MEASUREMENT REPORT

FCC PART 15.255 & RSS 210

FCC ID:	2AYEX-SK202A
IC:	26812-SK202A
Applicant:	Shenzhen EPS Technology Co., Ltd.

Application Type:	Certification
Product:	Contactless Ethernet module
Model No:	SK202A
FCC Classification:	Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.255)
ISED Rule(s):	RSS-210: Issue 10, RSS-Gen Issue 5
Test Procedure(s):	ANSI C63.10:2013
Test Date:	December 14 ~ 23, 2020

Reviewed By: Oscar Shi

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10:2013. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2012RSU016-U1	Rev. 01	Initial Report	01-16-2021	Valid

CONTENTS

1. GENERAL INFORMATION

1.1. Applicant

Shenzhen EPS Technology Co., Ltd.

9F, Tower 1, Shenyejinyuan Building, Qingshuihe 1st Road, Qingshuihe Street, Luohu District, Shenzhen

1.2. Manufacturer

Shenzhen EPS Technology Co., Ltd.

9F, Tower 1, Shenyejinyuan Building, Qingshuihe 1st Road, Qingshuihe Street, Luohu District, Shenzhen

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**	
	Laboratory Location (Suzhou – Wuzhong)	
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China	
	Laboratory Location (Suzhou – SIP)	
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China	
	Laboratory Accreditations	
	A2LA: 3628.01	CNAS: L10551
	FCC: CN1166	ISED: CN0001
	VCCI: R-20025, G-20034, C-20020, T-20020	
☐	**Test Site – MRT Shenzhen Laboratory**	
	Laboratory Location (Shenzhen)	
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China	
	Laboratory Accreditations	
	A2LA: 3628.02	CNAS: L10551
	FCC: CN1284	ISED: CN0105
☐	**Test Site – MRT Taiwan Laboratory**	
	Laboratory Location (Taiwan)	
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)	
	Laboratory Accreditations	
	TAF: L3261-190725	
	FCC: 291082, TW3261	ISED: TW3261

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	Contactless Ethernet module
Model No.:	SK202A
Frequency:	60GHz
Power:	DC 4.4~16V or USB
Antenna Type:	Horn Antenna
Type of Modulation：	OOK
Antenna Gain:	9dBi

Note: Above information is declared by manufacturer.

2.2. Test Mode

Test Mode	Mode 1: Transmit at 60GHz, the Data rate is 1.25Gbps and the encoding is 8B10B.

2.3. Test Environment Condition

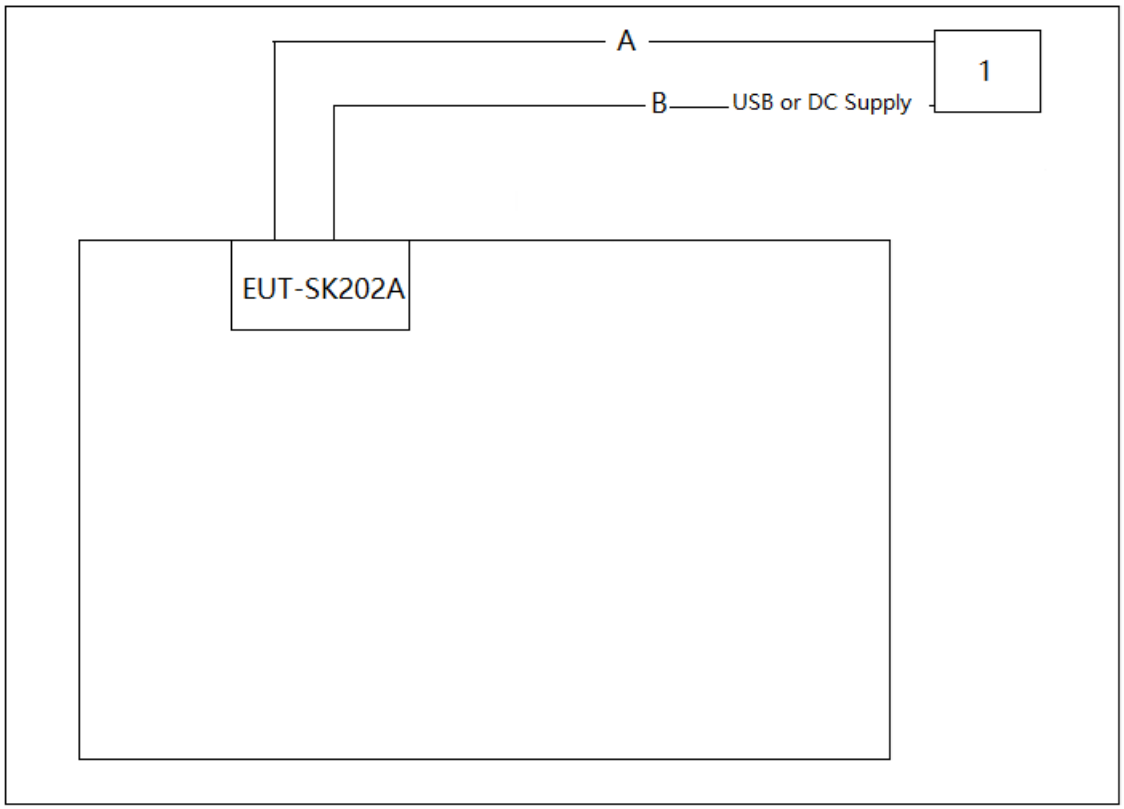
Ambient Temperature	15°C ~ 35°C
Relative Humidity	20%RH ~ 75%RH

2.4. Description of Test Software

The test utility software used during testing was “iperf3.exe”

2.5. Description of Test Configuration

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram


Cable Type		Cable Description
A	LAN Cable	Non-Shielded, ＞10m
B	USB Cable	Non-Shielded, ＞10m

2.6. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	E431	N/A	Non-Shielded, 1.8m

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

- The antenna of this device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Spectral Power Density / RF Output Power / Occupied Channel Bandwidth / Unwanted Emissions (SIP-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/09/03
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2021/12/17
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2021/12/17
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2021/12/17
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/15
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/13
Micro-Wave Antenna	MI-WWAVE	261U-25	MRTSUE06273	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261E-25	MRTSUE06276	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261F-25	MRTSUE06275	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261G	MRTSUE06274	N/A	N/A
Standard Gain Horn Antenna	A-INFOMW	LB-10-25-A	MRTSUE06410	N/A	N/A
Standard Gain Horn Antenna	A-INFOMW	LB-15-25-A	MRTSUE06409	N/A	N/A
Waveguide Harmonic Mixer	Keysight	M1970V	MRTSUE06271	N/A	N/A
Waveguide Harmonic Mixer	Keysight	M1970W	MRTSUE06272	N/A	N/A
RF Signal Generator	Keysight	E8257D	MRTSUE06453	1 Year	2021/07/02
SA Extension Module	Keysight	N9029AV06	MRTSUE06368	N/A	N/A
SA Extension Module	Keysight	N9029AV05	MRTSUE06367	N/A	N/A
SA Extension Module	Keysight	N9029AV03	MRTSUE06366	N/A	N/A
Millimeter wave signal source frequency expander	Keysight	E8257DV15	MRTSUE06456	N/A	N/A
RF Detector	SAGE	STD-15SF-NI	MRTSUE06466	N/A	N/A
Oscilloscope	Agilent	DSO-X 6002A	MRTSUE06107	1 year	2021/04/14
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2021/12/24

Conducted Emission (SIP-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06621	1 year	2021/12/03

Software	Version	Function
v3	V8.3.5	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44 dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04 dB 300MHz~1GHz: 4.95 dB 1GHz~40GHz: 6.40 dB Vertical: 30MHz~300MHz: 5.24 dB 300MHz~1GHz: 6.03 dB 1GHz~40GHz: 6.40 dB

6. TEST RESULT

6.1. Summary

FCC Part Section(s)	ISED Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.255 e (1)	RSS-210 J.4 (c)	6dB Occupied Bandwidth	N/A	Radiated	Pass	Section 6.2
N/A	RSS GEN 6.7	99% Occupied Bandwidth	N/A		Pass	Section 6.3
15.255(c)(1)(i)	RSS-210 J.2.2(b)	EIRP Power	Average Power < 40dBm Peak Power < 43dBm		Pass	Section 6.4
15.255(e)	RSS-210 J.4(a)	Conducted Output Power	< 500mW		Pass	Section 6.5
15.255(d)	RSS-210 J.3	Transmitter Spurious Emissions	Refer to Section 6.6		Pass	Section 6.6
15.255(f)	RSS-210 J.6	Frequency stability	Within the frequency band 57-71GHz		Pass	Section 6.7
15.255(h)	RSS-210 J.7	Group Installation	Refer to Section 6.8	N/A	Pass	Section 6.8
15.207	RSS-GEN 8.8	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.9

Note: The radiation measurements are performed in X, Y axis positioning. Only the worst-case data is shown in the report.

6.2. 6dB Occupied Bandwidth

6.2.1. Test Limit

N/A

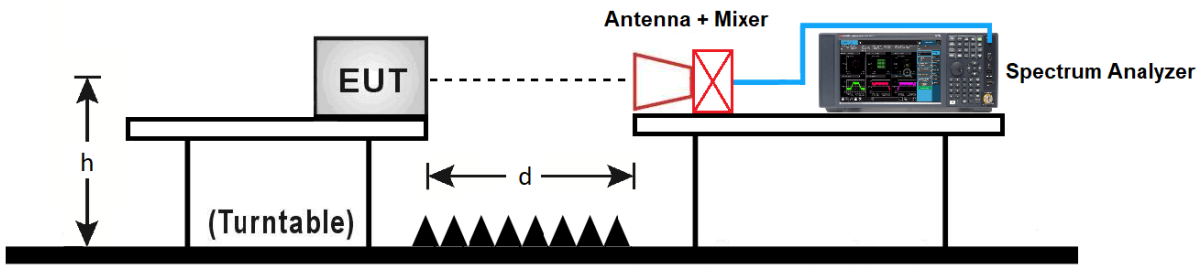
6.2.2. Test Procedure used

ANSI C63.10-2013 Section 9.3

6.2.3. Test Setting

1. Span = approximately two times to three times the EBW, centered on the carrier frequency
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector function = Peak
5. Sweep time = auto
6. Trace mode = max hold.
7. The EUT shall be transmitting at its maximum data rate. Allow the trace to stabilize.
8. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure the specified dB down one side of the emission.
9. Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker- delta frequency reading at this point is the specified emission bandwidth.

6.2.4. Test Setup

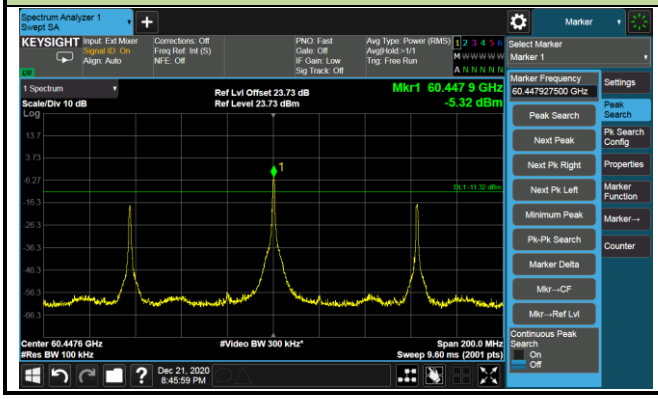


d = Substitution Distance; h = EUT Height

6.2.5. Test Result

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/21

Frequency (GHz)	6dB Bandwidth (MHz)
60.45	0.92

6dB Bandwidth
 

6.3. 99% Bandwidth Measurement

6.3.1. Test Limit

N/A

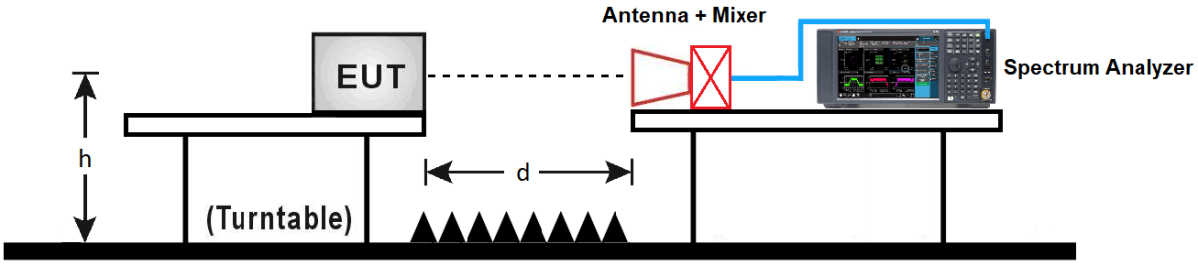
6.3.2. Test Procedure used

ANSI C63.10-2013 Section 6.9.3

6.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. Span = 1.5 times to 5.0 times the OBW.
3. RBW = 1 % to 5 % of the OBW. (RBW ≈1% of the EBW (if possible - if the EBW is greater than 100 times the largest available RBW, then use that setting)).
4. VBW ≥ 3×RBW.
5. Detector = Peak.
6. Trace mode = max hold.
7. Use the 99 % power bandwidth function of the instrument.

6.3.4. Test Setup



d = Substitution Distance; h = EUT Height

6.3.5. Test Result

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/23

Frequency (GHz)	99% Bandwidth (MHz)
60.45	4768.6

99% Bandwidth	
	

6.4. EIRP Power

6.4.1.Test Limit

Within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropic radiated power (EIRP): the average power of any emission shall not exceed 40dBm and the peak power of any emission shall not exceed 43dBm.

6.4.2.Test Procedure used

ANSI C63.10-2013 Section 9.11

Note: Far-field boundary calculation as below.

According to ANSI C63.10-2013, Clause 9, for mm-wave measurements, L >> λ and a more suitable formula for the far-field boundary distance: $R_{(Far\ Field)} = 2L^2/\lambda$

- L is the largest antenna dimension of the transmit antenna in m
- λ is the wavelength in m

Far-field boundary calculation			
Frequency (GHz)	λ (m)	L (m)	$R_{(Far\ Field)}$ (m)
60.45	0.0050	0.01	0.04

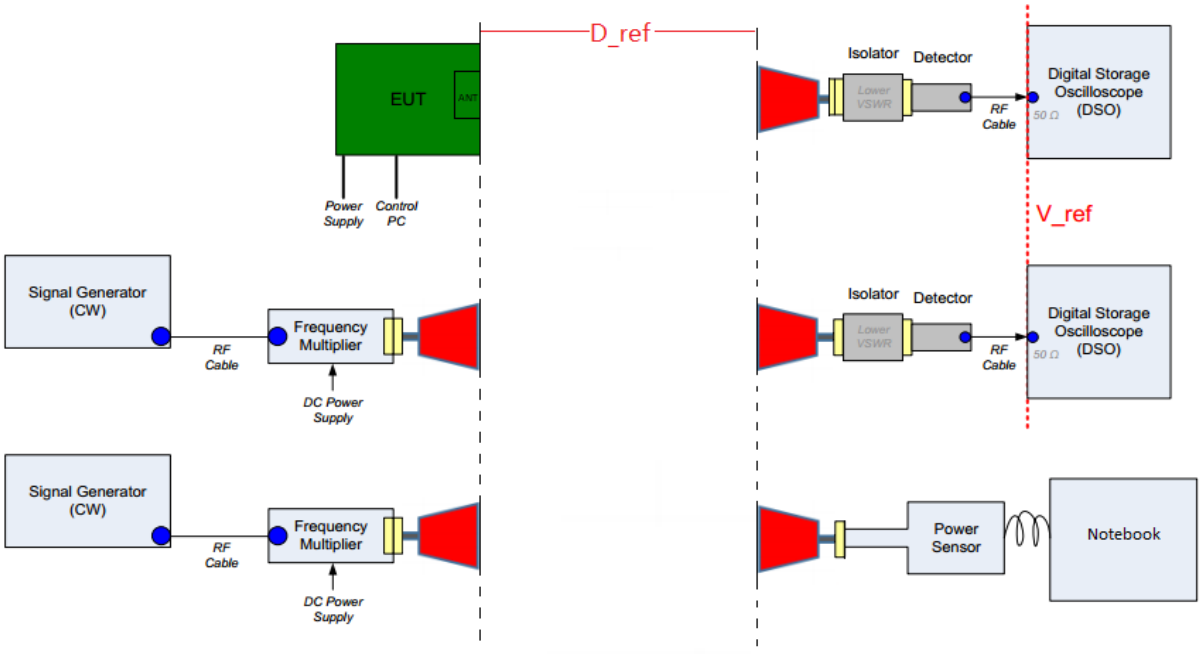
The measurement was performed at a minimum distance of 0.10m > $R_{(Far\ Field)}$

6.4.3.Test Setting

1. Connect the test antenna for the fundamental frequency band to the mm-wave RF detector. Place the test horn in the main beam of the EUT at 0.3m. Connect the video output of the detector to the 50Ω input of a DSO. Set the sampling rate of the DSO to at least twice the cutoff frequency of any LPF used or to at least twice the signal bandwidth without an LPF. Adjust the memory depth, the triggering, and the sweep speed to obtain a display that is representative of the signal considering the type of modulation.
2. Record the average and peak voltages from the DSO.
3. Replace the EUT with mm-wave source to the RF input port of the instrumentation system. The mm-wave source shall be unmodulated.
4. Adjust the frequency of the mm-wave source to the center of the frequency range occupied by the transmitter. Adjust the amplitude of the mm-wave source such that the DSO indicates a voltage equal to the peak voltage recorded in step 2.
5. Without changing any settings, replace the DSO with the mm-wave power meter. Measure and note the power.

6. Repeat step 4 and step 5 for the average voltage recorded in step 2.

6.4.4.Test Setup



6.4.5.Test Results

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/18

Frequency (GHz)	D (m)	Measured Voltage (mV)	P_R (dBm)	G_R (dBi)	EIRP (W)	EIRP (dBm)	Limit (dBm)	Result
Peak EIRP								
60.45	0.10	-52.31	-17.47	24.34	0.0042	6.23	43	Pass
Average EIRP								
60.45	0.10	-82.63	-21.60	24.34	0.0016	2.04	40	Pass

Note:

The measured power level (P_R) is converted to EIRP using Friis equation:

$$EIRP\ (W) = P_T * G_T = (P_R / G_R) * (4 * Pi * D / \lambda)^2$$

- P_R is the equivalent power measured at the output of the test antenna, in W
- λ is the wavelength of the emission under investigation, in m
- G_R is the linear gain of the test antenna, $G_{R\ (Numeric)} = 10^{\wedge}\ (dBi / 10)$
- D is the measurement distance, in m

6.5. Conducted Output Power

6.5.1.Test Limit

The peak transmitter conducted output power shall not exceed 500mW.

Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500mW times their emission bandwidth divided by 100MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer.

6.5.2.Test Procedure used

ANSI C63.10-2013 Section 9.11

6.5.3.Test Procedure

For peak measurements, calculate the peak conducted output power from the peak EIRP using below equation:

$$P_{cond} = EIRP_{Linear} / G_{EUT}$$

Where

P_{cond} is the conducted output power, in W

$EIRP_{Linear}$ is the equivalent isotropically radiated power, in W

G_{EUT} is numeric gain of the EUT radiating element (antenna)

6.5.4.Test Setup

N/A

6.5.5.Test Result

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/18

Frequency (GHz)	Peak EIRP (dBm)	EUT Antenna Gain (dBi)	Output Power (dBm)	Output Power (mW)	Limit (mW)	Result
60.45	6.23	9.00	-2.77	0.53	4.6	Pass

Note: The 6dB Bandwidth is less than 100MHz, so the limit of the Output Power is 4.6mW (500mW/100*0.92).

6.6. Transmitter Spurious Emissions

6.6.1.Test Limit

Limits on spurious emissions:

1. Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.

2. Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90pW/cm^2 at a distance of 3 meters.

3. The levels of the spurious emissions shall not exceed the level of the fundamental emission.

FCC Part 15.209 Limit		
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100**	3
88 ~ 216	150**	3
216 ~ 960	200**	3
Above 960	500	3
Note 1: The lower limit shall apply at the transition frequency. Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system. Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m).		

6.6.2.Test Procedure used

ANSI C63.10-2013 Section 9.12 and Section 9.13

6.6.3.Test Procedure

Measurement of harmonic and spurious emissions above 40 GHz

1. Connect the test antenna covering the appropriate frequency range to a spectrum analyzer via an external mixer.
2. Set spectrum analyzer RBW = 1MHz, VBW = 3MHz, average detector.
3. Maximize all observed emissions. Note the maximum power indicated on the spectrum analyzer. Adjust this reading, if necessary, by the conversion loss of the external mixer used at the frequency under investigation and the external mixer IF cable loss.
4. Calculate the maximum field strength of the emission at the measurement distance
5. Calculate the power density at the distance specified by the limit from the field strength at the distance specified by the limit
6. Repeat the preceding sequence for every emission observed in the frequency band under investigation.

Measurement of harmonic and spurious emissions below 40 GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

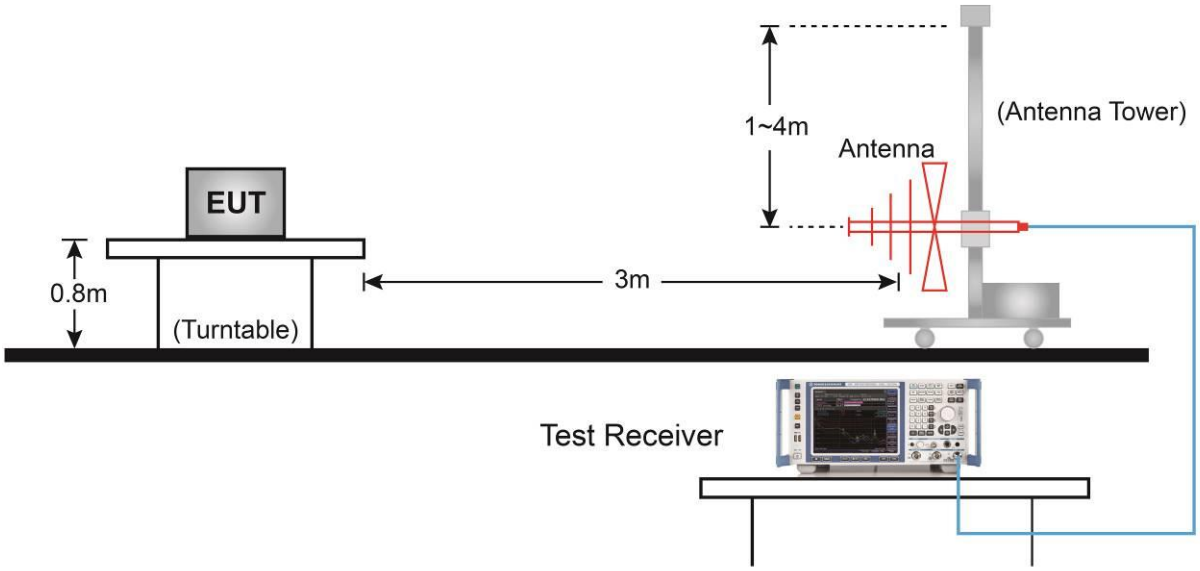
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

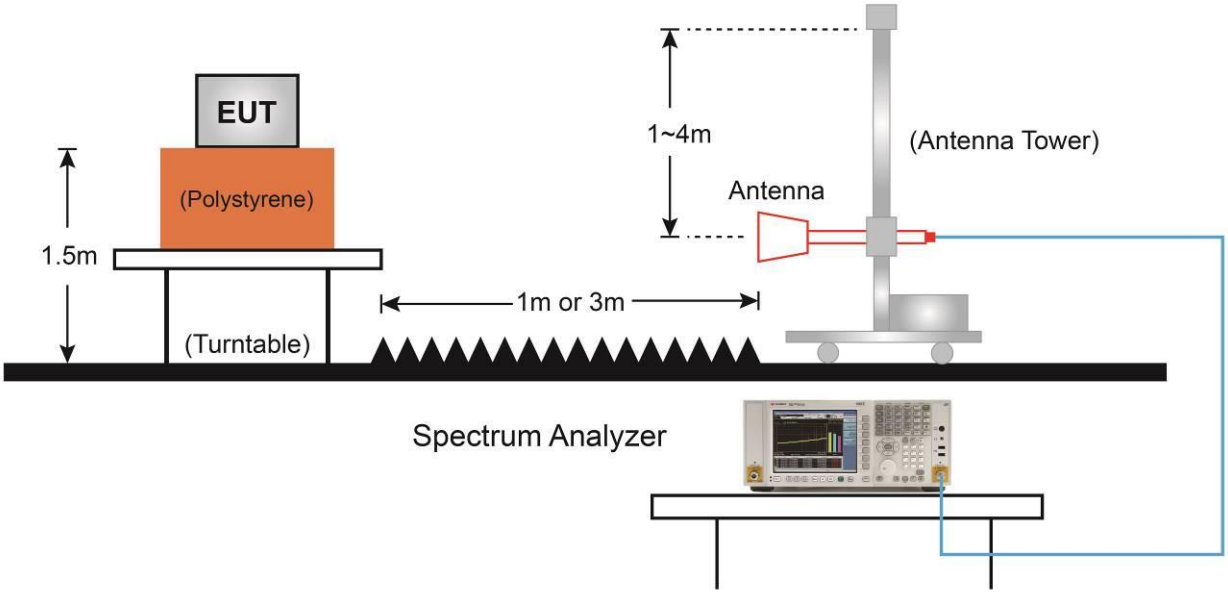
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.6.4.Test Setup

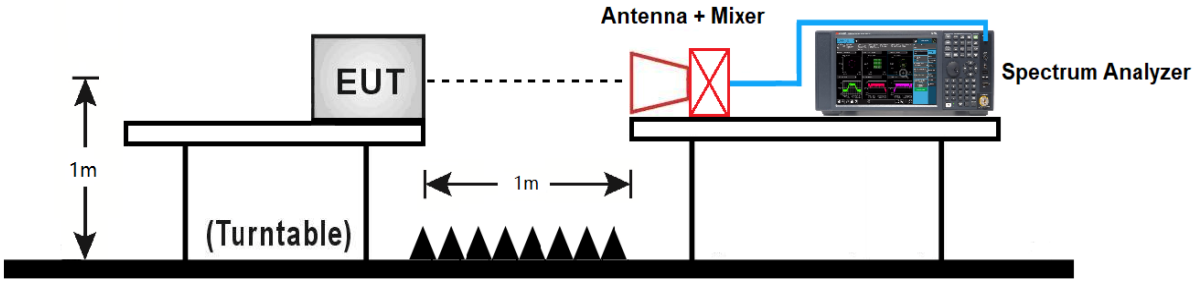
Below 1GHz Test Setup:



1GHz ~ 40GHz Test Setup:



Above 40GHz Test Setup:



6.6.5.Test Result

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/14 ~ 2020/12/18
Test Range	Below 40GHz		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
10307.5	48.4	-1.1	47.3	74.0	-26.7	Peak	Horizontal
17881.0	44.7	12.3	57.0	74.0	-17.0	Peak	Horizontal
17881.0	30.3	12.3	42.6	54.0	-11.4	Average	Horizontal
20145.0	56.5	-11.2	45.3	74.0	-28.7	Peak	Horizontal
39681.0	45.5	1.0	46.5	74.0	-27.5	Peak	Horizontal
11310.5	47.9	0.4	48.3	74.0	-25.7	Peak	Vertical
17838.5	45.3	11.8	57.1	74.0	-16.9	Peak	Vertical
17838.5	31.5	11.8	43.3	54.0	-10.7	Average	Vertical
20145.0	63.1	-11.2	51.9	74.0	-22.1	Peak	Vertical
20145.0	62.4	-11.2	51.2	54.0	-2.8	Average	Vertical
39659.0	45.5	1.2	46.7	74.0	-27.3	Peak	Vertical

Note:

1. Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
   Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)
2. Average measurement was not performed when the peak level lower than average limit.

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Site	SIP-AC2	Test Date	2020/12/14 ~ 2020/12/18
Test Range	40GHz ~ 200GHz		

Frequency (GHz)	Reading Level @ 1.0m (dBμV)	Factor (dB)	Measure Level @1.0m (dBμV/m)	Measure Level @3m (dBμV/m)	Power Density (pW/cm^2)	Limit (pW/cm^2)	Result
49.2	24.9	45.7	70.6	61.1	0.3	90.0	Pass
69.1	22.1	42.0	64.1	54.6	0.1	90.0	Pass
82.6	39.2	44.3	83.5	74.0	6.6	90.0	Pass
119.0	20.2	57.8	78.0	68.5	1.9	90.0	Pass
161.0	21.8	59.7	81.5	72.0	4.2	90.0	Pass

Note:

1. Measure Level @ 1.0m = Reading Level @1.0m + Factor

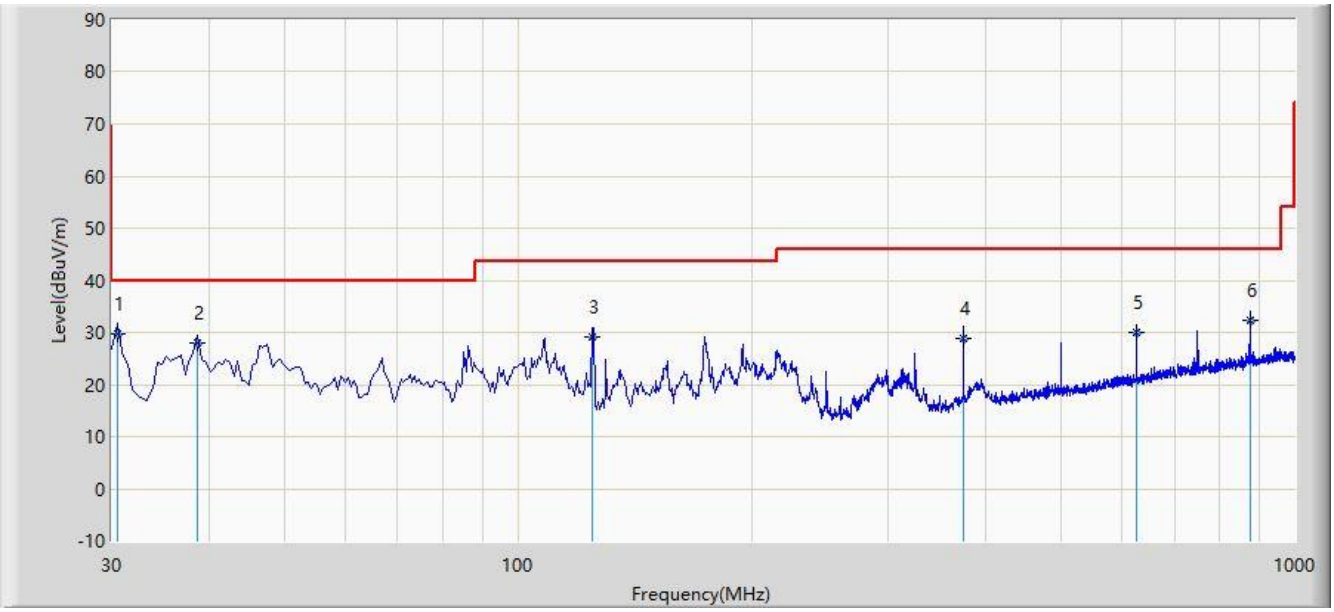
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) + Mixer Conversion Loss (dB)

2. Measure Level @ 3m = Measure Level @ 1.0m + 20 * log (1m / 3m)

3. Power Density = $(10^8 / 377) * \{10^{[(\text{Measure Level @3m } -120) / 20]}\}^2$

The Radiated Emission below 1GHz:

Site: SIP-AC2	Test Date: 2020/12/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Allen Zou
Probe: AC2_VULB 9168 _20-2000MHz-yuanqu	Polarity: Horizontal
EUT: Contactless Ethernet module	Power: By USB
Test Mode: Transmit at 60.45GHz	



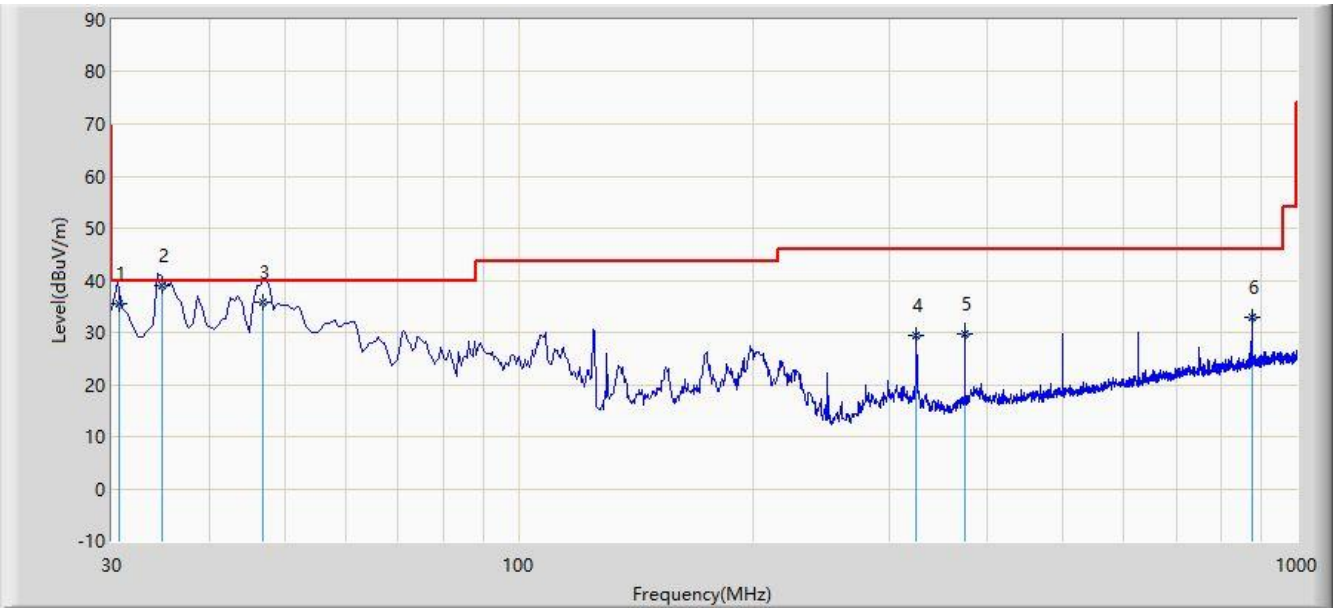
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			30.485	29.854	16.300	-10.146	40.000	13.553	QP
2			38.730	27.867	13.600	-12.133	40.000	14.268	QP
3			124.575	29.054	15.900	-14.446	43.500	13.154	QP
4			374.835	28.966	13.500	-17.034	46.000	15.466	QP
5			625.095	29.888	9.600	-16.112	46.000	20.288	QP
6		*	875.355	32.300	9.200	-13.700	46.000	23.100	QP

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: SIP-AC2	Test Date: 2020/12/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Allen Zou
Probe: AC2_VULB 9168 _20-2000MHz-yuanqu	Polarity: Vertical
EUT: Contactless Ethernet module	Power: By USB
Test Mode: Transmit at 60.45GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			30.729	35.363	21.800	-4.637	40.000	13.563	QP
2		*	34.819	38.976	25.200	-1.024	40.000	13.776	QP
3			46.975	35.812	21.800	-4.188	40.000	14.012	QP
4			324.880	29.295	14.800	-16.705	46.000	14.495	QP
5			374.835	29.766	14.300	-16.234	46.000	15.466	QP
6			875.369	32.900	9.800	-13.100	46.000	23.100	QP

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

6.7. Frequency Stability

6.7.1.Test Limit

Fundamental emissions must be contained within the frequency bands 57 - 71GHz during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

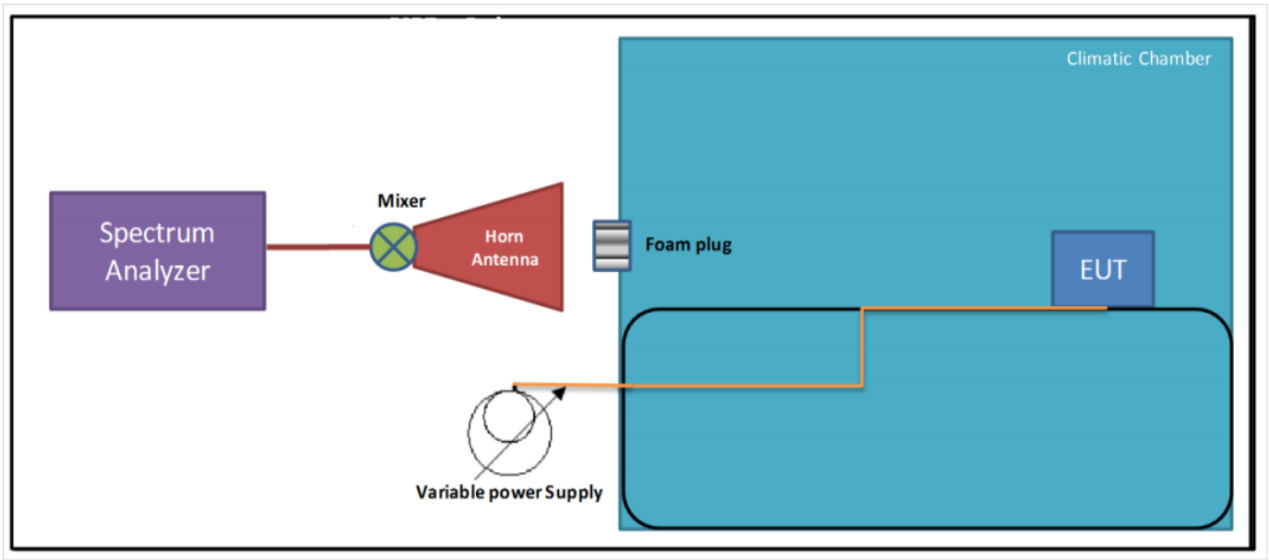
6.7.2.Test Procedure used

ANSI C63.10-2013 Section 9.14

6.7.3.Test Procedure

1. Arrange EUT and test equipment according Section 6.6.4.
2. With the EUT at ambient temperature and voltage source set to the EUT nominal operating voltage (100%), record the spectrum mask of the EUT emission on the spectrum analyzer.
3. Vary EUT power supply between 85% and 115% of nominal, and record the frequency excursion of the EUT emission mask.
4. Set the power supply to 100% nominal setting, and raise EUT operating temperature to 50 °C.
5. Record the frequency excursion of the EUT emission mask.
6. Repeat step 5 at each 10°C increment down to -20 °C.

6.7.4.Test Setup



6.7.5.Test Result

Product	Contactless Ethernet module	Test Engineer	Ternence Wang
Test Mode	Carrier Mode	Test Date	2020/12/18
Test Site	SIP-AC2		

Voltage (%)	Power (VDC)	Temp (℃)	Frequency (GHz)	Limit (GHz)	Result
115%	10.35	- 20	60.449913	57 ~ 71	Pass
		- 10	60.449924	57 ~ 71	Pass
		0	60.449902	57 ~ 71	Pass
		+ 10	60.449959	57 ~ 71	Pass
		+ 20	60.450034	57 ~ 71	Pass
		+ 30	60.450135	57 ~ 71	Pass
		+ 40	60.450197	57 ~ 71	Pass
		+ 50	60.450061	57 ~ 71	Pass
100%	9	+ 20(Ref)	60.450189	57 ~ 71	Pass
85%	7.65	+ 20	60.450207	57 ~ 71	Pass

6.8. Group Installation

6.8.1.Test Limit

Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

6.8.2.Test Procedure used

N/A

6.8.3.Test Procedure

N/A

6.8.4.Test Setup

N/A

6.8.5.Test Result

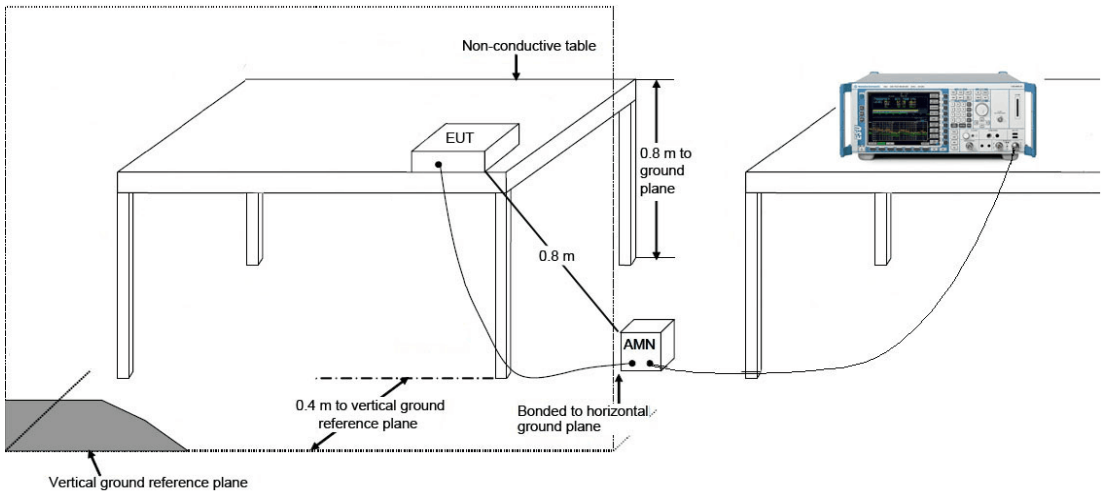
The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array.

6.9. AC Conducted Emissions Measurement

6.9.1.Test Limit

FCC 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 ~ 0.50	66 ~ 56	56 ~ 46
0.50 ~ 5.0	56	46
5.0 ~ 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.9.2.Test Setup



6.9.3.Test Result

The EUT is powered by USB, so this requirement does not apply.

7. CONCLUSION

The data collected relate only the item(s) tested and show that this device is in compliance with Part 15C of the FCC Rules and ISED Rules.

The End

Appendix A - Test Setup Photograph

Refer to “2012RSU016-UT” file.

Appendix B - EUT Photograph

Refer to “2012RSU016-UE” file.