



RADIO TEST REPORT

Report No:STS1909168W06

Issued for

Telo Systems Ltd.

Room 408,Chuangye Building,Seven-Star Park,Chuangye
2nd Road,Bao'an 28th District,Xin'an Bao'an District
Shenzhen, China

Product Name:	Smart Phone
Brand Name:	Telo Systems
Model Name:	TE610
Series Model:	N/A
FCC ID:	2ANY6-TE610
Test Standard:	FCC Part 15.407

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TEST RESULT CERTIFICATION

Applicant's Name..... : Telo Systems Ltd.
Address : Room 408,Chuangye Building,Seven-Star Park,Chuangye 2nd
Road,Bao'an 28th District,Xin'an Bao'an District Shenzhen, China
Manufacture's Name..... : Telo Systems Ltd.
Address : Room 408,Chuangye Building,Seven-Star Park,Chuangye 2nd
Road,Bao'an 28th District,Xin'an Bao'an District Shenzhen,
China

Product Description

Product Name..... : Smart Phone
Brand Name : Telo Systems
Model Name : TE610
Series Model..... : N/A

Test Standards..... : FCC Part15.407

Test Procedure..... ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test..... :

Date (s) of performance of tests..... : 12 Sept. 2019 ~ 30 Sept. 2019

Date of Issue..... : 08 Oct. 2019

Test Result..... : **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sunday Hu)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	08 Oct. 2019	STS1909168W06	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

§ 15.407, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

FCC Part 15.407		
FCC standard	Test Item	Results
15.207	AC Conducted Emission	PASS
§ 15.407 (2) (26 dB) / § 15.407 (e) (6 dB) / § 15.407 (a) (99%)	26dB/6dB & 99% Bandwidth	PASS
15.407(a) (1).(2).(3).(4).(5)	Maximum Conducted Output Power	PASS
15.407(b) & 15.209	Radiated Emission And (bandedge Emissions) Measurement	PASS
15.407(b)7	Conducted Emission And (bandedge Emissions) Measurement	PASS
15.407(a) (1).(2).(3).(4).(5)	Power Spectral Density	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203/15.204	Antenna Requirement	PASS

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) all tests are according to ANSI C63.10-2013



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.71\text{dB}$
2	Unwanted Emissions, conducted	$\pm 0.63\text{dB}$
3	All emissions, radiated 30-200MHz	$\pm 3.43\text{dB}$
4	All emissions, radiated 200MHz-1GHz	$\pm 3.57\text{dB}$
5	All emissions, radiated >1G	$\pm 4.13\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 3.18\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 2.70\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Smart Phone	
Trade Name	Telo Systems	
Model Name	TE610	
Series Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a Smart Phone	
	Operation Frequency:	IEEE 802.11a/ n(HT20):5.180GHz-5.240GHz
		IEEE 802.11n(HT40): 5.190GHz-5.310GHz
	Modulation Type:	IEEE 802.11a/ n(HT20):5.745GHz-5.825GHz
		IEEE 802.11n(HT40): 5.755GHz-5.795GHz
	Antenna Designation:	802.11a(OFDM): BPSK,QPSK,16-QAM,64-QAM
	Max.Output Power(Conducted):	802.11n(OFDM): BPSK,QPSK,16-QAM,64-QAM
Test Channel	Please refer to the Note 2.	
	Input: AC 100~240V, 300mA,50/60Hz	
	Output: DC 5V,2000mA	
Battery	Rated Voltage: 3.8V Charge Limit: 4.35V Capacity: 5200mAh	
Hardware version number	LM182_V1.0	
Software version number	TE610_US_V1_20190802	
Connecting I/O Port(s)	Please refer to the User's Manual	

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



1. Operation Frequency of channel			
5.180GHz-5.240GHz		5.745GHz-5.825GHz	
Channel	Frequency	Channel	Frequency
36	5180	149	5745
38	5190	151	5755
40	5200	153	5765
42	5210	157	5785
44	5220	159	5795
46	5230	161	5805
48	5240	165	5825

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Carrier Frequency Channel

5GHz:

For 802.11a/n(HT20)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11n(HT40)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
38	5190	151	5755
46	5230	159	5795

2. Ant	Brand	Model Name	Ant Type	Connector	Gain (dBi)	NOTE
A	Telo Systems	TE610	PIFA	N/A	2.1dBi	WLAN Ant.



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11a HT20 CH36&CH40&CH48	6 Mbps
Mode 2	TX IEEE 802.11a HT20 CH149&CH157&CH165	6 Mbps
Mode 3	TX IEEE 802.11n HT20 CH36&CH40&CH48	MCS 0
Mode 4	TX IEEE 802.11n HT20 CH149&CH157&CH165	MCS 0
Mode 5	TX IEEE 802.11n HT40 CH38&CH46	MCS 0
Mode 6	TX IEEE 802.11n HT40 CH151&CH159	MCS 0

- Note: (1) The measurements are performed at the highest, middle, lowest available channels.
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
(3) We have been tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.

AC Conducted Emission

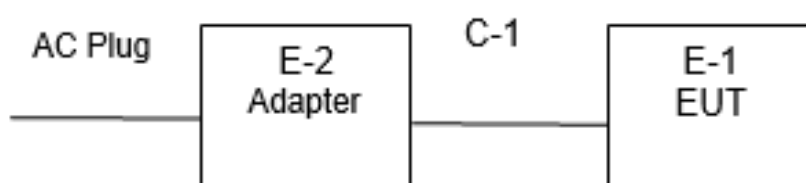
Test Case	
AC Conducted Emission	Mode 7: Keeping TX + WLAN Link

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test





2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Adapter	Telo Systems	TPA-46050200UU	N/A	N/A
C-1	DC Cable	N/A	110cm	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY51110105	2019.03.02	2020.03.01
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier(0.1 M-3GHz)	EM	EM330	060665	2018.10.13	2019.10.12
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-4 5	SK2018080901	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	BULUN	BL410-E/18.905			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
LISN	R&S	ENV216	101242	2018.10.11	2019.10.10
LISN	EMCO	3810/2NM	23625	2018.10.11	2019.10.10
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

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

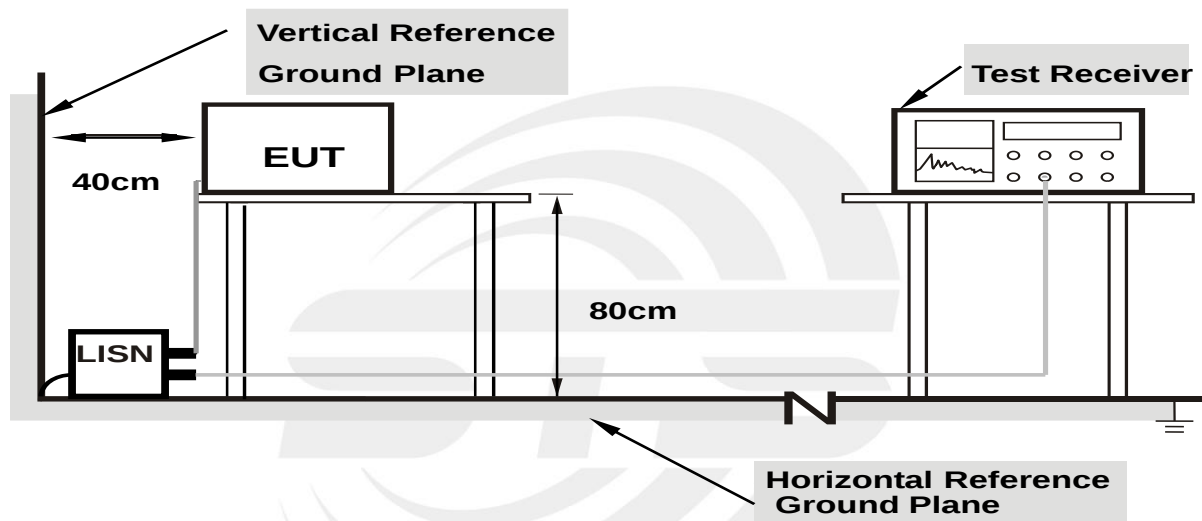
3.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.6 TEST RESULTS

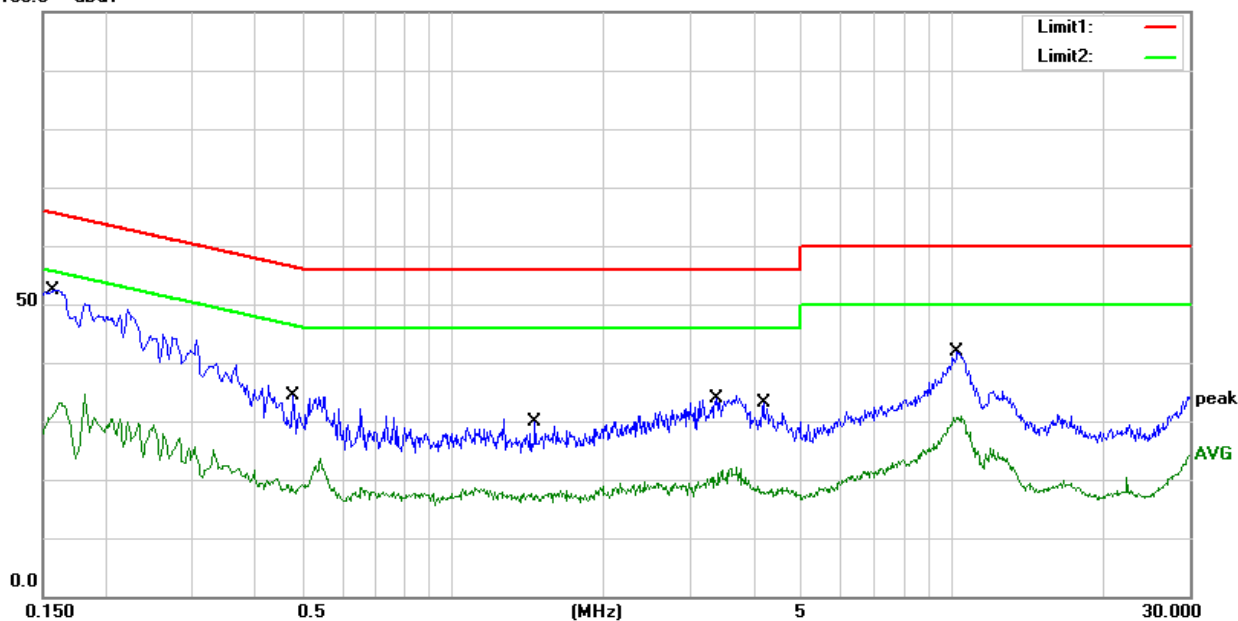
Temperature:	24.6(C)	Relative Humidity:	67%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode :	Mode 7		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	32.66	19.74	52.40	65.57	-13.17	QP
2	0.1580	14.83	19.74	34.57	55.57	-21.00	AVG
3	0.4780	14.48	19.96	34.44	56.37	-21.93	QP
4	0.4780	1.54	19.96	21.50	46.37	-24.87	AVG
5	1.4580	10.00	19.78	29.78	56.00	-26.22	QP
6	1.4580	-0.52	19.78	19.26	46.00	-26.74	AVG
7	3.3780	13.92	19.86	33.78	56.00	-22.22	QP
8	3.3780	1.84	19.86	21.70	46.00	-24.30	AVG
9	4.1820	13.18	19.88	33.06	56.00	-22.94	QP
10	4.1820	0.46	19.88	20.34	46.00	-25.66	AVG
11	10.2460	21.94	19.84	41.78	60.00	-18.22	QP
12	10.2460	10.49	19.84	30.33	50.00	-19.67	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit

100.0 dBuV



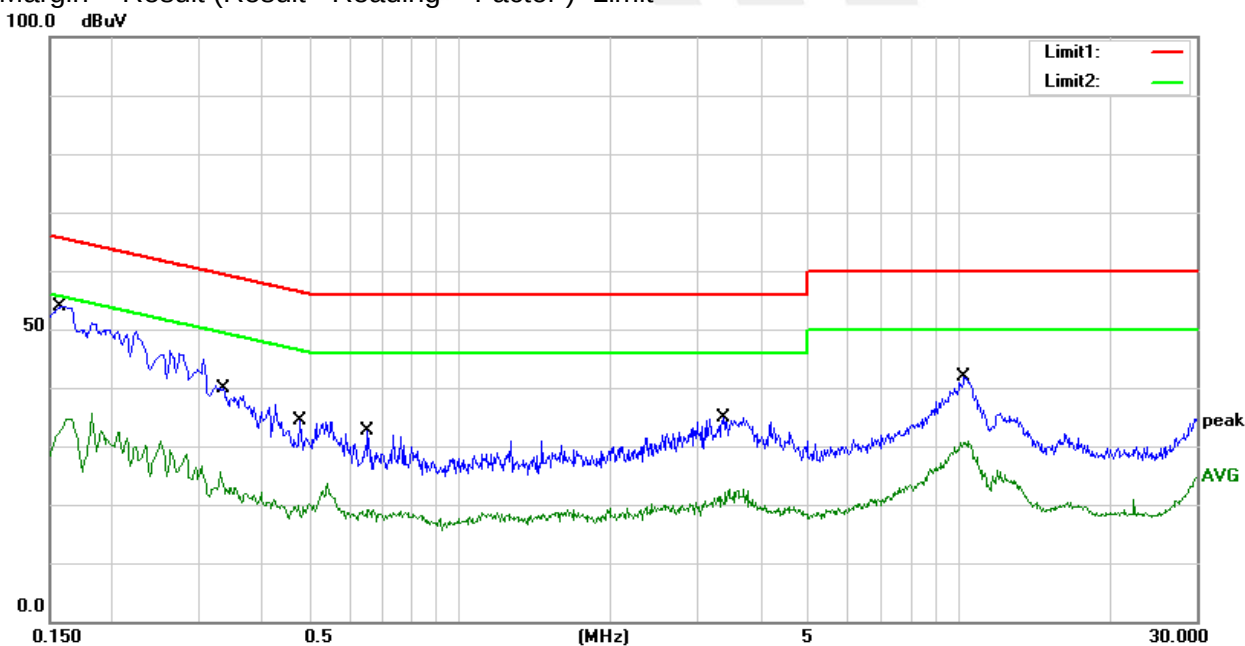


Temperature:	24.6(C)	Relative Humidity:	67%RH
Test Voltage	AC 120V/60Hz	Phase:	N
Test Mode	Mode 7		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	34.16	19.74	53.90	65.57	-11.67	QP
2	0.1580	15.83	19.74	35.57	55.57	-20.00	AVG
3	0.3340	19.73	20.17	39.90	59.35	-19.45	QP
4	0.3340	5.36	20.17	25.53	49.35	-23.82	AVG
5	0.4780	14.48	19.96	34.44	56.37	-21.93	QP
6	0.4780	3.64	19.96	23.60	46.37	-22.77	AVG
7	0.6540	12.72	19.85	32.57	56.00	-23.43	QP
8	0.6540	-0.66	19.85	19.19	46.00	-26.81	AVG
9	3.3780	14.92	19.86	34.78	56.00	-21.22	QP
10	3.3780	2.72	19.86	22.58	46.00	-23.42	AVG
11	10.2460	21.94	19.84	41.78	60.00	-18.22	QP
12	10.2460	10.67	19.84	30.51	50.00	-19.49	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit





3.2 RADIATED EMISSION AND (BANDEDGE) MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.407(b)7& 15.205/209(a), then the (a); limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	68.2	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15E.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz

For Band edge

Spectrum Parameter	Setting
Detector	Peak
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz



Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

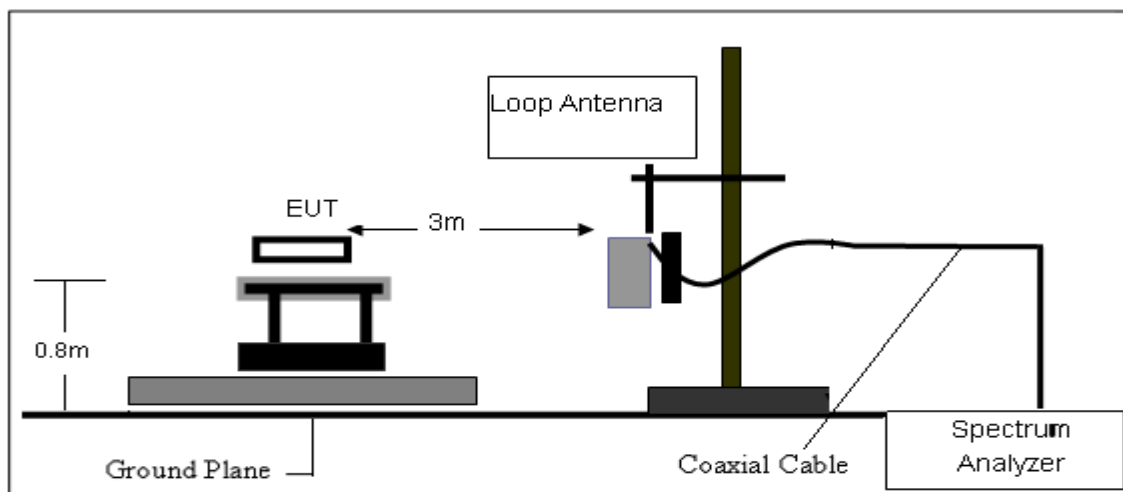
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported

3.2.2 DEVIATION FROM TEST STANDARD

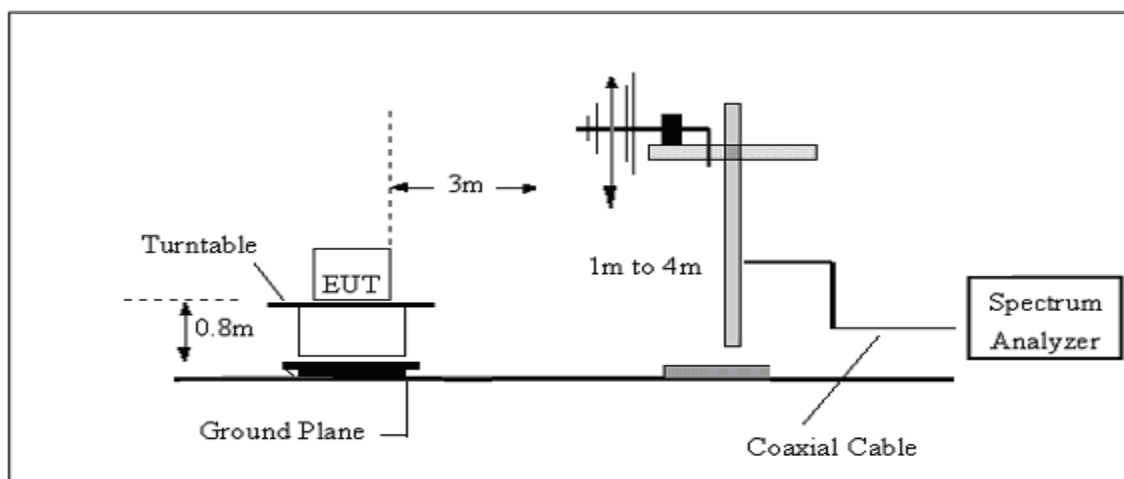
No deviation

3.2.3 TEST SETUP

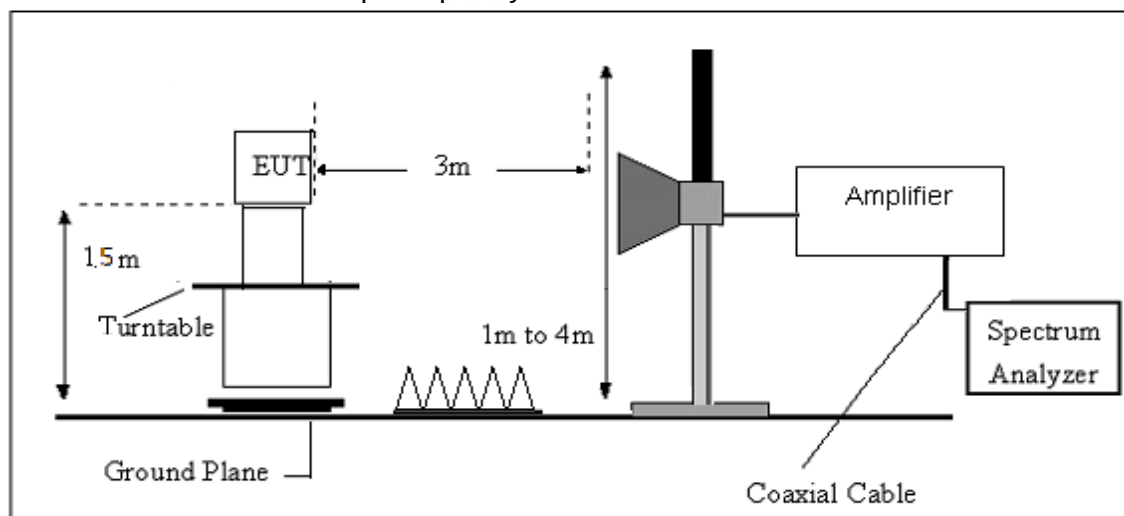
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz





3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 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	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$

**3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)**

Temperature:	25.2(C)	Relative Humidity:	61%RH
Test Voltage :	DC 3.8V from battery	Polarization :	--
Test Mode :	TX Mode		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

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

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

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

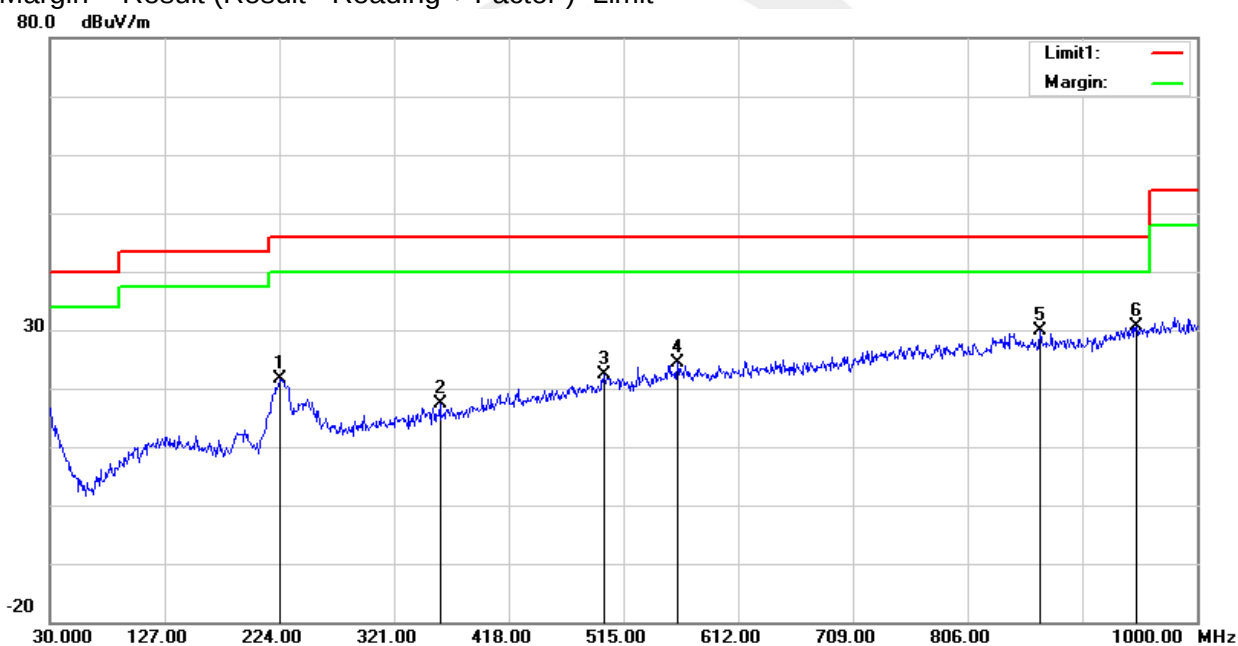
**3.2.7 TEST RESULTS (Between 30MHz – 1GHz)**

Temperature	25.2(C)	Relative Humidity:	61%RH
Test Voltage	DC 3.8V from battery	Polarization:	Horizontal
Test Mode	Mode 1~6(Mode 1 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	224.9700	40.91	-19.32	21.59	46.00	-24.41	QP
2	359.8000	30.25	-12.87	17.38	46.00	-28.62	QP
3	498.5100	30.52	-8.04	22.48	46.00	-23.52	QP
4	560.5900	29.92	-5.50	24.42	46.00	-21.58	QP
5	867.1100	30.39	-0.50	29.89	46.00	-16.11	QP
6	948.5900	29.06	1.56	30.62	46.00	-15.38	QP

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit



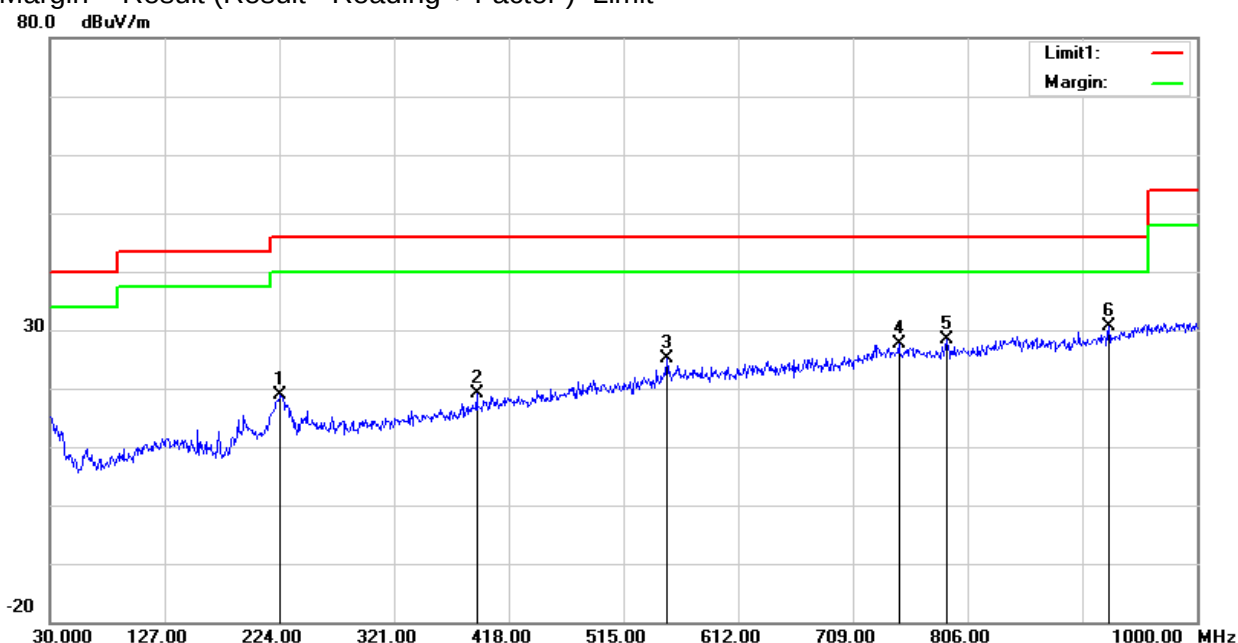


Temperature	25.2(C)	Relative Humidity:	61%RH
Test Voltage	DC 3.8V from battery	Polarization:	Vertical
Test Mode	Mode 1~6(Mode 1 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	224.9700	38.30	-19.32	18.98	46.00	-27.02	QP
2	390.8400	30.63	-11.54	19.09	46.00	-26.91	QP
3	551.8600	30.90	-5.72	25.18	46.00	-20.82	QP
4	747.8000	29.86	-2.15	27.71	46.00	-18.29	QP
5	788.5400	30.49	-2.00	28.49	46.00	-17.51	QP
6	925.3100	30.30	0.28	30.58	46.00	-15.42	QP

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit





3.2.8 TEST RESULTS (Above 1000 MHz)

Band I 5150-5250MHz

Frequency (MHz)	Reading (dBuV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Corrected Factor (dB)	Emission Level (dBμV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11a/ 5180 MHz)										
3249.76	44.19	44.70	6.70	28.20	-9.80	34.39	68.20	-33.81	Pk	Vertical
3249.76	41.07	44.70	6.70	28.20	-9.80	31.27	54.00	-22.73	AV	Vertical
3245.79	45.20	44.70	6.70	28.20	-9.80	35.40	68.20	-32.80	Pk	Horizontal
3245.79	41.01	44.70	6.70	28.20	-9.80	31.21	54.00	-22.79	AV	Horizontal
3985.59	38.68	44.20	7.90	29.70	-6.60	32.08	68.20	-36.12	Pk	Vertical
3985.59	36.26	44.20	7.90	29.70	-6.60	29.66	54.00	-24.34	AV	Vertical
3999.87	39.61	44.20	7.90	29.70	-6.60	33.01	68.20	-35.19	Pk	Horizontal
3999.87	36.06	44.20	7.90	29.70	-6.60	29.46	54.00	-24.54	AV	Horizontal
7225.40	36.48	43.50	11.40	35.50	3.40	39.88	68.20	-28.32	Pk	Vertical
7225.40	34.70	43.50	11.40	35.50	3.40	38.10	54.00	-15.90	AV	Vertical
7231.68	37.47	43.50	11.40	35.50	3.40	40.87	68.20	-27.33	Pk	Horizontal
7231.68	34.87	43.50	11.40	35.50	3.40	38.27	54.00	-15.73	AV	Horizontal
10360.07	39.46	44.50	13.80	38.80	8.10	47.56	68.20	-20.64	Pk	Vertical
10360.07	36.01	44.50	13.80	38.80	8.10	44.11	54.00	-9.89	AV	Vertical
10360.06	39.71	44.50	13.80	38.80	8.10	47.81	68.20	-20.39	Pk	Horizontal
10360.06	35.96	44.50	13.80	38.80	8.10	44.06	54.00	-9.94	AV	Horizontal
11030.18	34.06	43.60	14.30	39.50	10.20	44.26	68.20	-23.94	Pk	Vertical
11030.18	30.30	43.60	14.30	39.50	10.20	40.50	54.00	-13.50	AV	Vertical
11017.40	33.73	43.60	14.30	39.50	10.20	43.93	68.20	-24.27	Pk	Horizontal
11017.40	30.33	43.60	14.30	39.50	10.20	40.53	54.00	-13.47	AV	Horizontal
13290.32	32.17	42.60	15.90	38.90	12.20	44.37	68.20	-23.83	Pk	Vertical
13290.32	29.89	42.60	15.90	38.90	12.20	42.09	54.00	-11.91	AV	Vertical
13289.99	32.63	42.60	15.90	38.90	12.20	44.83	68.20	-23.37	Pk	Horizontal
13289.99	28.89	42.60	15.90	38.90	12.20	41.09	54.00	-12.91	AV	Horizontal



Mid Channel (802.11a/ 5200 MHz)										
3249.47	45.01	44.70	6.70	28.20	-9.80	35.21	68.20	-32.99	Pk	Vertical
3249.47	41.94	44.70	6.70	28.20	-9.80	32.14	54.00	-21.86	AV	Vertical
3262.41	44.93	44.70	6.70	28.20	-9.80	35.13	68.20	-33.07	Pk	Horizontal
3262.41	41.17	44.70	6.70	28.20	-9.80	31.37	54.00	-22.63	AV	Horizontal
3992.29	39.63	44.20	7.90	29.70	-6.60	33.03	68.20	-35.17	Pk	Vertical
3992.29	36.80	44.20	7.90	29.70	-6.60	30.20	54.00	-23.80	AV	Vertical
3988.36	39.25	44.20	7.90	29.70	-6.60	32.65	68.20	-35.55	Pk	Horizontal
3988.36	35.77	44.20	7.90	29.70	-6.60	29.17	54.00	-24.83	AV	Horizontal
7218.27	37.67	43.50	11.40	35.50	3.40	41.07	68.20	-27.13	Pk	Vertical
7218.27	33.73	43.50	11.40	35.50	3.40	37.13	54.00	-16.87	AV	Vertical
7233.36	37.29	43.50	11.40	35.50	3.40	40.69	68.20	-27.51	Pk	Horizontal
7233.36	34.82	43.50	11.40	35.50	3.40	38.22	54.00	-15.78	AV	Horizontal
10400.11	39.18	44.50	13.80	38.80	8.10	47.28	68.20	-20.92	Pk	Vertical
10400.11	36.22	44.50	13.80	38.80	8.10	44.32	54.00	-9.68	AV	Vertical
10400.01	39.13	44.50	13.80	38.80	8.10	47.23	68.20	-20.97	Pk	Horizontal
10400.01	36.54	44.50	13.80	38.80	8.10	44.64	54.00	-9.36	AV	Horizontal
11024.31	32.96	43.60	14.30	39.50	10.20	43.16	68.20	-25.04	Pk	Vertical
11024.31	30.41	43.60	14.30	39.50	10.20	40.61	54.00	-13.39	AV	Vertical
11017.83	32.74	43.60	14.30	39.50	10.20	42.94	68.20	-25.26	Pk	Horizontal
11017.83	30.19	43.60	14.30	39.50	10.20	40.39	54.00	-13.61	AV	Horizontal
13281.51	31.84	42.60	15.90	38.90	12.20	44.04	68.20	-24.16	Pk	Vertical
13281.51	29.36	42.60	15.90	38.90	12.20	41.56	54.00	-12.44	AV	Vertical
13288.85	31.86	42.60	15.90	38.90	12.20	44.06	68.20	-24.14	Pk	Horizontal
13288.85	29.27	42.60	15.90	38.90	12.20	41.47	54.00	-12.53	AV	Horizontal



High Channel (802.11a/ 5240 MHz)										
3260.90	44.84	44.70	6.70	28.20	-9.80	35.04	68.20	-33.16	Pk	Vertical
3260.90	41.95	44.70	6.70	28.20	-9.80	32.15	54.00	-21.85	AV	Vertical
3259.29	45.02	44.70	6.70	28.20	-9.80	35.22	68.20	-32.98	Pk	Horizontal
3259.29	41.85	44.70	6.70	28.20	-9.80	32.05	54.00	-21.95	AV	Horizontal
3996.48	38.64	44.20	7.90	29.70	-6.60	32.04	68.20	-36.16	Pk	Vertical
3996.48	36.38	44.20	7.90	29.70	-6.60	29.78	54.00	-24.22	AV	Vertical
3985.85	39.51	44.20	7.90	29.70	-6.60	32.91	68.20	-35.29	Pk	Horizontal
3985.85	35.78	44.20	7.90	29.70	-6.60	29.18	54.00	-24.82	AV	Horizontal
7226.31	37.21	43.50	11.40	35.50	3.40	40.61	68.20	-27.59	Pk	Vertical
7226.31	33.44	43.50	11.40	35.50	3.40	36.84	54.00	-17.16	AV	Vertical
7219.61	37.91	43.50	11.40	35.50	3.40	41.31	68.20	-26.89	Pk	Horizontal
7219.61	33.99	43.50	11.40	35.50	3.40	37.39	54.00	-16.61	AV	Horizontal
10480.06	39.77	44.50	13.80	38.80	8.10	47.87	68.20	-20.33	Pk	Vertical
10480.06	37.01	44.50	13.80	38.80	8.10	45.11	54.00	-8.89	AV	Vertical
10480.40	38.96	44.50	13.80	38.80	8.10	47.06	68.20	-21.14	Pk	Horizontal
10480.40	36.06	44.50	13.80	38.80	8.10	44.16	54.00	-9.84	AV	Horizontal
11024.84	33.84	43.60	14.30	39.50	10.20	44.04	68.20	-24.16	Pk	Vertical
11024.84	30.30	43.60	14.30	39.50	10.20	40.50	54.00	-13.50	AV	Vertical
11018.18	32.88	43.60	14.30	39.50	10.20	43.08	68.20	-25.12	Pk	Horizontal
11018.18	29.83	43.60	14.30	39.50	10.20	40.03	54.00	-13.97	AV	Horizontal
13296.56	32.09	42.60	15.90	38.90	12.20	44.29	68.20	-23.91	Pk	Vertical
13296.56	28.82	42.60	15.90	38.90	12.20	41.02	54.00	-12.98	AV	Vertical
13282.82	33.02	42.60	15.90	38.90	12.20	45.22	68.20	-22.98	Pk	Horizontal
13282.82	28.92	42.60	15.90	38.90	12.20	41.12	54.00	-12.88	AV	Horizontal

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11a, 802.11n (HT-20), 802.11n (HT-40), the worst case is 802.11a.
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.



Band IV(5.725-5.850) GHz

Frequency (MHz)	Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limit (dBuV/m)	Margin	Detector	Comment
	(dBuV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)		(dB)		
Low Channel (802.11a/ 5745 MHz)										
3259.81	45.11	44.70	6.70	28.20	-9.80	35.31	68.20	-32.89	Pk	Vertical
3259.81	42.01	44.70	6.70	28.20	-9.80	32.21	54.00	-21.79	AV	Vertical
3249.59	44.57	44.70	6.70	28.20	-9.80	34.77	68.20	-33.43	Pk	Horizontal
3249.59	40.78	44.70	6.70	28.20	-9.80	30.98	54.00	-23.02	AV	Horizontal
3988.51	39.95	44.20	7.90	29.70	-6.60	33.35	68.20	-34.85	Pk	Vertical
3988.51	36.02	44.20	7.90	29.70	-6.60	29.42	54.00	-24.58	AV	Vertical
3988.39	39.47	44.20	7.90	29.70	-6.60	32.87	68.20	-35.33	Pk	Horizontal
3988.39	36.97	44.20	7.90	29.70	-6.60	30.37	54.00	-23.63	AV	Horizontal
7220.15	36.45	43.50	11.40	35.50	3.40	39.85	68.20	-28.35	Pk	Vertical
7220.15	34.03	43.50	11.40	35.50	3.40	37.43	54.00	-16.57	AV	Vertical
7225.50	37.49	43.50	11.40	35.50	3.40	40.89	68.20	-27.31	Pk	Horizontal
7225.50	34.77	43.50	11.40	35.50	3.40	38.17	54.00	-15.83	AV	Horizontal
10511.79	39.44	44.50	13.90	38.80	8.20	47.64	68.20	-20.56	Pk	Vertical
10511.79	36.32	44.50	13.90	38.80	8.20	44.52	54.00	-9.48	AV	Vertical
10516.45	38.68	44.50	13.90	38.80	8.20	46.88	68.20	-21.32	Pk	Horizontal
10516.45	36.90	44.50	13.90	38.80	8.20	45.10	54.00	-8.90	AV	Horizontal
11490.16	32.74	43.60	14.30	39.50	10.20	42.94	68.20	-25.26	Pk	Vertical
11490.16	30.43	43.60	14.30	39.50	10.20	40.63	54.00	-13.37	AV	Vertical
11490.04	33.19	43.60	14.30	39.50	10.20	43.39	68.20	-24.81	Pk	Horizontal
11490.04	30.74	43.60	14.30	39.50	10.20	40.94	54.00	-13.06	AV	Horizontal
13284.47	31.65	42.60	15.90	38.90	12.20	43.85	68.20	-24.35	Pk	Vertical
13284.47	28.86	42.60	15.90	38.90	12.20	41.06	54.00	-12.94	AV	Vertical
13290.55	32.33	42.60	15.90	38.90	12.20	44.53	68.20	-23.67	Pk	Horizontal
13290.55	29.37	42.60	15.90	38.90	12.20	41.57	54.00	-12.43	AV	Horizontal



Mid Channel (802.11a/ 5785 MHz)										
3255.29	44.71	44.70	6.70	28.20	-9.80	34.91	68.20	-33.29	Pk	Vertical
3255.29	41.46	44.70	6.70	28.20	-9.80	31.66	54.00	-22.34	AV	Vertical
3252.34	44.45	44.70	6.70	28.20	-9.80	34.65	68.20	-33.55	Pk	Horizontal
3252.34	41.62	44.70	6.70	28.20	-9.80	31.82	54.00	-22.18	AV	Horizontal
3999.75	39.74	44.20	7.90	29.70	-6.60	33.14	68.20	-35.06	Pk	Vertical
3999.75	35.72	44.20	7.90	29.70	-6.60	29.12	54.00	-24.88	AV	Vertical
3994.75	39.90	44.20	7.90	29.70	-6.60	33.30	68.20	-34.90	Pk	Horizontal
3994.75	35.79	44.20	7.90	29.70	-6.60	29.19	54.00	-24.81	AV	Horizontal
7236.28	36.50	43.50	11.40	35.50	3.40	39.90	68.20	-28.30	Pk	Vertical
7236.28	34.36	43.50	11.40	35.50	3.40	37.76	54.00	-16.24	AV	Vertical
7217.64	37.18	43.50	11.40	35.50	3.40	40.58	68.20	-27.62	Pk	Horizontal
7217.64	33.98	43.50	11.40	35.50	3.40	37.38	54.00	-16.62	AV	Horizontal
10585.85	39.20	44.50	13.80	38.80	8.10	47.30	68.20	-20.90	Pk	Vertical
10585.85	37.01	44.50	13.80	38.80	8.10	45.11	54.00	-8.89	AV	Vertical
10586.96	39.43	44.50	13.80	38.80	8.10	47.53	68.20	-20.67	Pk	Horizontal
10586.96	36.14	44.50	13.80	38.80	8.10	44.24	54.00	-9.76	AV	Horizontal
11570.11	33.34	43.60	14.30	39.50	10.20	43.54	68.20	-24.66	Pk	Vertical
11570.11	30.82	43.60	14.30	39.50	10.20	41.02	54.00	-12.98	AV	Vertical
11570.10	34.05	43.60	14.30	39.50	10.20	44.25	68.20	-23.95	Pk	Horizontal
11570.10	29.75	43.60	14.30	39.50	10.20	39.95	54.00	-14.05	AV	Horizontal
13297.25	32.22	42.60	15.90	38.90	12.20	44.42	68.20	-23.78	Pk	Vertical
13297.25	29.72	42.60	15.90	38.90	12.20	41.92	54.00	-12.08	AV	Vertical
13298.81	32.63	42.60	15.90	38.90	12.20	44.83	68.20	-23.37	Pk	Horizontal
13298.81	28.84	42.60	15.90	38.90	12.20	41.04	54.00	-12.96	AV	Horizontal



High Channel (802.11a/ 5825 MHz)										
3259.14	44.23	44.70	6.70	28.20	-9.80	34.43	68.20	-33.77	Pk	Vertical
3259.14	41.38	44.70	6.70	28.20	-9.80	31.58	54.00	-22.42	AV	Vertical
3261.87	45.12	44.70	6.70	28.20	-9.80	35.32	68.20	-32.88	Pk	Horizontal
3261.87	41.86	44.70	6.70	28.20	-9.80	32.06	54.00	-21.94	AV	Horizontal
3994.06	39.80	44.20	7.90	29.70	-6.60	33.20	68.20	-35.00	Pk	Vertical
3994.06	36.64	44.20	7.90	29.70	-6.60	30.04	54.00	-23.96	AV	Vertical
3987.19	39.30	44.20	7.90	29.70	-6.60	32.70	68.20	-35.50	Pk	Horizontal
3987.19	35.93	44.20	7.90	29.70	-6.60	29.33	54.00	-24.67	AV	Horizontal
7230.78	36.51	43.50	11.40	35.50	3.40	39.91	68.20	-28.29	Pk	Vertical
7230.78	34.14	43.50	11.40	35.50	3.40	37.54	54.00	-16.46	AV	Vertical
7236.06	36.60	43.50	11.40	35.50	3.40	40.00	68.20	-28.20	Pk	Horizontal
7236.06	34.13	43.50	11.40	35.50	3.40	37.53	54.00	-16.47	AV	Horizontal
10626.14	39.60	44.50	13.80	38.80	8.10	47.70	68.20	-20.50	Pk	Vertical
10626.14	35.99	44.50	13.80	38.80	8.10	44.09	54.00	-9.91	AV	Vertical
10640.31	39.67	44.50	13.80	38.80	8.10	47.77	68.20	-20.43	Pk	Horizontal
10640.31	35.71	44.50	13.80	38.80	8.10	43.81	54.00	-10.19	AV	Horizontal
11650.20	33.79	43.60	14.30	39.50	10.20	43.99	68.20	-24.21	Pk	Vertical
11650.20	29.84	43.60	14.30	39.50	10.20	40.04	54.00	-13.96	AV	Vertical
11650.40	32.73	43.60	14.30	39.50	10.20	42.93	68.20	-25.27	Pk	Horizontal
11650.40	30.78	43.60	14.30	39.50	10.20	40.98	54.00	-13.02	AV	Horizontal
13290.82	31.87	42.70	18.00	37.10	12.40	44.27	68.20	-23.93	Pk	Vertical
13290.82	28.76	42.70	18.00	37.10	12.40	41.16	54.00	-12.84	AV	Vertical
13284.18	32.51	42.70	18.00	37.10	12.40	44.91	68.20	-23.29	Pk	Horizontal
13284.18	29.55	42.70	18.00	37.10	12.40	41.95	54.00	-12.05	AV	Horizontal

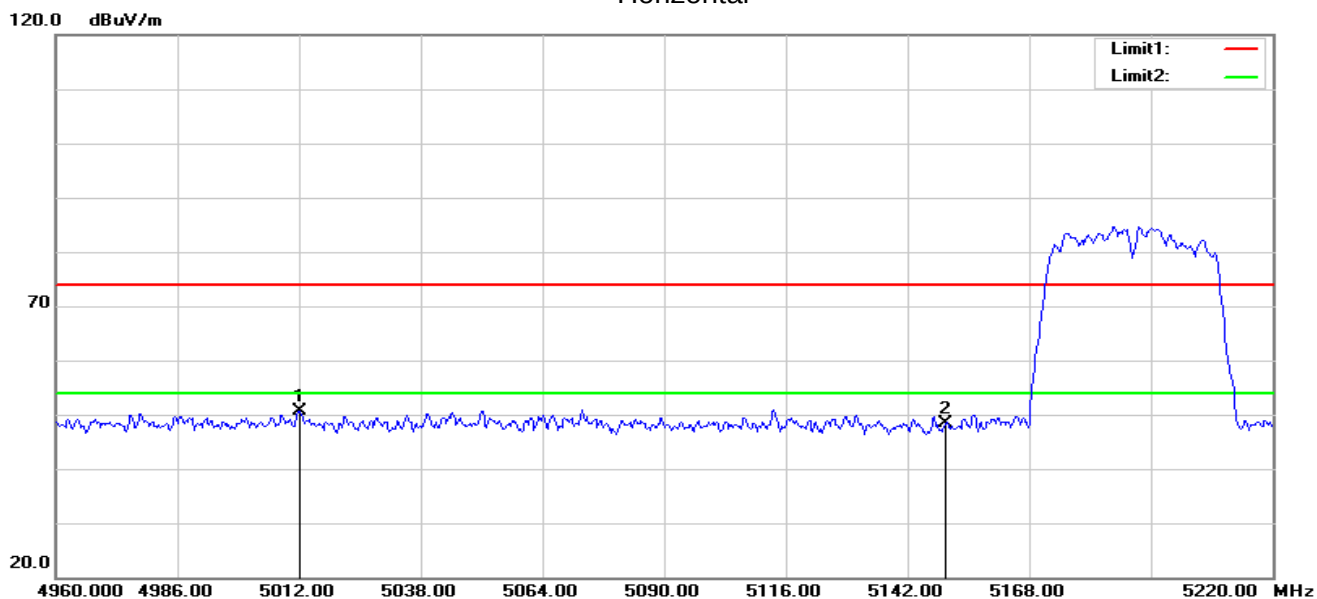
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11a, 802.11n (HT-20), 802.11n (HT-40), the worst case is 802.11a.
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.



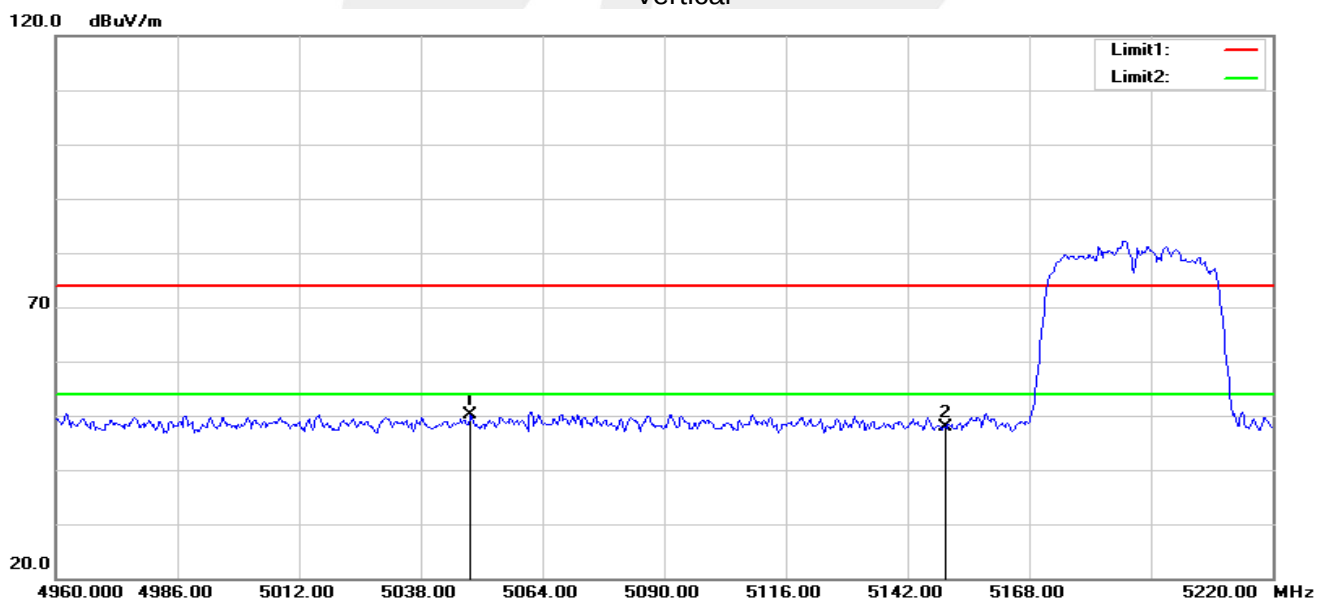
3.2.9 Band Edge

Band I 5150-5250MHz

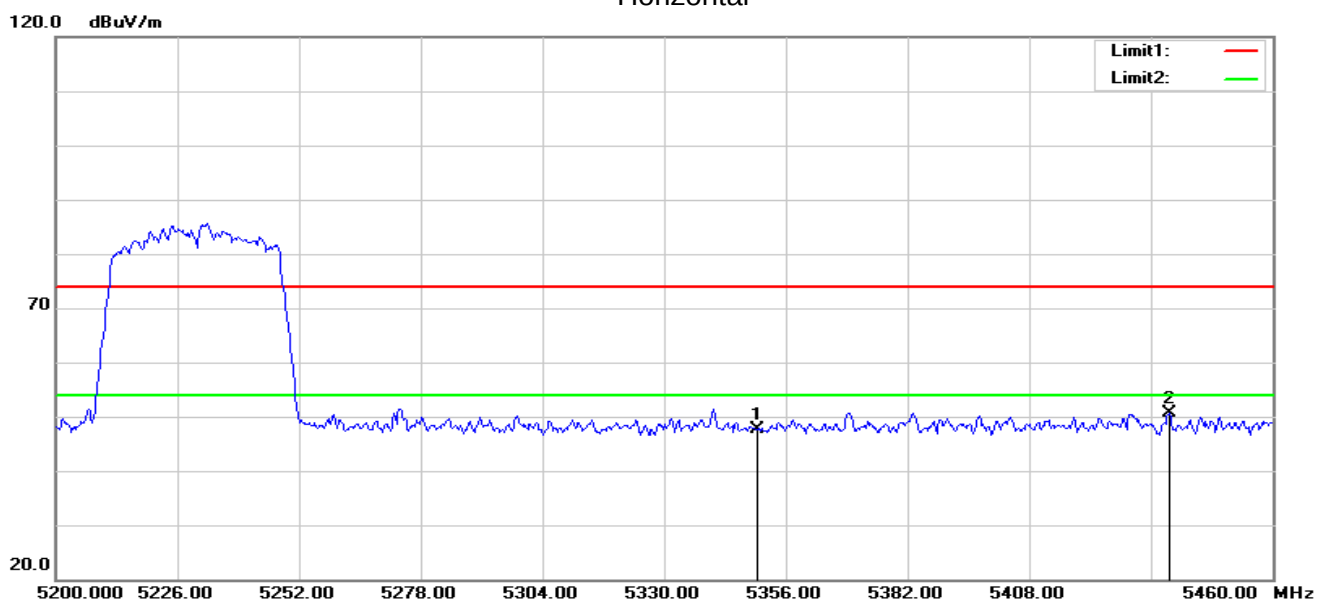
802.11a Low
Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5012.000	19.07	31.61	50.68	74.00	-23.32	peak
2	5150.000	16.64	31.72	48.36	74.00	-25.64	peak

Vertical

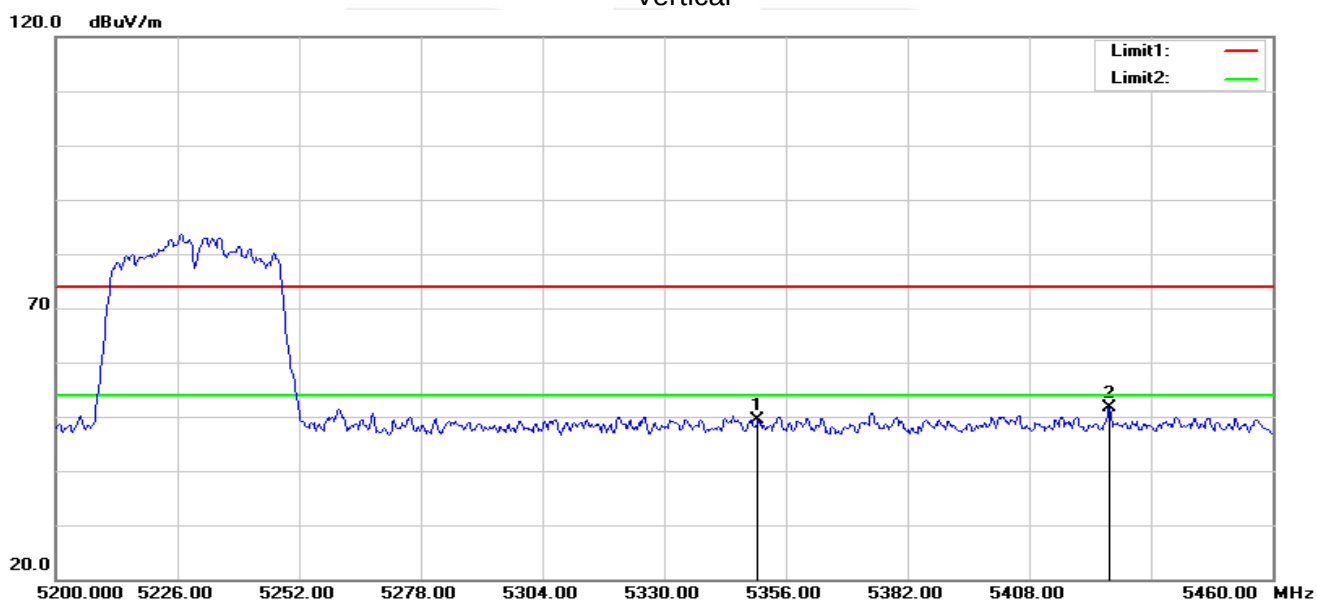


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5048.660	18.43	31.64	50.07	74.00	-23.93	peak
2	5150.000	16.11	31.72	47.83	74.00	-26.17	peak

**802.11a High**
Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	15.82	31.88	47.70	74.00	-26.30	peak
2	5437.900	18.66	31.95	50.61	74.00	-23.39	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	17.40	31.88	49.28	74.00	-24.72	peak
2	5425.160	19.64	31.94	51.58	74.00	-22.42	peak

Note: 802.11a,802.11n (HT-20),802.11n (HT-40), the worst case is 802.11a,only shown the worst case.

Band IV(5.725-5.85 GHz)

Note: The main frequency is too far away from the restricted band and does not require testing.

4. CONDUCTED SPURIOUS EMISSIONS AND BANDEDGE

4.1 LIMIT

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	1000 KHz/3000 KHz
Trace-Mode:	Max hold

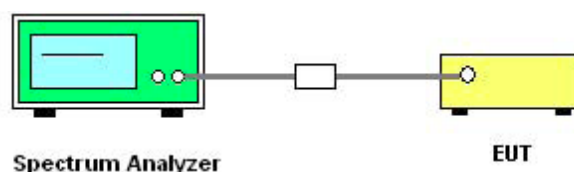
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 5700 to 5725 MHz Upper Band Edge: 5850 to 5870 MHz
RB / VB (emission in restricted band)	1000 KHz/3000 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1000 kHz. In order to make an accurate measurement, set the span greater than RBW.



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

Data See Attachment A





5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

1. For mobile and portable client devices in the 5.15-5.25 GHz band, , the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2 TEST PROCEDURE

1. The setting follows Method SA-1 of FCC KDB D02 General UNII Test Procedures New Rules v01r03.

For devices operating in the band, the rules specify a measurement bandwidth of 500 kHz.

Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used.

The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (*i.e.*, 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log (1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since $RBW=100 \text{ KHZ}$ is available on nearly all spectrum analyzers.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



**5.6 TEST RESULTS**

5150-5250MHz					
Frequency	Power Density(dBm)	Duty cycle factor (dB)	Power Density(dBm)	Limit	Result
802.11a					
5180	-4.328	0.090	-4.238	11	PASS
5200	-3.309	0.090	-3.219	11	PASS
5240	-3.124	0.090	-3.034	11	PASS
802.11n20					
5180	-4.618	0.120	-4.498	11	PASS
5200	-4.053	0.120	-3.933	11	PASS
5240	-3.346	0.120	-3.226	11	PASS
802.11n40					
5190	-7.576	0.110	-7.466	11	PASS
5230	-7.324	0.110	-7.214	11	PASS

5725-5850MHz					
Frequency	Power Density(dBm)	Duty cycle factor (dB)	Power Density(dBm)	Limit	Result
802.11a					
5745	-1.996	0.120	-1.876	30	PASS
5785	-2.269	0.120	-2.149	30	PASS
5825	-3.326	0.120	-3.206	30	PASS
802.11n20					
5745	-1.920	0.130	-1.790	30	PASS
5785	-3.385	0.130	-3.255	30	PASS
5825	-3.102	0.130	-2.972	30	PASS
802.11n40					
5755	-5.693	0.120	-5.573	30	PASS
5795	-6.519	0.120	-6.399	30	PASS

Test plot see Attachment B



6. BANDWIDTH MEASUREMENT

6.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring (26) power bandwidth:.

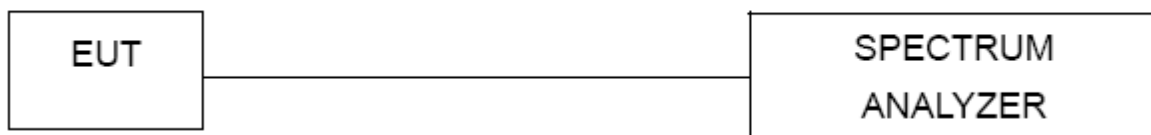
6.1.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW $\geq$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**6.1.5 TEST RESULTS**

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5180	19.78	Pass
5200	19.55	Pass
5240	19.66	Pass
802.11n(HT20)		
5180	20.11	Pass
5200	20.14	Pass
5240	19.87	Pass
802.11n(HT40)		
5180	40.23	Pass
5200	40.42	Pass

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5745	19.76	Pass
5785	19.60	Pass
5825	19.80	Pass
802.11n(HT20)		
5745	20.09	Pass
5785	20.05	Pass
5825	20.11	Pass
802.11n(HT40)		
5755	40.33	Pass
5795	40.25	Pass

Test plot see Attachment C



6.2 OCCUPIED BANDWIDTH (99%) TEST APPLIED PROCEDURES / LIMIT

The following procedure shall be used for measuring (99 %) power bandwidth:

6.2.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.

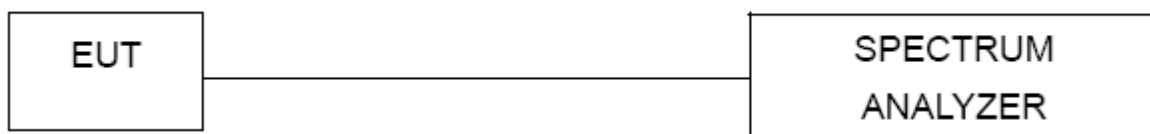
The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.2.2 DEVIATION FROM STANDARD

No deviation.

6.2.3 TEST SETUP



6.2.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**6.2.5 TEST RESULTS**

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5180	16.40	Pass
5200	16.38	Pass
5240	16.40	Pass
802.11n(HT20)		
5180	17.53	Pass
5200	17.51	Pass
5240	17.52	Pass
802.11n(HT40)		
5180	35.95	Pass
5200	35.99	Pass

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5745	16.38	Pass
5785	16.39	Pass
5825	16.39	Pass
802.11n(HT20)		
5745	17.51	Pass
5785	17.51	Pass
5825	17.54	Pass
802.11n(HT40)		
5755	35.90	Pass
5795	35.95	Pass

Test plot See Attachment C

6.3 MINIMUM EMISSION BANDWIDTH(6 DB) PROCEDURES / LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

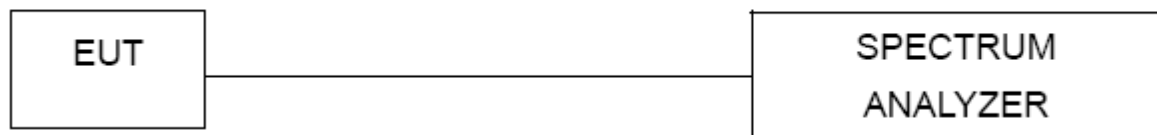
6.3.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) 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.

6.3.2 DEVIATION FROM STANDARD

No deviation.

6.3.3 TEST SETUP



6.3.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.3.5 TEST RESULTS

Frequency (MHz)	6dB Bandwidth (MHz)	Pass/Fail
802.11a		
5745	15.10	Pass
5785	15.12	Pass
5825	15.12	Pass
802.11n(HT20)		
5745	15.06	Pass
5785	15.11	Pass
5825	15.11	Pass
802.11n(HT40)		
5755	36.06	Pass
5795	35.93	Pass

Test plot see Attachment D





7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz, If transmitting antennas of directional gain greater than 6 dBi are used.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used.

FCC Part15 (15.407) , Subpart E				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(a) (1) (iv)	Peak Output Power	0.25 watt	5150-5250	PASS
		The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth)	5250-5350 5470-5725	
15.407(a) (3)		1 watt	5725-5825	

7.2 TEST PROCEDURE

Measurement using a Spectrum Analyzer or EMI Receiver:

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW $\geq$ 3 MHz.

(iv) Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle $< 98\%$, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

Measurement using a Power Sensor:

(i) Measurements may be performed using a wideband RF power sensor with a thermocouple detector or equivalent if all of the following conditions are satisfied:

The EUT is configured to transmit continuously or to transmit with a constant duty cycle.

At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.

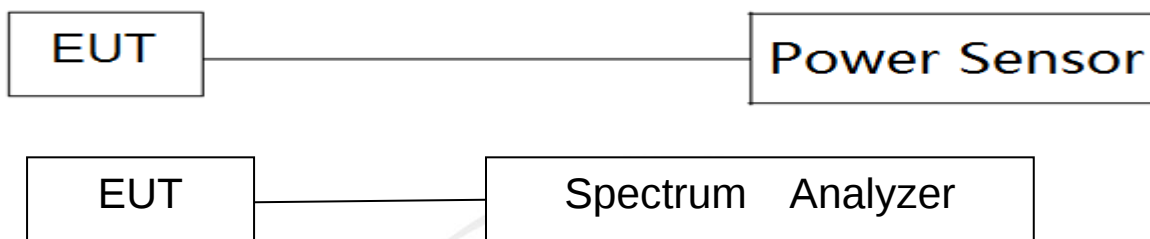
The integration period of the power sensor exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25%).

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULTS

Band I (5.15-5.25GHz)

Band I (5.15-5.25GHz)					
Test Channel	Frequency (MHz)	AV Power (dBm)	Duty cycle factor	AV Power (dBm)	LIMIT (dBm)
802.11a					
36	5180	1.08	0.09	1.17	23.98
40	5200	1.17	0.09	1.26	23.98
48	5240	1.33	0.09	1.42	23.98
802.11n(HT20)					
36	5180	1.25	0.12	1.37	23.98
40	5200	1.23	0.12	1.35	23.98
48	5240	1.17	0.12	1.29	23.98
802.11n(HT40)					
38	5190	1.26	0.11	1.37	23.98
46	5230	1.20	0.11	1.31	23.98

Note:

1. For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 0.25 W.

**Band IV (5.725-5.85GHz)**

Test Channel	Frequency (MHz)	AV Power (dBm)	Duty cycle factor	AV Power (dBm)	LIMIT (dBm)
802.11a					
149	5745	1.26	0.12	1.38	30
157	5785	1.02	0.12	1.14	30
165	5825	0.99	0.12	1.11	30
802.11n(HT20)					
149	5745	1.18	0.13	1.31	30
157	5785	0.96	0.13	1.09	30
165	5825	0.80	0.13	0.93	30
802.11n(HT40)					
151	5755	0.25	0.12	0.37	30
159	5795	0.31	0.12	0.43	30

Note:

1. For the band 5.745-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W.



Duty cycle

Band	Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty cycle factor
5.2G	a20	1.400	1.430	97.90%	0.09
	n20	1.310	1.348	97.18%	0.12
	n40	1.298	1.332	97.45%	0.11
5.8G	a20	1.402	1.440	97.36%	0.12
	n20	1.296	1.334	97.15%	0.13
	n40	1.299	1.335	97.30%	0.12

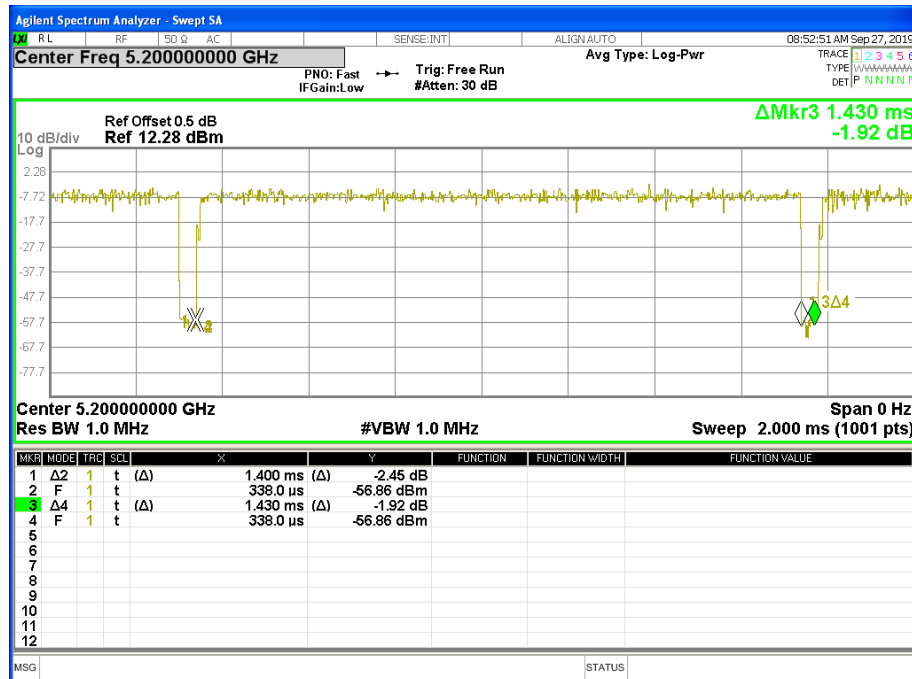
NOTE:

Duty cycle factor = $10 \cdot \log(1 / \text{Duty cycle})$ 

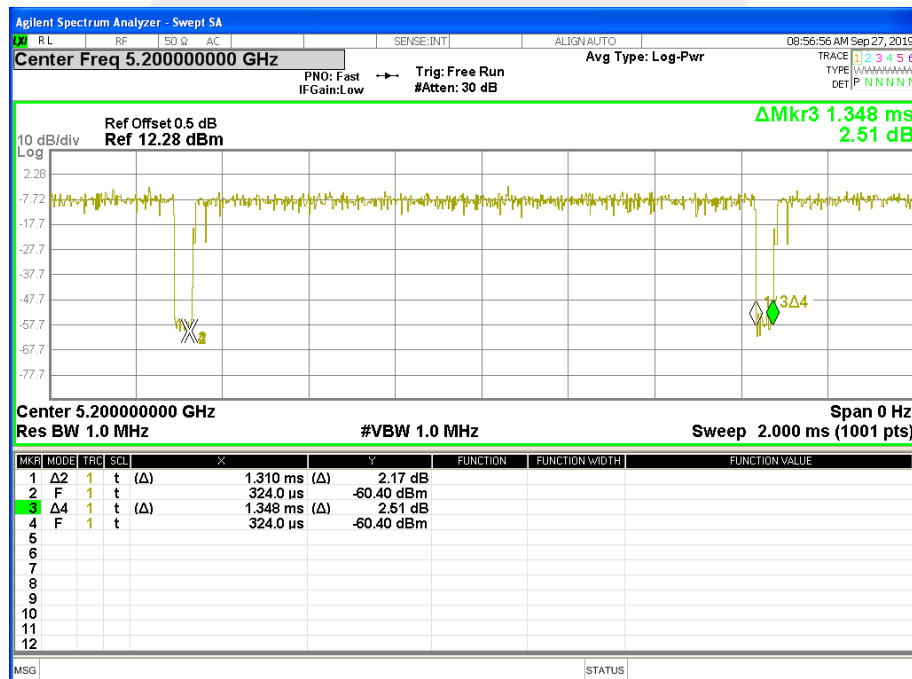


5.2G

802.11a

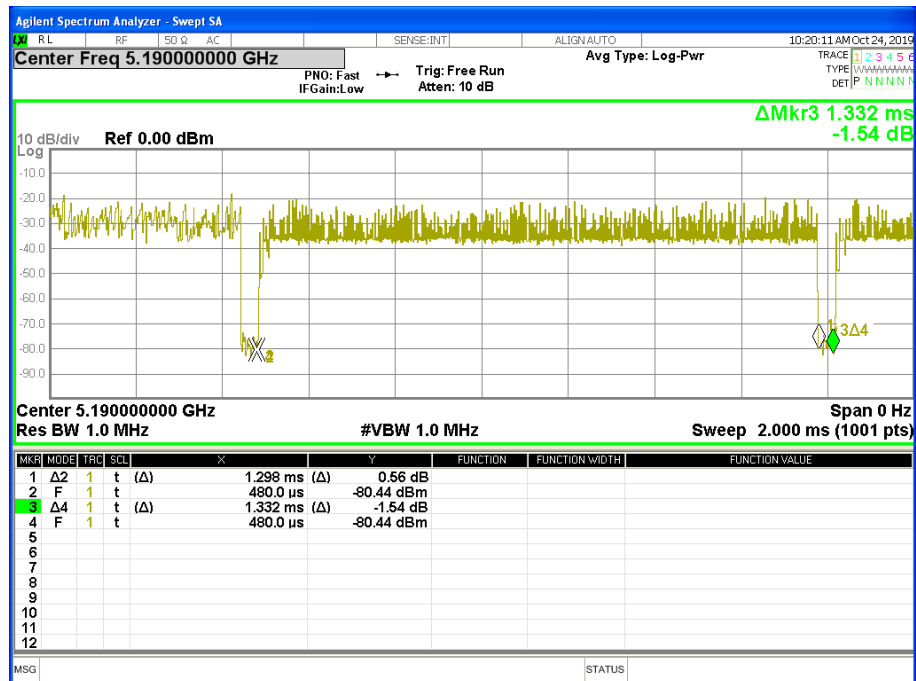


802.11n HT20





802.11n HT40





5.8G

802.11a

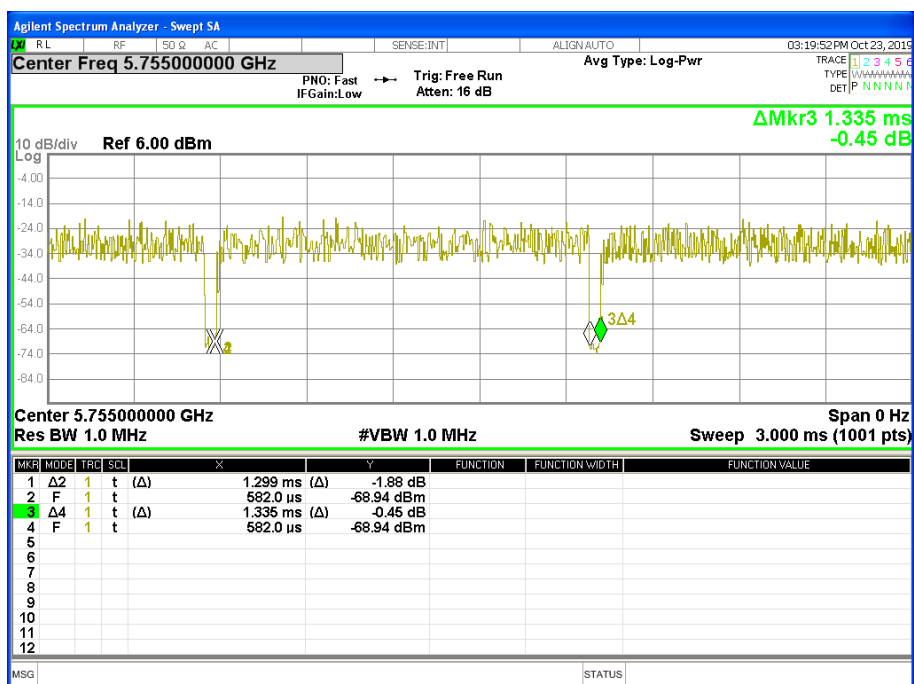


802.11n HT20





802.11n HT40





8. AUTOMATICALLY DISCONTINUE TRANSMISSION

8.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

8.2 TEST RESULT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission





9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 EUT ANTENNA

The EUT antenna is PIFA Antenna. It comply with the standard requirement.





APPENDIX - PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

*****END OF THE REPORT*****

