Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.407

Report Reference No. ..... :	**GTS20191205012-2-6**
FCC ID. ..... :	**2AUUTOPS-A45**
Compiled by (position+printed name+signature) . :	File administrators Peter Xiao
Supervised by (position+printed name+signature) . :	Test Engineer Moon Tan
Approved by (position+printed name+signature) . :	Manager Simon Hu
Date of issue ..... :	Apr.01, 2020
Representative Laboratory Name :	**Shenzhen Global Test Service Co.,Ltd.**
Address ..... :	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Applicant's name ..... :	**VIA TECHNOLOGIES (SHENZHEN) CO., LTD.**
Address ..... :	VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen, Guangdong, China
Test specification..... **:**	
Standard ..... :	**FCC Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES**
TRF Originator ..... :	Shenzhen Global Test Service Co.,Ltd.
Master TRF ..... :	Dated 2014-12

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Test item description..... :	**Distributed media player**
Trade Mark..... :	N/A
Manufacturer..... :	VIA TECHNOLOGIES (SHENZHEN) CO., LTD.
Model/Type reference..... :	OPS-A45
Listed Models ..... :	OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28, OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000, KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000
Modulation Type ..... :	DSSS,OFDM
Operation Frequency ..... :	From 5180MHz to 5240MHz,5260MHz to 5320MHz, 5500MHz to 5700MHz, 5745MHz to 5825MHz
Rating..... :	DC 12V
Result..... :	**PASS**

TEST REPORT

Test Report No. : GTS20191205012-2-6	Apr.01, 2020 Date of issue

Equipment under Test	:	Distributed media player
Model /Type	:	OPS-A45
Listed Models	:	OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28, OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000, KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000
Applicant	:	**VIA TECHNOLOGIES (SHENZHEN) CO., LTD.**
Address	:	VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen, Guangdong, China
Manufacturer	:	**VIA TECHNOLOGIES (SHENZHEN) CO., LTD.**
Address	:	VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen, Guangdong, China

Test Result:	**PASS**

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.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB 789033 D02: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORAMTION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Feb.27, 2020
Testing commenced on	:	Feb.28, 2020
Testing concluded on	:	Apr.01, 2020

2.2. Product Description

Product Name:	Distributed media player
Trade Mark:	N/A
Model/Type reference:	OPS-A45
List Model:	OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28, OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000, KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Power supply:	DC 12V
Hardware Version	ZX2800 ReV.A1
Software Version	zx2800_general-userdebug 7.1.2 V1.0.6 20190717.093102 derkeys
WIFI	
WLAN	Supported 802.11 a//n/ac
Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac20/40/80: OFDM(64QAM, 16QAM, QPSK, BPSK)
Operation frequency	IEEE 802.11a:5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11ac40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac80:5210MHz,5290MHz,5530MHz,5775MHz
Channel number	4 Channels for 20MHz bandwidth(5180-5240MHz) 4 Channels for 20MHz bandwidth(5260-5320MHz) 11 Channels for 20MHz bandwidth(5500-5700MHz) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 2 channels for 40MHz bandwidth(5270~5310MHz) 5 Channels for 40MHz bandwidth(5510-5670MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5210MHz) 1 channels for 80MHz bandwidth(5290MHz) 1 Channels for 80MHz bandwidth(5530Hz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna Description	External Antenna; 2.0dBi(Max.)

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		●	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

DC 12 V

2.4. Short description of the Equipment under Test (EUT)

This is a Distributed media player.

For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX.

IEEE 802.11a/ac20/ac40/ac80/n20/n40:

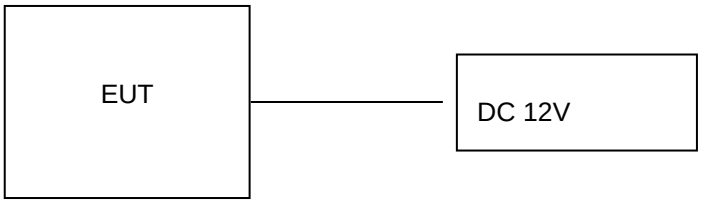
U-NI-1		U-NI-1		U-NI-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

U-NI-2A		U-NI-2A		U-NI-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

U-NI-2C		U-NI-2C		U-NI-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550		
108	5540	118	5590		
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

U-NI-3		U-NI-3		U-NI-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	**5745**	151	5755	155	5775
153	5765	159	5795		
157	**5785**				
161	5805				
165	**5825**				

2.6. Block Diagram of Test Setup



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

This submittal(s) (test report) is intended for **FCC ID: 2AUUTOPS-A45** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.8. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
Shenzhen Mingxin power Technology Co.,Ltd	Adapter	MX24W1-1202000C	--	SDOC

2.9. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

3.2. Test Facility

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

CNAS (No. CNAS L8169)
Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)
Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

3.3. Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Pass	Fail	NA	NP	Remark
§15.203	Antenna gain	802.11ac	☒ Lowest ☒ Middle ☒ Highest	802.11ac	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Power spectral density	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	Spectrum bandwidth – 26 dB bandwidth	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(e)	Spectrum bandwidth – 6 dB bandwidth	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(a)	Maximum output power	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance conducted	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.407(b)	Band edge compliance radiated	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.407(a)	TX spurious emissions conducted	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.407(a)	TX spurious emissions radiated	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	802.11a/ac20/ac40/ac80 802.11n HT20/40	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.407(g)	Frequency Stability	-/-	-/-	-/-	-/-	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☐	☐	☒	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11a/ac20/ac40/ac80 802.11n HT20/40	-/-	802.11ac	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11a/ac20/ac40/ac80 802.11n HT20/40	-/-	802.11ac	-/-	☒	☐	☐	☐	complies

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

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.

3.5. 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 Global Test Service 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 Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

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

3.6. Equipments Used during the Test

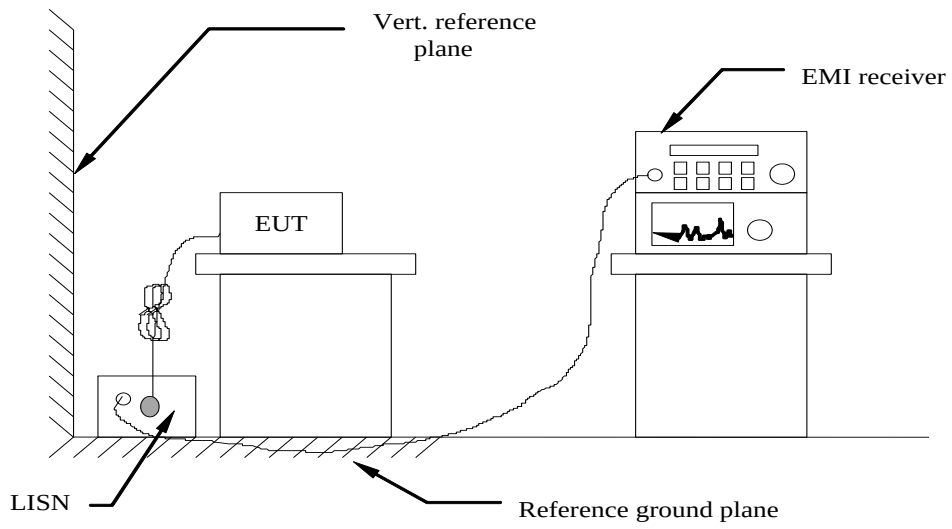
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2019/09/20	2020/09/19
LISN	R&S	ESH2-Z5	893606/008	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESPI3	101841-cd	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESCI7	101102	2019/09/20	2020/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19
Spectrum Analyzer	R&S	FSV40	100019	2019/09/20	2020/09/19
Vector Signal generator	Agilent	N5181A	MY49060502	2019/09/20	2020/09/19
Signal generator	Agilent	E4421B	3610AO1069	2019/09/20	2020/09/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2019/09/20	2020/09/19
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2019/09/23	2020/09/22
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2019/10/12	2020/10/11
Bilog Antenna	Schwarzbeck	VULB9163	000976	2019/05/26	2020/05/25
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV9179	9719-025	2019/09/20	2020/09/19
Amplifier	EMCI	EMC051845B	980355	2019/09/20	2020/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2019/09/20	2020/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2019/09/20	2020/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2019/09/20	2020/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2019/09/20	2020/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2019/09/20	2020/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2019/09/20	2020/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2019/09/20	2020/09/19
Test Control Unit	Tonscend	JS0806-1	178060067	2019/06/20	2020/06/19
Automated filter bank	Tonscend	JS0806-F	19F8060177	2019/06/20	2020/06/19
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

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 EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/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.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

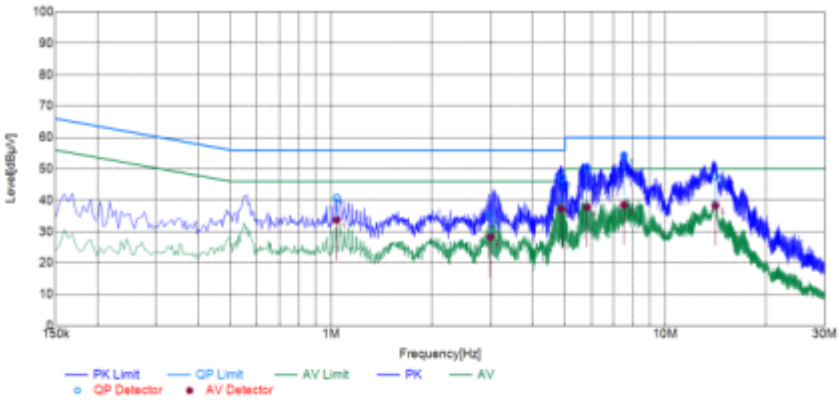
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

Remark: We measured Conducted Emission at all mode in AC 120V/60Hz, the worst case was recorded .

Power supply:	AC 120V/60Hz	Polarization	L

Test Graph

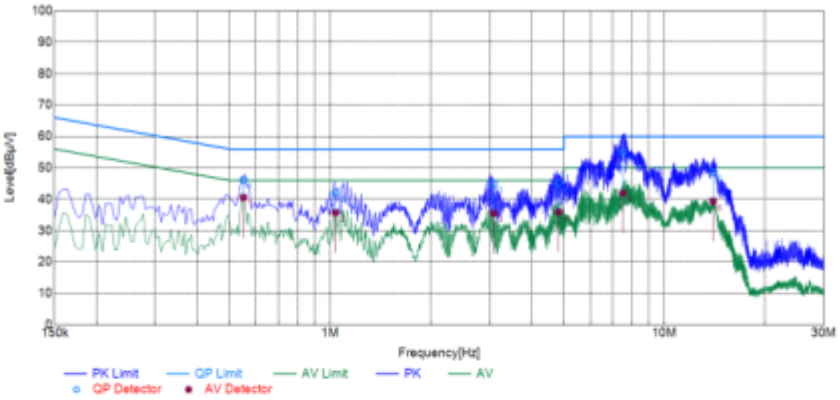


Final Data List

NO.	Frequency [MHz]	QP Reading [dBμV]	AVG. Reading [dBμV]	Factor [dB]	QP Result [dBμV]	AVG. Result [dBμV]	QP Limit [dBμV]	AVG. Limit [dBμV]	QP Margin [dB]	AVG. Margin [dB]	Line	Remark
1	1.0388	30.60	23.54	10.20	40.80	33.74	56.00	46.00	15.20	12.26	L1	PASS
2	2.9960	24.93	18.03	10.34	35.27	28.37	56.00	46.00	20.73	17.63	L1	PASS
3	4.8855	36.70	26.99	10.35	47.05	37.34	56.00	46.00	8.95	8.66	L1	PASS
4	5.8332	39.75	27.37	10.46	50.21	37.83	60.00	50.00	9.79	12.17	L1	PASS
5	7.5172	43.78	27.98	10.55	54.33	38.53	60.00	50.00	5.67	11.47	L1	PASS
6	14.1179	36.72	27.49	10.88	47.60	38.37	60.00	50.00	12.40	11.63	L1	PASS

Power supply:	AC 120V/60Hz	Polarization	N

Test Graph



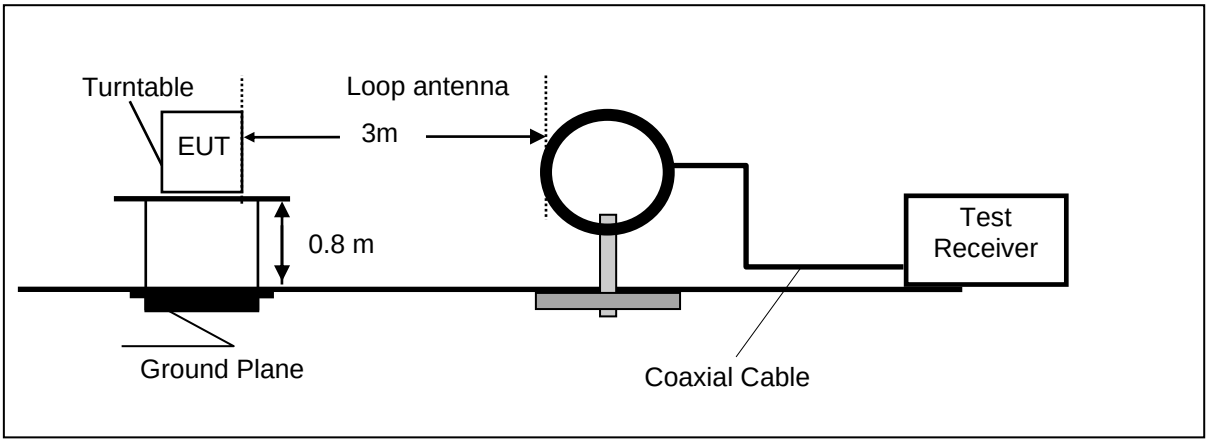
Final Data List

NO.	Frequency [MHz]	QP Reading [dBμV]	AVG. Reading [dBμV]	Factor [dB]	QP Result [dBμV]	AVG. Result [dBμV]	QP Limit [dBμV]	AVG. Limit [dBμV]	QP Margin [dB]	AVG. Margin [dB]	Line	Remark
1	0.5506	35.97	30.37	10.22	46.19	40.59	56.00	46.00	9.81	5.41	N	PASS
2	1.0382	31.85	25.56	10.20	42.05	35.76	56.00	46.00	13.95	10.24	N	PASS
3	3.0830	34.60	25.26	10.34	44.94	35.60	56.00	46.00	11.06	10.40	N	PASS
4	4.8247	34.78	25.62	10.35	45.13	35.97	56.00	46.00	10.87	10.03	N	PASS
5	7.5198	44.65	31.49	10.55	55.20	42.04	60.00	50.00	4.80	7.96	N	PASS
6	13.9770	37.75	28.51	10.86	48.61	39.37	60.00	50.00	11.39	10.63	N	PASS

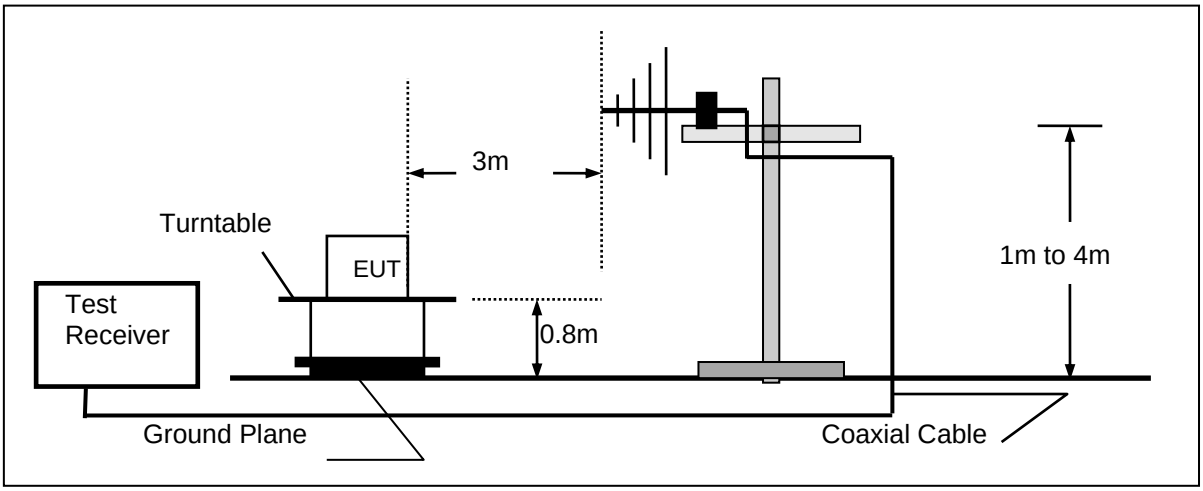
4.2. Radiated Emission

TEST CONFIGURATION

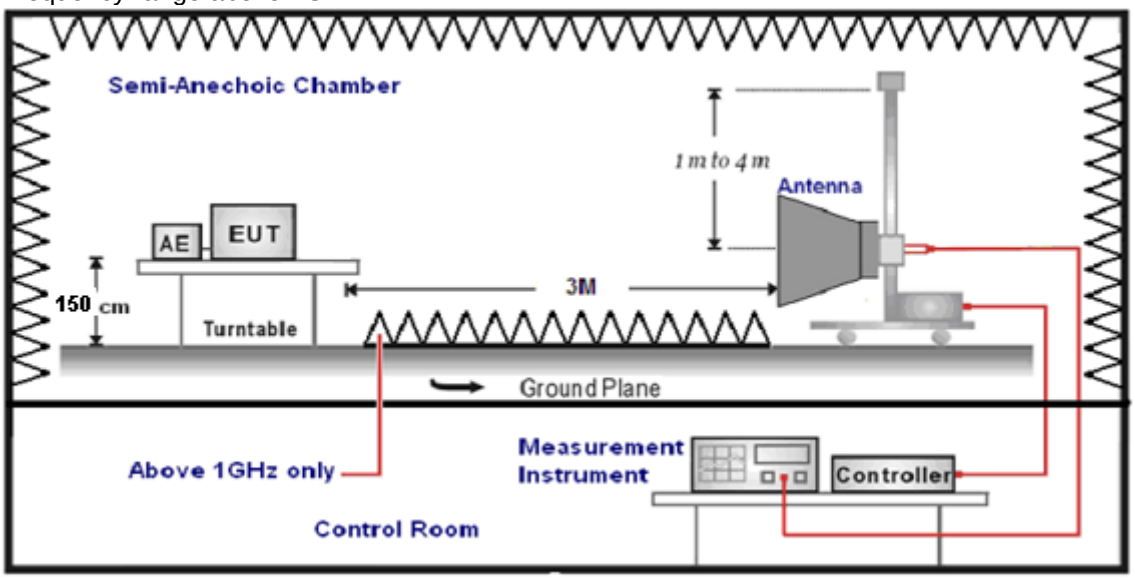
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



TEST PROCEDURE

1.The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing above 1GHz.
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.
5.The EUT minimum operation frequency was 24MHz and maximum operation frequency was 5825MHz.so radiated emission test frequency band from 9KHz to 40GHz.
6.The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7.Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

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	

Transd=AF +CL-AG

RADIATION LIMIT

According to §15.407 (b): 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

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBµV/m)
5150-5250	-27	68.2
5250-5350	-27	68.2
5470-5725	-27	68.2
5725-5850	-27 (beyond 10MHz of the bandedge)	68.2
	-17 (within 10 MHz of band edge)	78.2

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

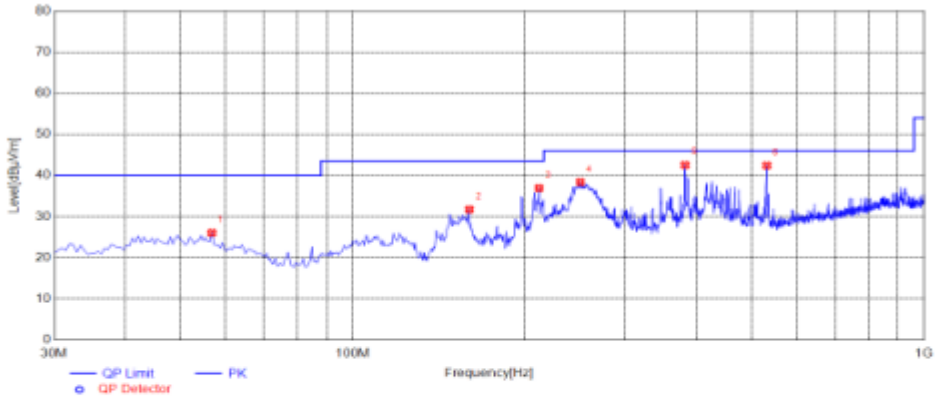
TEST RESULTS

Remark: We measured Radiated Emission at all mode from30MHz to 25GHz in AC 120V/60Hz and the worst case was recorded.

For 30MHz-1GHz

Horizontal

Test Graph

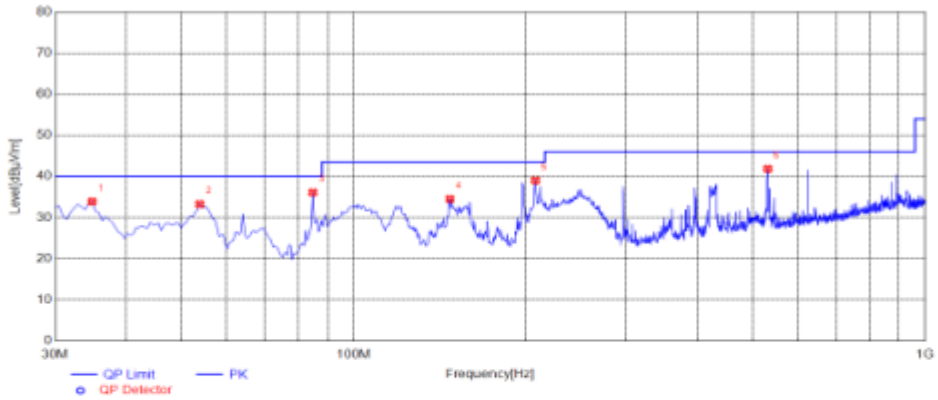


Suspected List

NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	56.6750	33.24	-7.20	26.04	40.00	13.96	100	174	PK	Horizonta	PASS
2	159.9800	43.63	-11.92	31.71	43.50	11.79	100	294	PK	Horizonta	PASS
3	211.8750	46.33	-9.44	36.89	43.50	6.61	100	307	PK	Horizonta	PASS
4	250.1900	46.76	-8.38	38.38	46.00	7.62	100	46	PK	Horizonta	PASS
5	381.6250	48.39	-5.86	42.53	46.00	3.47	100	33	PK	Horizonta	PASS
6	530.5200	45.60	-3.19	42.41	46.00	3.59	100	82	PK	Horizonta	PASS

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	34.8500	43.77	-9.88	33.89	40.00	6.11	100	349	PK	Vertical	PASS
2	53.7650	40.07	-6.81	33.26	40.00	6.74	100	126	PK	Vertical	PASS
3	84.8050	47.76	-11.64	36.12	40.00	3.88	100	58	PK	Vertical	PASS
4	147.3700	47.25	-12.75	34.50	43.50	9.00	100	221	PK	Vertical	PASS
5	207.9950	48.42	-9.42	39.00	43.50	4.50	100	74	PK	Vertical	PASS
6	530.5200	45.03	-3.19	41.84	46.00	4.16	100	358	PK	Vertical	PASS

For 1GHz to 40GHz

5150-5250MHz:

802.11a Mode_Channel 36 _5180 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10360	39.54	38.55	33.13	11.26	56.22	68.20	-11.98	Peak	Horizontal
1	10360	30.65	38.55	33.13	11.26	47.33	54.00	-6.67	AV	Horizontal
1	10360	40.85	38.55	33.13	11.26	57.53	68.20	-10.67	Peak	Vertical
1	10360	29.11	38.55	33.13	11.26	45.79	54.00	-8.21	AV	Vertical

802.11a Mode_Channel 40 _ 5200 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10400	40.07	38.55	33.13	11.26	56.75	68.20	-11.45	Peak	Horizontal
1	10400	30.39	38.55	33.13	11.26	47.07	54.00	-6.93	AV	Horizontal
1	10400	41.05	38.55	33.13	11.26	57.73	68.20	-10.47	Peak	Vertical
1	10400	29.25	38.55	33.13	11.26	45.93	54.00	-8.07	AV	Vertical

802.11a Mode_ Channel 48_ 5240 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10480	39.37	38.55	33.13	11.26	56.05	68.20	-12.15	Peak	Horizontal
1	10480	30.52	38.55	33.13	11.26	47.20	54.00	-6.80	AV	Horizontal
1	10480	41.93	38.55	33.13	11.26	58.61	68.20	-9.59	Peak	Vertical
1	10480	28.24	38.55	33.13	11.26	44.92	54.00	-9.08	AV	Vertical

802.11n20 Mode_Channel 36 _5180 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10360	39.83	38.55	33.13	11.26	56.51	68.20	-11.69	Peak	Horizontal
1	10360	31.46	38.55	33.13	11.26	48.14	54.00	-5.86	AV	Horizontal
1	10360	41.12	38.55	33.13	11.26	57.80	68.20	-10.40	Peak	Vertical
1	10360	29.27	38.55	33.13	11.26	45.95	54.00	-8.05	AV	Vertical

802.11n20 Mode_Channel 40 _ 5200 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10400	39.77	38.55	33.13	11.26	56.45	68.20	-11.75	Peak	Horizontal
1	10400	31.99	38.55	33.13	11.26	48.67	54.00	-5.33	AV	Horizontal
1	10400	40.07	38.55	33.13	11.26	56.75	68.20	-11.45	Peak	Vertical
1	10400	29.79	38.55	33.13	11.26	46.47	54.00	-7.53	AV	Vertical

802.11n20 Mode_ Channel 48_ 5240 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10480	39.27	38.55	33.13	11.26	55.95	68.20	-12.25	Peak	Horizontal
1	10480	30.87	38.55	33.13	11.26	47.55	54.00	-6.45	AV	Horizontal
1	10480	41.81	38.55	33.13	11.26	58.49	68.20	-9.71	Peak	Vertical
1	10480	28.43	38.55	33.13	11.26	45.11	54.00	-8.89	AV	Vertical

802.11n40 Mode_Channel 38 _5190 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10380	40.78	38.55	33.13	11.26	57.46	68.20	-10.74	Peak	Horizontal
1	10380	30.30	38.55	33.13	11.26	46.98	54.00	-7.02	AV	Horizontal
1	10380	40.54	38.55	33.13	11.26	57.22	68.20	-10.98	Peak	Vertical
1	10380	28.70	38.55	33.13	11.26	45.38	54.00	-8.62	AV	Vertical

802.11n40 Mode_Channel 46 _ 5230 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10460	40.46	38.55	33.13	11.26	57.14	68.20	-11.06	Peak	Horizontal
1	10460	31.56	38.55	33.13	11.26	48.24	54.00	-5.76	AV	Horizontal
1	10460	40.46	38.55	33.13	11.26	57.14	68.20	-11.06	Peak	Vertical
1	10460	30.00	38.55	33.13	11.26	46.68	54.00	-7.32	AV	Vertical

802.11ac20 Mode_Channel 36 _5180 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10360	40.45	38.55	33.13	11.26	57.13	68.20	-11.07	Peak	Horizontal
1	10360	30.91	38.55	33.13	11.26	47.59	54.00	-6.41	AV	Horizontal
1	10360	40.03	38.55	33.13	11.26	56.71	68.20	-11.49	Peak	Vertical
1	10360	28.35	38.55	33.13	11.26	45.03	54.00	-8.97	AV	Vertical

802.11ac20 Mode_Channel 40 _ 5200 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10400	40.12	38.55	33.13	11.26	56.80	68.20	-11.40	Peak	Horizontal
1	10400	30.77	38.55	33.13	11.26	47.45	54.00	-6.55	AV	Horizontal
1	10400	41.22	38.55	33.13	11.26	57.90	68.20	-10.30	Peak	Vertical
1	10400	28.92	38.55	33.13	11.26	45.60	54.00	-8.40	AV	Vertical

802.11ac20 Mode_ Channel 48_ 5240 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10480	40.15	38.55	33.13	11.26	56.83	68.20	-11.37	Peak	Horizontal
1	10480	31.41	38.55	33.13	11.26	48.09	54.00	-5.91	AV	Horizontal
1	10480	41.39	38.55	33.13	11.26	58.07	68.20	-10.13	Peak	Vertical
1	10480	29.10	38.55	33.13	11.26	45.78	54.00	-8.22	AV	Vertical

802.11ac40 Mode_Channel 38 _5190 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10380	39.83	38.55	33.13	11.26	56.51	68.20	-11.69	Peak	Horizontal
1	10380	30.87	38.55	33.13	11.26	47.55	54.00	-6.45	AV	Horizontal
1	10380	41.28	38.55	33.13	11.26	57.96	68.20	-10.24	Peak	Vertical
1	10380	29.77	38.55	33.13	11.26	46.45	54.00	-7.55	AV	Vertical

802.11ac40 Mode_Channel 46 _ 5230 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10460	39.39	38.55	33.13	11.26	56.07	68.20	-12.13	Peak	Horizontal
1	10460	31.66	38.55	33.13	11.26	48.34	54.00	-5.66	AV	Horizontal
1	10460	41.22	38.55	33.13	11.26	57.90	68.20	-10.30	Peak	Vertical
1	10460	28.33	38.55	33.13	11.26	45.01	54.00	-8.99	AV	Vertical

802.11ac80 Mode_Channel 42 _5210 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10420	40.44	38.55	33.13	11.26	57.12	68.20	-11.08	Peak	Horizontal
1	10420	31.05	38.55	33.13	11.26	47.73	54.00	-6.27	AV	Horizontal
1	10420	40.77	38.55	33.13	11.26	57.45	68.20	-10.75	Peak	Vertical
1	10420	28.50	38.55	33.13	11.26	45.18	54.00	-8.82	AV	Vertical

5260-5320MHz:

802.11a Mode_Channel 52 _5260 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10520	39.50	38.55	33.13	11.26	56.18	68.20	-12.02	Peak	Horizontal
1	10520	31.62	38.55	33.13	11.26	48.30	54.00	-5.70	AV	Horizontal
1	10520	40.91	38.55	33.13	11.26	57.59	68.20	-10.61	Peak	Vertical
1	10520	28.96	38.55	33.13	11.26	45.64	54.00	-8.36	AV	Vertical

802.11a Mode_Channel 56 _ 5280 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10560	39.17	38.55	33.13	11.26	55.85	68.20	-12.35	Peak	Horizontal
1	10560	31.10	38.55	33.13	11.26	47.78	54.00	-6.22	AV	Horizontal
1	10560	40.53	38.55	33.13	11.26	57.21	68.20	-10.99	Peak	Vertical
1	10560	29.65	38.55	33.13	11.26	46.33	54.00	-7.67	AV	Vertical

802.11a Mode_ Channel 64_ 5320 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10640	39.87	38.55	33.13	11.26	56.55	68.20	-11.65	Peak	Horizontal
1	10640	30.08	38.55	33.13	11.26	46.76	54.00	-7.24	AV	Horizontal
1	10640	40.68	38.55	33.13	11.26	57.36	68.20	-10.84	Peak	Vertical
1	10640	29.19	38.55	33.13	11.26	45.87	54.00	-8.13	AV	Vertical

802.11n20 Mode_Channel 52 _5260 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10520	40.43	38.55	33.13	11.26	57.11	68.20	-11.09	Peak	Horizontal
1	10520	30.79	38.55	33.13	11.26	47.47	54.00	-6.53	AV	Horizontal
1	10520	41.16	38.55	33.13	11.26	57.84	68.20	-10.36	Peak	Vertical
1	10520	29.57	38.55	33.13	11.26	46.25	54.00	-7.75	AV	Vertical

802.11n20 Mode_Channel 56 _ 5280 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10560	39.21	38.55	33.13	11.26	55.89	68.20	-12.31	Peak	Horizontal
1	10560	30.32	38.55	33.13	11.26	47.00	54.00	-7.00	AV	Horizontal
1	10560	40.92	38.55	33.13	11.26	57.60	68.20	-10.60	Peak	Vertical
1	10560	29.14	38.55	33.13	11.26	45.82	54.00	-8.18	AV	Vertical

802.11n20 Mode_ Channel 64_ 5320 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10640	40.57	38.55	33.13	11.26	57.25	68.20	-10.95	Peak	Horizontal
1	10640	31.53	38.55	33.13	11.26	48.21	54.00	-5.79	AV	Horizontal
1	10640	41.94	38.55	33.13	11.26	58.62	68.20	-9.58	Peak	Vertical
1	10640	29.93	38.55	33.13	11.26	46.61	54.00	-7.39	AV	Vertical

802.11n40 Mode_Channel 54 _5270 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10540	39.21	38.55	33.13	11.26	55.89	68.20	-12.31	Peak	Horizontal
1	10540	30.18	38.55	33.13	11.26	46.86	54.00	-7.14	AV	Horizontal
1	10540	41.16	38.55	33.13	11.26	57.84	68.20	-10.36	Peak	Vertical
1	10540	28.27	38.55	33.13	11.26	44.95	54.00	-9.05	AV	Vertical

802.11n40 Mode_Channel 62 _ 5310 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10620	39.44	38.55	33.13	11.26	56.12	68.20	-12.08	Peak	Horizontal
1	10620	30.26	38.55	33.13	11.26	46.94	54.00	-7.06	AV	Horizontal
1	10620	40.74	38.55	33.13	11.26	57.42	68.20	-10.78	Peak	Vertical
1	10620	29.30	38.55	33.13	11.26	45.98	54.00	-8.02	AV	Vertical

802.11ac20 Mode_Channel 52 _5260 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10520	40.29	38.55	33.13	11.26	56.97	68.20	-11.23	Peak	Horizontal
1	10520	30.50	38.55	33.13	11.26	47.18	54.00	-6.82	AV	Horizontal
1	10520	40.18	38.55	33.13	11.26	56.86	68.20	-11.34	Peak	Vertical
1	10520	28.65	38.55	33.13	11.26	45.33	54.00	-8.67	AV	Vertical

802.11ac20 Mode_Channel 56 _ 5280 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10560	39.28	38.55	33.13	11.26	55.96	68.20	-12.24	Peak	Horizontal
1	10560	30.04	38.55	33.13	11.26	46.72	54.00	-7.28	AV	Horizontal
1	10560	40.76	38.55	33.13	11.26	57.44	68.20	-10.76	Peak	Vertical
1	10560	28.51	38.55	33.13	11.26	45.19	54.00	-8.81	AV	Vertical

802.11ac20 Mode_ Channel 64_ 5320 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10640	40.44	38.55	33.13	11.26	57.12	68.20	-11.08	Peak	Horizontal
1	10640	31.71	38.55	33.13	11.26	48.39	54.00	-5.61	AV	Horizontal
1	10640	40.94	38.55	33.13	11.26	57.62	68.20	-10.58	Peak	Vertical
1	10640	29.76	38.55	33.13	11.26	46.44	54.00	-7.56	AV	Vertical

802.11ac40 Mode_Channel 54 _5270 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10540	39.34	38.55	33.13	11.26	56.02	68.20	-12.18	Peak	Horizontal
1	10540	31.70	38.55	33.13	11.26	48.38	54.00	-5.62	AV	Horizontal
1	10540	41.94	38.55	33.13	11.26	58.62	68.20	-9.58	Peak	Vertical
1	10540	29.60	38.55	33.13	11.26	46.28	54.00	-7.72	AV	Vertical

802.11ac40 Mode_Channel 62 _ 5310 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10620	39.05	38.55	33.13	11.26	55.73	68.20	-12.47	Peak	Horizontal
1	10620	30.85	38.55	33.13	11.26	47.53	54.00	-6.47	AV	Horizontal
1	10620	41.33	38.55	33.13	11.26	58.01	68.20	-10.19	Peak	Vertical
1	10620	28.45	38.55	33.13	11.26	45.13	54.00	-8.87	AV	Vertical

802.11ac80 Mode_Channel 58 _5290 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	10580	40.69	38.55	33.13	11.26	57.37	68.20	-10.83	Peak	Horizontal
1	10580	31.54	38.55	33.13	11.26	48.22	54.00	-5.78	AV	Horizontal
1	10580	41.62	38.55	33.13	11.26	58.30	68.20	-9.90	Peak	Vertical
1	10580	28.79	38.55	33.13	11.26	45.47	54.00	-8.53	AV	Vertical

5500-5500MHz:

802.11a Mode_Channel 100 _5500 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11000	42.22	38.55	33.13	11.26	58.90	68.20	-9.30	Peak	Horizontal
1	11000	31.66	38.55	33.13	11.26	48.34	54.00	-5.66	AV	Horizontal
1	11000	42.10	38.55	33.13	11.26	58.78	68.20	-9.42	Peak	Vertical
1	11000	29.81	38.55	33.13	11.26	46.49	54.00	-7.51	AV	Vertical

802.11a Mode_Channel 120 _ 5600 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11200	41.41	38.55	33.13	11.26	58.09	68.20	-10.11	Peak	Horizontal
1	11200	31.90	38.55	33.13	11.26	48.58	54.00	-5.42	AV	Horizontal
1	11200	42.19	38.55	33.13	11.26	58.87	68.20	-9.33	Peak	Vertical
1	11200	29.42	38.55	33.13	11.26	46.10	54.00	-7.90	AV	Vertical

802.11a Mode_ Channel 140_ 5700 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11400	41.20	38.55	33.13	11.26	57.88	68.20	-10.32	Peak	Horizontal
1	11400	31.87	38.55	33.13	11.26	48.55	54.00	-5.45	AV	Horizontal
1	11400	41.75	38.55	33.13	11.26	58.43	68.20	-9.77	Peak	Vertical
1	11400	30.07	38.55	33.13	11.26	46.75	54.00	-7.25	AV	Vertical

802.11n20 Mode_Channel 100 _5500 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11000	41.63	38.55	33.13	11.26	58.31	68.20	-9.89	Peak	Horizontal
1	11000	31.61	38.55	33.13	11.26	48.29	54.00	-5.71	AV	Horizontal
1	11000	42.99	38.55	33.13	11.26	59.67	68.20	-8.53	Peak	Vertical
1	11000	29.66	38.55	33.13	11.26	46.34	54.00	-7.66	AV	Vertical

802.11n20 Mode_Channel 120 _ 5600 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11200	41.47	38.55	33.13	11.26	58.15	68.20	-10.05	Peak	Horizontal
1	11200	31.46	38.55	33.13	11.26	48.14	54.00	-5.86	AV	Horizontal
1	11200	43.74	38.55	33.13	11.26	60.42	68.20	-7.78	Peak	Vertical
1	11200	29.06	38.55	33.13	11.26	45.74	54.00	-8.26	AV	Vertical

802.11n20 Mode_ Channel 140_ 5700 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11400	41.32	38.55	33.13	11.26	58.00	68.20	-10.20	Peak	Horizontal
1	11400	32.37	38.55	33.13	11.26	49.05	54.00	-4.95	AV	Horizontal
1	11400	42.40	38.55	33.13	11.26	59.08	68.20	-9.12	Peak	Vertical
1	11400	30.42	38.55	33.13	11.26	47.10	54.00	-6.90	AV	Vertical

802.11n40 Mode_Channel 102 _5510 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11020	42.39	38.55	33.13	11.26	59.07	68.20	-9.13	Peak	Horizontal
1	11020	32.45	38.55	33.13	11.26	49.13	54.00	-4.87	AV	Horizontal
1	11020	41.85	38.55	33.13	11.26	58.53	68.20	-9.67	Peak	Vertical
1	11020	30.68	38.55	33.13	11.26	47.36	54.00	-6.64	AV	Vertical

802.11n40 Mode_Channel 110 _ 5550 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11100	41.28	38.55	33.13	11.26	57.96	68.20	-10.24	Peak	Horizontal
1	11100	30.14	38.55	33.13	11.26	46.82	54.00	-7.18	AV	Horizontal
1	11100	42.51	38.55	33.13	11.26	59.19	68.20	-9.01	Peak	Vertical
1	11100	30.60	38.55	33.13	11.26	47.28	54.00	-6.72	AV	Vertical

802.11n40 Mode_Channel 134 _ 5670 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11340	41.22	38.55	33.13	11.26	57.90	68.20	-10.30	Peak	Horizontal
1	11340	32.25	38.55	33.13	11.26	48.93	54.00	-5.07	AV	Horizontal
1	11340	41.22	38.55	33.13	11.26	57.90	68.20	-10.30	Peak	Vertical
1	11340	30.85	38.55	33.13	11.26	47.53	54.00	-6.47	AV	Vertical

802.11ac20 Mode_Channel 100 _5550 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11000	41.94	38.55	33.13	11.26	58.62	68.20	-9.58	Peak	Horizontal
1	11000	31.52	38.55	33.13	11.26	48.20	54.00	-5.80	AV	Horizontal
1	11000	42.90	38.55	33.13	11.26	59.58	68.20	-8.62	Peak	Vertical
1	11000	29.40	38.55	33.13	11.26	46.08	54.00	-7.92	AV	Vertical

802.11ac20 Mode_Channel 120 _ 5600 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11200	40.54	38.55	33.13	11.26	57.22	68.20	-10.98	Peak	Horizontal
1	11200	30.13	38.55	33.13	11.26	46.81	54.00	-7.19	AV	Horizontal
1	11200	42.85	38.55	33.13	11.26	59.53	68.20	-8.67	Peak	Vertical
1	11200	29.83	38.55	33.13	11.26	46.51	54.00	-7.49	AV	Vertical

802.11ac20 Mode_ Channel 140_ 5700 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11400	41.01	38.55	33.13	11.26	57.69	68.20	-10.51	Peak	Horizontal
1	11400	32.16	38.55	33.13	11.26	48.84	54.00	-5.16	AV	Horizontal
1	11400	42.75	38.55	33.13	11.26	59.43	68.20	-8.77	Peak	Vertical
1	11400	29.43	38.55	33.13	11.26	46.11	54.00	-7.89	AV	Vertical

802.11ac40 Mode_Channel 102 _5510 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11020	42.25	38.55	33.13	11.26	58.93	68.20	-9.27	Peak	Horizontal
1	11020	31.30	38.55	33.13	11.26	47.98	54.00	-6.02	AV	Horizontal
1	11020	42.27	38.55	33.13	11.26	58.95	68.20	-9.25	Peak	Vertical
1	11020	30.45	38.55	33.13	11.26	47.13	54.00	-6.87	AV	Vertical

802.11ac40 Mode_Channel 110 _ 5550 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11100	41.41	38.55	33.13	11.26	58.09	68.20	-10.11	Peak	Horizontal
1	11100	31.03	38.55	33.13	11.26	47.71	54.00	-6.29	AV	Horizontal
1	11100	43.82	38.55	33.13	11.26	60.50	68.20	-7.70	Peak	Vertical
1	11100	29.36	38.55	33.13	11.26	46.04	54.00	-7.96	AV	Vertical

802.11ac40 Mode_Channel 134 _ 5670 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11340	41.87	38.55	33.13	11.26	58.55	68.20	-9.65	Peak	Horizontal
1	11340	32.83	38.55	33.13	11.26	49.51	54.00	-4.49	AV	Horizontal
1	11340	41.37	38.55	33.13	11.26	58.05	68.20	-10.15	Peak	Vertical
1	11340	30.53	38.55	33.13	11.26	47.21	54.00	-6.79	AV	Vertical

802.11ac80 Mode_Channel 106 _5530 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11060	40.23	38.55	33.13	11.26	56.91	68.20	-11.29	Peak	Horizontal
1	11060	32.47	38.55	33.13	11.26	49.15	54.00	-4.85	AV	Horizontal
1	11060	42.01	38.55	33.13	11.26	58.69	68.20	-9.51	Peak	Vertical
1	11060	29.05	38.55	33.13	11.26	45.73	54.00	-8.27	AV	Vertical

5725-5850MHz:

802.11a Mode_Channel 149 _5745 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11490	39.48	38.55	33.13	11.26	56.16	68.20	-12.04	Peak	Horizontal
1	11490	30.83	38.55	33.13	11.26	47.51	54.00	-6.49	AV	Horizontal
1	11490	43.00	38.55	33.13	11.26	59.68	68.20	-8.52	Peak	Vertical
1	11490	30.09	38.55	33.13	11.26	46.77	54.00	-7.23	AV	Vertical

802.11a Mode_Channel 157 _ 5785 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11570	40.79	38.55	33.13	11.26	57.47	68.20	-10.73	Peak	Horizontal
1	11570	30.87	38.55	33.13	11.26	47.55	54.00	-6.45	AV	Horizontal
1	11570	41.12	38.55	33.13	11.26	57.80	68.20	-10.40	Peak	Vertical
1	11570	30.55	38.55	33.13	11.26	47.23	54.00	-6.77	AV	Vertical

802.11a Mode_ Channel 165_ 5825 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11650	40.57	38.55	33.13	11.26	57.25	68.20	-10.95	Peak	Horizontal
1	11650	32.43	38.55	33.13	11.26	49.11	54.00	-4.89	AV	Horizontal
1	11650	41.90	38.55	33.13	11.26	58.58	68.20	-9.62	Peak	Vertical
1	11650	29.13	38.55	33.13	11.26	45.81	54.00	-8.19	AV	Vertical

802.11n20 Mode_Channel 149 _5745 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11490	40.60	38.55	33.13	11.26	57.28	68.20	-10.92	Peak	Horizontal
1	11490	31.76	38.55	33.13	11.26	48.44	54.00	-5.56	AV	Horizontal
1	11490	41.55	38.55	33.13	11.26	58.23	68.20	-9.97	Peak	Vertical
1	11490	29.82	38.55	33.13	11.26	46.50	54.00	-7.50	AV	Vertical

802.11n20 Mode_Channel 157 _ 5785 MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11570	40.99	38.55	33.13	11.26	57.67	68.20	-10.53	Peak	Horizontal
1	11570	31.69	38.55	33.13	11.26	48.37	54.00	-5.63	AV	Horizontal
1	11570	41.94	38.55	33.13	11.26	58.62	68.20	-9.58	Peak	Vertical
1	11570	29.86	38.55	33.13	11.26	46.54	54.00	-7.46	AV	Vertical

802.11n20 Mode_ Channel 165_ 5825 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	39.96	38.55	33.13	11.26	56.64	68.20	-11.56	Peak	Horizontal
1	11650	31.58	38.55	33.13	11.26	48.26	54.00	-5.74	AV	Horizontal
1	11650	42.23	38.55	33.13	11.26	58.91	68.20	-9.29	Peak	Vertical
1	11650	30.88	38.55	33.13	11.26	47.56	54.00	-6.44	AV	Vertical

802.11n40 Mode_Channel 151 _5755 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11510	39.91	38.55	33.13	11.26	56.59	68.20	-11.61	Peak	Horizontal
1	11510	30.43	38.55	33.13	11.26	47.11	54.00	-6.89	AV	Horizontal
1	11510	42.67	38.55	33.13	11.26	59.35	68.20	-8.85	Peak	Vertical
1	11510	29.49	38.55	33.13	11.26	46.17	54.00	-7.83	AV	Vertical

802.11n40 Mode_Channel 159 _ 5795MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11590	39.49	38.55	33.13	11.26	56.17	68.20	-12.03	Peak	Horizontal
1	11590	31.47	38.55	33.13	11.26	48.15	54.00	-5.85	AV	Horizontal
1	11590	41.33	38.55	33.13	11.26	58.01	68.20	-10.19	Peak	Vertical
1	11590	29.42	38.55	33.13	11.26	46.10	54.00	-7.90	AV	Vertical

802.11ac20 Mode_Channel 149 _5745 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11490	39.07	38.55	33.13	11.26	55.75	68.20	-12.45	Peak	Horizontal
1	11490	31.23	38.55	33.13	11.26	47.91	54.00	-6.09	AV	Horizontal
1	11490	42.68	38.55	33.13	11.26	59.36	68.20	-8.84	Peak	Vertical
1	11490	30.13	38.55	33.13	11.26	46.81	54.00	-7.19	AV	Vertical

802.11ac20 Mode_Channel 157 _ 5785 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11570	40.02	38.55	33.13	11.26	56.70	68.20	-11.50	Peak	Horizontal
1	11570	30.94	38.55	33.13	11.26	47.62	54.00	-6.38	AV	Horizontal
1	11570	42.86	38.55	33.13	11.26	59.54	68.20	-8.66	Peak	Vertical
1	11570	30.88	38.55	33.13	11.26	47.56	54.00	-6.44	AV	Vertical

802.11ac20 Mode_ Channel 165_ 5825 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11650	39.70	38.55	33.13	11.26	56.38	68.20	-11.82	Peak	Horizontal
1	11650	32.15	38.55	33.13	11.26	48.83	54.00	-5.17	AV	Horizontal
1	11650	41.71	38.55	33.13	11.26	58.39	68.20	-9.81	Peak	Vertical
1	11650	30.83	38.55	33.13	11.26	47.51	54.00	-6.49	AV	Vertical

802.11ac40 Mode_Channel 151 _5755 MHz

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
1	11510	39.50	38.55	33.13	11.26	56.18	68.20	-12.02	Peak	Horizontal
1	11510	31.76	38.55	33.13	11.26	48.44	54.00	-5.56	AV	Horizontal
1	11510	41.59	38.55	33.13	11.26	58.27	68.20	-9.93	Peak	Vertical
1	11510	29.65	38.55	33.13	11.26	46.33	54.00	-7.67	AV	Vertical

802.11ac40 Mode_Channel 159 _ 5795MHz

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11590	40.78	38.55	33.13	11.26	57.46	68.20	-10.74	Peak	Horizontal
1	11590	32.14	38.55	33.13	11.26	48.82	54.00	-5.18	AV	Horizontal
1	11590	42.29	38.55	33.13	11.26	58.97	68.20	-9.23	Peak	Vertical
1	11590	30.83	38.55	33.13	11.26	47.51	54.00	-6.49	AV	Vertical

802.11ac80 Mode_Channel 155 _5775 MHz

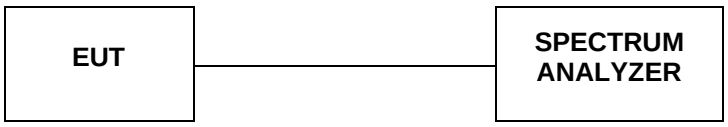
Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
1	11550	40.21	38.55	33.13	11.26	56.89	68.20	-11.31	Peak	Horizontal
1	11550	31.92	38.55	33.13	11.26	48.60	54.00	-5.40	AV	Horizontal
1	11550	41.41	38.55	33.13	11.26	58.09	68.20	-10.11	Peak	Vertical
1	11550	30.26	38.55	33.13	11.26	46.94	54.00	-7.06	AV	Vertical

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

4.3. Duty Cycle

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 B Duty Cycle (x), Transmission Duration (T):

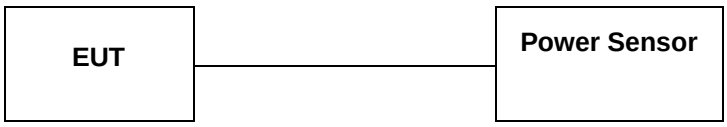
a. A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal
b. The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zerospan measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in section II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST RESULTS

For reporting purpose only.
Please refer to Appendix F.

4.4. Maximum Average Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 Section E3 Measurement using a Power Meter (PM):

a. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied
   1. The EUT is configured to transmit continuously or to transmit with a constant duty cycle
   2. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
   3. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
b. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B
c. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

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 percent).

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

Frequency Range (MHz)	Limit
5150-5250	Fixed:1 Watt (30dBm) Mobile and portable: 250mW (24dBm)
5250-5350	250mW (24dBm)
5470-5725	250mW (24dBm)
5725-5850	1 Watt (30dBm)
Note: The maximum e.i.r.p at anyelevation angle above 30 degrees as measured from the horizon must not exceed 125mW(21dBm)	

TEST RESULTS

5150-5250MHz:

Channel	Frequency (MHz)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV + Duty factor (dBm)	Limits (dBm)	Verdict
802.11a						
36	5180	8.38	0	8.38	24.00	PASS
40	5200	8.37	0	8.37	24.00	PASS
48	5240	8.66	0	8.66	24.00	PASS
802.11n20						
36	5180	8.29	0	8.29	24.00	PASS
40	5200	8.16	0	8.16	24.00	PASS
48	5240	8.09	0	8.09	24.00	PASS
802.11ac20						
36	5180	8.11	0	8.11	24.00	PASS
40	5200	8.74	0	8.74	24.00	PASS
48	5240	8.70	0	8.70	24.00	PASS
802.11n40						
38	5190	8.42	0	8.42	24.00	PASS
46	5230	8.79	0	8.79	24.00	PASS
802.11ac40						
38	5190	8.09	0	8.09	24.00	PASS
46	5230	8.32	0	8.32	24.00	PASS
802.11ac80						
42	5210	8.05	0	8.05	24.00	PASS

5260-5320MHz:

Channel	Frequency (MHz)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV + Duty factor (dBm)	Limits (dBm)	Verdict
802.11a						
52	5260	8.37	0	8.37	24.00	PASS
56	5280	8.73	0	8.73	24.00	PASS
64	5320	8.48	0	8.48	24.00	PASS
802.11n20						
52	5260	8.36	0	8.36	24.00	PASS
56	5280	8.58	0	8.58	24.00	PASS
64	5320	8.25	0	8.25	24.00	PASS
802.11ac20						
52	5260	8.42	0	8.42	24.00	PASS
56	5280	8.16	0	8.16	24.00	PASS
64	5320	8.27	0	8.27	24.00	PASS
802.11n40						
54	5270	8.41	0	8.41	24.00	PASS
62	5310	8.78	0	8.78	24.00	PASS
802.11ac40						
54	5270	8.25	0	8.25	24.00	PASS
62	5310	8.19	0	8.19	24.00	PASS
802.11ac80						
58	5290	8.18	0	8.18	24.00	PASS

5500-5700MHz:

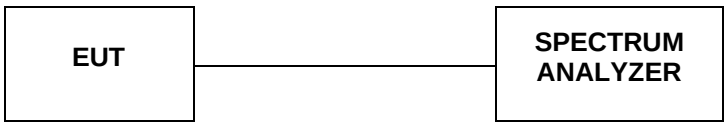
Channel	Frequency (MHz)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV + Duty factor (dBm)	Limits (dBm)	Verdict
802.11a						
100	5500	8.30	0	8.30	24.00	PASS
120	5600	8.81	0	8.81	24.00	PASS
140	5700	8.18	0	8.18	24.00	PASS
802.11n20						
100	5500	8.54	0	8.54	24.00	PASS
120	5600	8.16	0	8.16	24.00	PASS
140	5700	8.47	0	8.47	24.00	PASS
802.11ac20						
100	5500	8.73	0	8.73	24.00	PASS
120	5600	8.20	0	8.20	24.00	PASS
140	5700	8.55	0	8.55	24.00	PASS
802.11n40						
102	5510	8.52	0	8.52	24.00	PASS
110	5550	8.43	0	8.43	24.00	PASS
134	5670	8.66	0	8.66	24.00	PASS
802.11ac40						
102	5510	8.49	0	8.49	24.00	PASS
110	5550	8.17	0	8.17	24.00	PASS
134	5670	8.24	0	8.24	24.00	PASS
802.11ac80						
106	5530	8.25	0	8.25	24.00	PASS

5725-5850MHz:

Channel	Frequency (MHz)	Output Power AV (dBm)	Duty factor (dB)	Output Power AV + Duty factor (dBm)	Limits (dBm)	Verdict
802.11a						
149	5745	8.72	0	8.72	30.00	PASS
157	5785	8.10	0	8.10	30.00	PASS
165	5825	8.22	0	8.22	30.00	PASS
802.11n20						
149	5745	8.81	0	8.81	30.00	PASS
157	5785	8.50	0	8.50	30.00	PASS
165	5825	8.73	0	8.73	30.00	PASS
802.11ac20						
149	5745	8.13	0	8.13	30.00	PASS
157	5785	8.22	0	8.22	30.00	PASS
165	5825	8.68	0	8.68	30.00	PASS
802.11n40						
151	5755	8.63	0	8.63	30.00	PASS
159	5795	8.10	0	8.10	30.00	PASS
802.11ac40						
151	5755	8.47	0	8.47	30.00	PASS
159	5795	8.36	0	8.36	30.00	PASS
802.11ac80						
155	5775	8.13	0	8.13	30.00	PASS

4.5. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 789033 D02 General UNII Test Procedures New Rules v01 F: The rules requires "maximum power spectral density" measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission

a. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
b. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
c. Make the following adjustments to the peak value of the spectrum, if applicable:
   1. If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.
   2.) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
d. The result is the Maximum PSD over 1 MHz reference bandwidth.
e. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, 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:
   1. Set RBW ≥ 1/T, where T is defined in section II.B.I.a).
   2. Set VBW ≥ 3 RBW.
   3. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   4. If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   5. 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 KHz is available on nearly all spectrum analyzers.
f. 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 percent).

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

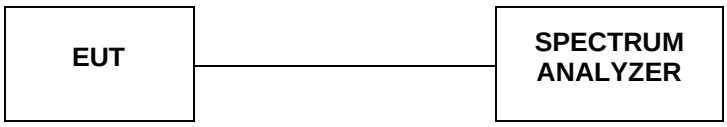
Frequency Range (MHz)	Limit
5150-5250	Other then Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz
5250-5350	11dBm/MHz
5470-5725	11dBm/MHz
5725-5850	30dBm/500kHz

TEST RESULTS

Please refer to Appendix A.

4.6. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a. Set RBW = 100 kHz.
b. Set the video bandwidth (VBW) ≥ 3 × 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.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

LIMIT

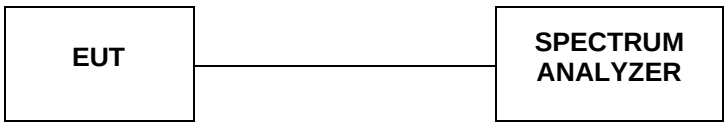
For Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz

TEST RESULTS

Please refer to Appendix D.

4.7. 26dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for Emission Bandwidth (EBW) measurement:

a. Set RBW = 300 kHz (approximately 1% of the emission bandwidth).
b. Set the video bandwidth (VBW) = 1000 KHz (VBW > 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 26 dB down from the maximum 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%.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

LIMIT

No Limits for 26dBc Bandwith

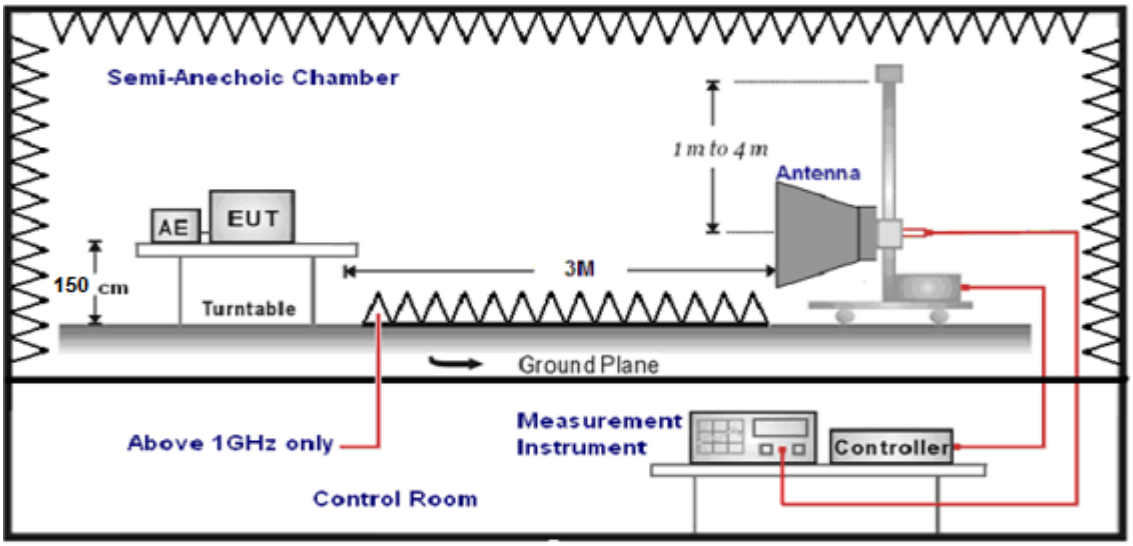
TEST RESULTS

Please refer to Appendix B.

Please refer to Appendix C.

4.8. Band Edge Compliance

TEST CONFIGURATION



LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

According to §15.407 (b): 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

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m)
5150-5250	-27	68.2
5250-5350	-27	68.2
5470-5725	-27	68.2
5725-5850	-27 (beyond 10MHz of the bandedge)	68.2
	-17 (within 10 MHz of band edge)	78.2

TEST PROCEDURE

1.The EUT was placed on a turn table which is 1.5m above 1GHz.
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..
5.The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
1GHz-18GHz	Double Ridged Horn Antenna	3

Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-18GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

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	

TEST RESULTS

Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11a VHT20 mode.

For Radiated Bandedge Measurement

802.11 a/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
4500.0	39.18	35.58	29.04	8.28	54.00	68.20	-14.20	Peak	Horizontal
4500.0	32.25	35.58	29.04	8.28	47.07	54.00	-6.93	AV	Horizontal
5150.0	42.23	35.58	29.04	8.28	57.05	68.20	-11.15	Peak	Horizontal
5150.0	30.03	35.58	29.04	8.28	44.85	54.00	-9.15	AV	Horizontal

802.11 a/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
4500.0	35.26	35.58	29.04	8.28	50.08	68.20	-18.12	Peak	Vertical
4500.0	30.20	35.58	29.04	8.28	45.02	54.00	-8.98	AV	Vertical
5150.0	39.11	35.58	29.04	8.28	53.93	68.20	-14.27	Peak	Vertical
5150.0	30.62	35.58	29.04	8.28	45.44	54.00	-8.56	AV	Vertical

802.11 a/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5350.0	42.04	35.42	29.06	8.39	56.79	68.20	-11.41	Peak	Horizontal
5350.0	33.26	35.42	29.06	8.39	48.01	54.00	-5.99	AV	Horizontal
5460.0	41.20	35.42	29.06	8.39	55.95	68.20	-12.25	Peak	Horizontal
5460.0	30.06	35.42	29.06	8.39	44.81	54.00	-9.19	AV	Horizontal

802.11 a/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5350.0	35.23	35.42	29.06	8.39	49.98	68.20	-18.22	Peak	Vertical
5350.0	30.30	35.42	29.06	8.39	45.05	54.00	-8.95	AV	Vertical
5460.0	39.08	35.42	29.06	8.39	53.83	68.20	-14.37	Peak	Vertical
5460.0	30.53	35.42	29.06	8.39	45.28	54.00	-8.72	AV	Vertical

802.11 a/ Channel 52 :5260 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500.0	39.01	35.58	29.04	8.28	53.83	68.20	-14.37	Peak	Horizontal
4500.0	32.07	35.58	29.04	8.28	46.89	54.00	-7.11	AV	Horizontal
5150.0	42.14	35.58	29.04	8.28	56.96	68.20	-11.24	Peak	Horizontal
5150.0	30.30	35.58	29.04	8.28	45.12	54.00	-8.88	AV	Horizontal

802.11 a/ Channel 52 :5260 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500.0	35.19	35.58	29.04	8.28	50.01	68.20	-18.19	Peak	Vertical
4500.0	30.42	35.58	29.04	8.28	45.24	54.00	-8.76	AV	Vertical
5150.0	39.21	35.58	29.04	8.28	54.03	68.20	-14.17	Peak	Vertical
5150.0	30.49	35.58	29.04	8.28	45.31	54.00	-8.69	AV	Vertical

802.11 a/ Channel 64 :5320 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350.0	42.04	35.42	29.06	8.39	56.79	68.20	-11.41	Peak	Horizontal
5350.0	33.12	35.42	29.06	8.39	47.87	54.00	-6.13	AV	Horizontal
5460.0	41.00	35.42	29.06	8.39	55.75	68.20	-12.45	Peak	Horizontal
5460.0	30.26	35.42	29.06	8.39	45.01	54.00	-8.99	AV	Horizontal

802.11 a/ Channel 64 :5320 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350.0	35.00	35.42	29.06	8.39	49.75	68.20	-18.45	Peak	Vertical
5350.0	30.34	35.42	29.06	8.39	45.09	54.00	-8.91	AV	Vertical
5460.0	39.03	35.42	29.06	8.39	53.78	68.20	-14.42	Peak	Vertical
5460.0	30.62	35.42	29.06	8.39	45.37	54.00	-8.63	AV	Vertical

802.11 a/ Channel 100 :5500 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5460.0	39.13	35.35	29.07	8.43	53.84	68.20	-14.36	Peak	Horizontal
5460.0	32.12	35.35	29.07	8.43	46.83	54.00	-7.17	AV	Horizontal
5470.0	42.27	35.35	29.07	8.43	56.98	68.20	-11.22	Peak	Horizontal
5470.0	30.16	35.35	29.07	8.43	44.87	54.00	-9.13	AV	Horizontal

802.11 a/ Channel 100 :5500 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5460.0	35.07	35.35	29.07	8.43	49.78	68.20	-18.42	Peak	Vertical
5460.0	30.14	35.35	29.07	8.43	44.85	68.20	-23.35	AV	Vertical
5470.0	39.15	35.35	29.07	8.43	53.86	68.20	-14.34	Peak	Vertical
5470.0	30.51	35.35	29.07	8.43	45.22	68.20	-22.98	AV	Vertical

802.11 a/ Channel 140 :5700 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5725.0	42.19	35.3	29.11	8.51	56.89	68.20	-11.31	Peak	Horizontal
5725.0	33.06	35.3	29.11	8.51	47.76	54.00	-6.24	AV	Horizontal
5735.0	41.22	35.3	29.11	8.51	55.92	68.20	-12.28	Peak	Horizontal
5735.0	30.11	35.3	29.11	8.51	44.81	54.00	-9.19	AV	Horizontal

802.11 a/ Channel 140 :5700 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5725.0	35.30	35.3	29.11	8.51	50.00	68.20	-18.20	Peak	Vertical
5725.0	30.23	35.3	29.11	8.51	44.93	68.20	-23.27	AV	Vertical
5735.0	39.14	35.3	29.11	8.51	53.84	68.20	-14.36	Peak	Vertical
5735.0	30.63	35.3	29.11	8.51	45.33	68.20	-22.87	AV	Vertical

802.11 a/ Channel 149 :5745 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5650.0	39.25	35.29	29.13	8.65	54.06	74.00	-19.94	Peak	Horizontal
5700.0	32.19	35.29	29.13	8.65	47.00	54.00	-7.00	AV	Horizontal
5720.0	42.19	35.29	29.13	8.65	57.00	74.00	-17.00	Peak	Horizontal
5725.0	30.21	35.29	29.13	8.65	45.02	54.00	-8.98	AV	Horizontal

802.11 a/ Channel 149 :5745 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5650.0	40.20	35.29	29.13	8.65	55.01	74.00	-18.99	Peak	Vertical
5700.0	30.06	35.29	29.13	8.65	44.87	54.00	-9.13	AV	Vertical
5720.0	48.17	35.29	29.13	8.65	62.98	74.00	-11.02	Peak	Vertical
5725.0	29.46	35.29	29.13	8.65	44.27	54.00	-9.73	AV	Vertical

802.11 a/ Channel 165 :5825 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5850.0	42.22	35.29	29.18	8.8	57.13	74.00	-16.87	Peak	Horizontal
5855.0	33.11	35.29	29.18	8.8	48.02	54.00	-5.98	AV	Horizontal
5875.0	41.02	35.29	29.18	8.8	55.93	74.00	-18.07	Peak	Horizontal
5925.0	30.19	35.29	29.18	8.8	45.10	54.00	-8.90	AV	Horizontal

802.11 a/ Channel 165 :5825 MHz									
Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector	Polarization
5850.0	46.63	35.29	29.18	8.80	61.54	74.00	-12.46	Peak	Vertical
5855.0	30.13	35.29	29.18	8.80	45.04	54.00	-8.96	AV	Vertical
5875.0	47.91	35.29	29.18	8.80	62.82	74.00	-11.18	Peak	Vertical
5925.0	29.92	35.29	29.18	8.80	44.83	54.00	-9.17	AV	Vertical

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

For Conducted Band edge Measurement
The test results have included the antenna gain

Please refer to Appendix E.

4.9. Antenna Requirement

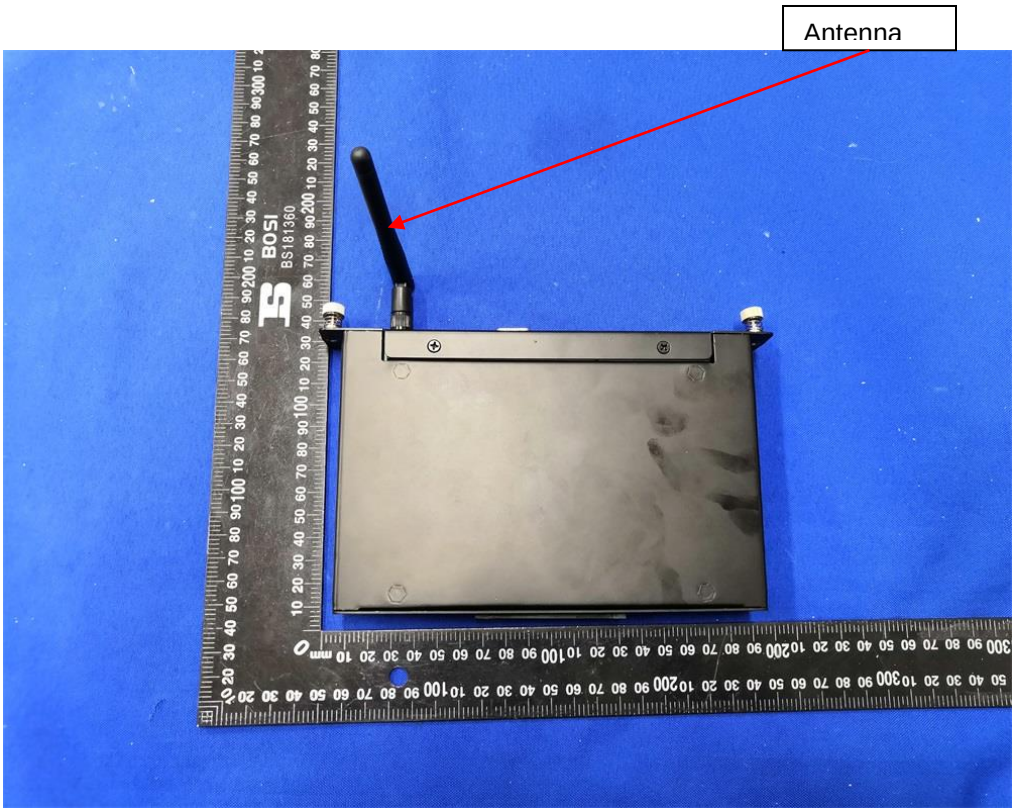
Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Information

The antenna is External antenna, through the buckle stretched out, The directional gains of antenna used for transmitting is 2.0dBi.



5. Test Setup Photos of the EUT

Photo of Radiated Emissions Measurement

Fig. 1

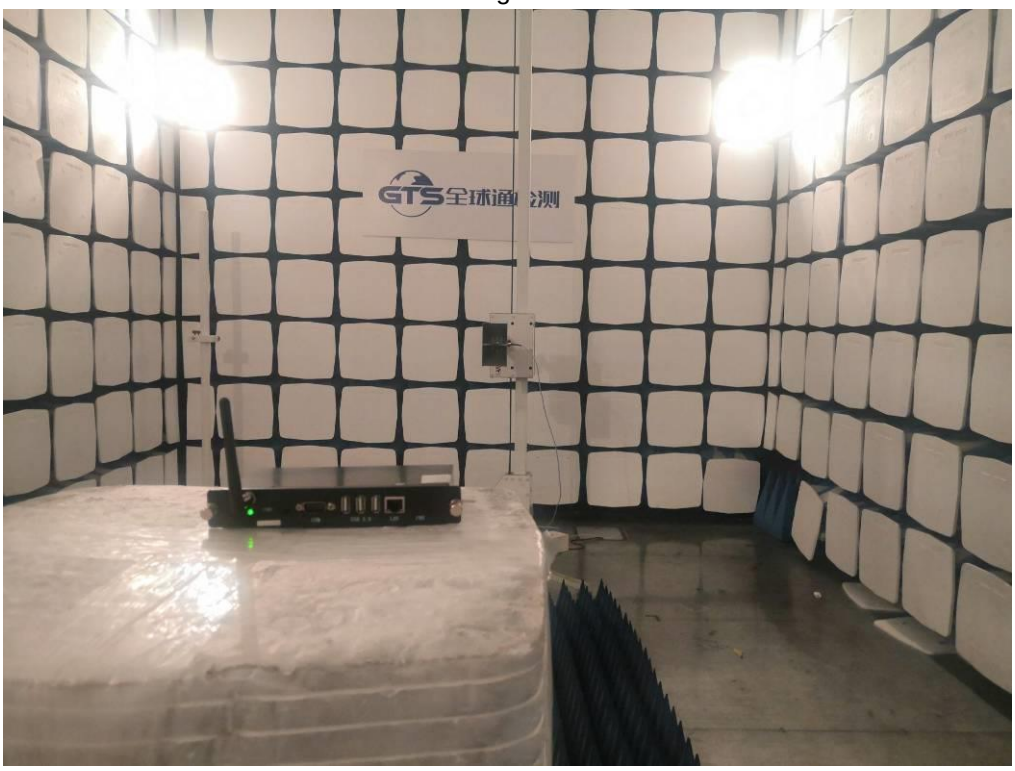


Fig. 2

Photo of Conducted Emissions Measurement

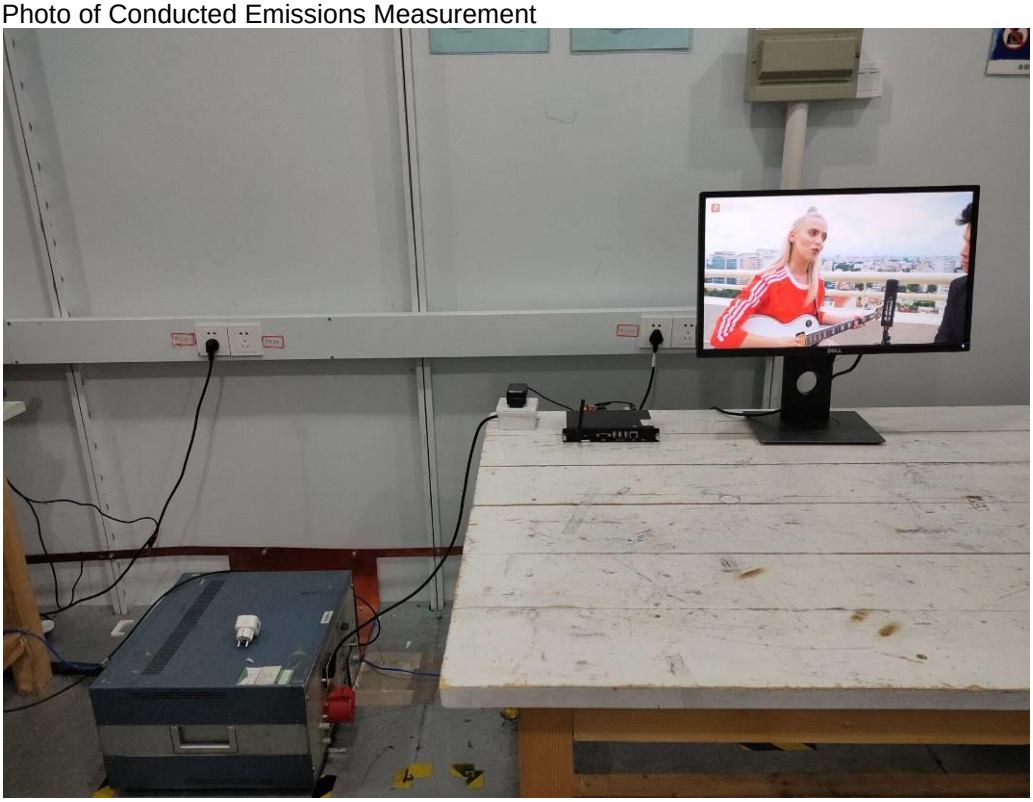
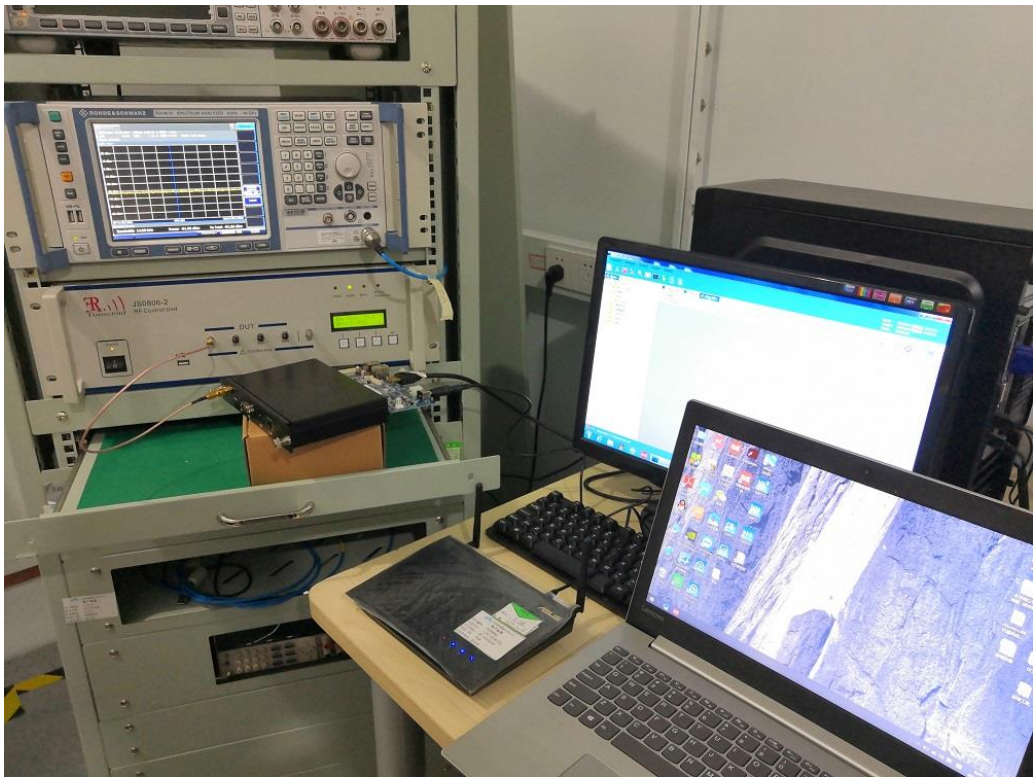


Fig. 3

Photo of DFS Measurement



6. External and Internal Photos of the EUT

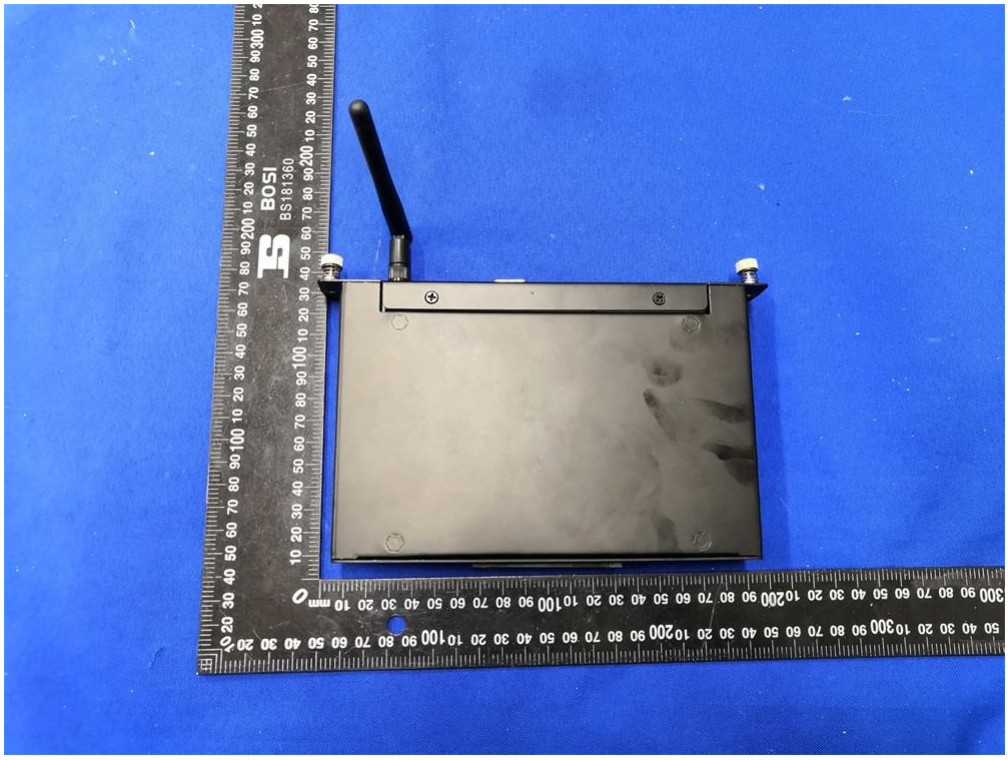


Fig. 1

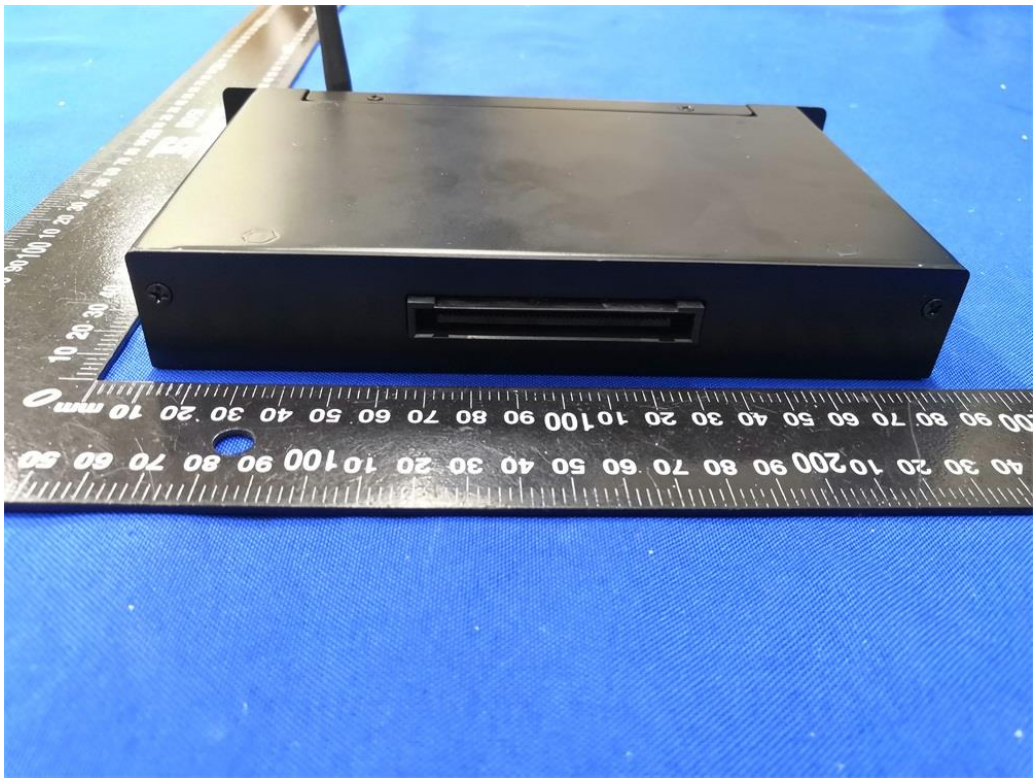


Fig. 2

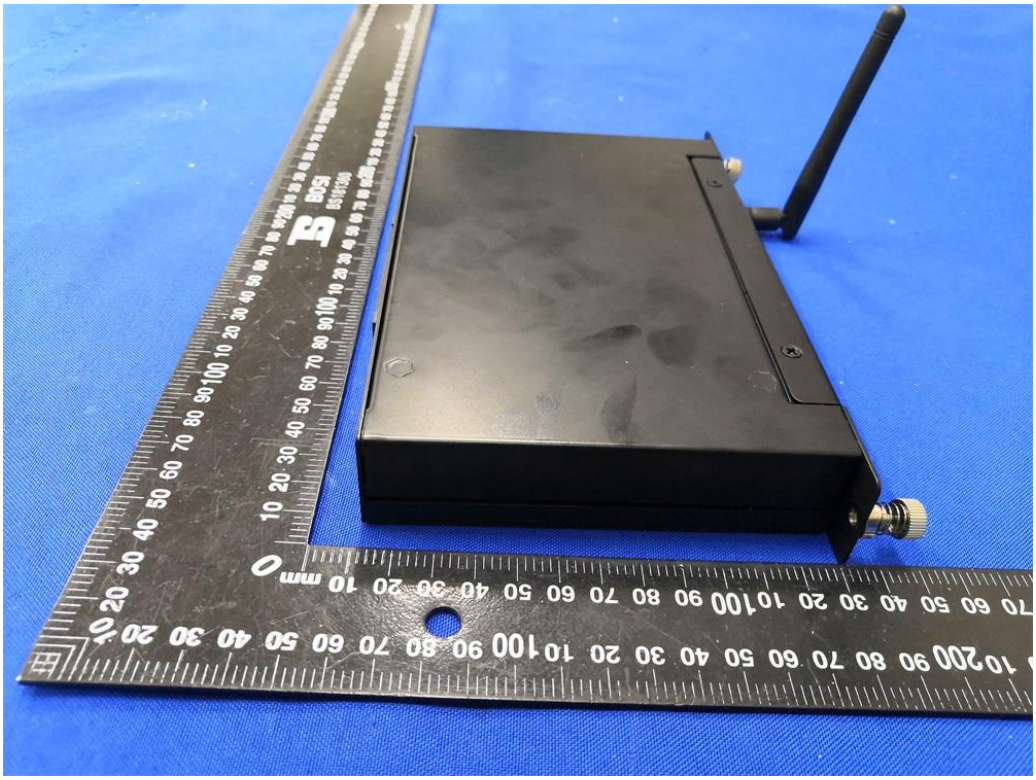


Fig. 3

Fig. 4

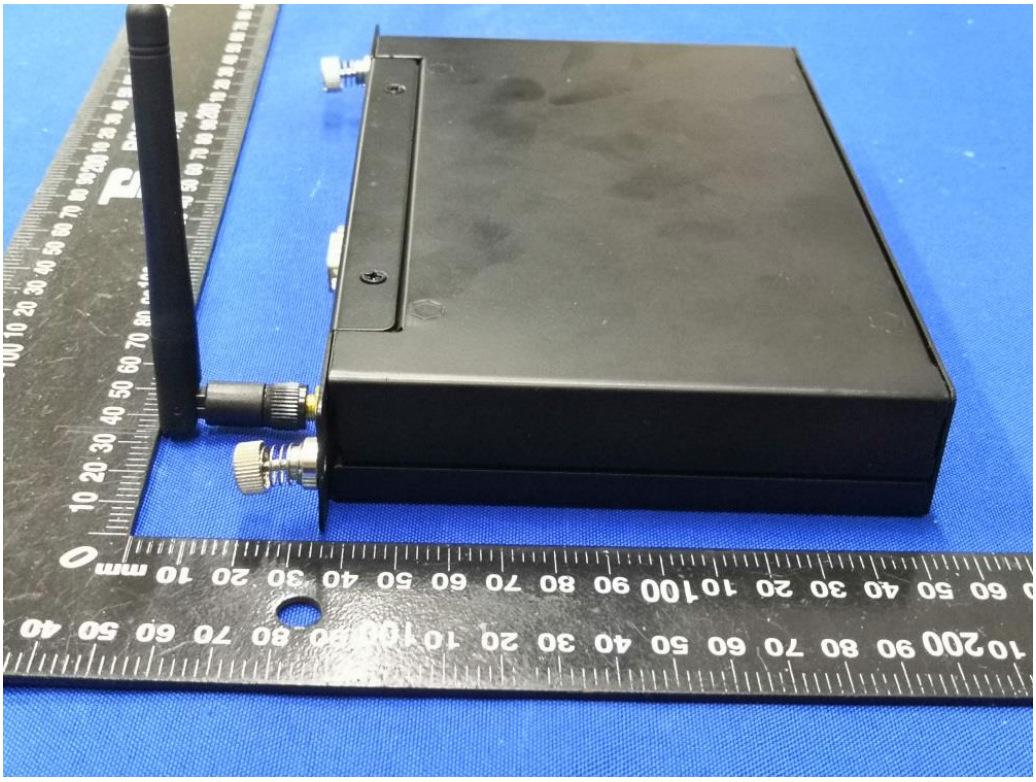


Fig. 5

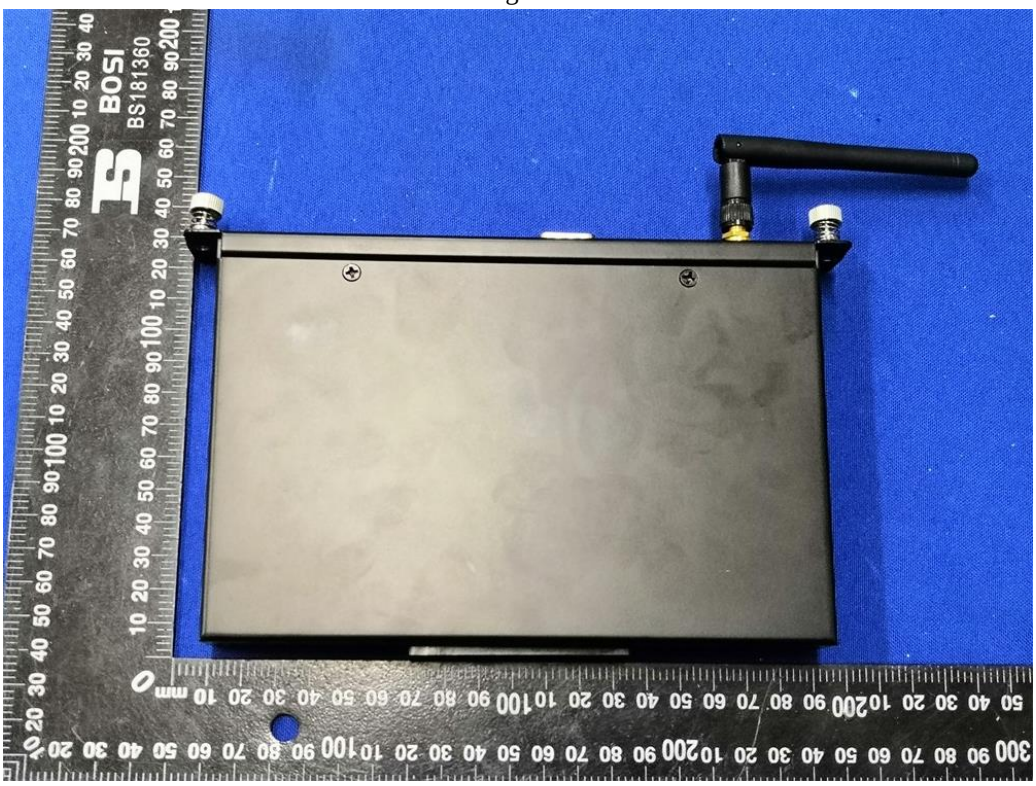


Fig. 6

Fig. 7

Fig. 8

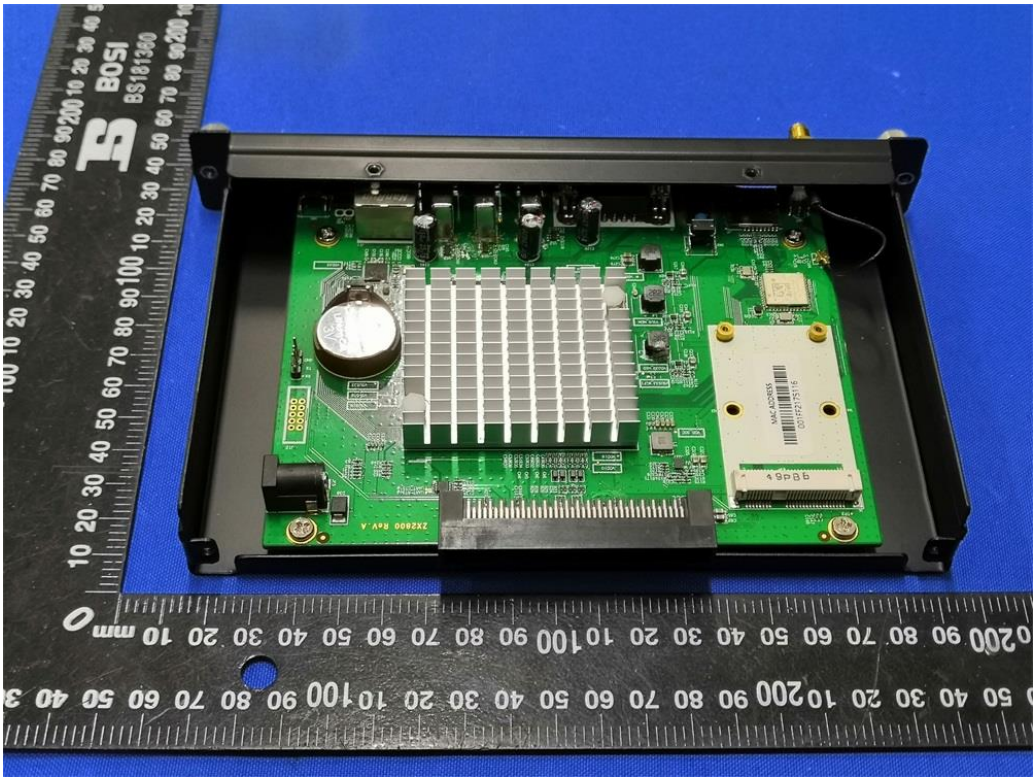


Fig. 9

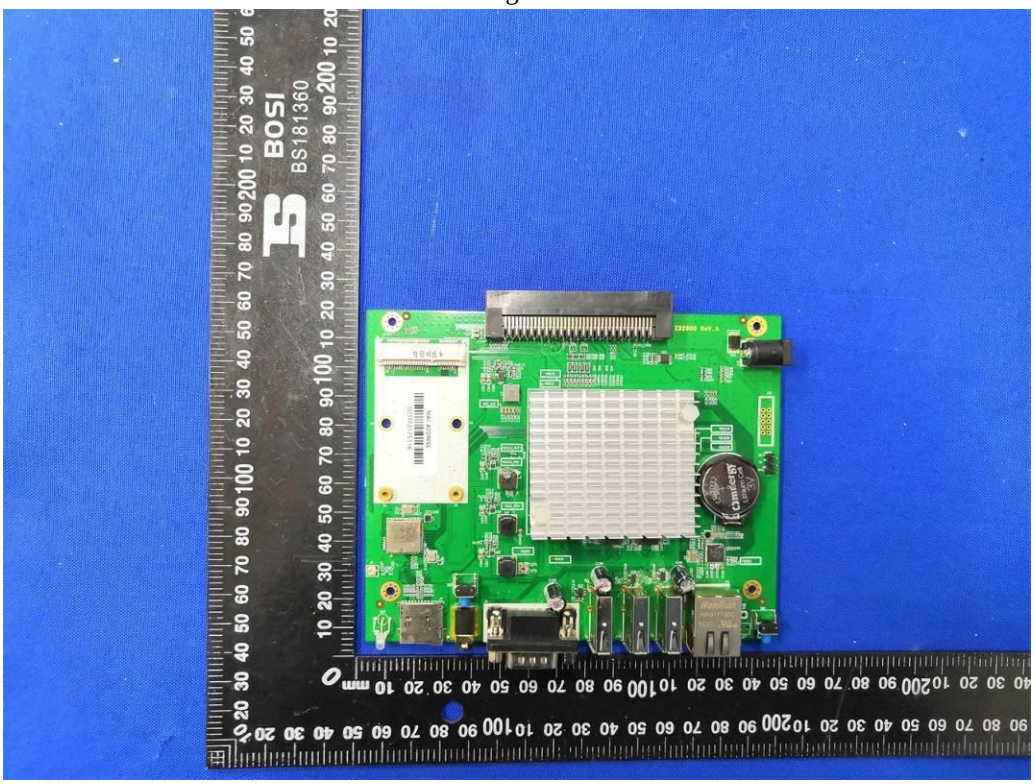


Fig. 10

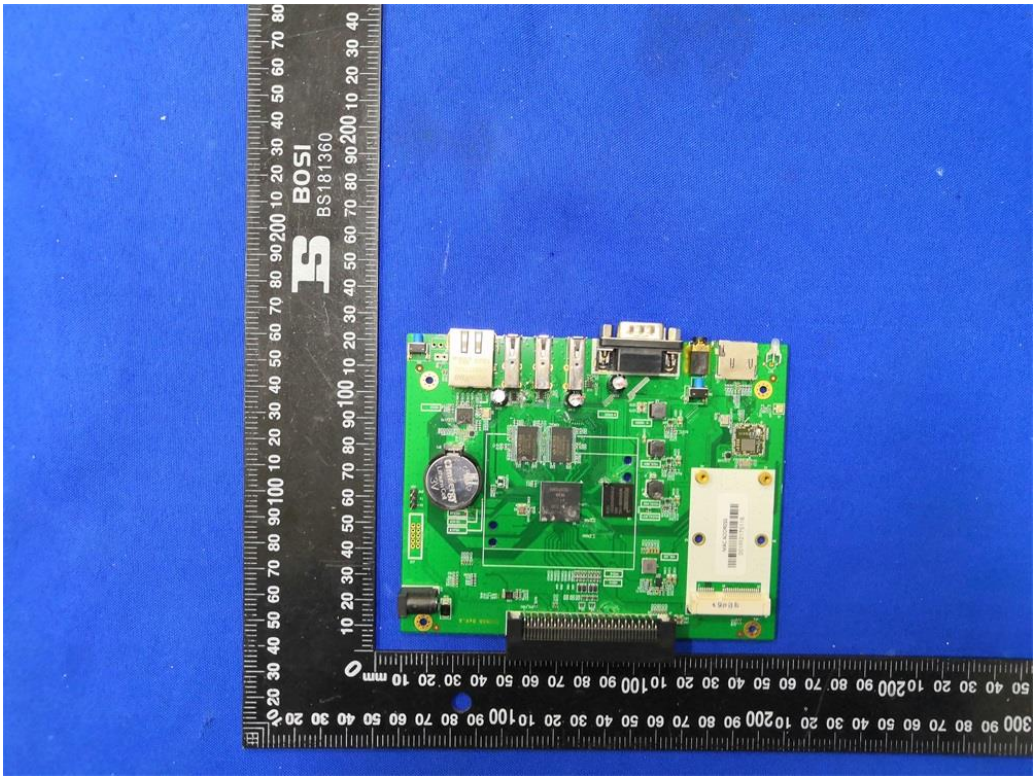

BOSI
BS181360

Fig. 11

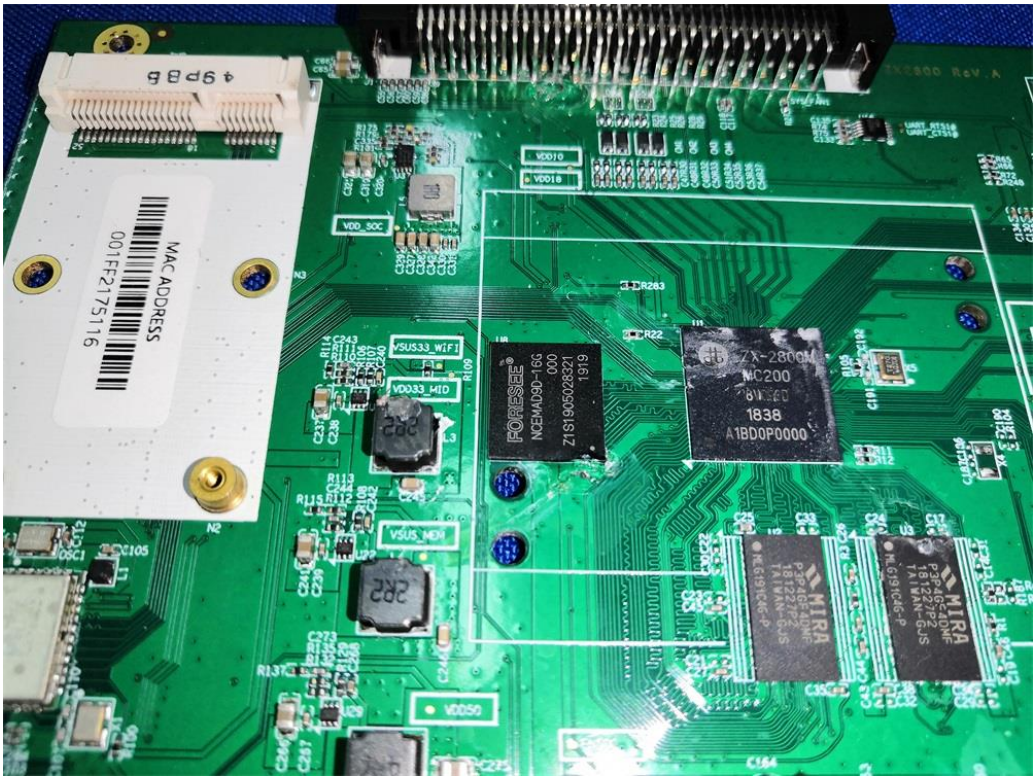

MAC ADDRESS
001FF2175116
FORESEE
NCEMAD90-16G
ZX-2800M
MC200
1838
A1BD0P0000
VSUS33_WIFI
VDD33_MID
VSUS_MEM
VDD50
VDD_SOC
MIRA

Fig. 12

MODULE1
AzureWave B1
Model AW-CM256SM
C109
C111
C112
C107
C110
C105
L1
X1
R100
D17
D15
D11
D16
D14
D13
D12
J7
J3
N1

Fig. 13

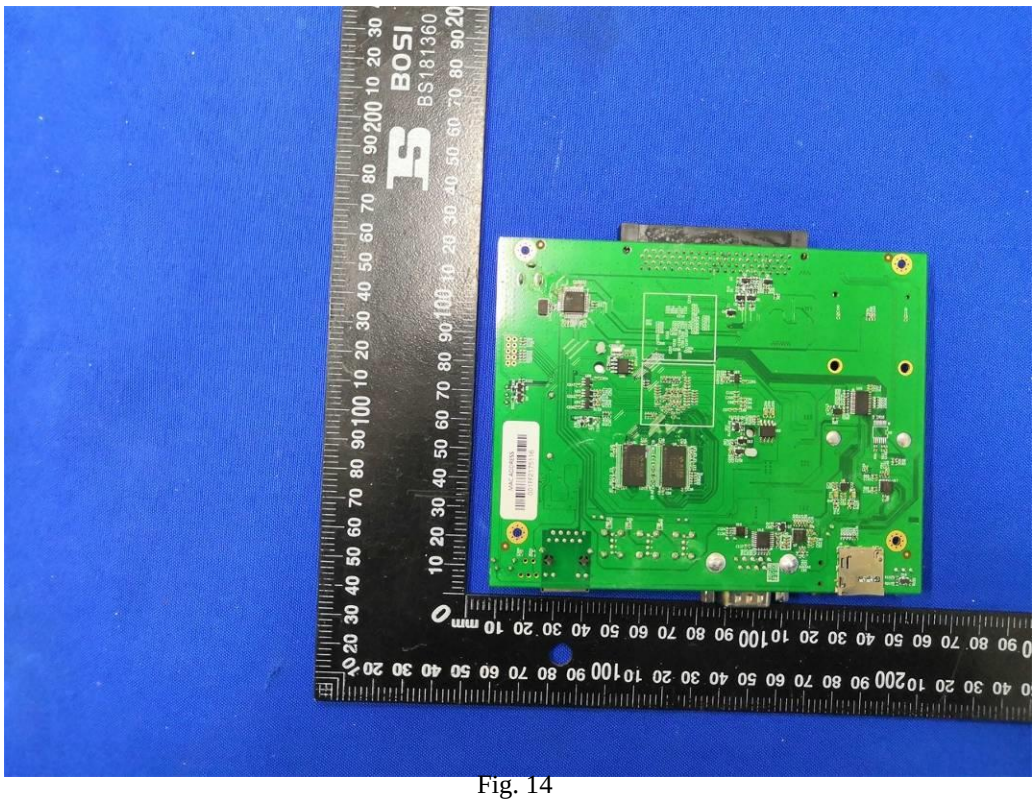

BOSI
BS181360

Fig. 14

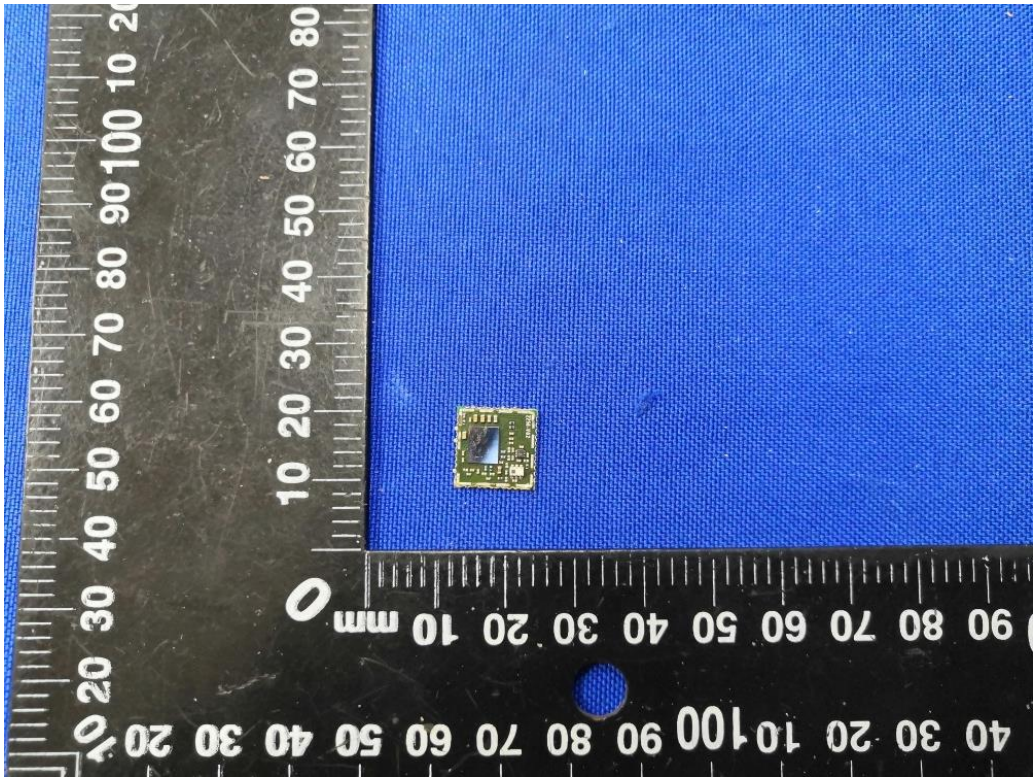


Fig. 15

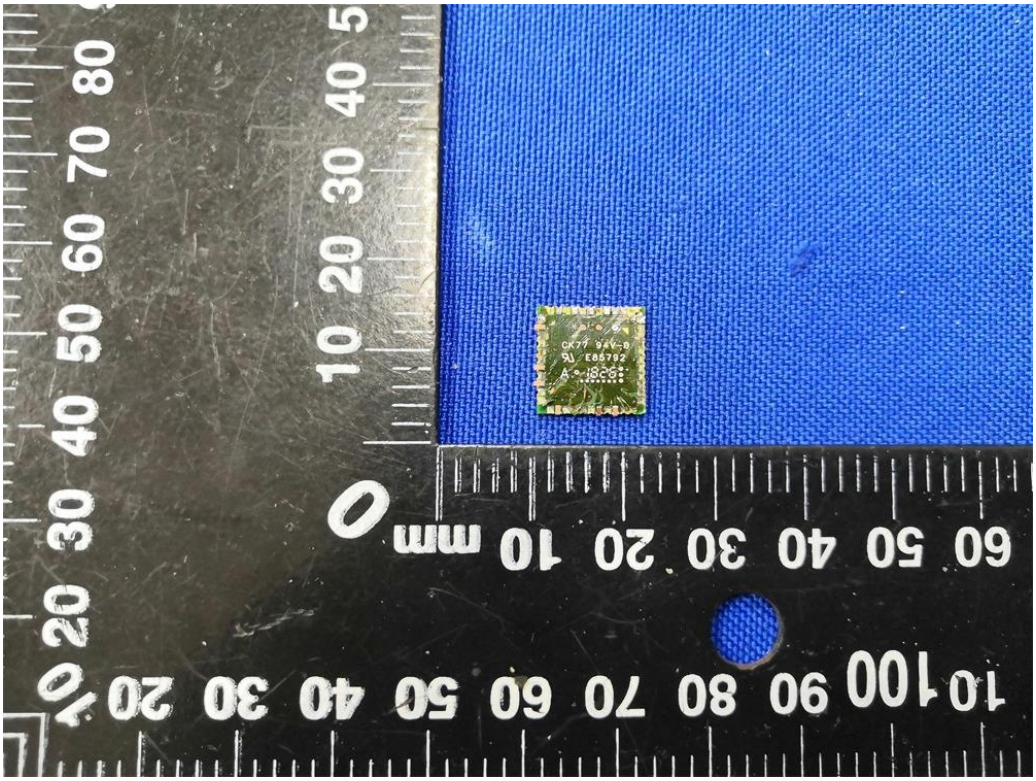


Fig. 16

.....End of Report.....