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TEST REPORT

FCC PART 15.247

Report Reference No. .....: **CTL1601120121-WF-02**

Compiled by: (position+printed name+signature)	Jacky Chen (File administrators)	Jacky Chen
Tested by: (position+printed name+signature)	Allen Wang (Test Engineer)	Allen Wang
Approved by: (position+printed name+signature)	Tracy Qi (Manager)	Tracy Qi

Product Name.....: Smart POS

Model/Type reference .....: WIZARHAND Q1

List Model(s).....: /

Trade Mark .....: wizarPOS

FCC ID .....: **2AG97-Q1**

Applicant's name .....: **WizarPos International Co., Ltd.**

Address of applicant .....: 3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA

Test Firm .....: **Shenzhen CTL Testing Technology Co., Ltd.**

Address of Test Firm .....: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Test specification.....:

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

TRF Originator .....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF .....: Dated 2011-01

Date of Receipt.....: Jan. 12, 2016

Date of Test Date.....: Jan. 13, 2016–Jan. 27, 2016

Data of Issue.....: Jan. 28, 2016

Result.....: Positive

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TEST REPORT

Test Report No. :	CTL1601120121-WF-02	Jan. 28, 2016 Date of issue

Equipment under Test	:	Smart POS
Model /Type	:	WIZARHAND Q1
Listed Models	:	/
Applicant	:	**WizarPos International Co.,Ltd.**
Address	:	3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA
Manufacturer	:	**WizarPos International Co.,Ltd.**
Address	:	3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA

Test result	**Pass ***

＊ In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2016-01-28	CTL1601120121-WF-02	Tracy Qi

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Shenzhen CTL Testing Technology Co.,Ltd.

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 C63.10: 2013: 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 15.247		
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

Shenzhen CTL Testing Technology Co.,Ltd.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing 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 970318, December 19, 2013.

1.4. Statement of the 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 CTL Testing 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 CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

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

2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Smart POS
Model/Type reference:	WIZARHAND Q1
Power supply:	DC 7.4V from battery
Adapter information:	Model:SK02G-0900200U Input:AC100-240V 50/60Hz 0.6A Max Output:9V⎓2A
Hardware version:	1.0.0
Software version:	1.0.0
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:	0.85dBi
Bluetooth BLE	
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:	0.85dBi

Note: For more details, please refer to the user’s manual of the EUT.

2.3. Description of Test Modes and Test Frequency

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.

There are 11 channels provided to the EUT and Channel 01/06/11 were selected for WIFI test.

There are 39 channels provided to the EUT and Channel 00/19/39 were selected for BT4.0 test.

Operation Frequency WIFI：

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		

Operation Frequency List BT4.0：

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

Note: The line display in grey were the channel selected for testing

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 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. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	N9020	US46220290	2016/1/17	2017/1/16
Power Meter	Anritsu	ML2487B	110553	2015/06/02	2016/06/01
Power Sensor	Anritsu	MA2411B	100345	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2015/05/19	2016/05/18
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Transient Limiter	SCHWARZCECK	VTSD 9561F	9666	2015/06/02	2016/06/01
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19

The calibration interval was one year

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AG97-Q1 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

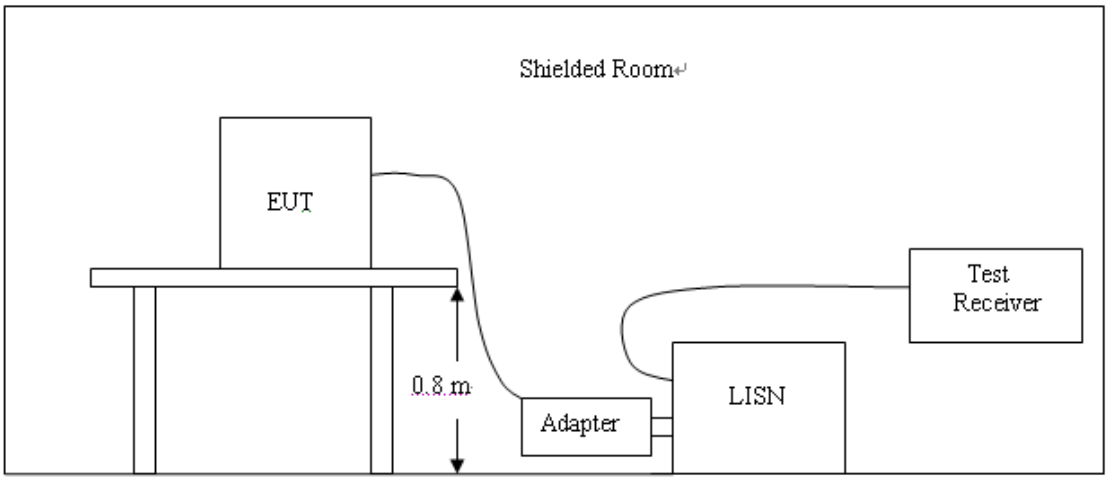
LIMIT

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



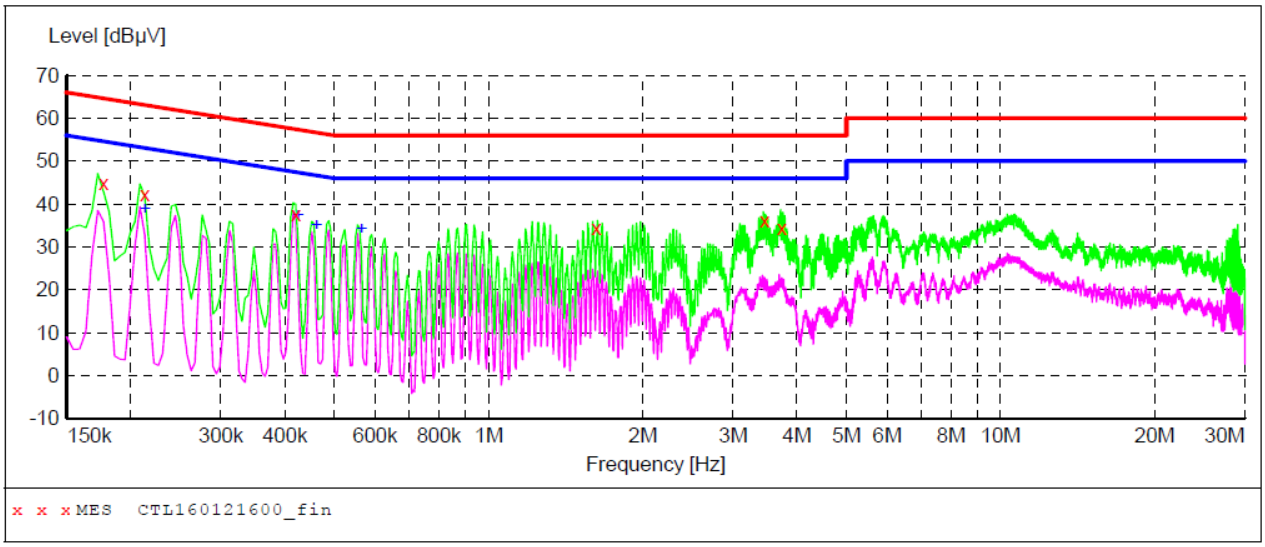
TEST PROCEDURE

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 C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. 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

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160121600_fin"

1/21/2016 9:53AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177001	44.90	10.2	65	19.7	QP	L1	GND
0.213001	42.20	10.2	63	20.9	QP	L1	GND
0.420001	37.40	10.2	57	20.0	QP	L1	GND
1.621501	34.30	10.3	56	21.7	QP	L1	GND
3.457501	36.00	10.4	56	20.0	QP	L1	GND
3.736501	34.30	10.4	56	21.7	QP	L1	GND

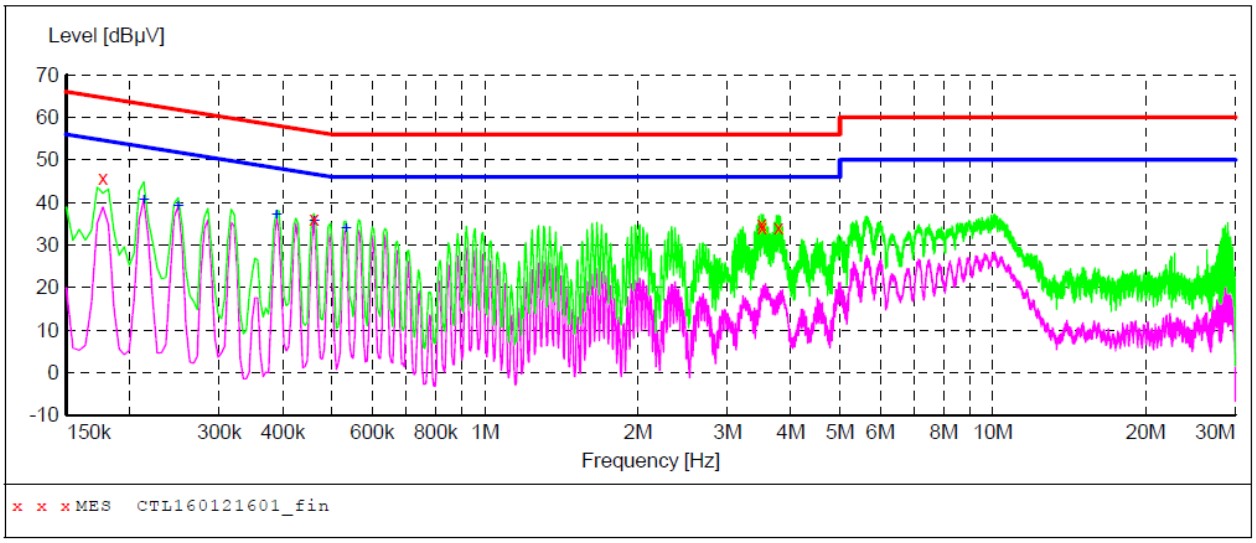
MEASUREMENT RESULT: "CTL160121600_fin2"

1/21/2016 9:53AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.213001	38.60	10.2	53	14.5	AV	L1	GND
0.424501	37.20	10.2	47	10.2	AV	L1	GND
0.460501	35.00	10.2	47	11.7	AV	L1	GND
0.564001	34.00	10.2	46	12.0	AV	L1	GND

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160121601_fin"

1/21/2016 9:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177001	45.60	10.2	65	19.0	QP	N	GND
0.460501	36.20	10.2	57	20.5	QP	N	GND
3.502501	34.90	10.4	56	21.1	QP	N	GND
3.507001	34.20	10.4	56	21.8	QP	N	GND
3.786001	34.00	10.4	56	22.0	QP	N	GND

MEASUREMENT RESULT: "CTL160121601_fin2"

1/21/2016 9:57AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.213001	40.50	10.2	53	12.6	AV	N	GND
0.249001	38.90	10.2	52	12.9	AV	N	GND
0.388501	37.10	10.2	48	11.0	AV	N	GND
0.460501	35.60	10.2	47	11.1	AV	N	GND
0.532501	33.90	10.2	46	12.1	AV	N	GND

Remark:802.11b/802.11g/802.11n(H20)/802.11n(H40) and BLE mode all have been tested ,only worse case is reported

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

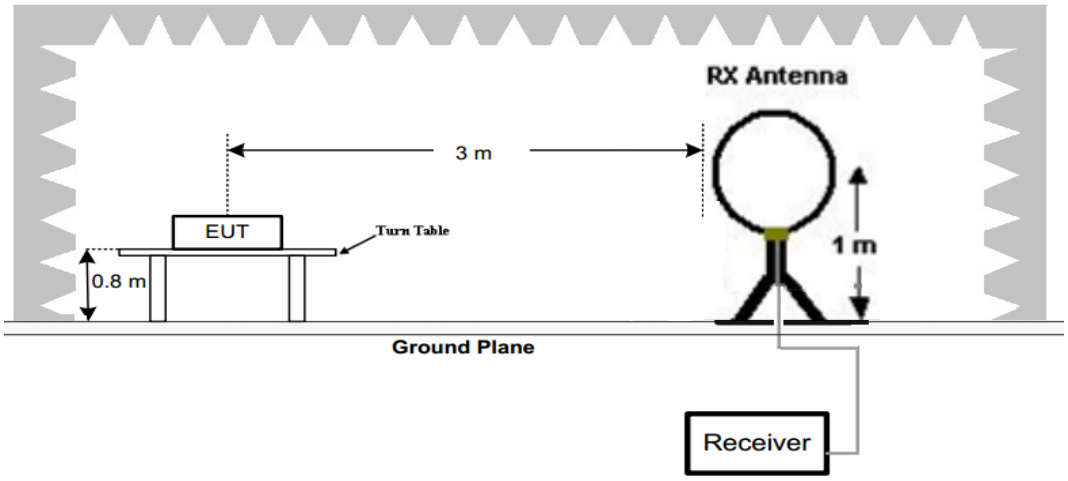
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

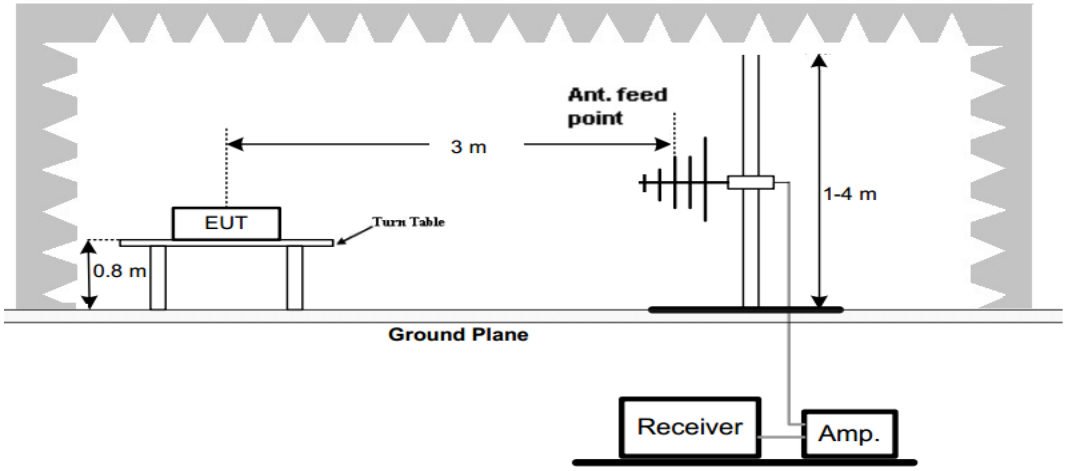
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

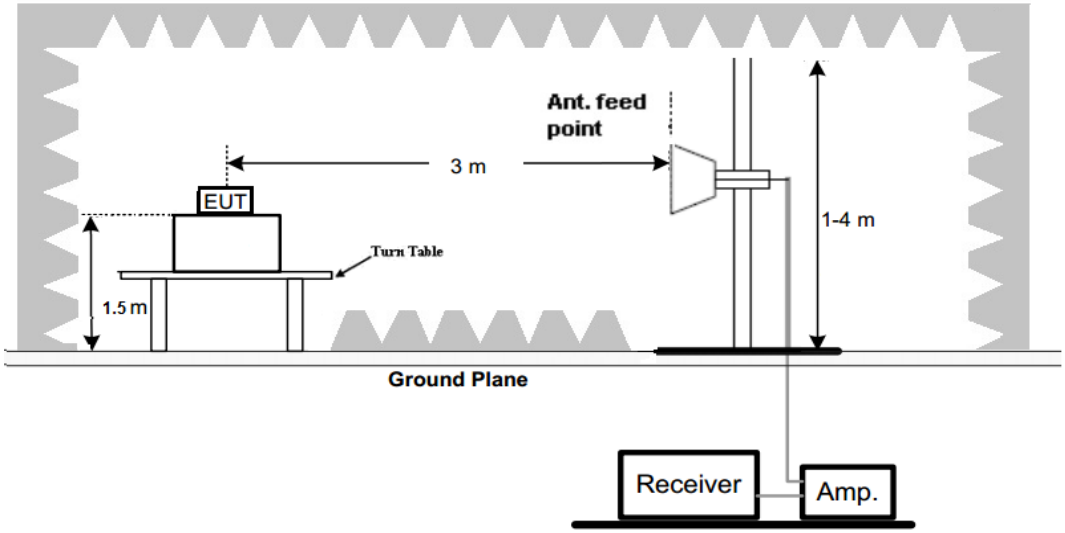
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m 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.

TEST RESULTS

Remark:
1. We tested three channels (lowest/middle/highest) of each mode and recorded worst case at 802.11b low channel for measurement below 1GHz.
2. We tested three channels (lowest/middle/highest) of each mode and recorded worst case at 802.11b mode above 1GHz.
3. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.

For 9 KHz-30MHz

WIFI

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.38	48.48	96.01	47.53	PK	PASS
1.66	54.26	63.20	8.94	QP	PASS
15.84	56.79	69.54	12.75	QP	PASS
20.26	50.47	69.54	19.07	QP	PASS

BT4.0

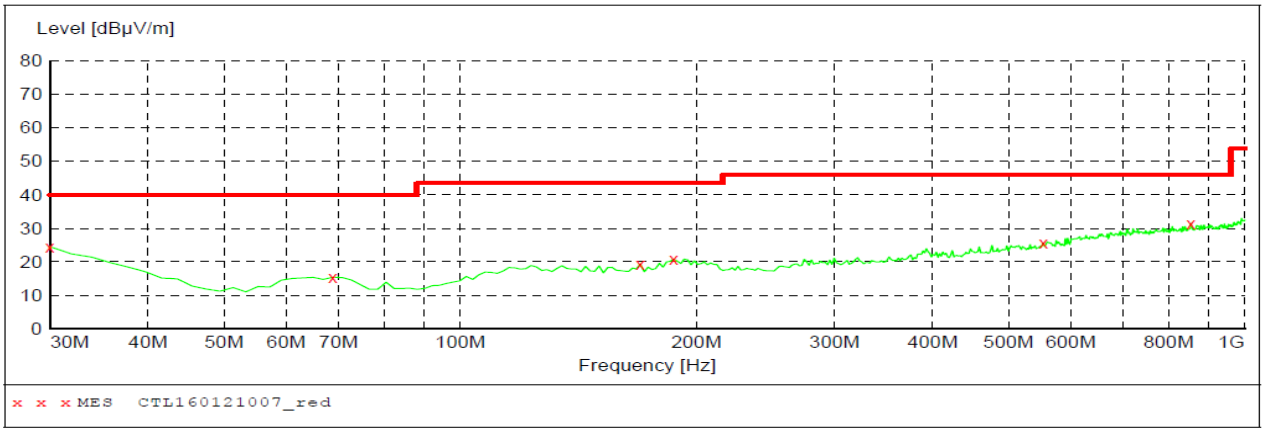
Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.44	47.52	94.74	47.22	PK	PASS
1.48	52.36	64.20	11.84	QP	PASS
16.59	54.41	69.54	15.13	QP	PASS
25.14	50.36	69.54	19.18	QP	PASS

For 30MHz-1GHz

Test mode:	WIFI	Polarization:	Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160121007_red"

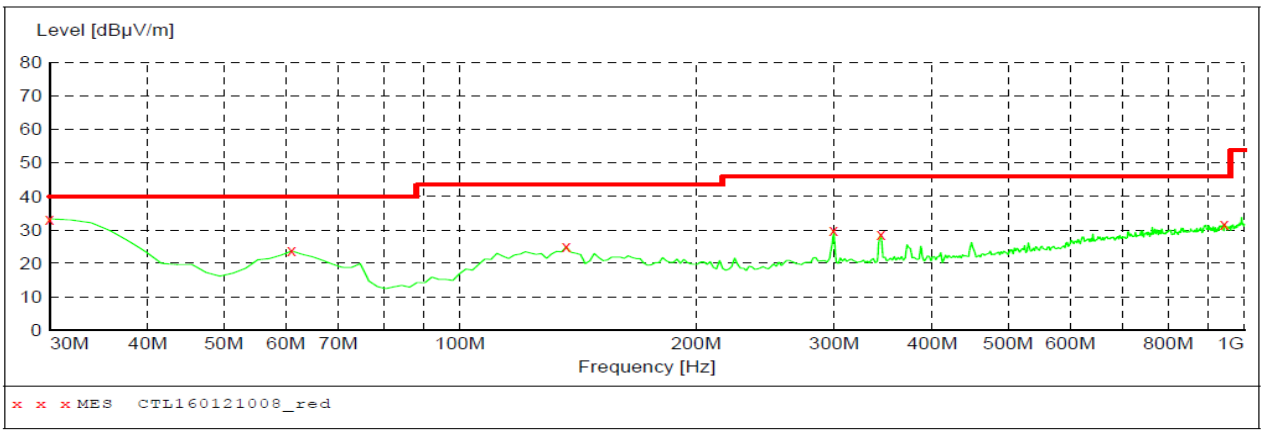
1/21/2016 9:29AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.50	20.8	40.0	15.5	---	0.0	0.00	HORIZONTAL
68.800000	15.40	8.2	40.0	24.6	---	0.0	0.00	HORIZONTAL
169.680000	19.40	13.3	43.5	24.1	---	0.0	0.00	HORIZONTAL
187.140000	20.80	13.1	43.5	22.7	---	0.0	0.00	HORIZONTAL
553.800000	25.50	21.0	46.0	20.5	---	0.0	0.00	HORIZONTAL
854.500000	31.50	25.2	46.0	14.5	---	0.0	0.00	HORIZONTAL

Test mode:	WIFI	Polarization:	Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160121008_red"

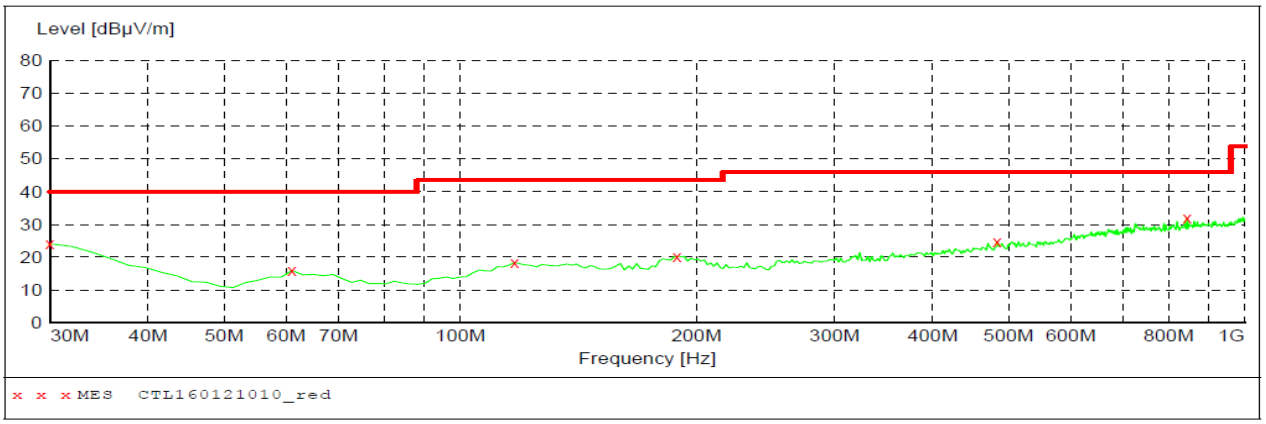
1/21/2016 9:32AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	33.30	20.8	40.0	6.7	---	0.0	0.00	VERTICAL
61.040000	23.70	8.1	40.0	16.3	---	0.0	0.00	VERTICAL
136.700000	24.90	14.4	43.5	18.6	---	0.0	0.00	VERTICAL
299.660000	29.70	15.2	46.0	16.3	---	0.0	0.00	VERTICAL
344.280000	28.50	16.6	46.0	17.5	---	0.0	0.00	VERTICAL
943.740000	31.70	26.4	46.0	14.3	---	0.0	0.00	VERTICAL

Test mode:	BT4.0	Polarization:	Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160121010_red"

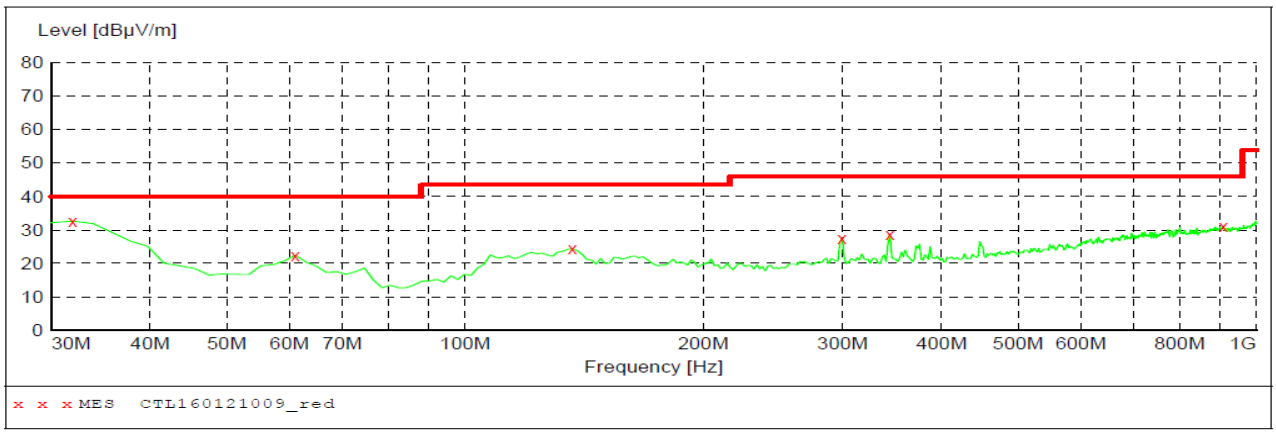
1/21/2016 9:34AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.10	20.8	40.0	15.9	---	0.0	0.00	HORIZONTAL
61.040000	15.90	8.1	40.0	24.1	---	0.0	0.00	HORIZONTAL
117.300000	18.40	14.7	43.5	25.1	---	0.0	0.00	HORIZONTAL
189.080000	20.30	13.1	43.5	23.2	---	0.0	0.00	HORIZONTAL
483.960000	24.80	20.0	46.0	21.2	---	0.0	0.00	HORIZONTAL
844.800000	32.00	25.1	46.0	14.0	---	0.0	0.00	HORIZONTAL

Test mode:	BT4.0	Polarization:	Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160121009_red"

1/21/2016 9:33AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	32.60	19.2	40.0	7.4	---	0.0	0.00	VERTICAL
61.040000	22.40	8.1	40.0	17.6	---	0.0	0.00	VERTICAL
136.700000	24.40	14.4	43.5	19.1	---	0.0	0.00	VERTICAL
299.660000	27.40	15.2	46.0	18.6	---	0.0	0.00	VERTICAL
344.280000	28.50	16.6	46.0	17.5	---	0.0	0.00	VERTICAL
908.820000	31.10	26.1	46.0	14.9	---	0.0	0.00	VERTICAL

For 1GHz to 25GHz

Note: 802.11b/802.11g/802.11n(H20)/802.11n(H40) all have been tested ,only worse case 802.11b was reported

802.11b Mode (above 1GHz)

Frequency(MHz):				2412		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	103.54	PK	--	--	70.14	28.78	4.61	0.00	33.40
1	2402.00	92.65	AV	--	--	59.25	28.78	4.61	0.00	33.40
2	2390.00	36.78	PK	74	37.22	3.46	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	43.65	PK	74	30.35	10.26	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	60.65	PK	74	13.35	56.10	33.52	6.92	35.89	4.55
4	4824.00	49.66	AV	54	4.34	45.11	33.52	6.92	35.89	4.55
5	5175.50	48.74	PK	74	25.26	41.42	34.49	7.13	34.29	7.32
5	5175.50	--	AV	54	--	--	--	--	--	--
6	7236.00	54.25	PK	74	19.75	42.98	37.10	9.19	35.02	11.27
6	7236.00	46.25	AV	54	7.75	34.98	37.10	9.19	35.02	11.27

Frequency(MHz):				2412		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	103.69	PK	--	--	70.29	28.78	4.61	0.00	33.40
1	2402.00	92.78	AV	--	--	59.38	28.78	4.61	0.00	33.40
2	2390.00	36.88	PK	74	37.12	3.56	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	43.69	PK	74	30.31	10.30	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	60.75	PK	74	13.25	56.20	33.52	6.92	35.89	4.55
4	4824.00	49.87	AV	54	4.13	45.32	33.52	6.92	35.89	4.55
5	5233.50	49.54	PK	74	24.46	42.12	34.57	7.16	34.31	7.42
5	5233.50	--	AV	54	--	--	--	--	--	--
6	7236.00	55.48	PK	74	18.52	44.21	37.10	9.19	35.02	11.27
6	7236.00	46.52	AV	54	7.48	35.25	37.10	9.19	35.02	11.27

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Frequency(MHz):				2437		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2437.00	102.65	PK	--	--	69.15	28.85	4.65	0.00	33.50
1	2437.00	92.74	AV	--	--	59.24	28.85	4.65	0.00	33.50
2	4318.56	43.25	PK	74	30.75	38.43	32.83	6.60	34.62	4.82
2	4318.56	--	AV	54	--	--	--	--	--	--
3	4874.00	59.89	PK	74	14.11	53.65	33.59	6.95	34.30	6.24
3	4874.00	48.66	AV	54	5.34	42.42	33.59	6.95	34.30	6.24
4	5210.75	46.52	PK	74	27.48	38.93	34.55	7.15	34.11	7.59
4	5210.75	--	AV	54	--	--	--	--	--	--
5	7311.00	55.41	PK	74	18.59	43.75	37.44	9.22	35.00	11.66
5	7311.00	46.33	AV	54	7.67	34.67	37.44	9.22	35.00	11.66

Frequency(MHz):				2437		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2437.00	103.65	PK	--	--	70.15	28.85	4.65	0.00	33.50
1	2437.00	93.25	AV	--	--	59.75	28.85	4.65	0.00	33.50
2	3950.35	42.45	PK	74	31.55	37.74	33.20	6.34	34.83	4.71
2	3950.35	--	AV	54	--	--	--	--	--	--
3	4874.00	58.47	PK	74	15.53	52.13	33.59	6.95	34.20	6.34
3	4874.00	47.69	AV	54	6.31	41.35	33.59	6.95	34.20	6.34
4	5265.25	47.22	PK	74	26.78	39.51	34.61	7.18	34.08	7.71
4	5265.25	--	AV	54	--	--	--	--	--	--
5	7311.00	55.65	PK	74	18.35	43.99	37.44	9.22	35.00	11.66
5	7311.00	46.41	AV	54	7.59	34.75	37.44	9.22	35.00	11.66

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Frequency(MHz):				2462		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	102.74	PK	--	--	69.12	28.92	4.70	0.00	33.62
1	2480.00	92.26	AV	--	--	58.64	28.92	4.70	0.00	33.62
2	2483.50	43.33	PK	74	30.67	9.70	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	36.74	PK	74	37.26	3.06	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	58.63	PK	74	15.37	53.85	33.71	6.98	35.91	4.78
4	4924.00	47.44	AV	54	6.56	42.66	33.71	6.98	35.91	4.78
5	5335.50	48.55	PK	74	25.45	41.00	34.68	7.22	34.35	7.55
5	5335.50	--	AV	54	--	--	--	--	--	--
6	7386.00	55.23	PK	74	18.77	43.35	37.61	9.25	34.98	11.88
6	7386.00	46.24	AV	54	7.76	34.36	37.61	9.25	34.98	11.88

Frequency(MHz):				2462		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	103.25	PK	--	--	69.63	28.92	4.70	0.00	33.62
1	2480.00	92.44	AV	--	--	58.82	28.92	4.70	0.00	33.62
2	2483.50	43.74	PK	74	30.26	10.11	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	36.33	PK	74	37.67	2.65	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	58.50	PK	74	15.5	53.72	33.71	6.98	35.91	4.78
4	4924.00	47.26	AV	54	6.74	42.48	33.71	6.98	35.91	4.78
5	5625.75	48.63	PK	74	25.37	40.93	34.78	7.38	34.46	7.70
5	5625.75	--	AV	54	--	--	--	--	--	--
6	7386.00	55.45	PK	74	18.55	43.57	37.61	9.25	34.98	11.88
6	7386.00	46.21	AV	54	7.79	34.33	37.61	9.25	34.98	11.88

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

BT4.0 Mode (above 1GHz)

Frequency(MHz):				2402		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	83.25	PK	--	--	49.85	28.78	4.61	0.00	33.40
1	2402.00	77.65	AV	--	--	44.25	28.78	4.61	0.00	33.40
2	2390.00	36.26	PK	74	37.74	2.94	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	40.55	PK	74	33.45	7.16	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	49.24	PK	74	24.76	44.73	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	5211.50	37.26	PK	74	36.74	29.87	34.55	7.15	34.31	7.39
5	5211.50	--	AV	54	--	--	--	--	--	--
6	7206.00	38.25	PK	74	35.75	27.14	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2402		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	84.25	PK	--	--	50.85	28.78	4.61	0.00	33.40
1	2402.00	77.89	AV	--	--	44.49	28.78	4.61	0.00	33.40
2	2390.00	36.55	PK	74	37.45	3.23	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	39.15	PK	74	34.85	5.76	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	48.66	PK	74	25.34	44.15	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	5045.75	37.57	PK	74	36.43	30.62	34.14	7.06	34.25	6.95
5	5045.75	--	AV	54	--	--	--	--	--	--
6	7206.00	38.88	PK	74	35.12	27.77	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Frequency(MHz):				2440		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2440.00	83.66	PK	--	--	50.15	28.85	4.65	0.00	33.51
1	2440.00	77.14	AV	--	--	43.63	28.85	4.65	0.00	33.51
2	4331.50	37.52	PK	74	36.48	32.69	32.84	6.61	34.61	4.83
2	4331.50	--	AV	54	--	--	--	--	--	--
3	4880.00	45.65	PK	74	28.35	39.40	33.60	6.95	34.30	6.25
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5215.75	38.33	PK	74	35.67	30.73	34.56	7.15	34.11	7.60
4	5215.75	--	AV	54	--	--	--	--	--	--
5	7320.00	38.78	PK	74	35.22	27.09	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2440		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2440.00	84.65	PK	--	--	51.14	28.85	4.65	0.00	33.51
1	2440.00	77.54	AV	--	--	44.03	28.85	4.65	0.00	33.51
2	4311.50	37.55	PK	74	36.45	32.74	32.83	6.60	34.62	4.81
2	4311.50	--	AV	54	--	--	--	--	--	--
3	4880.00	45.32	PK	74	28.68	39.07	33.60	6.95	34.30	6.25
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5250.75	39.74	PK	74	34.26	32.07	34.59	7.17	34.09	7.67
4	5250.75	--	AV	54	--	--	--	--	--	--
5	7320.00	36.22	PK	74	37.78	24.53	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak

Frequency(MHz):				2480		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	83.59	PK	--	--	49.97	28.92	4.70	0.00	33.62
1	2480.00	77.21	AV	--	--	43.59	28.92	4.70	0.00	33.62
2	2483.50	40.52	PK	74	33.48	6.89	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	38.32	PK	74	35.68	4.64	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	42.54	PK	74	31.46	37.62	33.84	7.00	35.92	4.92
4	4960.00	--	AV	54	--	--	--	--	--	--
5	5150.75	38.21	PK	74	35.79	30.94	34.44	7.12	34.28	7.27
5	5150.75	--	AV	54	--	--	--	--	--	--
6	7440.00	41.26	PK	74	32.74	29.31	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2480		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	84.65	PK	--	--	51.03	28.92	4.70	0.00	33.62
1	2480.00	77.54	AV	--	--	43.92	28.92	4.70	0.00	33.62
2	2483.50	40.65	PK	74	33.35	7.02	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	38.65	PK	74	35.35	4.97	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	43.32	PK	74	30.68	38.40	33.84	7.00	35.92	4.92
4	4960.00	--	AV	54	--	--	--	--	--	--
5	5215.75	38.58	PK	74	35.42	31.18	34.56	7.15	34.31	7.40
5	5215.75	--	AV	54	--	--	--	--	--	--
6	7440.00	41.25	PK	74	32.75	29.30	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

3.3. Maximum Conducted Output Power

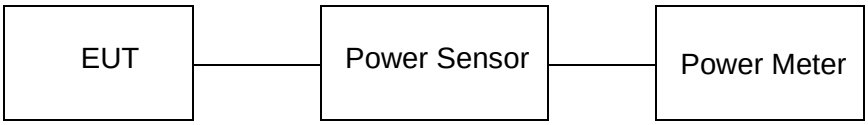
Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration



Test Results

WIFI

Type	Channel	Peak Output power (dBm)	AV Output power (dBm)	Limit (dBm)	Result
802.11b	01	17.53	16.25	30.00	Pass
	06	18.07	16.86		
	11	18.13	16.24		
802.11g	01	17.14	13.54	30.00	Pass
	06	17.25	13.65		
	11	17.20	13.41		
802.11n(HT20)	01	16.10	12.25	30.00	Pass
	06	16.72	12.41		
	11	16.86	12.22		
802.11n(HT40)	03	16.53	12.25	30.00	Pass
	06	16.66	12.32		
	09	16.87	12.28		

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

BT4.0

Type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	-2.69	30.00	Pass
	19	-2.65		
	39	-2.52		

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

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

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
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 power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration

Test Results

WIFI

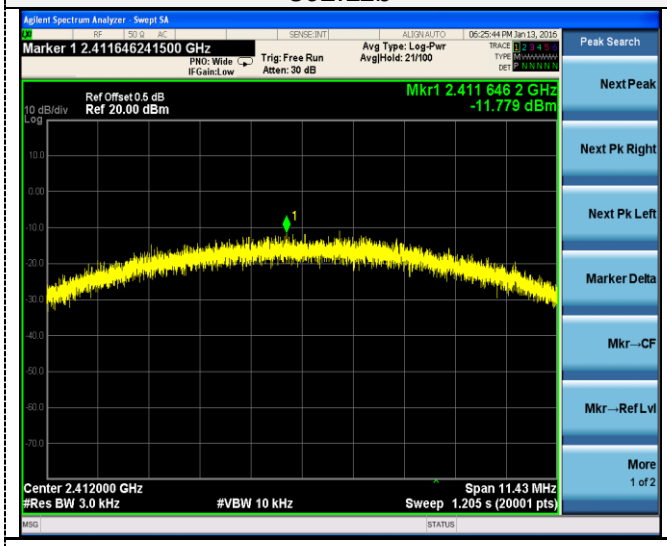
Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-11.779	8.00	Pass
	06	-10.214		
	11	-10.243		
802.11g	01	-16.901	8.00	Pass
	06	-16.588		
	11	-15.064		
802.11n(HT20)	01	-17.099	8.00	Pass
	06	-16.925		
	11	-15.517		
802.11n(HT40)	03	-19.565	8.00	Pass
	06	-18.781		
	09	-19.095		

BT4.0

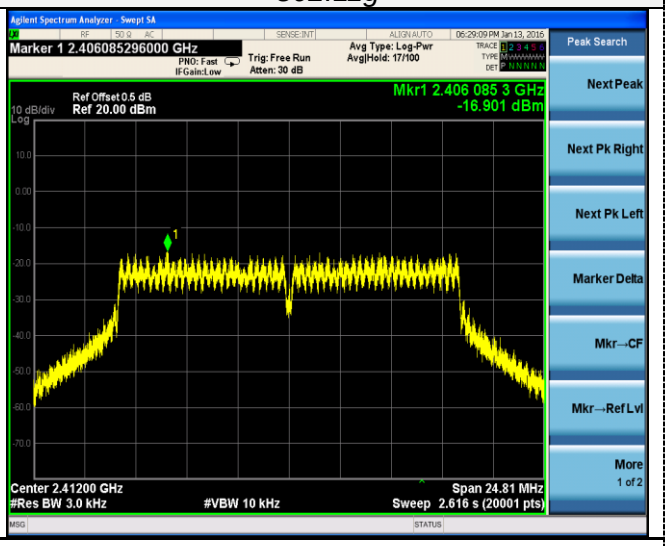
Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
GFSK	00	-22.002	8.00	Pass
	19	-21.201		
	39	-20.844		

Test plot as follows:

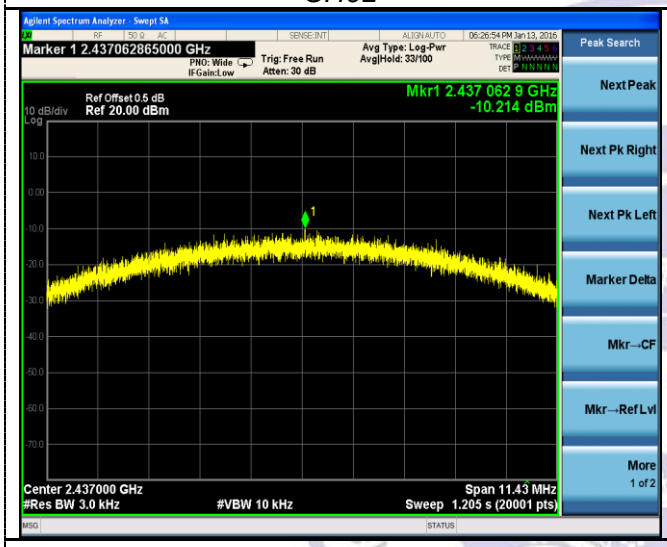
802.11b



802.11g



CH01



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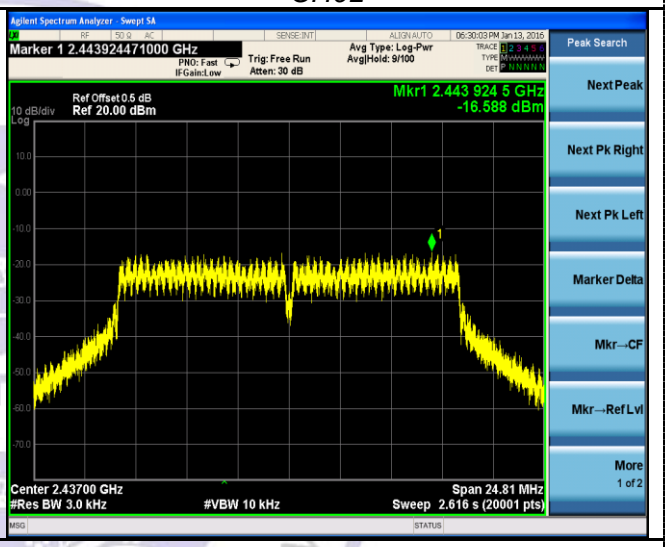
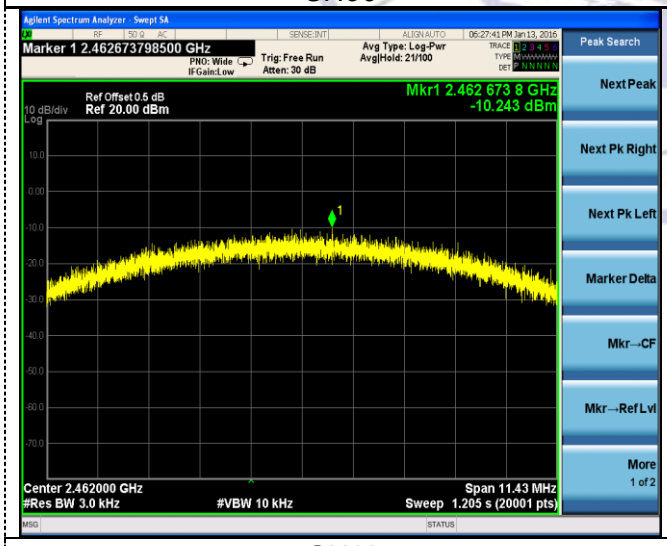


CH06



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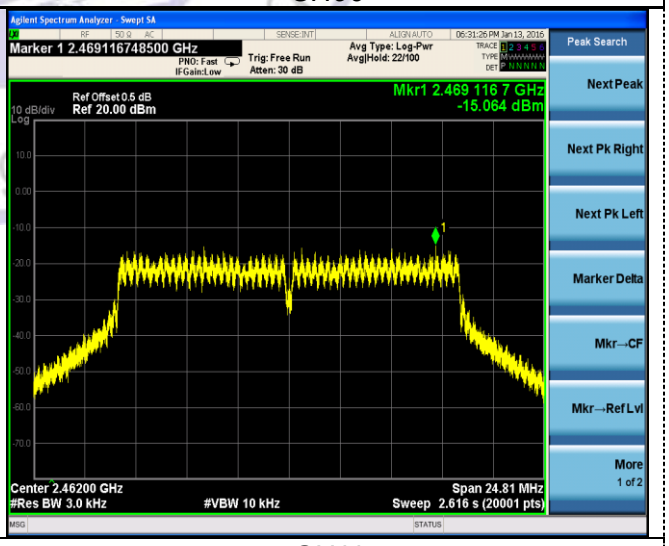
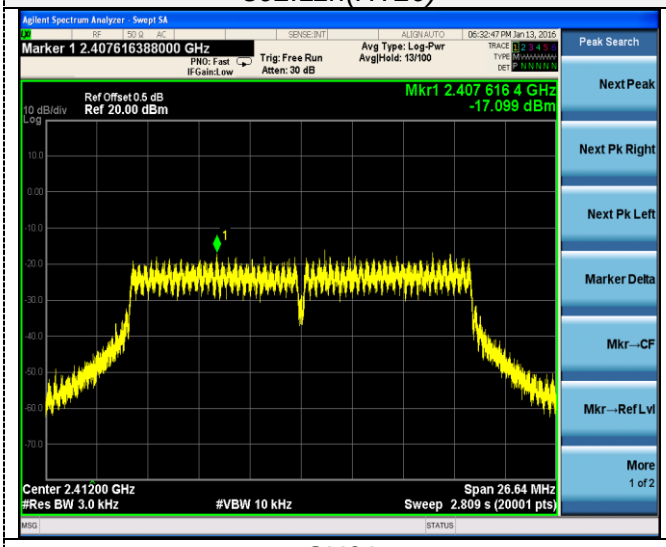


CH11

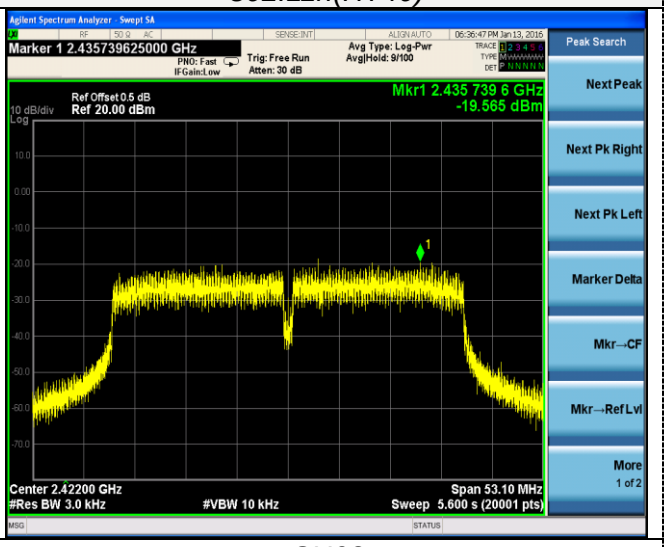
CH11

802.11n(HT20)

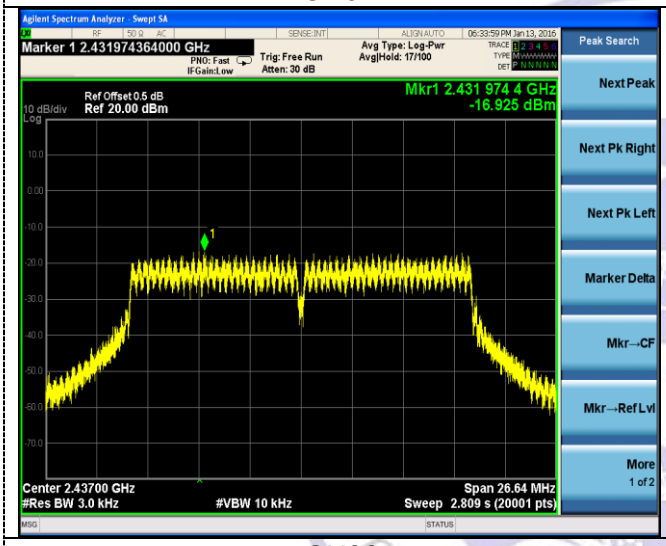


CH01

802.11n(HT40)



CH03



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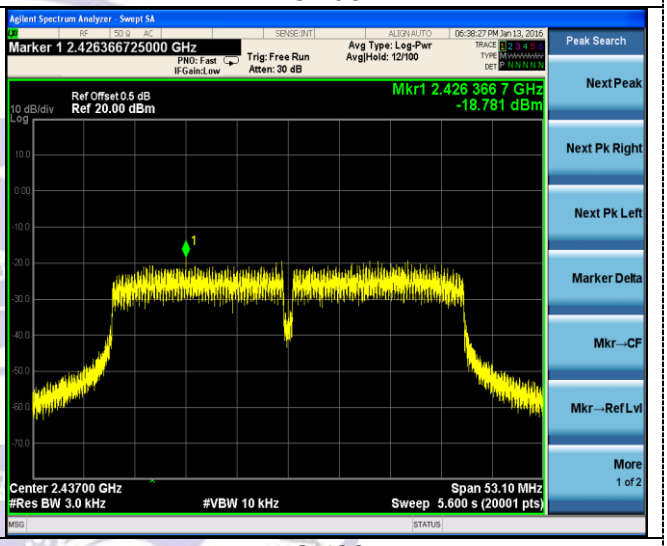

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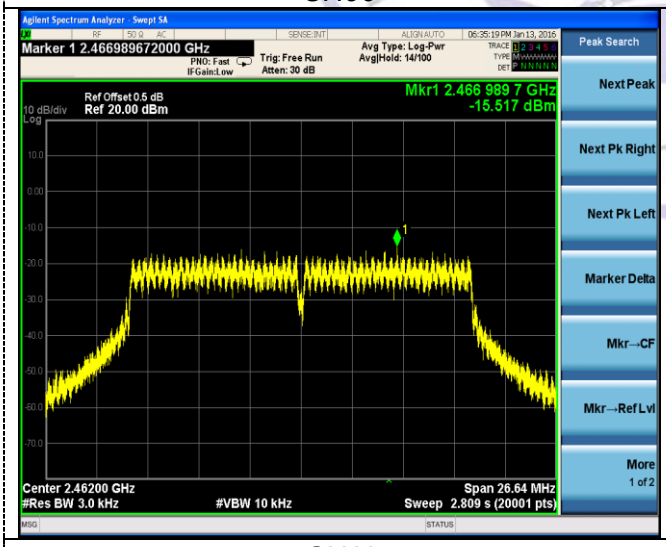

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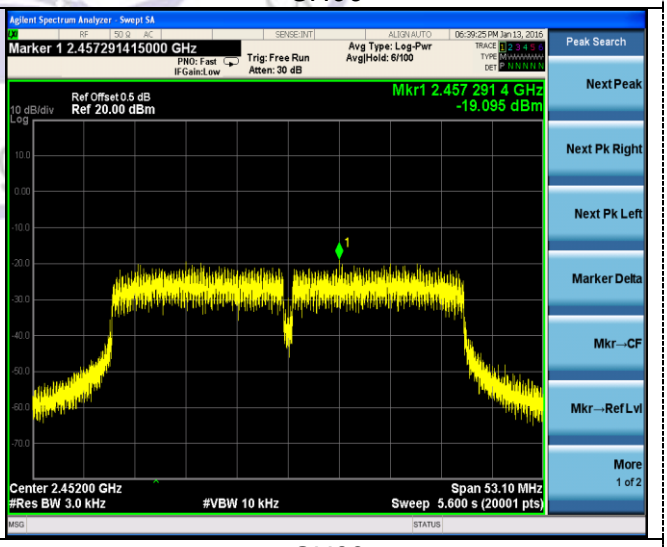
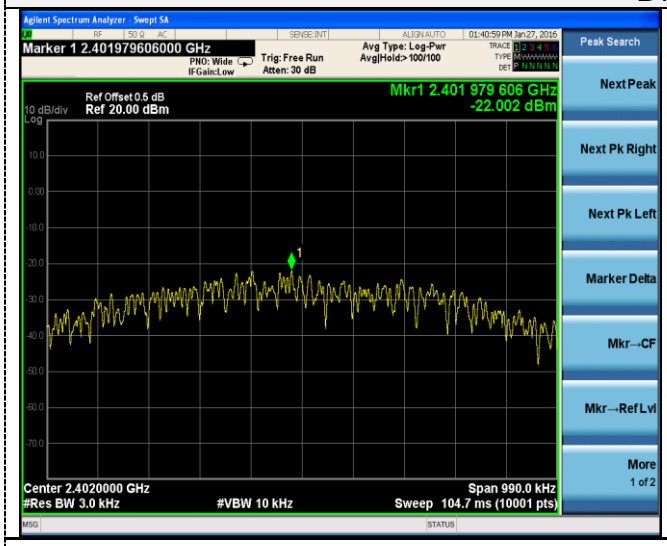
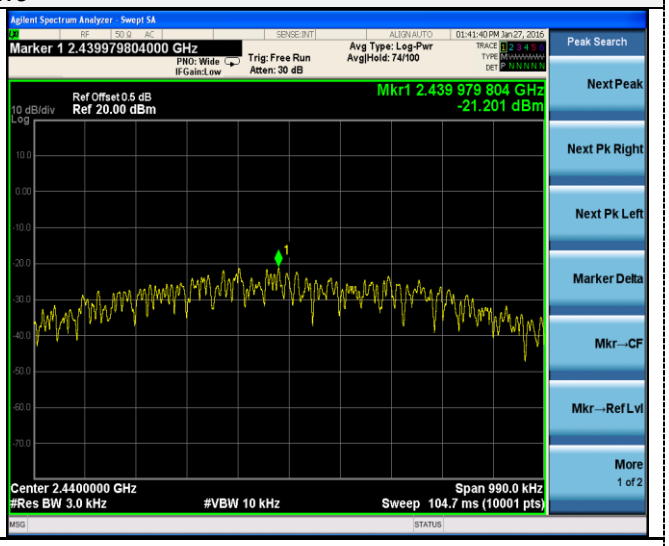


CH09

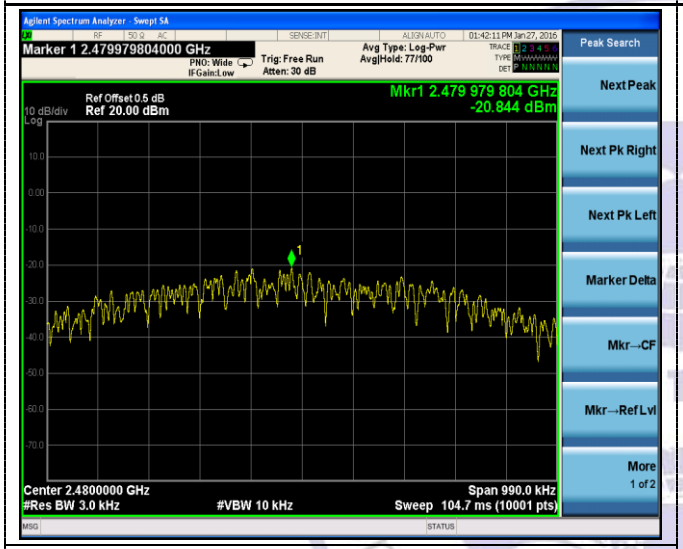
BT4.0



CH00



CH19



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3.5. 6dB Bandwidth

Limit

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

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

Test Configuration

Test Results

WIFI

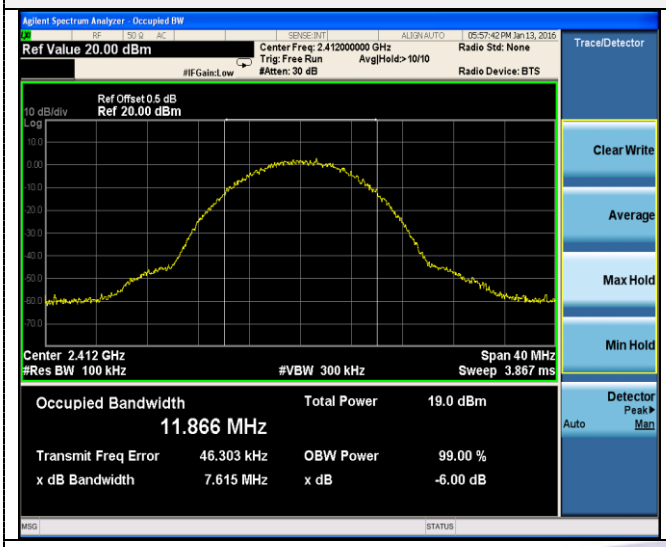
Type	Channel	6dB Bandwidth (MHz)	99% OBW (MHz)	Limit (KHz)	Result
802.11b	01	7.615	11.886	≥500	Pass
	06	7.251	11.869		
	11	7.536	11.916		
802.11g	01	16.500	16.483	≥500	Pass
	06	16.540	16.530		
	11	16.520	16.507		
802.11n(HT20)	01	17.720	17.686	≥500	Pass
	06	17.760	17.699		
	11	17.730	17.678		
802.11n(HT40)	03	35.260	36.023	≥500	Pass
	06	35.380	36.025		
	09	35.390	36.017		

BT4.0

Type	Channel	6dB Bandwidth (MHz)	99% OBW (MHz)	Limit (KHz)	Result
GFSK	00	0.6589	1.0460	≥500	Pass
	19	0.6569	1.0436		
	39	0.6594	1.0471		

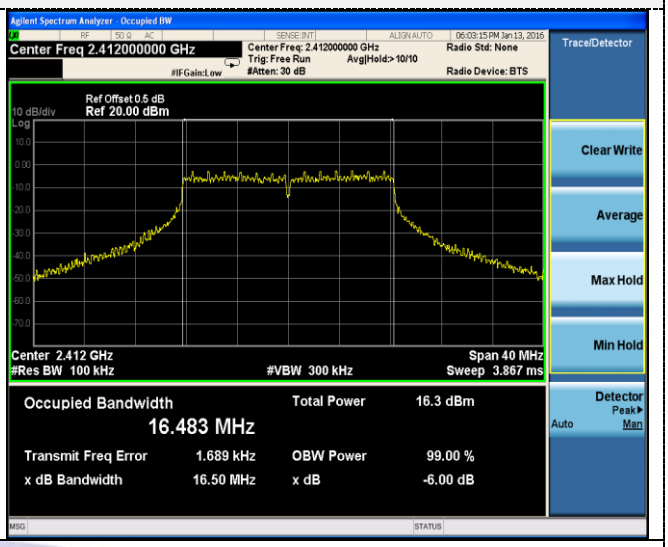
Test plot as follows:

802.11b

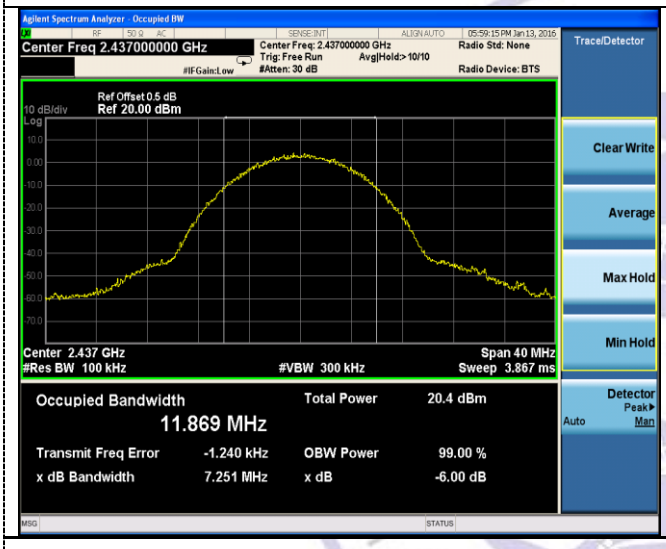


CH01

802.11g

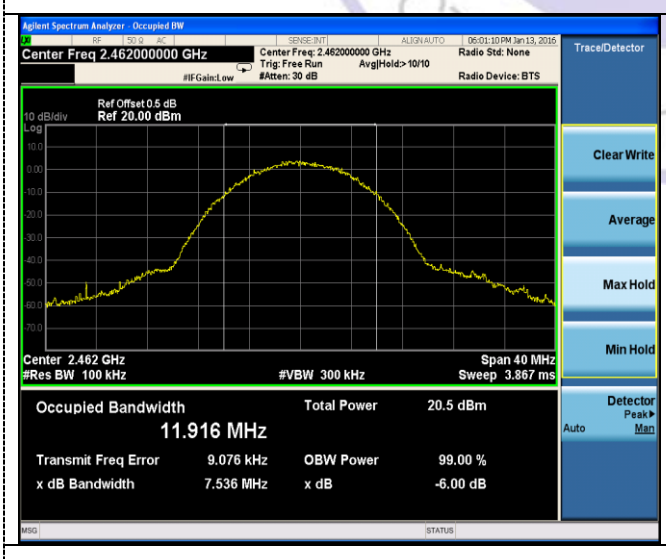


CH01



CH06

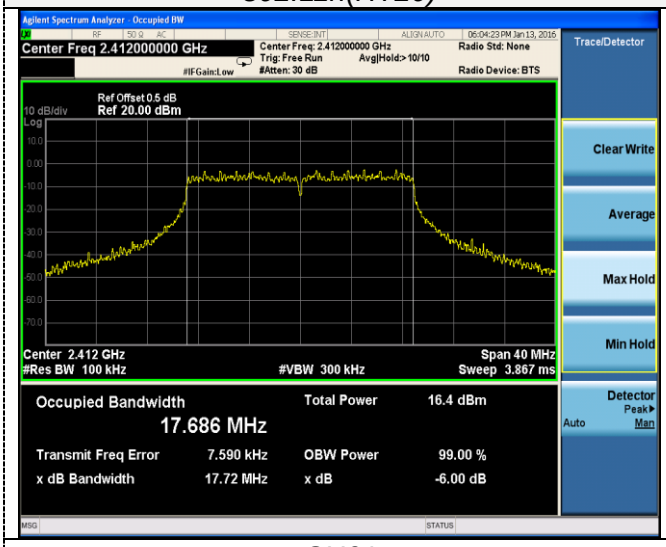
CH06



CH11

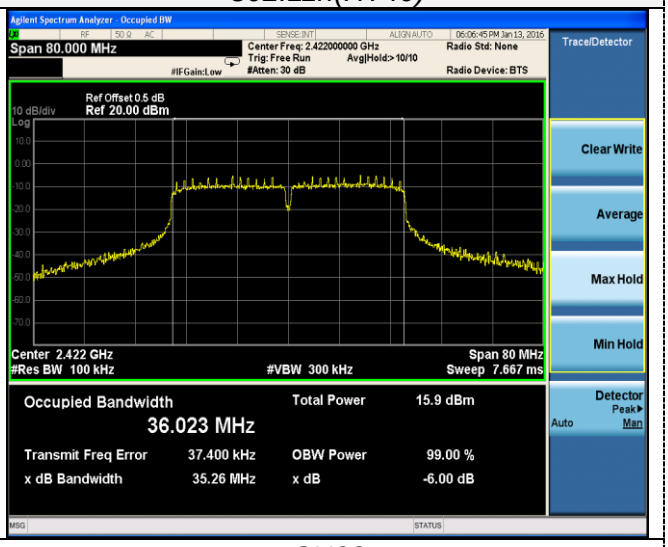
CH11

802.11n(HT20)

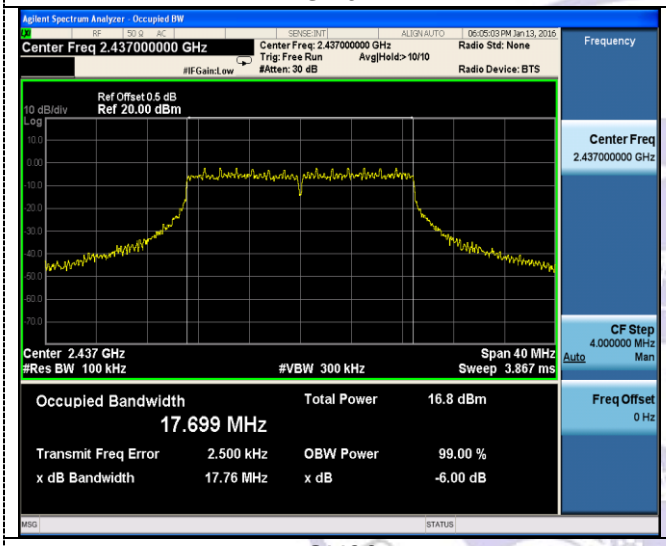


CH01

802.11n(HT40)



CH03



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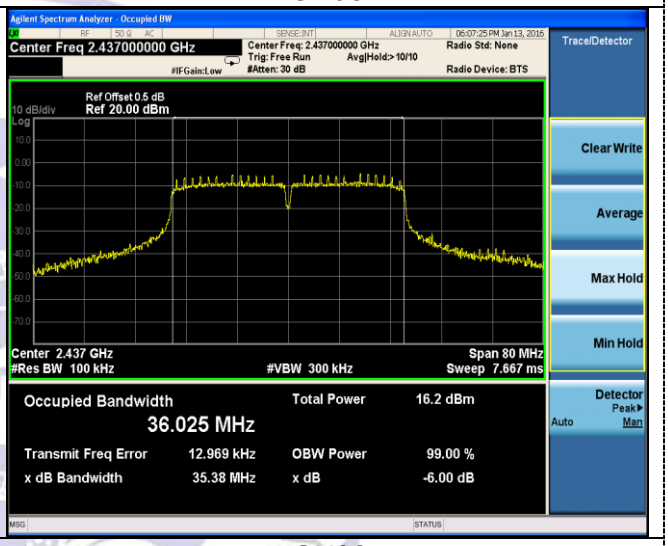

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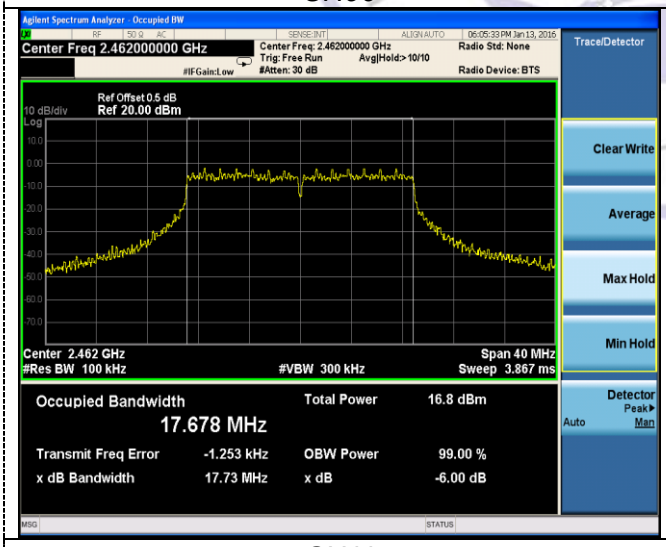
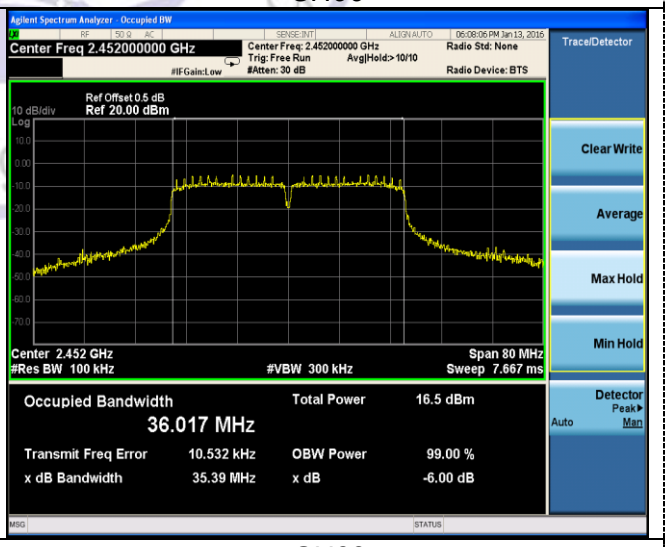
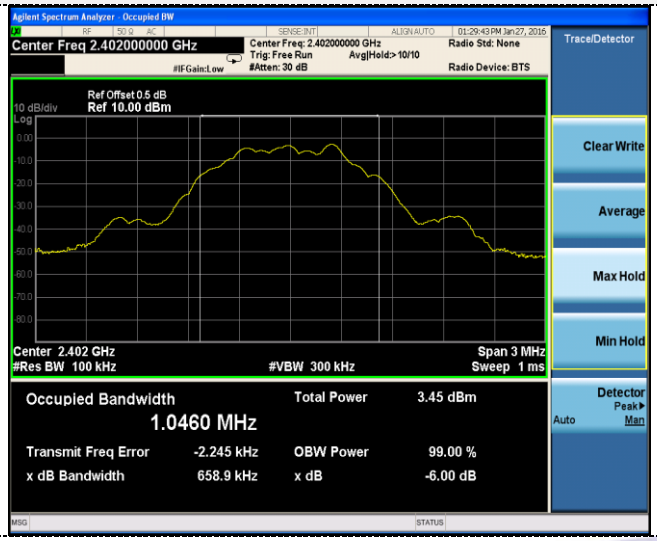


CH11

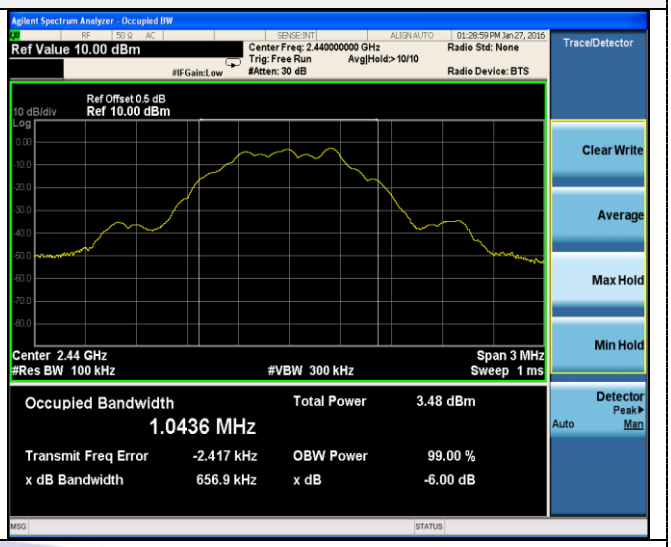


CH09

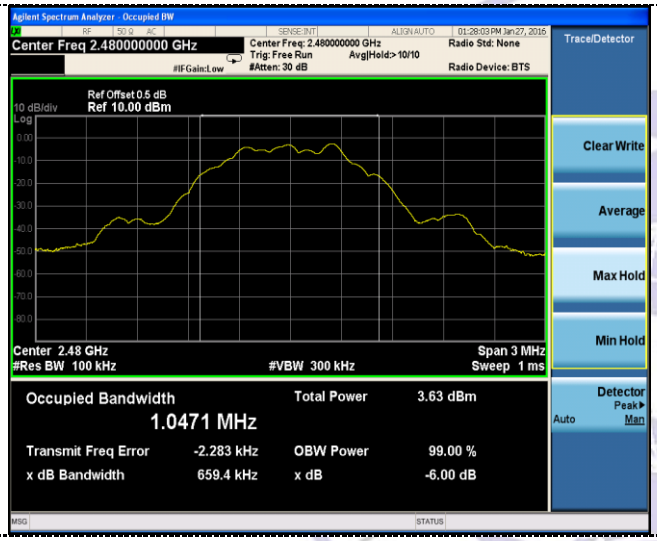
BT4.0



CH00



CH19



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