REPORT No.: SZ17050133W17A

FCC RF TEST REPORT

APPLICANT	:	Pycom Ltd
PRODUCT NAME	:	Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython.
MODEL NAME	:	L01 1.0
TRADE NAME	:	LoPy OEM
BRAND NAME	:	Pycom
FCC ID	:	2AJMTLOPY01R
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2017-09-11

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2017-09-11	First edition

TEST REPORT DECLARATION

Applicant	Pycom Ltd
Applicant Address	Highpoint, 9 Sydenham Road, GU1 3RX Guildford, Surrey UK
Manufacturer	In-Tech Electronics Ltd
Manufacturer Address	2/F Rhythm Home,119 ShazuiRoad, Futian, Shenzhen, Guangdong, P.R.China
Product Name	Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython.
Model Name	L01 1.0
Brand Name	Pycom
HW Version	1.0r
SW Version	1.0
Test Standards	47 CFR Part 15 Subpart C
Test Date	2017-06-27 to 2017-09-11
Test Result	PASS

Tested by : Tu Ya'nan

Tu Ya'nan (Test Engineer)

Approved by : Andy Yeh

Andy Yeh (Supervisor)

1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 EUT Description

EUT Type..... :	Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython.
Serial No. ..... :	(N/A, marked #1 by test site)
Hardware Version..... :	1.0r
Software Version..... :	1.0
Applicant..... :	Pycom Ltd Highpoint, 9 Sydenham Road, GU1 3RX Guildford, Surrey UK
Manufacturer ..... :	In-Tech Electronics Ltd 2/F Rhythm Home,119 ShazuiRoad, Futian, Shenzhen, Guangdong, P.R.China
Frequency Range..... :	The frequency range used is 902.3MHz-914.9MHz (64 channels, at intervals of 0.2MHz)
Channel Number ..... :	64(See Note)
Antenna 1 Type ..... :	External Antenna (P/N"Molex:1052620001")
Antenna 1 Gain..... :	1.4dBi
Antenna 2 Type ..... :	External Antenna
Antenna 2 Gain..... :	0.5dBi

NOTE:

1. The EUT is a Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython. It's operating at 902.3MHz-914.9MHz; the frequencies allocated for the EUT is F(MHz)=902.3+0.2*n (0<=n<=63). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 0 (902.3MHz), 32 (908.7MHz) and 63 (914.9MHz).
2. The EUT has two antennas for test, the TX power for Ant1 is 12dBm and for Ant2 is 5dBm.
3. The EUT connected to the serial port of the computer with a serial communication cable, and then use the dedicated software to control the EUT into the test mode.
4. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Result
1	15.203	Antenna Requirement	N/A	**PASS**
2	15.215	Bandwidth	Jun 27, 2017	**PASS**
3	15.249(a)	Field strength	Aug 14, 2017	**PASS**
4	15.207	Conducted Emission	Aug 15, 2017	**PASS**
5	15.209 ,15.249(a)	Radiated Emission and field strength of harmonics	Aug 14, 2017& Sep 11, 2017	**PASS**

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10:2013.

1.2.1 Test Environment Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR PART 15C REQUIREMENTS

2.1 Antenna requirement

2.1.1 Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2 Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2 Bandwidth

2.2.1 Requirement

Note: for reporting purpose only.

2.2.2 Test Description

A. Test Set:

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

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Please reference ANNEX A(1.5).

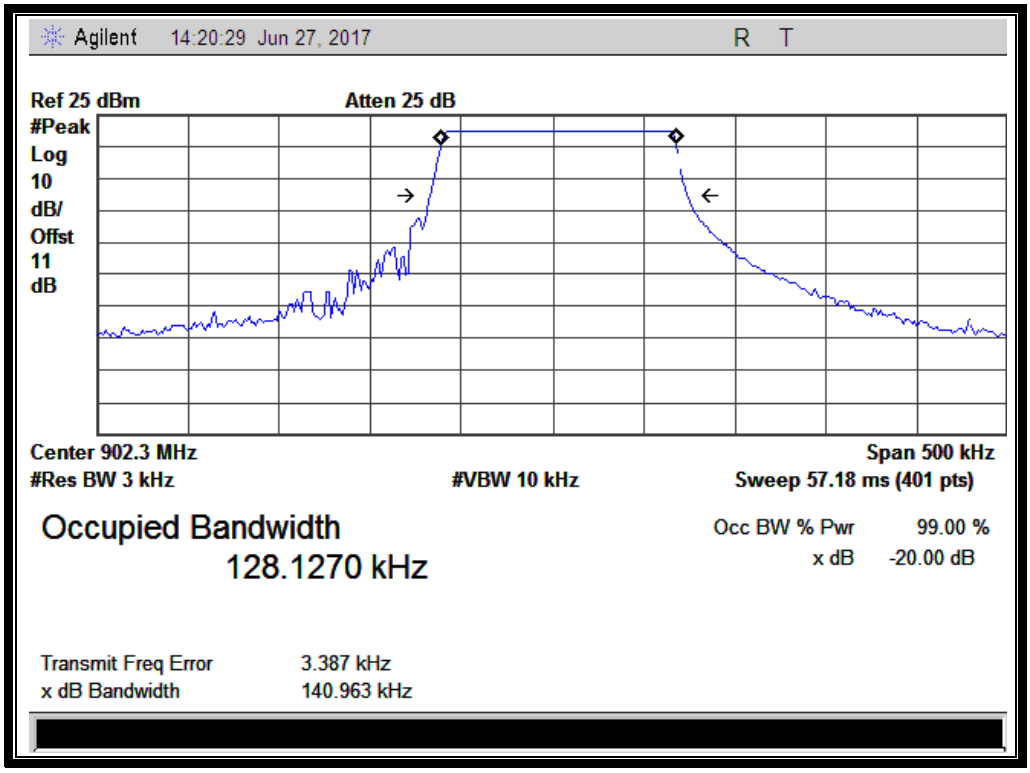
2.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

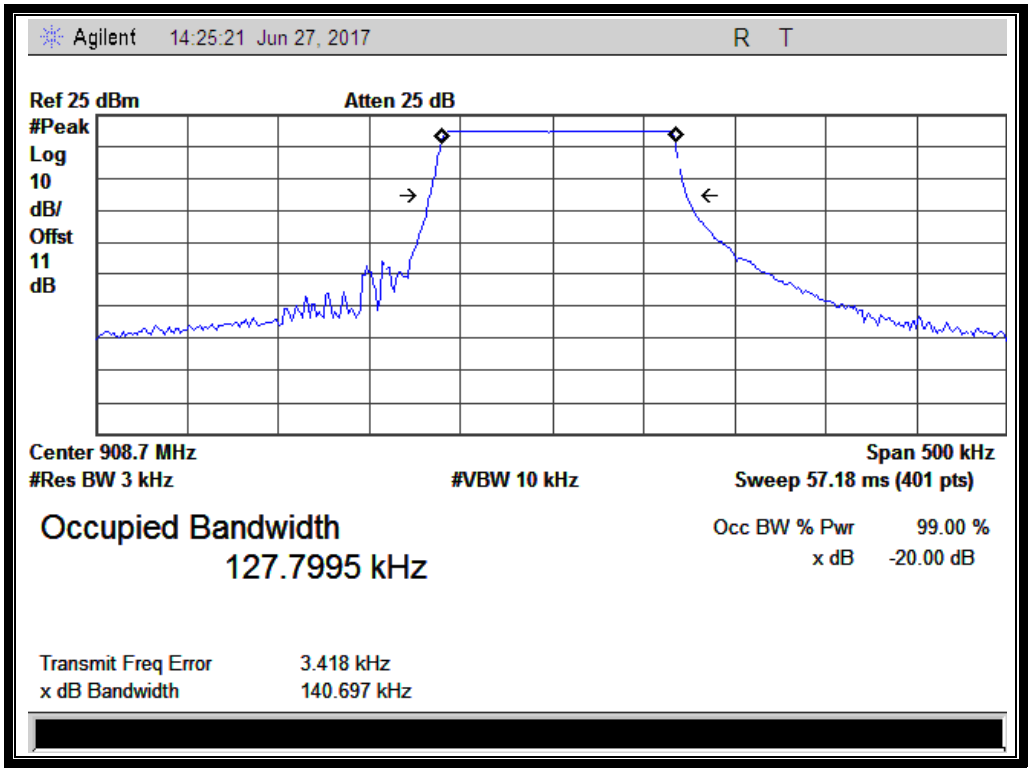
A. Test Verdict:

Channel	Frequency (MHz)	20 dB Bandwidth (KHz)	Refer Plot
0	902.3	140.963	Plot A
32	908.7	140.697	Plot B
63	914.9	139.678	Plot C

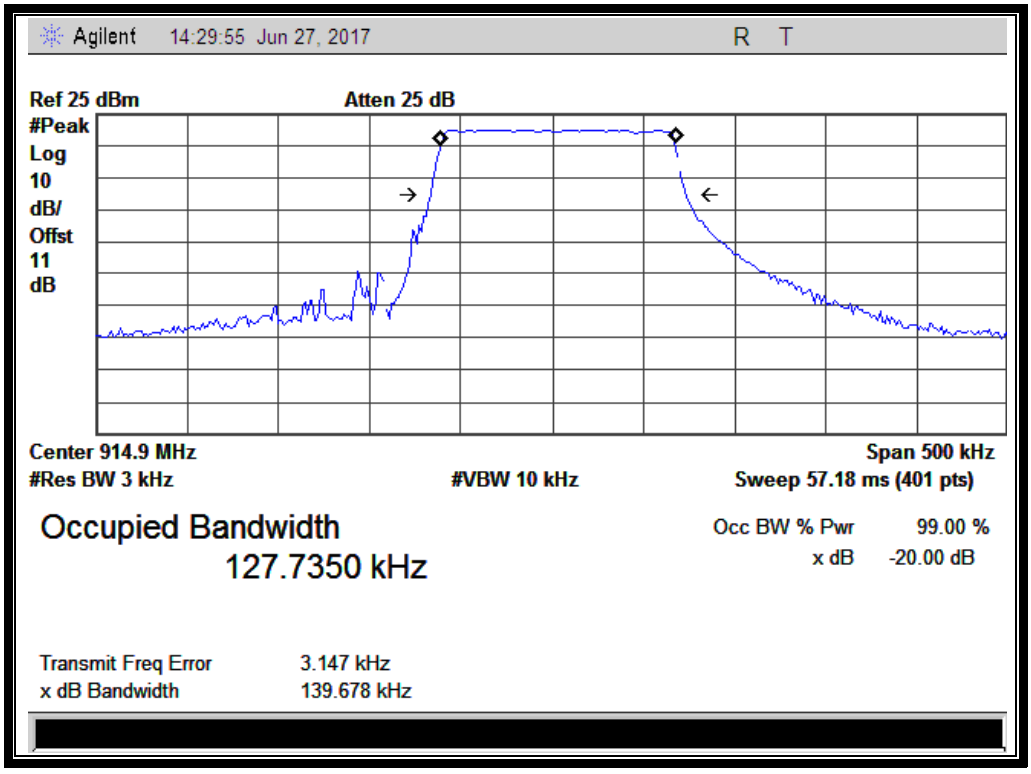
B. Test Plots



(Plot A, Channel 0 : 902.3MHz)



(Plot B, Channel 32 : 908.7MHz)



(Plot C, Channel 63: 914.9MHz)

2.3 Conducted Emission

2.3.1 Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

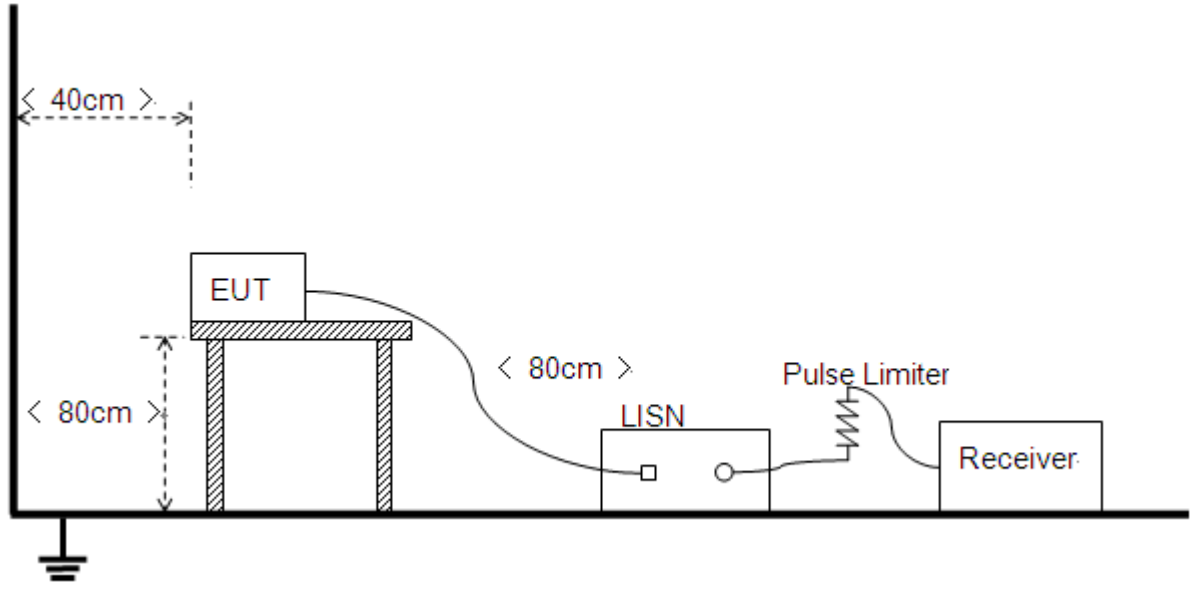
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.3.2 Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10 2013.

B. Equipments List:

Please reference ANNEX A(1.5).

2.3.3 Test Result

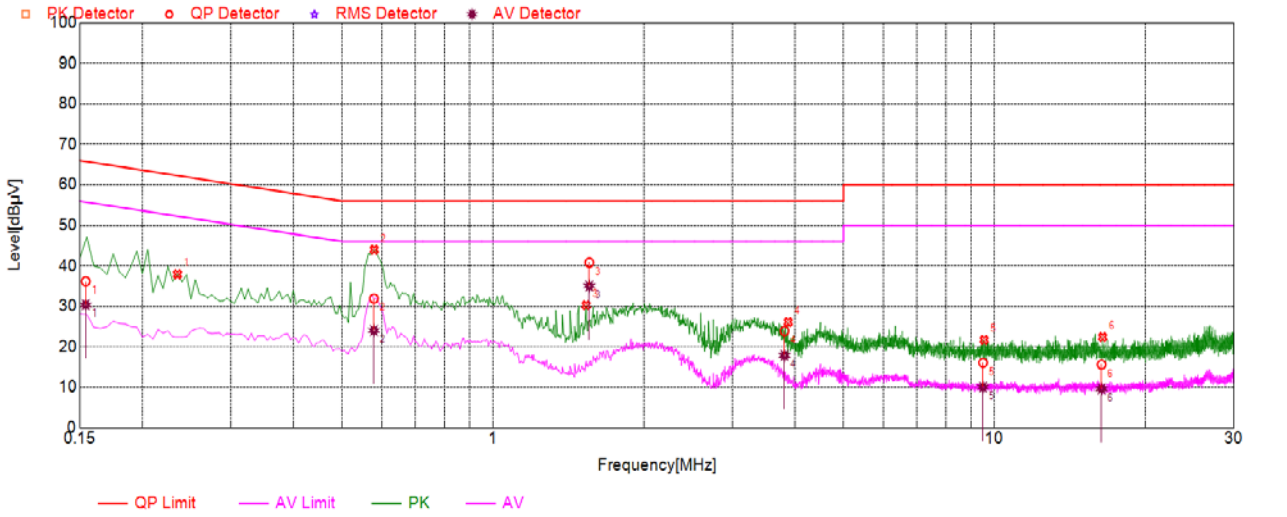
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

A. Test setup:

The EUT configuration of the emission tests is EUT + Link.

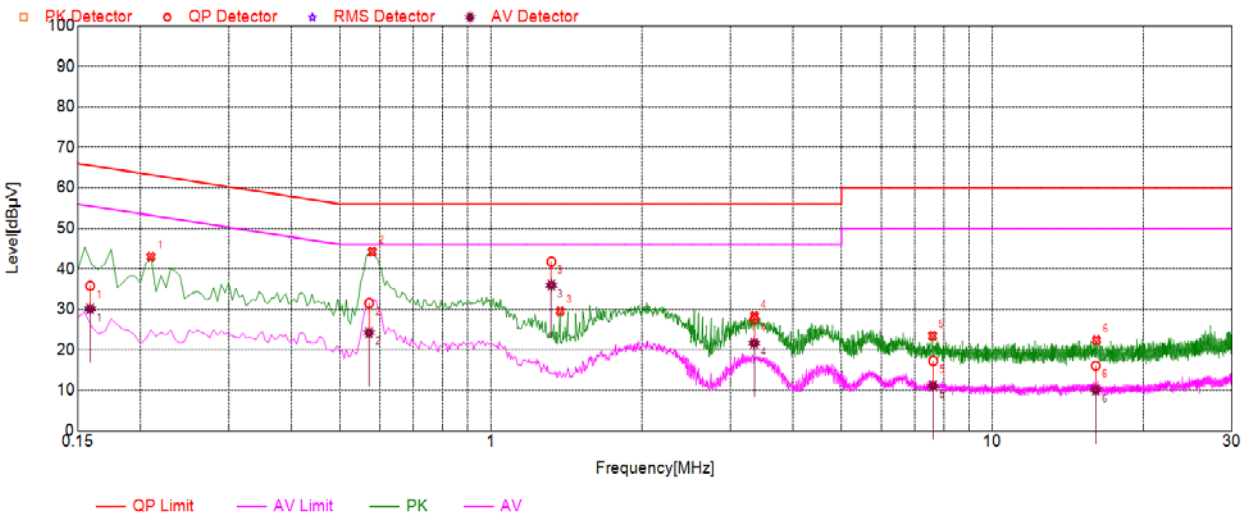
Note: The test voltage is AC 120V/60Hz.

B. Test Plots:



(Plot A: L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1542	36.17	30.38	65.88	55.88	Line	PASS
2	0.5792	31.93	24.07	56	46		PASS
3	1.5568	40.82	35.04	56	46		PASS
4	3.8152	23.92	17.90	56	46		PASS
5	9.4918	16.08	10.06	60	50		PASS
6	16.3574	15.64	9.63	60	50		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1588	35.80	30.11	65.75	55.75	Line	PASS
2	0.5716	31.51	24.26	56	46		PASS
3	1.3202	41.74	35.98	56	46		PASS
4	3.3504	27.57	21.65	56	46		PASS
5	7.6196	17.25	11.09	60	50		PASS
6	16.07	16.09	10.06	60	50		PASS

2.4 Field strength of fundamental

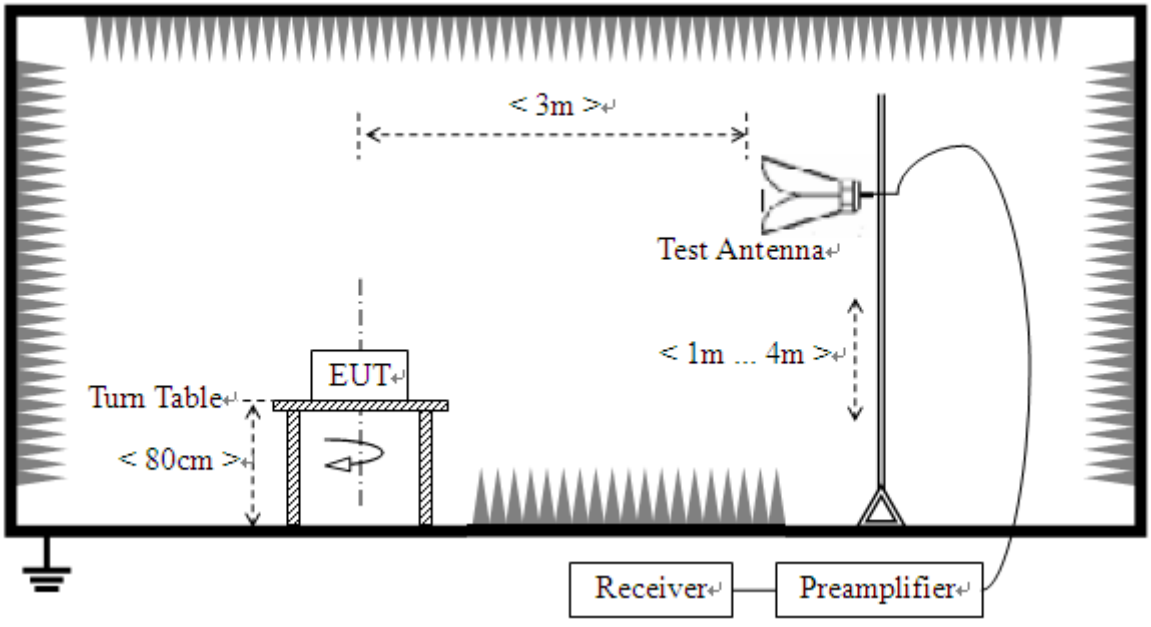
2.4.1 Requirement

According to FCC section 15.249(a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

2.4.2 Test Description

A. Test Setup



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the

ground to determine the maximum value of the field strength.

B. Equipments List:

Please reference ANNEX A(1.5).

2.1.1 Test Procedure

Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 120 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak

Trace = max hold

2.1.2 Test Result

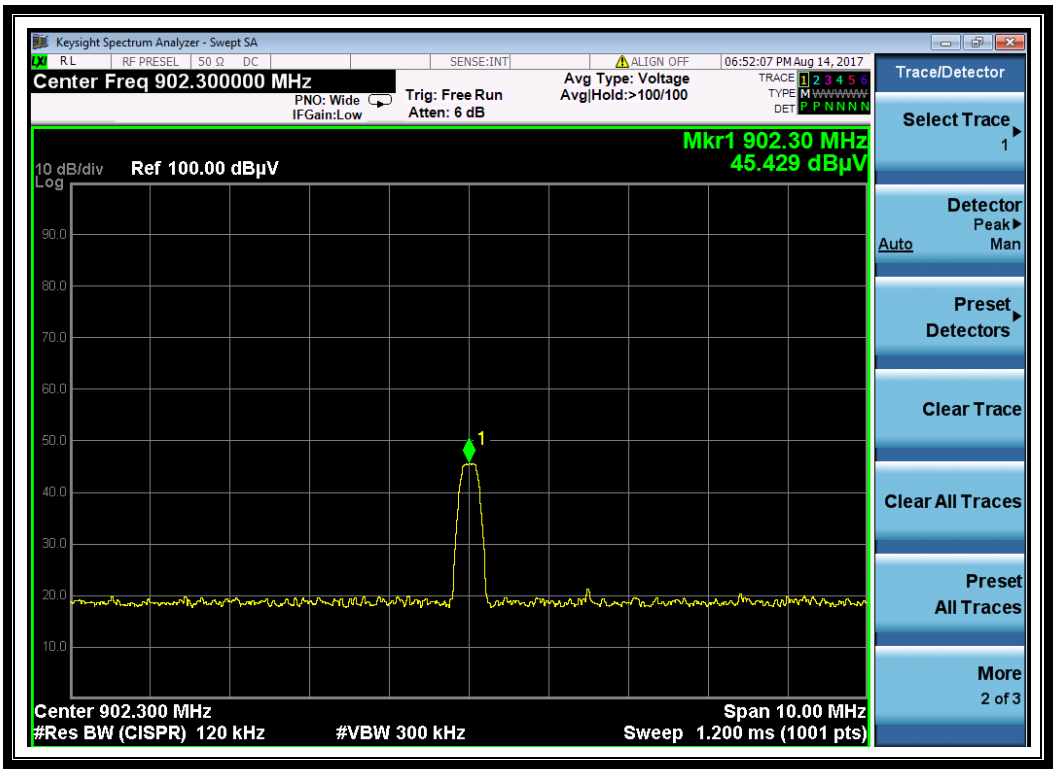
The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; A_T =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m
During the test, the total correction Factor AT and A_{Factor} were built in test software.
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report

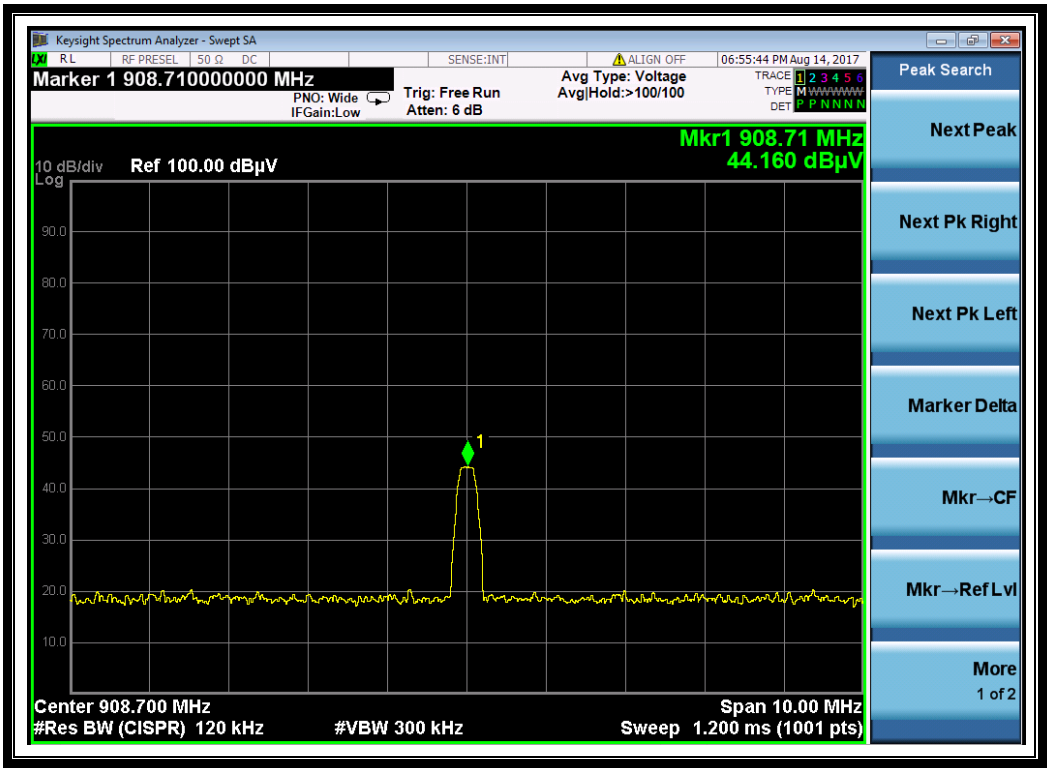
Result for Antenna 1:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
0	902.3	PK	45.429	3.798	22.392	71.619	113.98	Pass
32	908.7	PK	44.160	3.798	22.392	70.350	113.98	Pass
63	914.9	PK	45.564	3.798	22.392	71.754	113.98	Pass

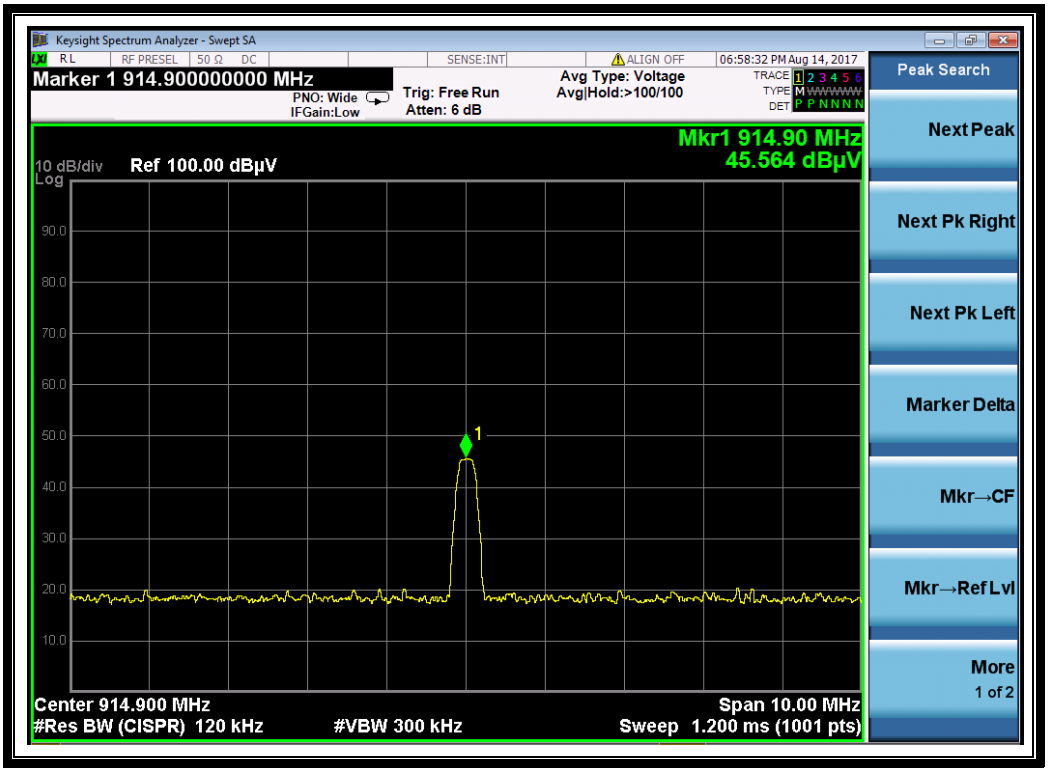
Test Plots:



(Plot 1 PK @ Channel 0: 902.3MHz)



(Plot 2 PK@ Channel 32: 908.7MHz)

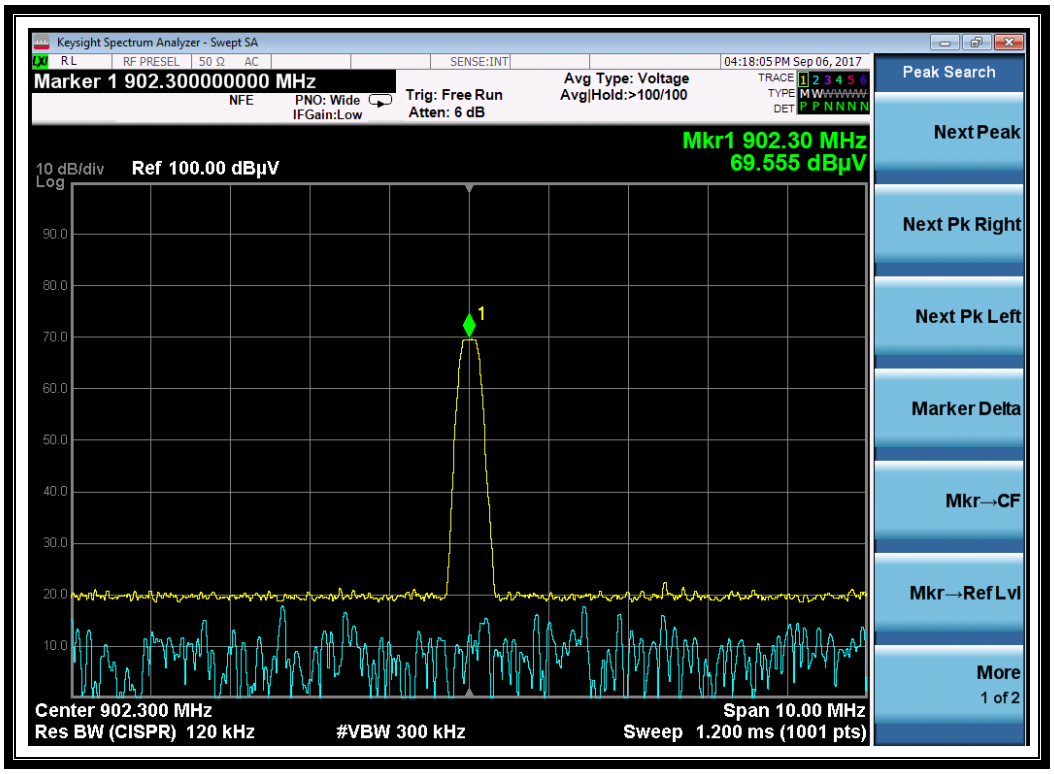


(Plot 3PK@ Channel 63: 914.9MHz)

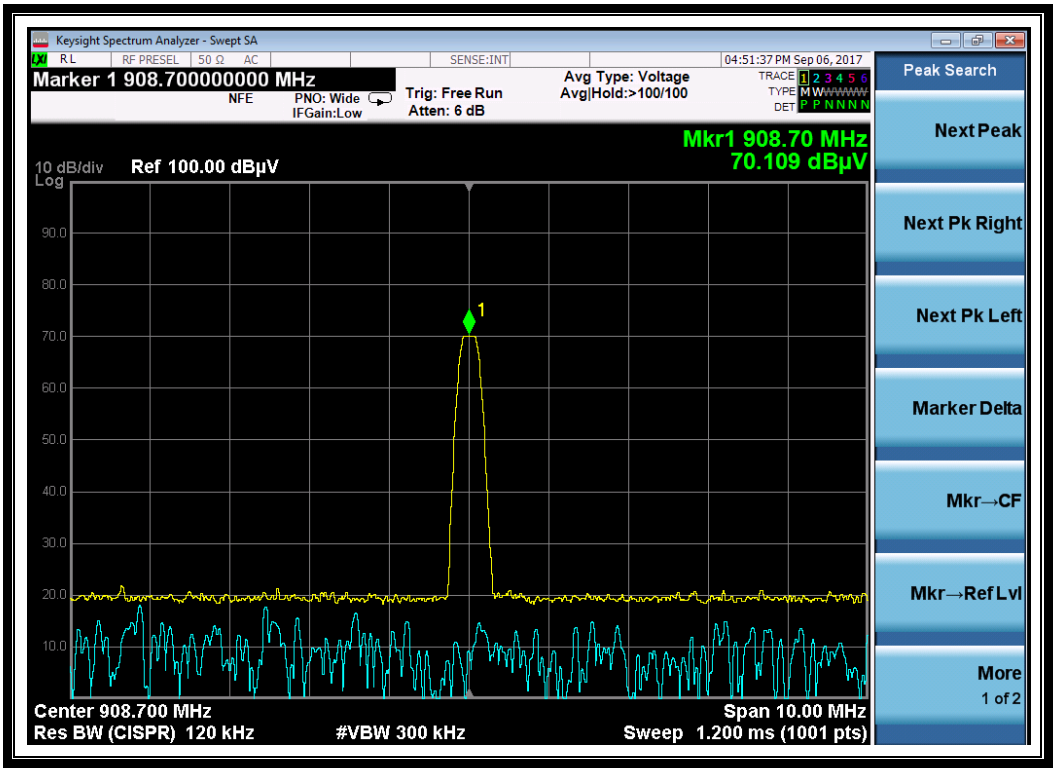
Result for Antenna 2:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
		PK/ AV						
0	902.3	PK	69.555	1.0	22.3	92.855	113.98	Pass
32	908.7	PK	70.109	1.0	22.3	93.409	113.98	Pass
63	914.9	PK	69.514	1.0	22.3	92.814	113.98	Pass

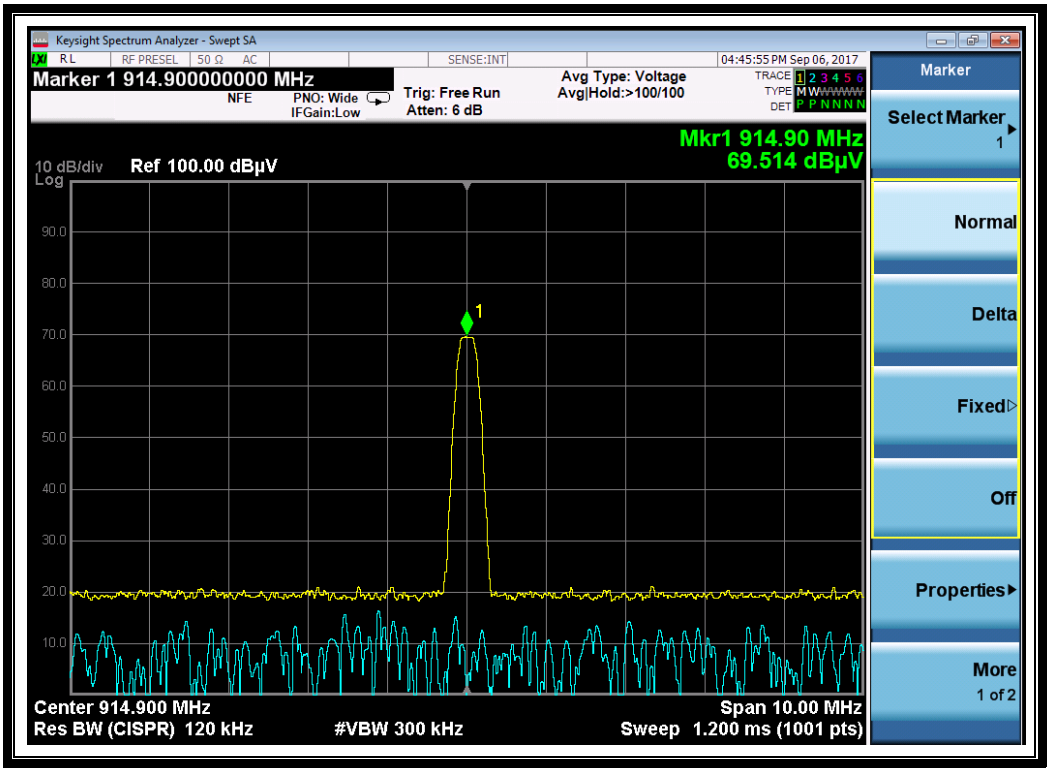
Test Plots:



(Plot 4 PK @ Channel 0: 902.3MHz)



(Plot 5 PK@ Channel 32: 908.7MHz)



(Plot 6 PK@ Channel 63: 914.9MHz)

2.5 Radiated Emission and field strength of harmonics

2.5.1 Requirement

According to section 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to section 15.249(d), Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Field Strength Limitation at 3m Measurement Dist	
			(uV/m)	(dBuV/m)
0.009 - 0.490	2400/F(kHz)	300	10000* 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 - 1.705	24000/F(kHz)	30	100* 2400/F(KHz)	20log 2400/F(KHz) + 40
1.705 - 30.0	30	30	100*30	20log 30 + 40
30 - 88	100	3	100	20log 100
88 - 216	150	3	150	20log 150
216 - 960	200	3	200	20log 200
Above 960	500	3	500	20log 500

According to section 15.249(e), for frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Note:

1) The tighter limit shall apply at the boundary between two frequency range.

2) Limitation expressed in dBuV/m is calculated by 20log Emission Level(uV/m).

3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using theformula of Ld1 = Ld2 * $(d2/d1)^2$.

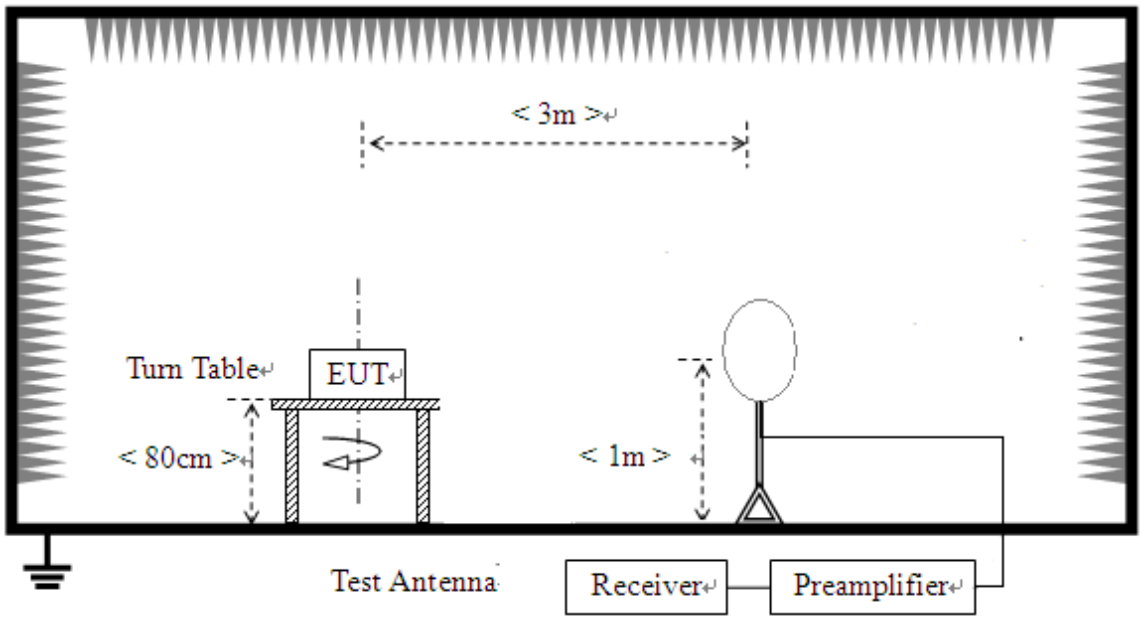
Example: F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as

Ld1 = L1 = 30uV/m * $(10)^2$ = 100 * 30uV/m

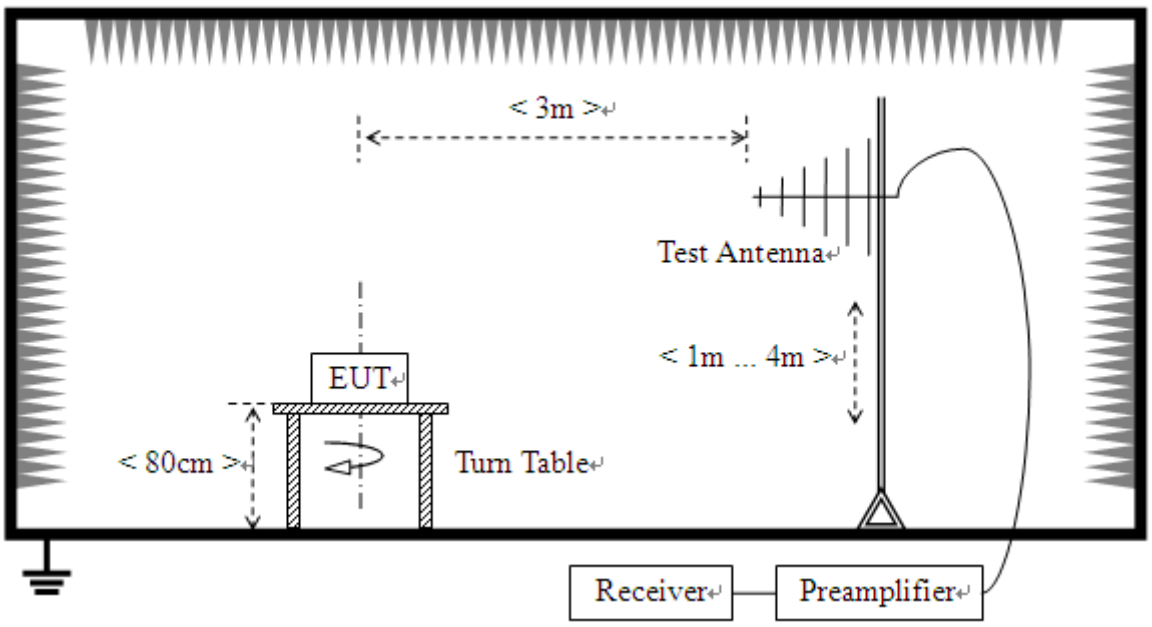
2.4.2 Test Description

A. Test Setup:

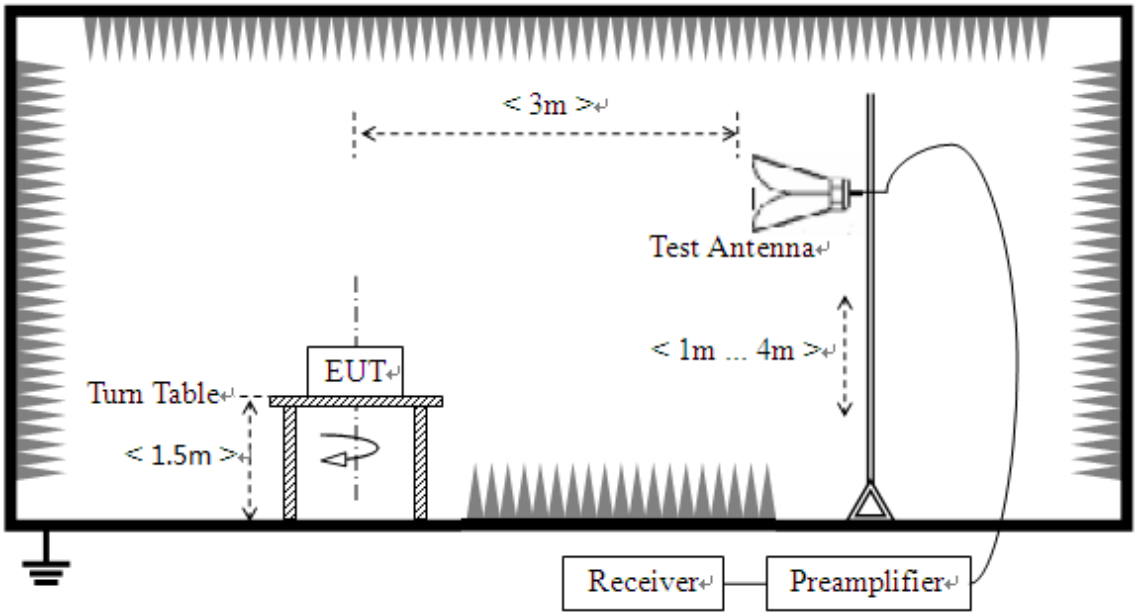
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10:2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant

emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Please reference ANNEX A(1.5).

2.4.3 Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

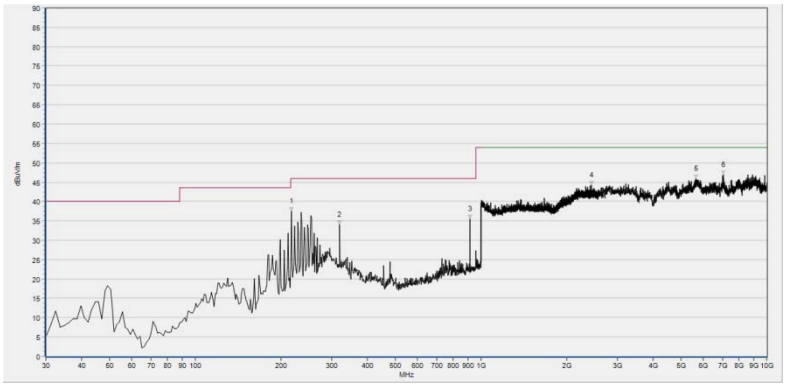
During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

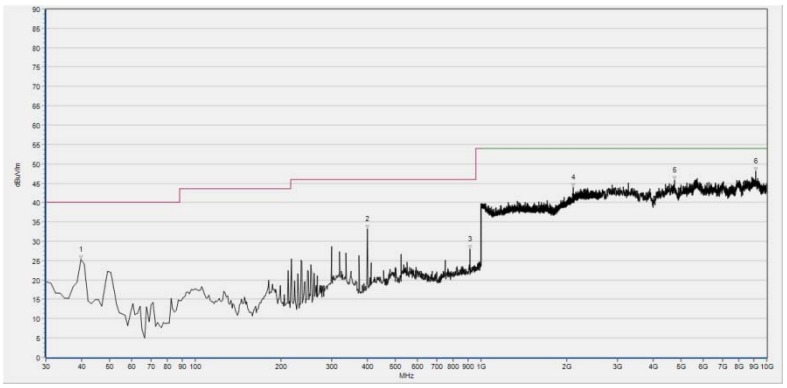
Result for Antenna 1

Plot for lowest Channel = 902.3



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
216.959	37.55	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
320.150	33.99	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
915.019	35.59	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2435.454	44.29	N/A	N/A	74.0	N/A	54.0	Horizontal	N/A
5651.027	45.86	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
7060.447	46.84	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

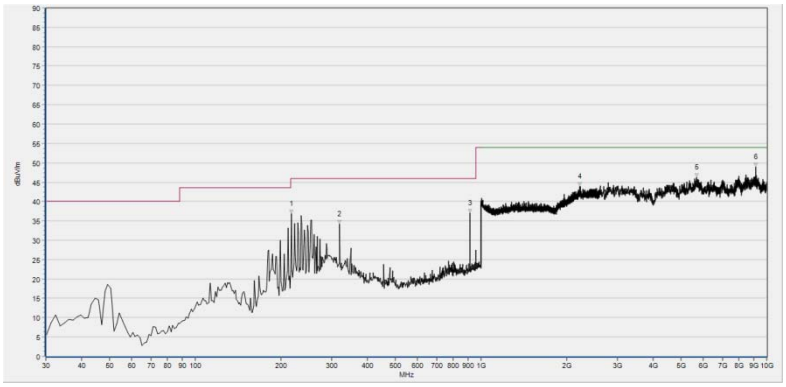
(Antenna Horizontal, 30MHz to 10GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.712	25.34	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
400.275	33.16	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
915.019	28.02	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
2098.679	43.85	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4758.938	45.67	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
9150.136	48.17	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

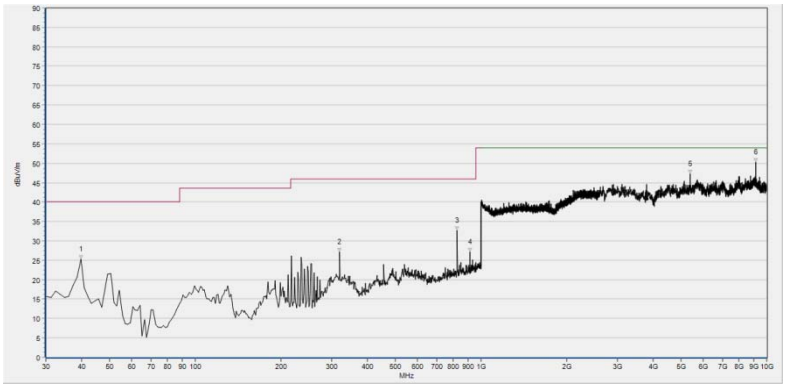
(Antenna Vertical, 30MHz to 10GHz)

Plot for middle Channel = 908.7



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
216.959	36.87	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
320.150	34.19	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
915.019	36.98	N/A	N/A	N/A	46.00	N/A	Horizontal	N/A
2216.487	43.88	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5671.395	46.24	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
9150.136	48.88	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

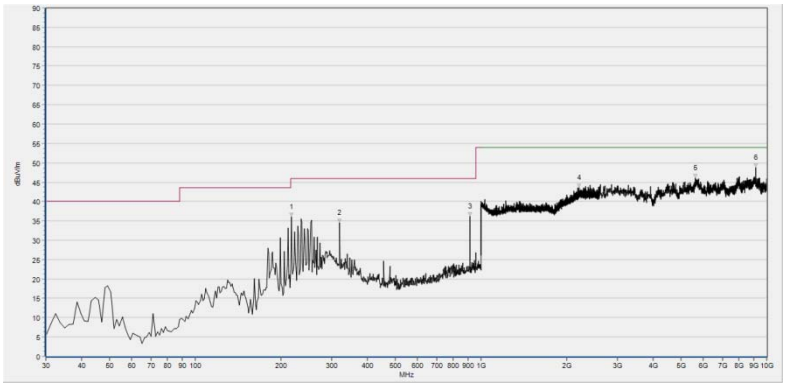
(Antenna Horizontal, 30MHz to 10GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.712	25.38	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
320.150	27.08	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
825.181	32.76	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
915.019	27.07	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
5398.472	47.25	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
9150.136	50.31	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

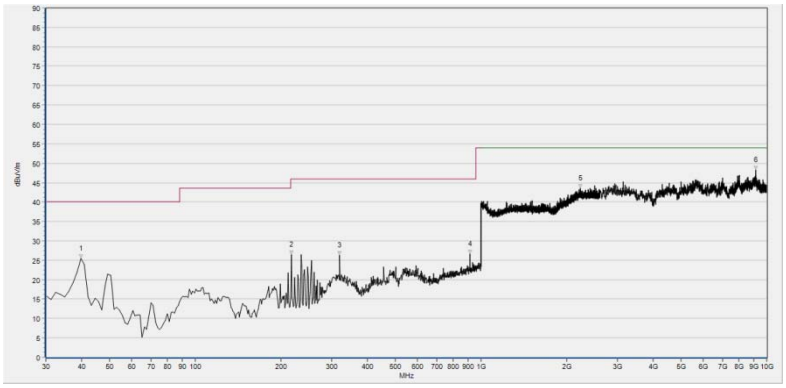
(Antenna Vertical, 30MHz to 10GHz)

Plot for highest Channel = 914.9



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
216.959	36.03	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
320.150	34.58	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
915.019	36.23	N/A	N/A	N/A	46.00	N/A	Horizontal	N/A
2208.163	43.56	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5626.587	46.03	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
9150.136	48.83	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 10GHz)

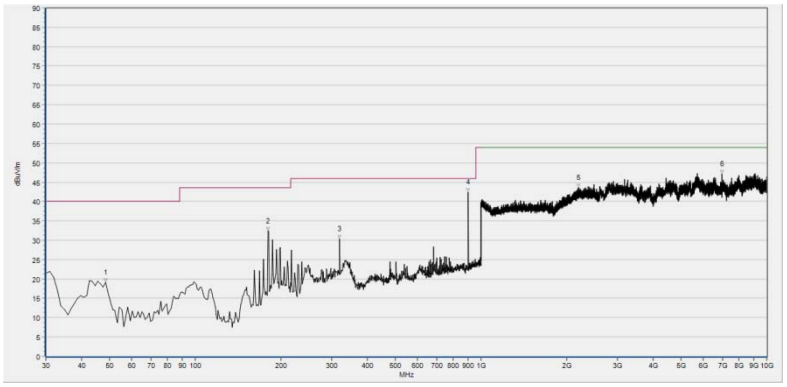


Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.712	25.55	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
216.959	26.44	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
320.150	26.32	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
915.019	26.61	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2223.529	43.56	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
9150.136	48.21	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 10GHz)

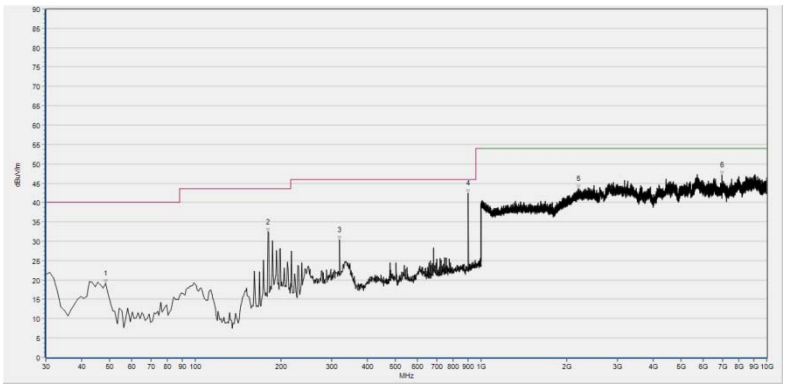
Result for Antenna 2

Plot for lowest Channel = 902.3



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
48.430	19.05	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
179.380	32.28	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.030	30.41	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
902.030	42.45	N/A	N/A	N/A	46.00	N/A	Horizontal	N/A
2193.067	43.58	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
6968.960	47.17	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

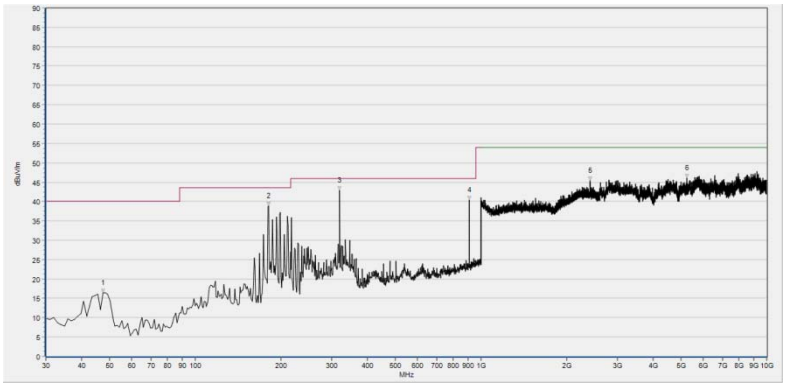
(Antenna Horizontal, 30MHz to 10GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
48.430	19.05	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.380	32.28	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.030	30.41	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
902.030	42.45	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
2193.067	43.58	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
6968.960	47.17	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

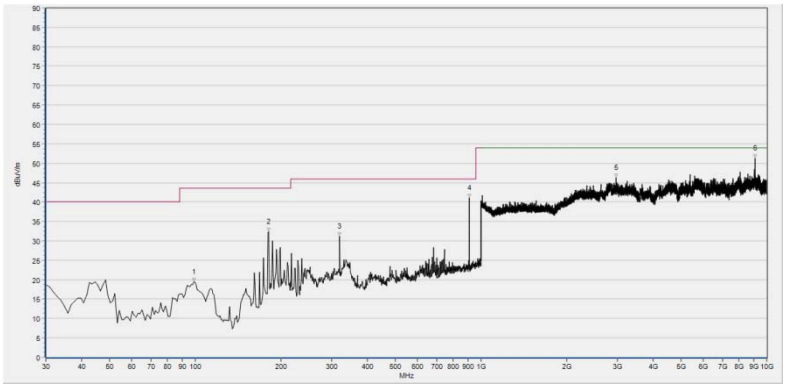
(Antenna Vertical, 30MHz to 10GHz)

Plot for middle Channel = 908.7



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
47.460	16.45	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
180.350	38.96	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.030	42.93	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
908.820	40.41	N/A	N/A	N/A	46.00	N/A	Horizontal	N/A
2412.267	45.35	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5258.080	46.02	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

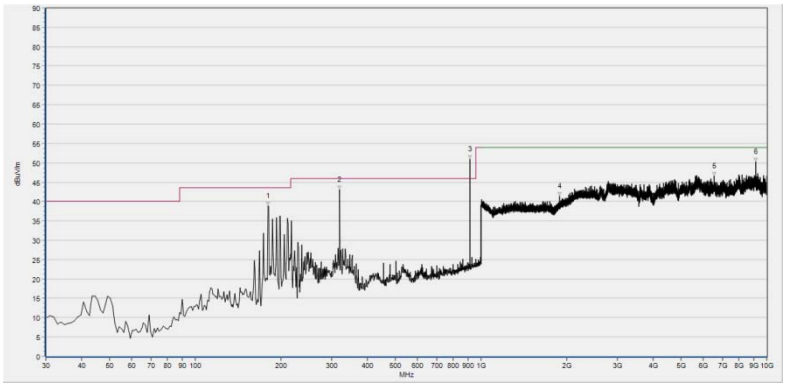
(Antenna Horizontal, 30MHz to 10GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
98.870	19.40	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
180.350	32.34	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.030	31.19	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
908.820	41.04	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
2970.000	46.24	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
9086.840	51.22	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

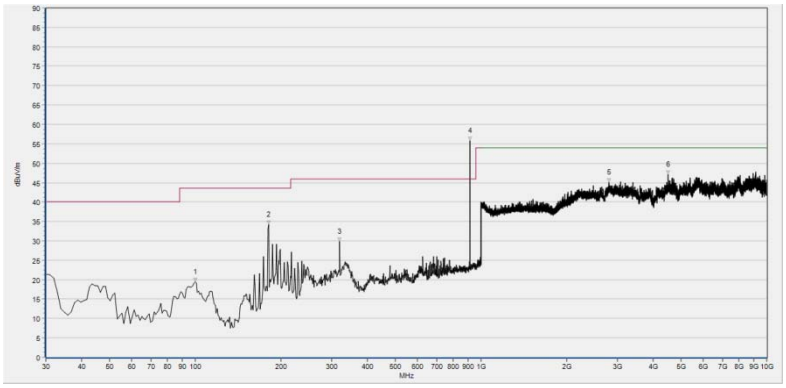
(Antenna Vertical, 30MHz to 10GHz)

Plot for highest Channel = 914.9



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
179.380	38.85	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.030	43.05	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
914.640	50.96	N/A	N/A	N/A	46.00	N/A	Horizontal	N/A
1879.467	41.34	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
6544.200	46.57	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
9149.000	50.22	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 10GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
99.840	19.41	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
180.350	34.14	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.030	29.89	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
914.640	55.83	N/A	N/A	N/A	46.00	N/A	Vertical	N/A
2799.800	45.14	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4515.120	47.03	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 10GHz)

ANNEX A GENERAL INFORMATION

1.1 Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

1.2 Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192.

1.4 Maximum measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Bandwidth	±5%
Radiated Emission	±2.95dB
Conducted Emission	±2.44dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

1.5 Test Equipments Utilized

1.4.1 Conducted Test Equipments

Conducted Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Spectrum Analyzer	MY45101810	E4407B	Agilent	2017.05.24	2018.05.23
2	Power Splitter	NW521	1506A	Weinschel	2017.05.24	2018.05.23
3	Attenuator 1	(N/A.)	10dB	Resnet	2017.05.24	2018.05.23
4	Attenuator 2	(N/A.)	3dB	Resnet	2017.05.24	2018.05.23
5	EXA Signal Analzyer	MY53470836	N9010A	Agilent	2016.12.07	2017.12.06
6	RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
7	Coaxial cable	CB02	RF02	Morlab	N/A	N/A
8	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.4.2 Conducted Emission Test Equipments

Conducted Emission Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Receiver	US44210471	E7405A	Agilent	2017.05.24	2018.05.23
2	LISN	812744	NSLK 8127	Schwarzbeck	2017.05.24	2018.05.23
3	Service Supplier	100448	CMU200	R&S	2017.05.24	2018.05.23
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2017.05.24	2018.05.23
5	Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

1.4.3 Auxiliary Test Equipment

Auxiliary Test Equipment						
No.	**Equipment Name**	**Model No.**	**Brand Name**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Computer	T430i	Think Pad	Lenovo	N/A	N/A

1.4.4 Radiated Test Equipments

Radiated Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal.Due Date**
1	System Simulator	GB45360846	8960-E5515C	Agilent	2017.05.17	2018.05.16
2	Receiver	MY54130016	N9038A	Agilent	2017.05.17	2018.05.16
3	Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2016.12.09	2017.12.08
4	Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2017.03.30	2018.03.29
5	Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2017.03.30	2018.03.29
6	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2017.03.30	2018.03.29
7	Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
8	Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
9	Coaxial cable(N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
10	1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
11	18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16

1.4.5 Climate Chamber

Climate Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Climate Chamber	2004012	HL4003T	Yinhe	2017.01.11	2018.01.10

1.4.6 Vibration Table

Vibration Table						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Vibration Table	N/A	ACT2000-S015L	CMI-COM	2017.01.11	2018.01.10

1.4.7 Anechoic Chamber

Anechoic Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Anechoic Chamber	N/A	9m*6m*6m	Changning	2017.01.11	2018.01.10

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