FCC TEST REPORT

Test report

On Behalf of

Invengo Information Technology Co., Ltd.

For

reader-writer

Model No.: XC-RF855

Serial Model : N/A

FCC ID: TQ4-XC-RF855

Prepared for:	**Invengo Information Technology Co., Ltd.** **27 / f, 28 / f, united headquarters building, high-tech zone, No.63, gaoxin south 10th road, nanshan district, shenzhen**
Prepared By:	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Nov. 25, 2019 ~ Dec. 02, 2019**
Date of Report:	**Dec. 02, 2019**
Report Number:	**HK1911132884-E**

TEST RESULT CERTIFICATION

Applicant's name ..... :	Invengo Information Technology Co., Ltd.
Address ..... :	27 / f, 28 / f, united headquarters building, high-tech zone, No.63, gaoxin south 10th road, nanshan district, shenzhen
Manufacture's Name ..... :	Invengo Information Technology Co., Ltd.
Address ..... :	Tongguan road, yuanwanggu rfid industrial park, gongming office, guangming new district, shenzhen

Product description

Trade Mark:	invengo
Product name ..... :	reader-writer
Model and/or type reference . :	XC-RF855
Standards ..... :	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

Date of Test ..... :	
Date (s) of performance of tests ..... :	Nov. 25, 2019 ~ Dec. 02, 2019
Date of Issue ..... :	Dec. 02, 2019
Test Result ..... :	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST		RESULT
15.207	Conducted Emission	COMPLIANT
15.249&15.209	Fundamental &Radiated Spurious Emission Measuremen	COMPLIANT
15.215	Bandwidth	COMPLIANT
15.205	Band Edge Emission	COMPLIANT
15.203	Antenna Requirement	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	reader-writer
Model Name	XC-RF855
Serial No.	N/A
Trade Mark	invengo
Model Difference	N/A
FCC ID	TQ4-XC-RF855
Antenna Type	Internal Antenna
Antenna Gain	3dBi
Operation frequency	920.25MHz-927.25MHz
Number of Channels	15CH
Modulation Type	ASK
Battery	N/A
Power Source	DC 5V 4A
Adapter	MODEL:FSP020-DPAN2 AC INPUT:100-240V,1.0A, 50-60Hz DC OUTPUT:5.0V⎓4.0A MAX

2.2 Carrier Frequency of Channels

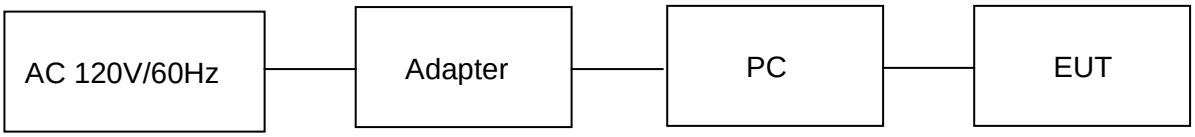
Channel List							
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
1	**902.75**	14	909.25	27	915.75	40	922.25
2	903.25	15	909.75	28	916.25	41	922.75
3	903.75	16	910.25	29	916.75	42	923.25
4	904.25	17	910.75	30	917.25	43	923.75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

2.3 Operation of EUT during testing

Operating Mode
The mode is used: **Transmitting mode**
Low Channel: 902.75MHz
Middle Channel: 914.75MHz
High Channel: 927.25MHz

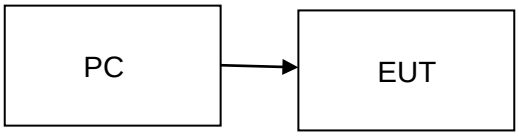
2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:



Note: Dock is only a connector, there is no extra circuit.

Operation of EUT during Radiation and Above1GHz Radiation testing:



2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2019	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2019	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2019	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2019	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2019	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2019	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2019	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2019	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2019	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2019	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2019	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2019	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JZOZtheBO T120-B Version	HKE-083	N/A	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2019	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2019	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2019	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2019	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year
19	Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Dec. 28, 2019	1 Year

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

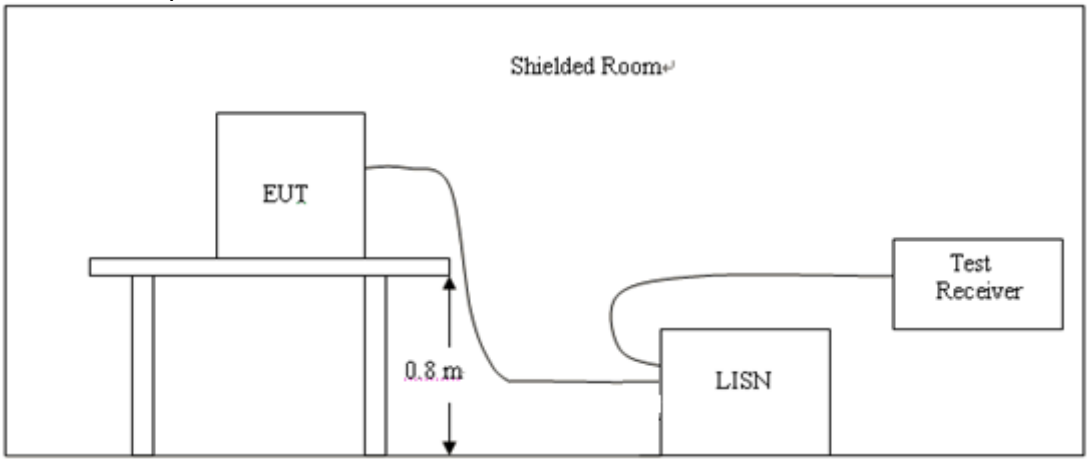
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

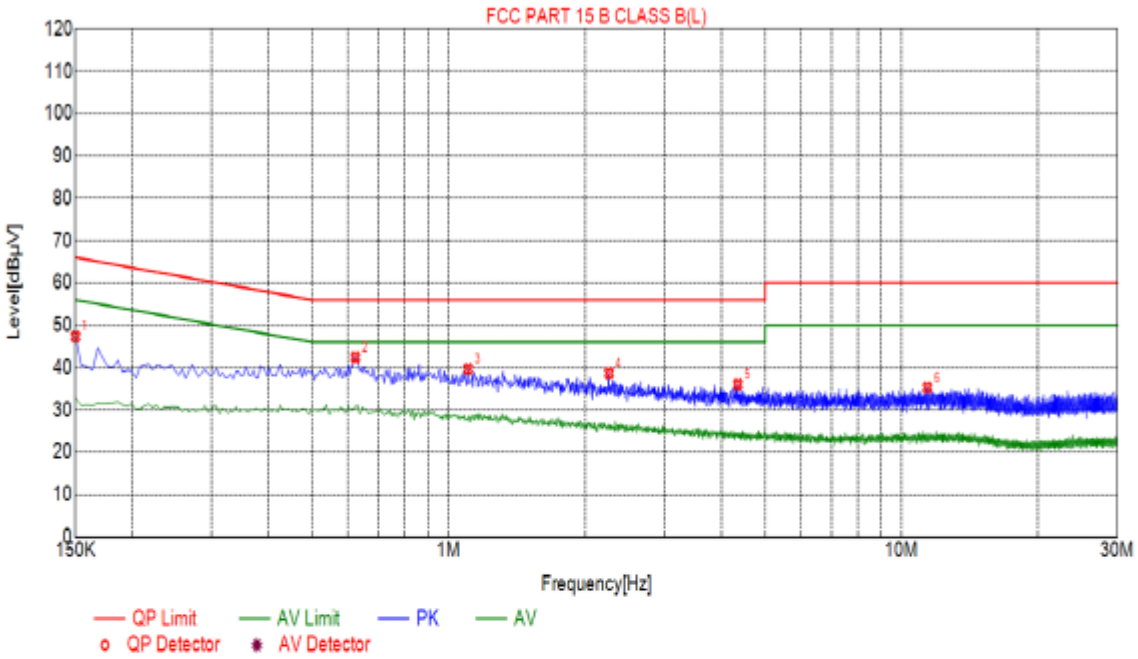
1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

Pass

All the test modes completed for test. Only the worst result that is high channel mode was reported as below:

Test Specification: Line

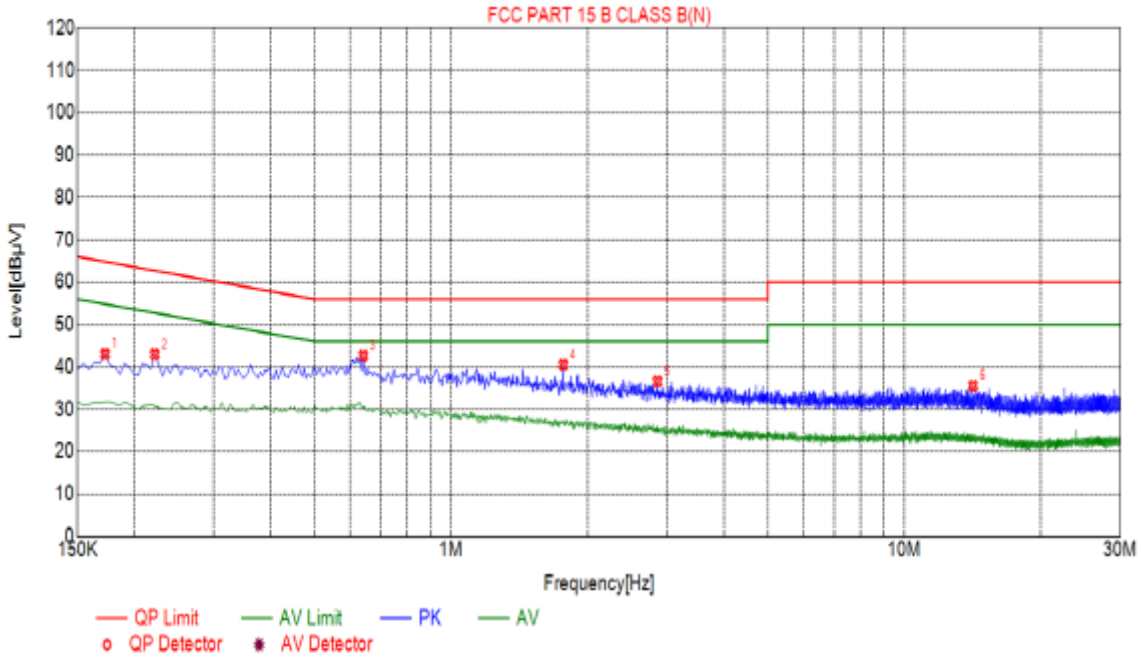


Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1500	47.34	10.03	66.00	18.66	PK
2	0.6225	42.44	10.05	56.00	13.56	PK
3	1.1040	39.69	10.07	56.00	16.31	PK
4	2.2605	38.67	10.18	56.00	17.33	PK
5	4.3530	36.05	10.25	56.00	19.95	PK
6	11.4090	35.33	10.00	60.00	24.67	PK

Remark:

Factor = Cable loss + LISN factor, Margin = Limit – Level

Test Specification: Neutral



Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1725	43.03	10.04	64.84	21.81	PK
2	0.2220	42.98	10.04	62.74	19.76	PK
3	0.6405	42.69	10.05	56.00	13.31	PK
4	1.7700	40.50	10.14	56.00	15.50	PK
5	2.8545	36.59	10.21	56.00	19.41	PK
6	14.1855	35.60	9.95	60.00	24.40	PK

Remark:

Factor = Cable loss + LISN factor, Margin = Limit – Level

4 RADIATED EMISSION TEST

4.1 Radiation Limit

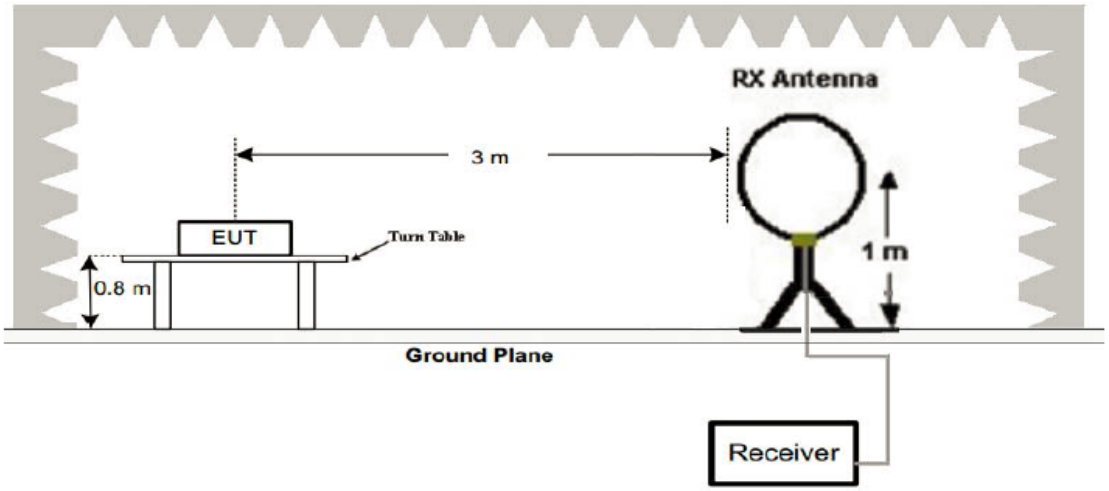
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

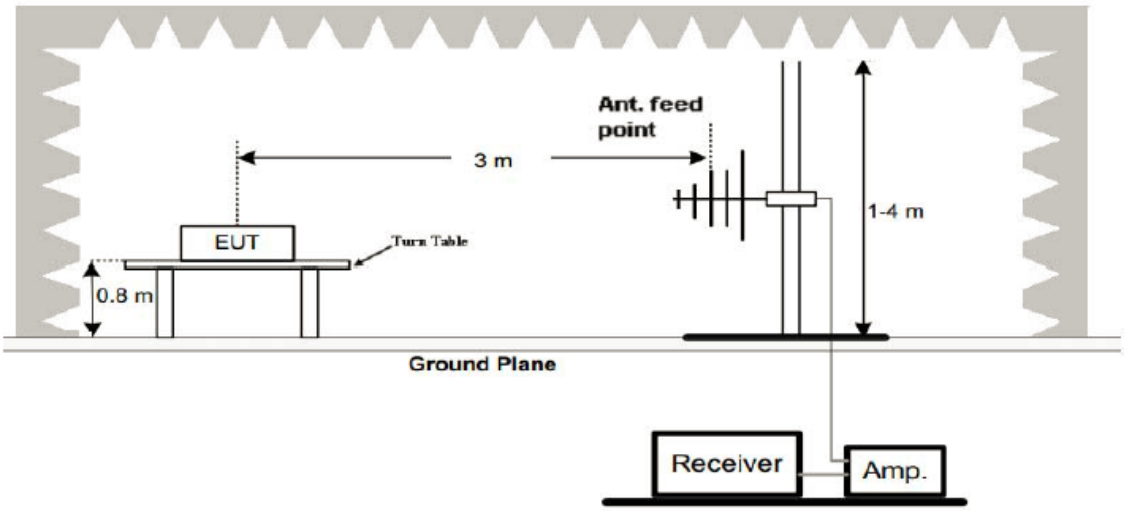
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

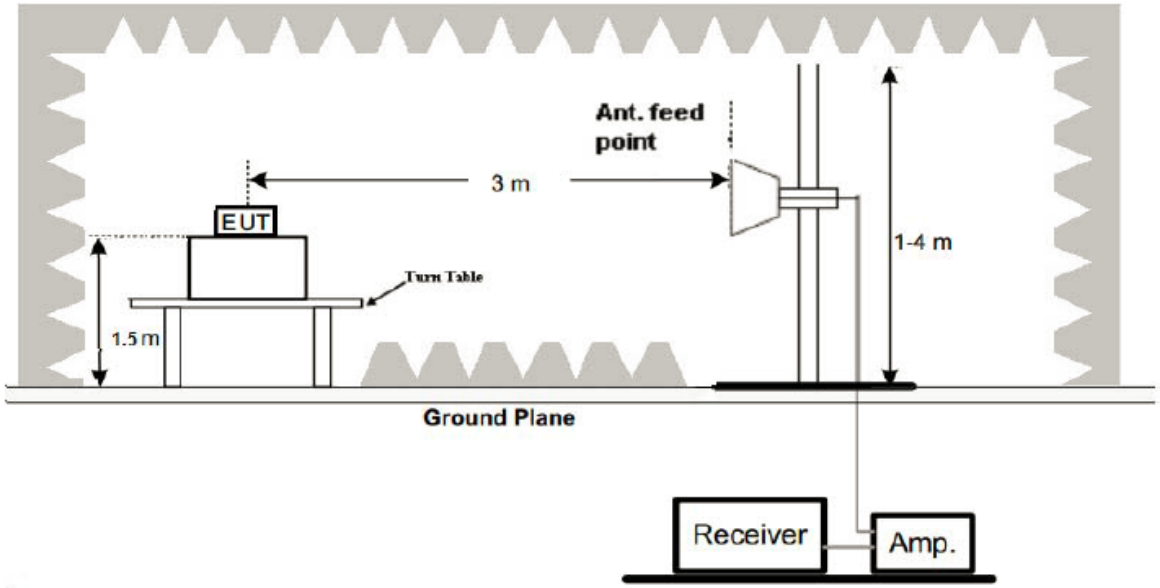
（1）Radiated Emission Test-Up Frequency Below 30MHz



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



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



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

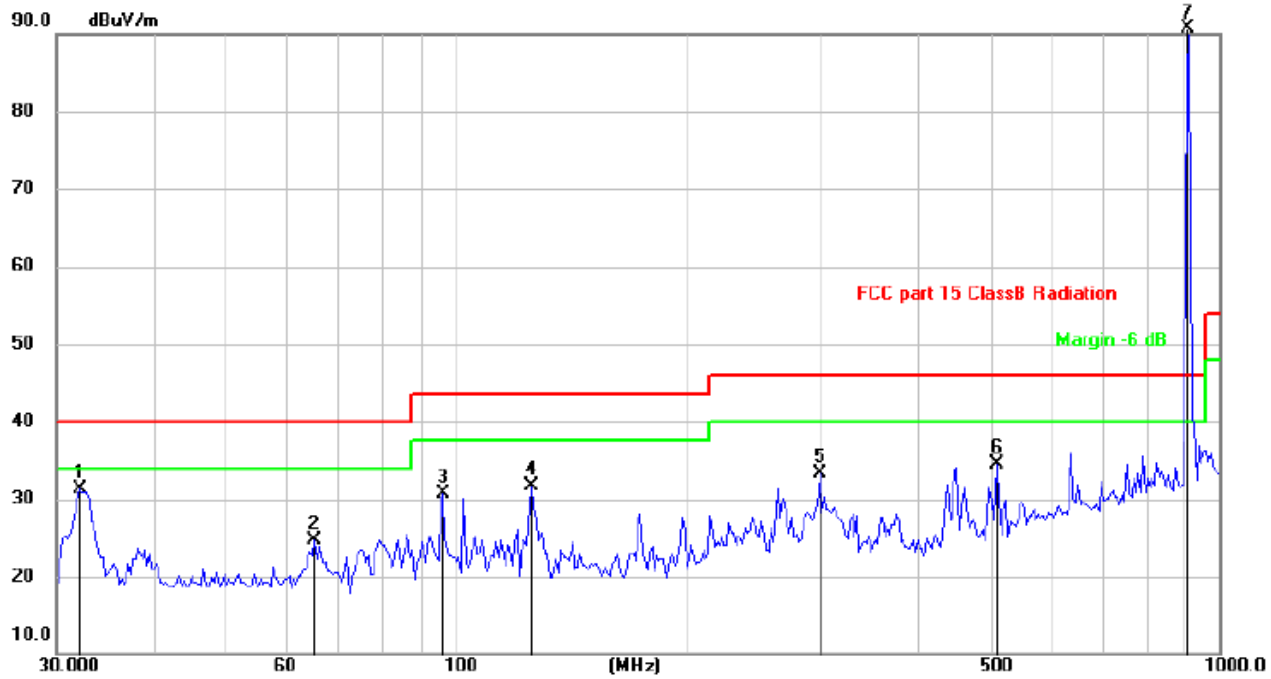
PASS

Remark:

1. All the test modes completed for test. The worst case of Radiated Emission is the first antenna, the test data of this mode was reported.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.
3. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.
4. This data is the worst case of Radiated Emission under the worst one of the Antenna.

Low channel below 1GHz Test Results:

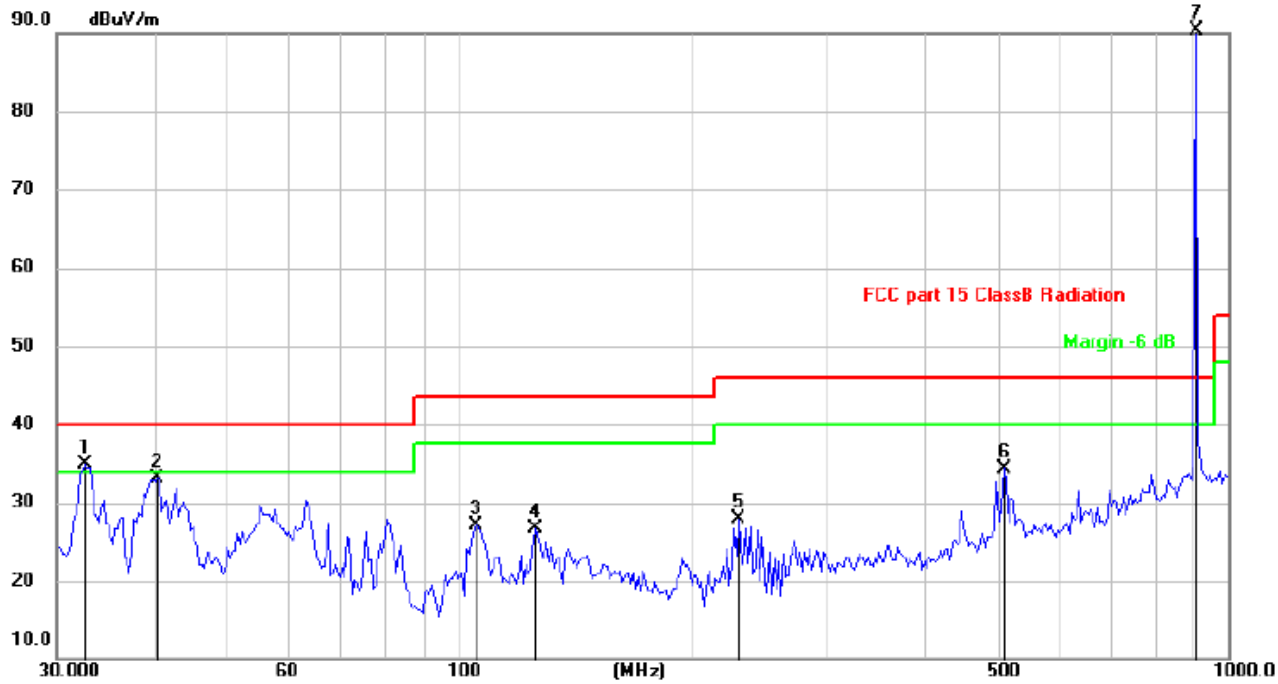
Antenna polarity: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		32.1794	38.43	-7.20	31.23	40.00	-8.77	QP	100	24	
2		65.3431	32.53	-7.88	24.65	40.00	-15.35	QP	100	247	
3		96.0985	40.86	-10.19	30.67	43.50	-12.83	QP	102	42	
4		125.4457	39.06	-7.28	31.78	43.50	-11.72	QP	100	32	
5		299.3158	39.17	-5.81	33.36	46.00	-12.64	QP	104	145	
6		510.0434	35.34	-0.86	34.48	46.00	-11.52	QP	112	235	
7	*	902.7500	84.23	6.42	90.65	94.00	-3.35	QP	107	241	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level.
The frequency 902.7500MHz is main frequency.

Antenna polarity: V



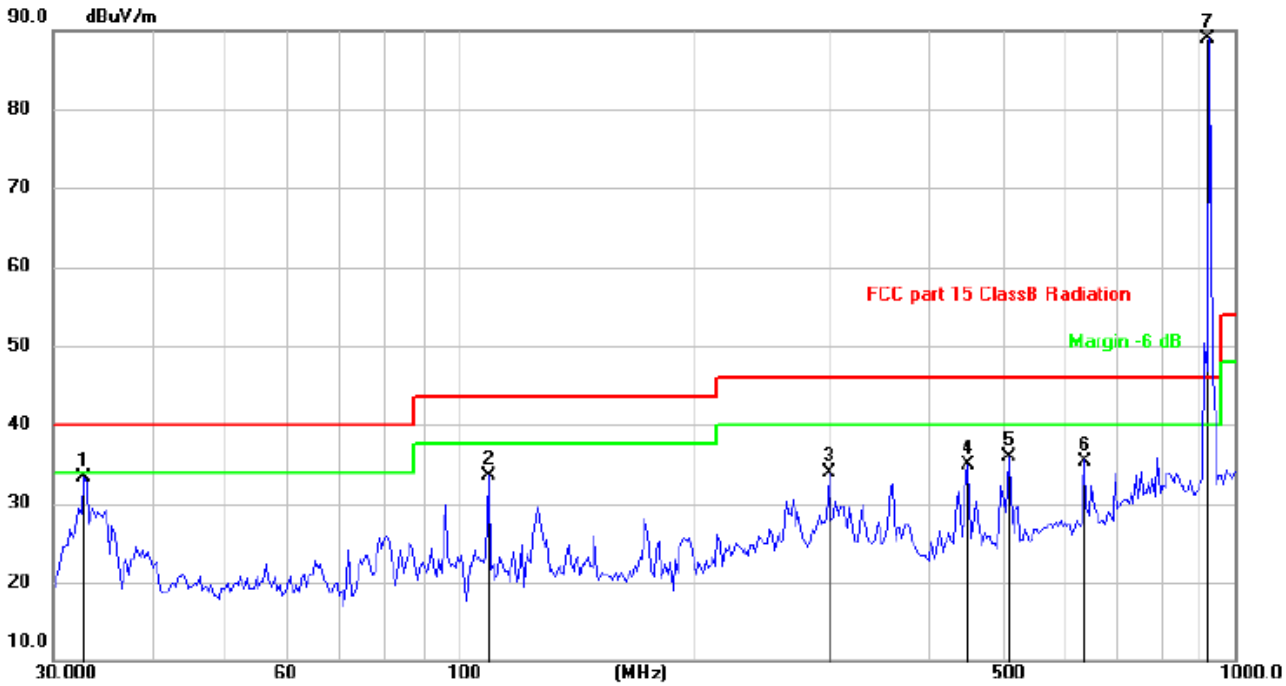
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	!	32.6340	42.09	-7.18	34.91	40.00	-5.09	QP	104	214	
2		40.5591	39.37	-6.31	33.06	40.00	-6.94	QP	102	124	
3		105.2716	36.45	-9.42	27.03	43.50	-16.47	QP	100	350	
4		125.4457	33.99	-7.28	26.71	43.50	-16.79	QP	112	247	
5		230.9067	36.75	-8.87	27.88	46.00	-18.12	QP	107	124	
6		510.0434	35.26	-0.86	34.40	46.00	-11.60	QP	114	32	
7	*	902.7500	83.98	6.42	90.40	94.00	-3.60	QP	105	54	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level

The frequency 902.7500MHz is main frequency.

Middle channel below 1GHz Test Results:

Antenna polarity: H

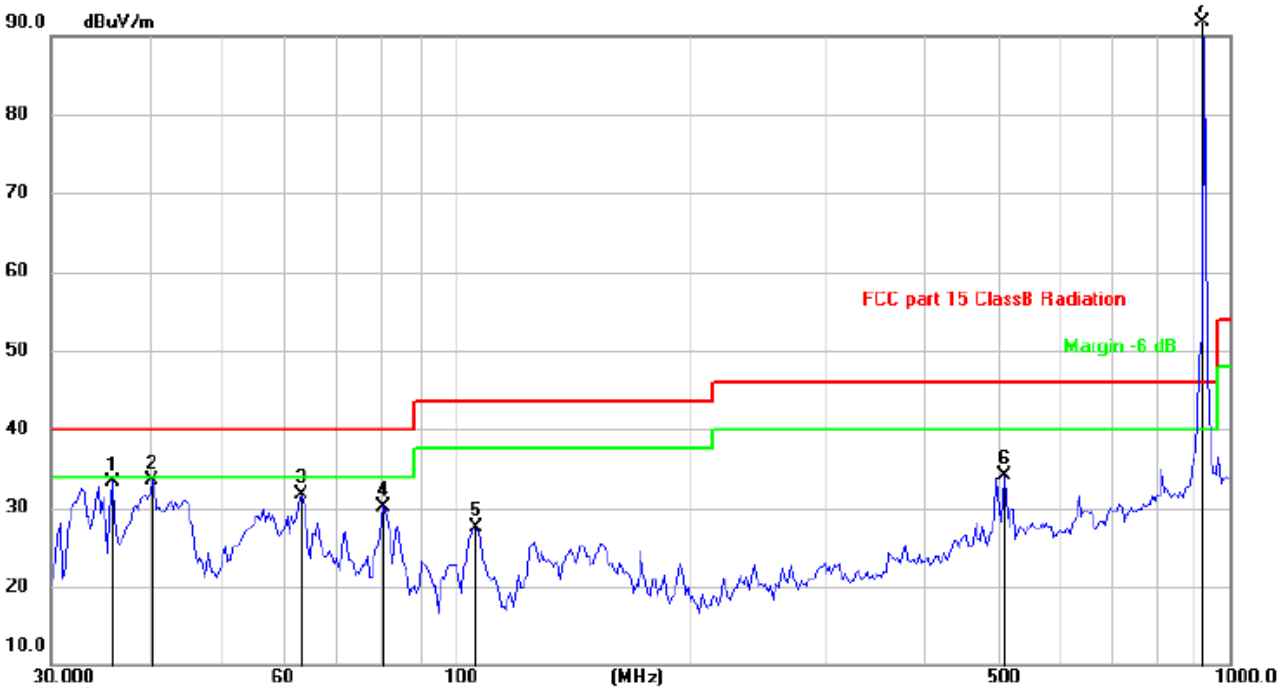


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		32.8635	40.55	-7.16	33.39	40.00	-6.61	QP	114	351	
2		109.0284	42.67	-9.08	33.59	43.50	-9.91	QP	124	38	
3		299.3158	39.72	-5.81	33.91	46.00	-12.09	QP	104	257	
4		452.7196	36.54	-1.73	34.81	46.00	-11.19	QP	100	354	
5		510.0434	36.76	-0.86	35.90	46.00	-10.10	QP	113	72	
6		638.3686	32.59	2.81	35.40	46.00	-10.60	QP	105	75	
7	*	914.7500	82.19	6.70	88.89	94.00	-5.11	QP	100	24	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level

The frequency 914.7500MHz is main frequency.

Antenna polarity: V



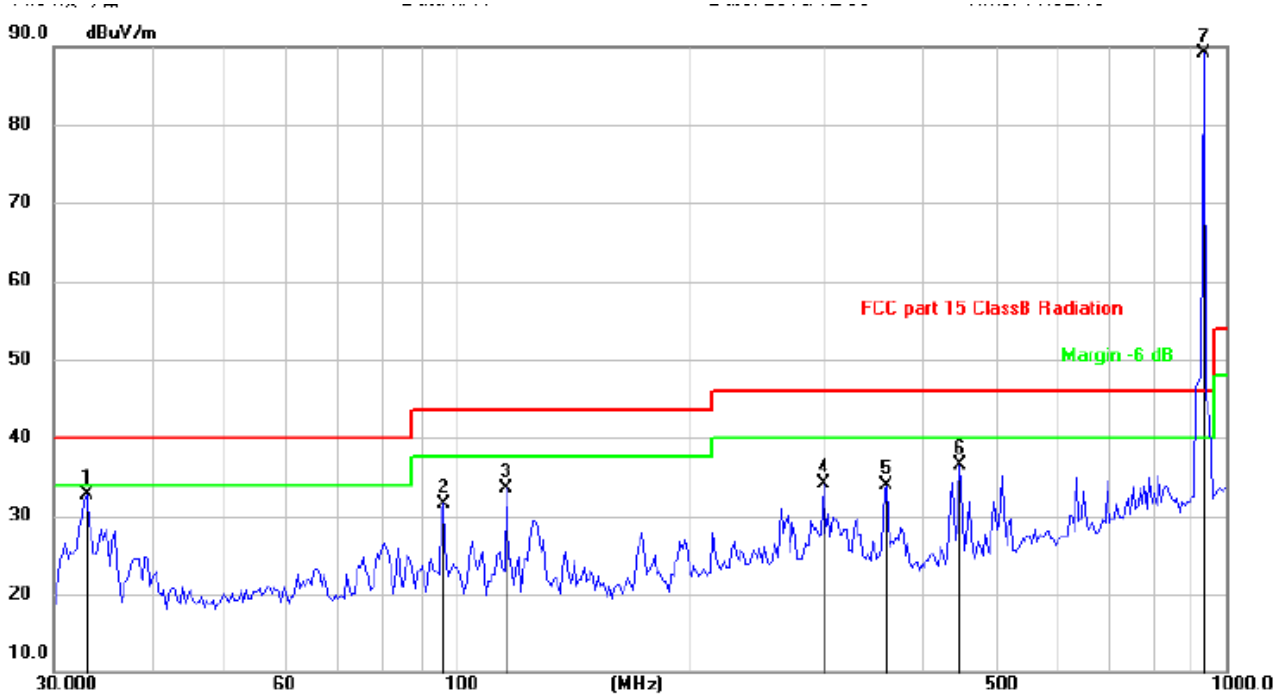
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		36.0007	40.15	-6.90	33.25	40.00	-6.75	QP	110	248	
2		40.5591	39.84	-6.31	33.53	40.00	-6.47	QP	107	234	
3		63.0915	39.32	-7.52	31.80	40.00	-8.20	QP	105	85	
4		80.6440	40.82	-10.62	30.20	40.00	-9.80	QP	132	37	
5		106.0126	36.93	-9.36	27.57	43.50	-15.93	QP	105	64	
6		510.0434	35.01	-0.86	34.15	46.00	-11.85	QP	114	321	
7	*	914.7500	84.00	6.70	90.70	94.00	-3.30	QP	125	78	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level

The frequency 914.7500MHz is main frequency.

High channel below 1GHz Test Results:

Antenna polarity: H

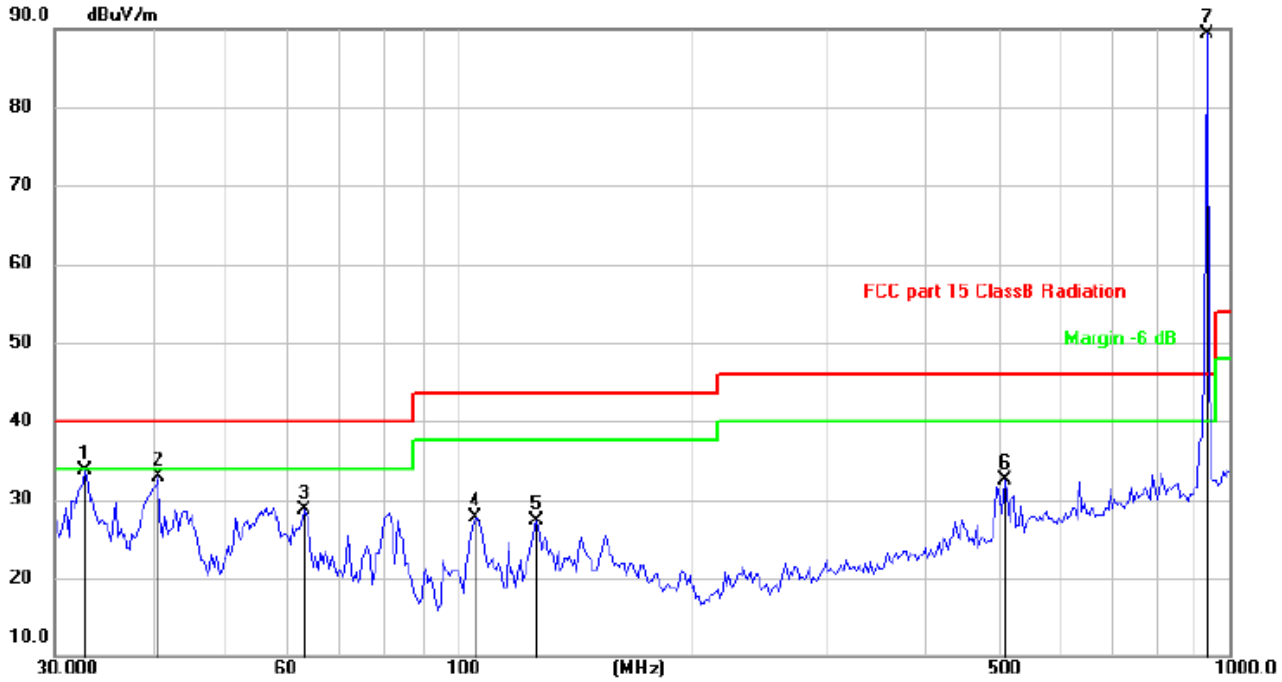


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		33.0949	39.94	-7.15	32.79	40.00	-7.21	QP	110	314	
2		96.0985	41.79	-10.19	31.60	43.50	-11.90	QP	105	354	
3		116.1320	41.88	-8.40	33.48	43.50	-10.02	QP	108	27	
4		299.3158	39.88	-5.81	34.07	46.00	-11.93	QP	124	238	
5		361.7137	38.09	-4.25	33.84	46.00	-12.16	QP	123	153	
6		449.5557	38.33	-1.78	36.55	46.00	-9.45	QP	105	174	
7	*	927.2500	82.06	6.99	89.05	94.00	-4.95	QP	100	25	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level

The frequency 927.2500MHz is main frequency.

Antenna polarity: V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		32.8635	40.78	-7.16	33.62	40.00	-6.38	QP	102	42	
2		40.8444	39.18	-6.32	32.86	40.00	-7.14	QP	142	234	
3		63.0915	36.25	-7.52	28.73	40.00	-11.27	QP	150	254	
4		105.2716	37.10	-9.42	27.68	43.50	-15.82	QP	143	101	
5		126.3285	34.38	-7.15	27.23	43.50	-16.27	QP	100	52	
6		510.0434	33.34	-0.86	32.48	46.00	-13.52	QP	104	98	
7	*	927.2500	82.31	6.99	89.30	94.00	-4.70	QP	105	135	

Remark: Transd = Cableloss + Antenna factor - Pre-amplifier; Margin = Limit – Level
The frequency 927.2500MHz is main frequency.

Remark：

(1) Measuring frequencies from 9 KHz to the 1 GHz, radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor. And the emission from 9kHz to 30MHz are more than 20dB below the limit.

(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

（4）The radiated Emission limit of the main frequency is 94dBuV/m, so it is pass.

Above 1 GHz Test Results:

CH Low

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1805.5	60.45	-5.81	54.64	74	-19.36	peak
1805.5	48.16	-5.81	42.35	54	-11.65	AVG
2708.25	58.22	-3.59	54.63	74	-19.37	peak
2708.25	47.37	-3.59	43.78	54	-10.22	AVG
3611	59.99	-0.99	59.00	74	-15.00	peak
3611	48.20	-0.99	47.21	54	-6.79	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1805.5	58.99	-5.81	53.18	74	-20.82	peak
1805.5	47.70	-5.81	41.89	54	-12.11	AVG
2708.25	58.33	-3.59	54.74	74	-19.26	peak
2708.25	49.51	-3.59	45.92	54	-8.08	AVG
3611	60.08	-0.99	59.09	74	-14.91	peak
3611	49.25	-0.99	48.26	54	-5.74	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH Middle

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1829.5	57.39	-5.75	51.64	74	-22.36	peak
1829.5	47.66	-5.75	41.91	54	-12.09	AVG
2744.25	56.41	-3.51	52.90	74	-21.10	peak
2744.25	47.34	-3.51	43.83	54	-10.17	AVG
3659	60.82	-0.89	59.93	74	-14.07	peak
3659	49.42	-0.89	48.53	54	-5.47	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1829.5	58.57	-5.75	52.82	74	-21.18	peak
1829.5	48.95	-5.75	43.20	54	-10.80	AVG
2744.25	57.73	-3.51	54.22	74	-19.78	peak
2744.25	49.08	-3.51	45.57	54	-8.43	AVG
3659	59.85	-0.86	58.99	74	-15.01	peak
3659	49.84	-0.89	48.95	54	-5.05	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

CH High

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1854.5	60.10	-5.62	54.48	74	-19.52	peak
1854.5	48.83	-5.62	43.21	54	-10.79	AVG
2871.75	57.30	-3.41	53.89	74	-20.11	peak
2871.75	49.51	-3.41	46.10	54	-7.90	AVG
3709	61.57	-0.74	60.83	74	-13.17	peak
3709	48.54	-0.74	47.80	54	-6.20	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1854.5	60.47	-5.62	54.85	74	-19.15	peak
1854.5	49.71	-5.62	44.09	54	-9.91	AVG
2871.75	56.65	-3.41	53.24	74	-20.76	peak
2871.75	51.15	-3.41	47.74	54	-6.26	AVG
3709	59.99	-0.74	59.25	74	-14.75	peak
3709	52.54	-0.74	51.80	54	-2.20	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark :
(1) Measuring frequencies from 1 GHz to the 25 GHz。
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
(7)All modes of operation were investigated and the worst-case emissions are reported.

5 BAND EDGE

5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz, to measure the conducted peak band edge.

5.3 Test Result

NOTE; This data is the worst case of Radiated Emission under the worst one of the Antenna.

PASS

Radiated Band Edge Test:

Operation Mode: TX CH Low

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
850	39.25	-3.05	36.20	46.00	-9.80	QP
850	/	/	/	/	/	AVG
880	36.05	-3.08	32.97	46.00	-13.03	QP
880	/	/	/	/	/	AVG
902	42.13	-3.12	39.01	46.00	-6.99	QP
902	/	/	/	/	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
850	38.48	-3.05	35.43	46.00	-10.57	QP
850	/	/	/	/	/	AVG
880	40.69	-3.08	37.61	46.00	-8.39	QP
880	/	/	/	/	/	AVG
902	38.51	-3.12	35.39	46.00	-10.61	QP
902	/	/	/	/	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High

Horizontal (Worst case)

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
928.00	40.00	-3.18	36.82	46.00	-9.18	QP
928.00	/	/	/	/	/	AVG
950.00	37.18	-3.22	33.96	46.00	-12.04	QP
950.00	/	/	/	/	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
928.00	36.54	-3.18	33.36	46.00	-12.64	QP
928.00	/	/	/	/	/	AVG
950.00	39.40	-3.22	36.18	46.00	-9.82	QP
950.00	/	/	/	/	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same as Radiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW= 1KHz. VBW= 3 KHz, Span=150KHz
4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

6.3 Measurement Equipment Used

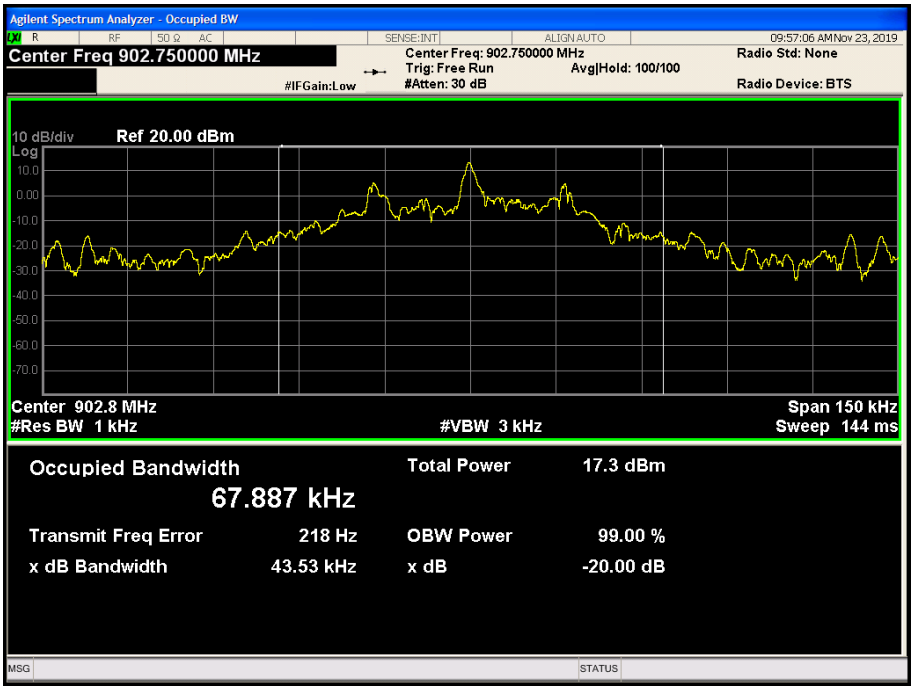
Same as Radiated Emission Measurement

6.4 Test Result

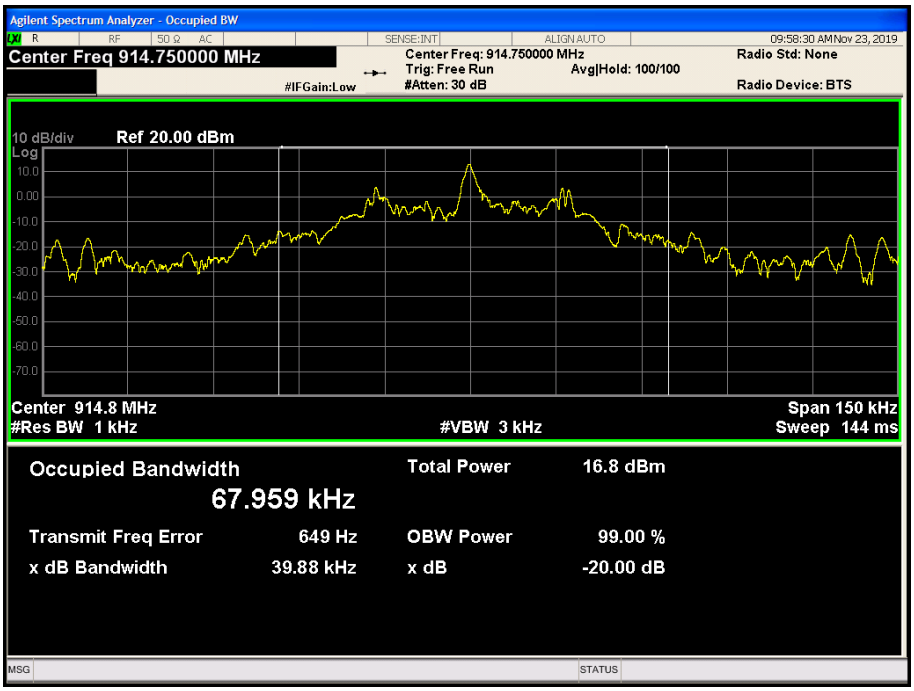
PASS

Frequency	20dB Bandwidth (MHz)	Result
902.75MHz	0.0435	**PASS**
914.75MHz	0.0399	**PASS**
927.25MHz	0.0389	**PASS**

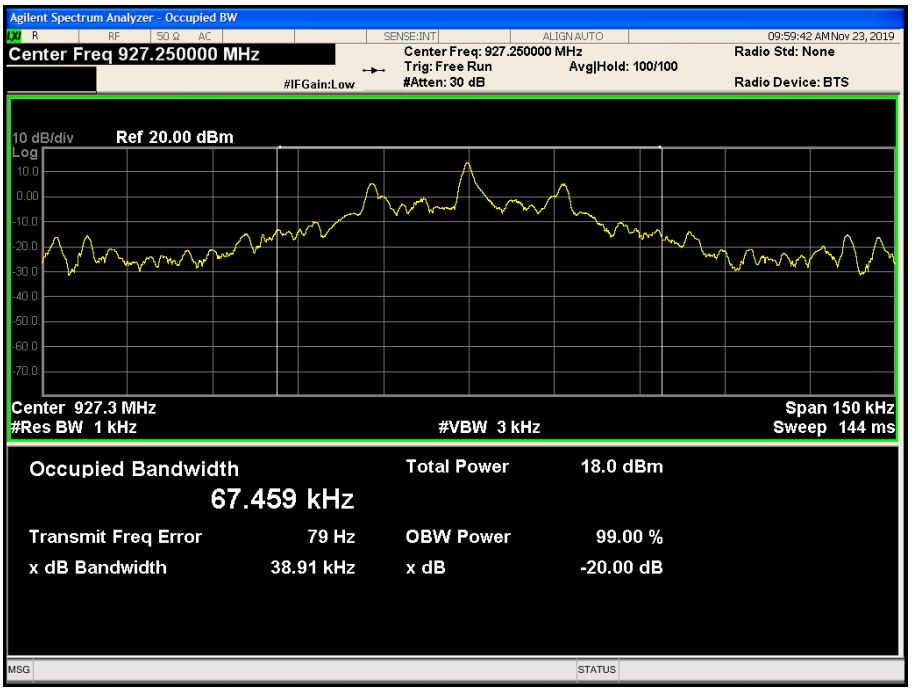
CH: LOW



CH: Middle



CH: High



7 ANTENNA REQUIREMENT

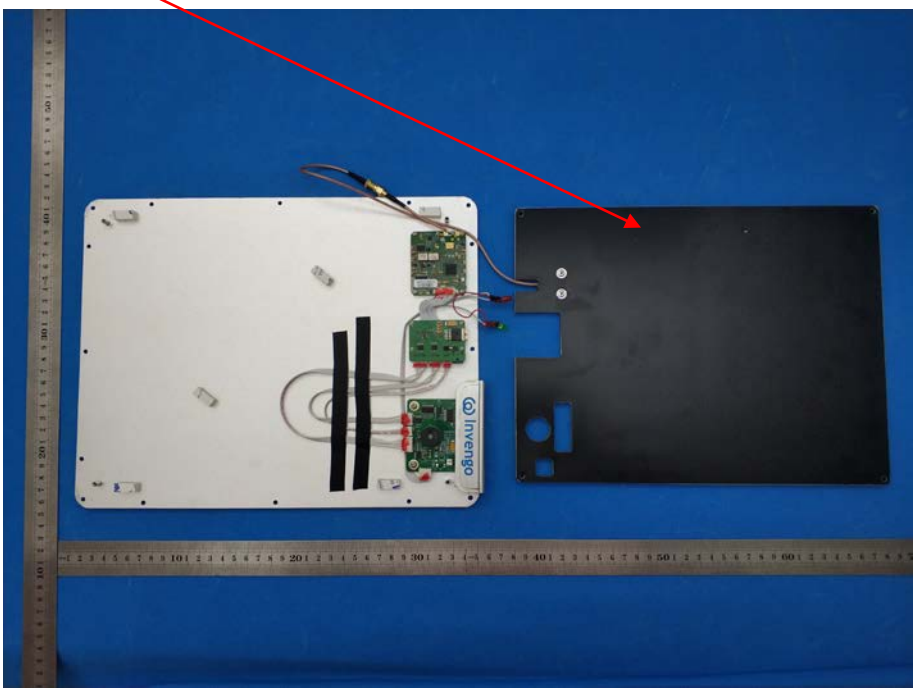
Standard Applicable

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 15.249, 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 Connected Construction

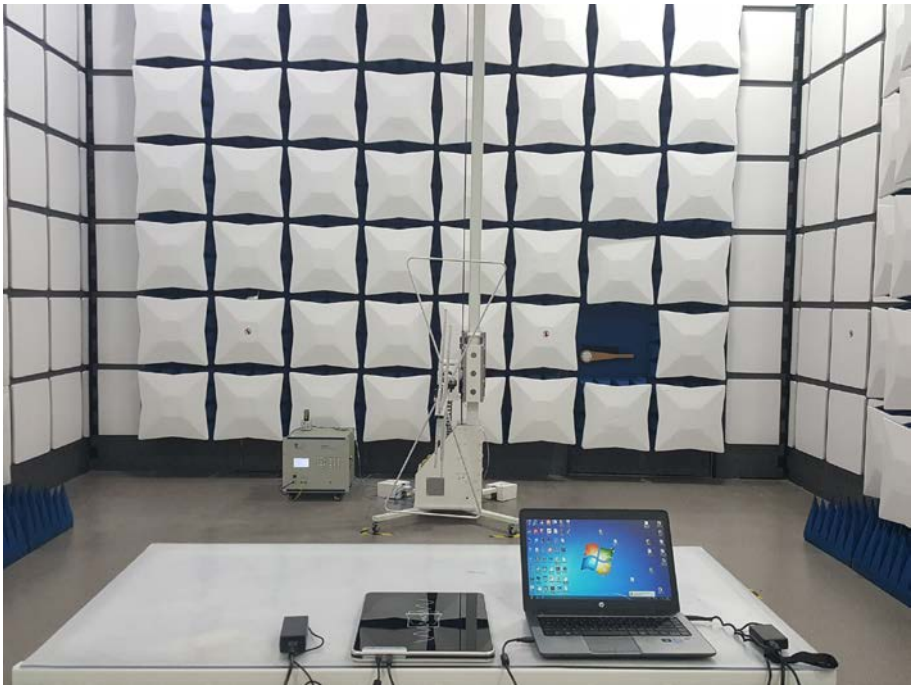
The antenna used in this product is internal Antenna. The directional gains of antenna used for transmitting is 3dBi.

Internal Antenna



8 PHOTOGRAPH OF TEST

Radiated Emission



Conducted Emission

End of Report