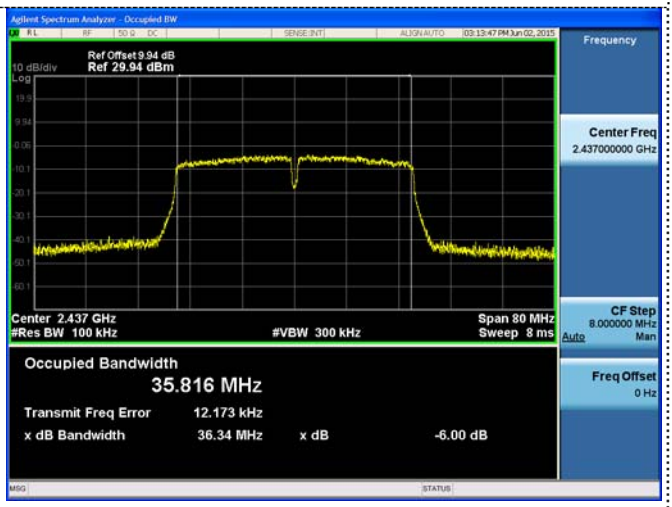
802.11n(HT20)



802.11n(HT40)

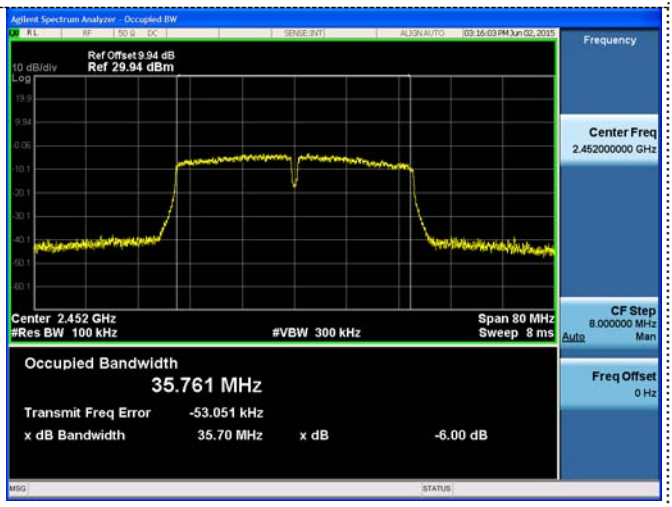
CH01

CH00



CH06

CH06



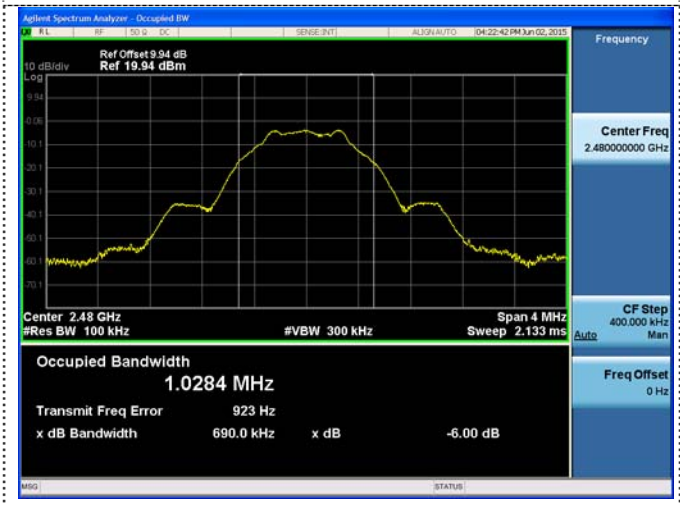
CH11

CH09

BT4.0

CH00

CH19



CH39

3.6. Band Edge Compliance of RF Emission

Limit

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. 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)).

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)

Test Procedure

Test Procedure tor conducted method

- Use this procedure when the maximum (average) conducted output power was used to demonstrate compliance to the output power limit.
  1. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a spectrum analyzer
  2. Turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
  3. Set spectrum analyzer RBW =100 kHz, VBW=300 kHz, Detector=RMS, Sweep point=≥ 2 × span / RBW, Sweep time=Auto, trace= Average(100 traces)
  4. Marker the highest point which fall into restricted frequency bands
  5. Repeat above procedures until all measured frequencies were complete.

Note: This test procedure is used for WIFI in this report

- This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance to the output power limit.
  1. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a spectrum analyzer
  2. Turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
  3. Set spectrum analyzer RBW =100 kHz, VBW=300 kHz, Detector=peak, Sweep time=Auto, trace=maxhold
  4. Marker the highest point which fall into restricted frequency bands
  5. Repeat above procedures until all measured frequencies were complete.

Note: This test procedure is used for BT4.0 in this report

Test Procedure tor radiated method

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The antenna 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 polarizations 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 rotatable 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel
7. Test the EUT in the lowest channel, the highest channel
8. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
9. Repeat above procedures until all frequencies measured was complete.

Test Results

A. **Conducted measurements**

802.11b			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2353.966	56.16	30	PASS
2484.000	55.25	30	PASS

2412

2462

802.11g			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2389.258	43.84	30	PASS
2483.516	41.53	30	PASS

2412

2462

802.11n20			
Frequency (MHz)	Delta Peak to Band emission (dBc)	Limit (dBc)	Verdict
2389.449	44.84	30	PASS
2483.573	41.72	30	PASS

2412

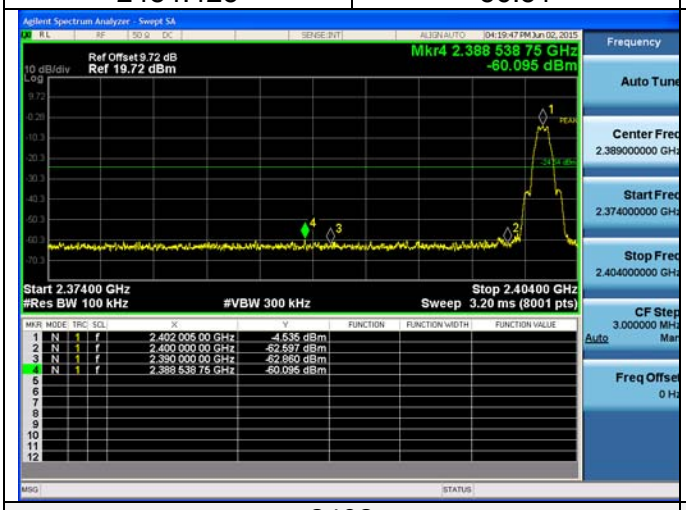
2462

802.11n40			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2389.465	41.15	30	PASS
2483.555	41.36	30	PASS

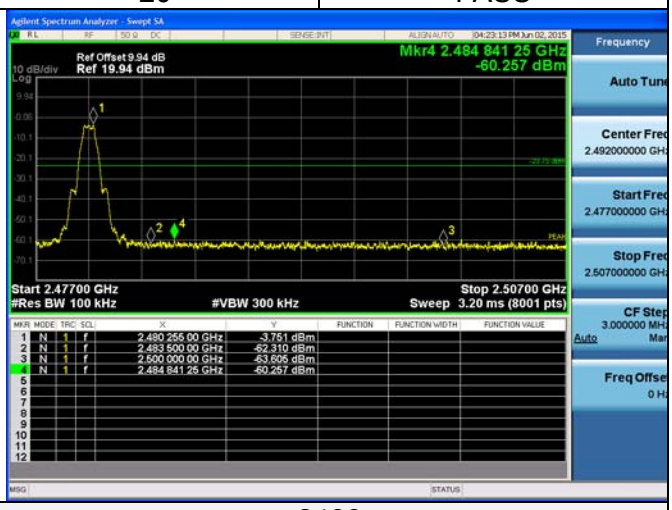
2422

2452

BT4.0			
Frequency (MHz)	**Delta Peak to Band emission (dBc)**	**Limit (dBc)**	**Verdict**
2388.538	55.56	20	PASS
2484.425	56.51	20	PASS



2402



2480

B. **Radiated measurements**

802.11b

Frequency(MHz):			2412			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	57.22	PK	74.00	16.78	1.00	130	62.53	27.49	3.32	36.12	-5.31
2390.00	49.13	AV	54.00	4.87	1.00	130	54.44	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	55.76	PK	74.00	18.24	1.00	45	61.07	27.49	3.32	36.12	-5.31
2390.00	46.91	AV	54.00	7.09	1.00	45	52.22	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	53.72	PK	74.00	20.28	1.00	170	59.44	27.45	3.38	36.55	-5.72
2483.50	45.17	AV	54.00	8.83	1.00	170	50.89	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	51.35	PK	74.00	22.65	1.00	145	57.07	27.45	3.38	36.55	-5.72
2483.50	45.48	AV	54.00	8.52	1.00	145	51.20	27.45	3.38	36.55	-5.72

802.11g

Frequency(MHz):			2412			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	58.34	PK	74.00	15.66	1.00	130	63.65	27.49	3.32	36.12	-5.31
2390.00	49.57	AV	54.00	4.43	1.00	130	54.88	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	55.59	PK	74.00	18.41	1.00	45	60.90	27.49	3.32	36.12	-5.31
2390.00	47.76	AV	54.00	6.24	1.00	45	53.07	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	55.34	PK	74.00	18.66	1.00	170	61.06	27.45	3.38	36.55	-5.72
2483.50	46.72	AV	54.00	7.28	1.00	170	52.44	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	52.33	PK	74.00	21.67	1.00	145	58.05	27.45	3.38	36.55	-5.72
2483.50	45.31	AV	54.00	8.69	1.00	145	51.03	27.45	3.38	36.55	-5.72

802.11n20

Frequency(MHz):			2412			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	58.15	PK	74.00	15.85	1.00	130	63.46	27.49	3.32	36.12	-5.31
2390.00	49.11	AV	54.00	4.89	1.00	130	54.42	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2412**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	56.40	PK	74.00	17.60	1.00	45	61.71	27.49	3.32	36.12	-5.31
2390.00	47.48	AV	54.00	6.52	1.00	45	52.79	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2462**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	54.54	PK	74.00	19.46	1.00	170	60.26	27.45	3.38	36.55	-5.72
2483.50	45.57	AV	54.00	8.43	1.00	170	51.29	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2462**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	53.84	PK	74.00	20.16	1.00	145	59.56	27.45	3.38	36.55	-5.72
2483.50	47.18	AV	54.00	6.82	1.00	145	52.90	27.45	3.38	36.55	-5.72

802.11n40

Frequency(MHz):			2422			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	57.98	PK	74.00	16.02	1.00	130	63.29	27.49	3.32	36.12	-5.31
2390.00	49.22	AV	54.00	4.78	1.00	130	54.53	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2422**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	55.20	PK	74.00	18.80	1.00	45	60.51	27.49	3.32	36.12	-5.31
2390.00	48.95	AV	54.00	5.05	1.00	45	54.26	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2452**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	55.75	PK	74.00	18.25	1.00	170	61.47	27.45	3.38	36.55	-5.72
2483.50	46.43	AV	54.00	7.57	1.00	170	52.15	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2452**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	52.45	PK	74.00	21.55	1.00	145	58.17	27.45	3.38	36.55	-5.72
2483.50	47.13	AV	54.00	6.87	1.00	145	52.85	27.45	3.38	36.55	-5.72

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Frequency(MHz):			2402			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	49.25	PK	74.00	24.75	1.00	130	54.56	27.49	3.32	36.12	-5.31
2390.00	40.68	AV	54.00	13.32	1.00	130	45.99	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2402**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	46.43	PK	74.00	27.57	1.00	45	51.74	27.49	3.32	36.12	-5.31
2390.00	40.39	AV	54.00	13.61	1.00	45	45.70	27.49	3.32	36.12	-5.31
Frequency(MHz):			**2480**			**Polarity:**			**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	46.02	PK	74.00	27.98	1.00	170	51.74	27.45	3.38	36.55	-5.72
2483.50	37.98	AV	54.00	16.02	1.00	170	43.70	27.45	3.38	36.55	-5.72
Frequency(MHz):			**2480**			**Polarity:**			**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	43.19	PK	74.00	30.81	1.00	145	48.91	27.45	3.38	36.55	-5.72
2483.50	36.72	AV	54.00	17.28	1.00	145	42.44	27.45	3.38	36.55	-5.72