FCC Radio Test Report

Equipment	: Smartphone
Brand Name	: Essential
Model No.	: A11
FCC ID	: 2ALBB-A11
Standard	: 47 CFR FCC Part 15.255
Applicant	: Essential Products Inc. 380 Portage Ave., Palo Alto, CA 94306, USA
Manufacturer	: FIH Mobile Limited No.4, Mingsheng St.,Tu-Cheng Dist., New Taipei City 23679, Taiwan

The product sample received on Jun. 08, 2017 and completely tested on Jun. 19, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013, 47 CFR FCC Part 15.255 and Millimeter Wave Test Procedures and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Cliff Chang
SPORTON INTERNATIONAL INC.

Testing Laboratory
1190

Table of Contents

Summary of Test Result

Standard Requirements and Conformance Test Specifications				
Report Clause	**Ref. Std. Clause**	**Description**	**Result**	**Remark**
3.1	FCC 15.207	AC Power Conducted Emissions	Complied	-
3.2	FCC 15.255(d)	Occupied Bandwidth	Complied	-
3.3	FCC 15.255(b)(1)	EIRP Power	Complied	-
3.4	FCC 15.255(d)	Peak Conducted Power	Complied	-
3.5	FCC 15.255(c)	Transmitter Spurious Emissions	Complied	-
0	FCC 15.255(e)	Frequency Stability	Complied	-
3.7	FCC 15.255(a),(g)	Operation Restriction and Group Installation	Complied	-

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR740822-02	Rev. 01	Initial issue of report	Aug. 07, 2017
FR740822-02	Rev. 02	1. Updating the AC Power Conducted Emission Test Data and Photo. 2. Adding the information of Test Result of EIRP Power. 3. Revising 1GHz plots in Transmitter Spurious Emissions. 4. Adding the information of Transmitter Spurious Emissions. 5. Revising the information of User Condition. 6. Revising the information of Equipment Use Condition.	Aug. 18, 2017
FR740822-02	Rev. 03	Revising Test Setup Diagram (AC Power Conducted Emissions)	Aug. 21, 2017
FR740822-02	Rev. 04	1. Revising the information of Transmit Operating Modes 2. Adding the low pass filter in the equipment list.(section 4: Test Equipment and Calibration Data)	Aug. 23, 2017

1 General Description

1.1 Information

1.1.1 The Channel Plan(s)

Frequency Range	60.48 GHz

1.1.2 Transmit Operating Modes

The Different Transmit Operating Modes
☐ Operating mode 1: Smart Antenna Systems - with beam forming
☐ Operating mode 2: Smart Antenna Systems - without beam forming
☒ Operating mode 3: Single Antenna Equipment

1.1.3 Antenna Information

Antenna Information	
☐ Equipment placed on the market without antennas	
☒ Integral antenna	
Integral antenna gain	0 dB
	☐ Temporary RF connector provided
	☒ No temporary RF connector provided
☐ External antenna (dedicated antennas)	
	☐ Single power level with corresponding antenna(s)
	☐ Multiple power settings and corresponding antenna(s)

1.1.4 Power Levels

Applicable power levels	☐ Conducted ☒ EIRP		
Antenna gain	0 dBi		
Frequency (GHz)	Highest setting (P_{high}): (dBm)		
	Modulation	AV Power	Peak Power
60.48	BPSK	-4.08	4.81

1.1.5 Extreme Operating

The Extreme Operating Temperature Range that Apply to the Equipment				
☐ -20 °C to +50 °C				
☐ 0 °C to +40 °C				
☒ Other: -10 °C to 55 °C				
EUT Power Type	From Power Adapter or Battery			
Supply Voltage	☒ AC	State AC voltage	120	V
Supply Voltage	☒ DC - Li-ion Polymer Rechargeable Battery	State DC voltage	3.85	V

1.1.6 Equipment Use Condition

Equipment Use Condition
☐ Fixed field disturbance sensors at 61-61.5GHz
☐ Except fixed field disturbance sensors at 61-61.5GHz
☒ Except fixed field disturbance sensors

1.1.7 User Condition

Intended Operation
☒ Indoor
☒ Outdoor

1.2 Additional Information Provided by the Submitter

1.2.1 Modulation

Modulation	
Modulation is BPSK.	
Can the transmitter operate un-modulated:	☒ Yes ☐ No

1.2.2 Duty Cycle

Duty Cycle		Duty Cycle Factor
The transmitter is intended for	100%	0.00

1.3 Accessories

Accessories				
No.	**Equipment Name**	**Brand Name**	**Model Name**	**Rating**
1	Adapter	Ktec	KSA-27A-090300HU	INPUT: 100-240V~50/60HZ 0.7A OUTPUT: 5V, 3A OR 9V, 3A
No.	**Equipment Name**	**Brand holder**	**Model Name**	**Rating**
2	Li-ion Polymer Rechargeable Battery	Amperex Technology Limited	HE323	Nominal Voltage: 3.85V Charge limited voltage: 4.4V

1.4 Support Equipment

Test Site: CO05-HY

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Smartphone	Essential	PH-1	DoC

Test Site: 03CH01-CB and TH01-CB

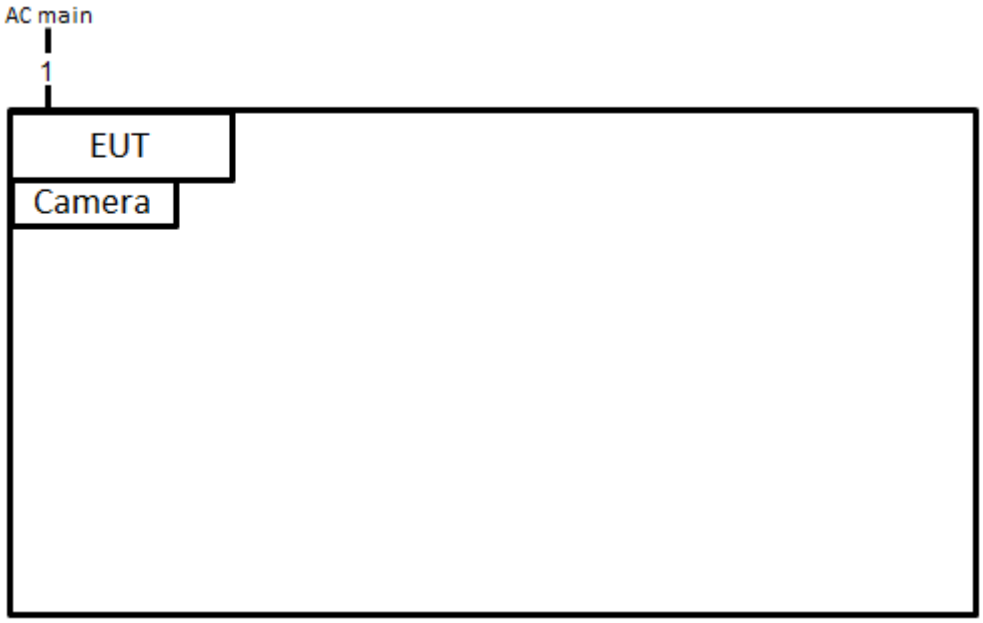
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	DoC
2	Test fixtrue	N/A	N/A	N/A

1.5 EUT Operation during Test

During the test, executed the test program to control the EUT continuously transmit RF signal.

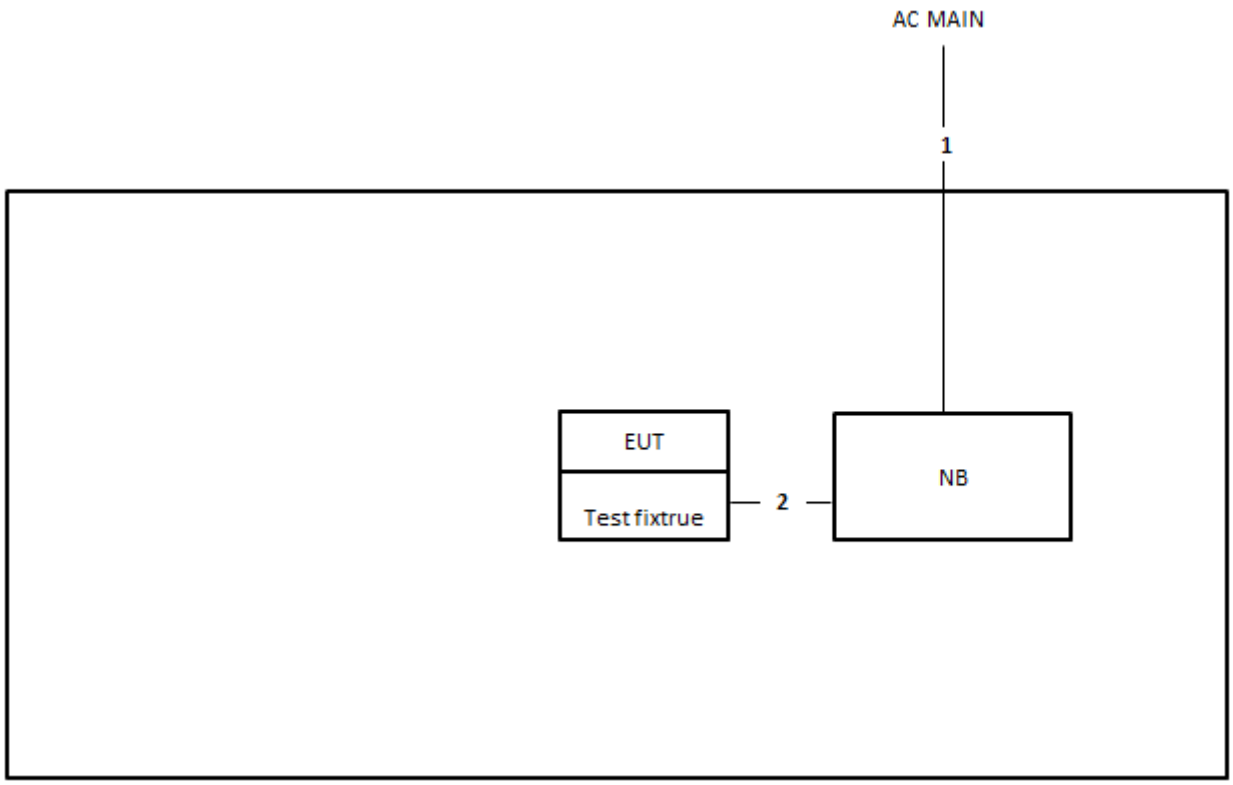
1.6 Test Setup Diagram

Test Setup Diagram - AC Power Conducted Emissions



Item	Connection	Shielded	Length
1	Power cable	No	1.8m

Test Setup Diagram - Transmitter Spurious Emissions



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	Micro USB cable	Yes	0.8m

1.7 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15.255
- ANSI C63.10-2013 Section 9. “Procedures for testing millimeter-wave systems”

1.8 Testing Location

Testing Location				
☒	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973		
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085		
Test Site No.				
CO05-HY		03CH01-CB		TH01-CB

2 Test Configuration of Equipment under Test

2.1 Test Channel Frequencies

Nominal Channel Bandwidth
60.48

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
AC Power Conducted Emissions	CTX
Occupied Bandwidth	60.48
EIRP Power	60.48
Peak Conducted Power	60.48
Transmitter Spurious Emissions (below 1 GHz)	CTX
Transmitter Spurious Emissions (1 GHz-40 GHz)	60.48
Transmitter Spurious Emissions (above 40 GHz)	60.48
Frequency Stability	Un-Modulation

Note: The EUT was performed in X axis, Y axis and Z axis position. The worst case was found in Y axis, so it was selected to perform test and its test result was written in the report.

2.3 Far Field Boundary Calculations

The far-field boundary is given as:

far field = (2 * L^2) / λ

where:

L = Largest Antenna Dimension, including the reflector, in meters

λ = wavelength in meters

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
60.48	0.0022	0.0049603	0.0020	0.20

3 Transmitter Test Result

3.1 AC Power Conducted Emissions

3.1.1 Limit of AC Power Conducted Emissions

AC Power Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

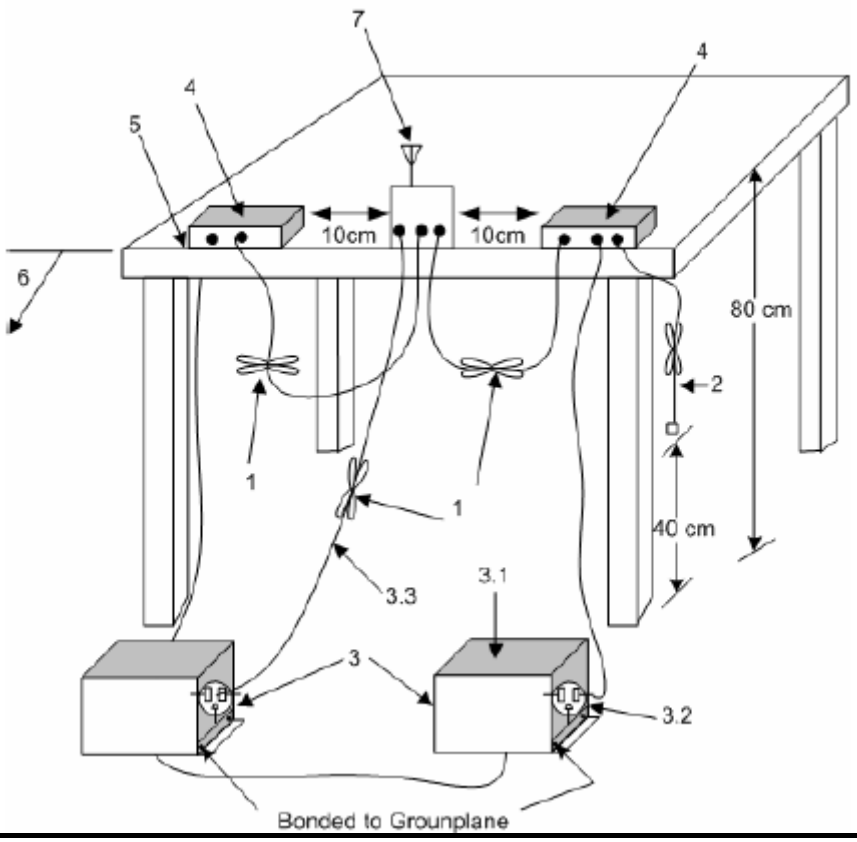
Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 6.2.

3.1.4 Test Setup

AC Power Conducted Emissions



AC Power Conducted Emissions
1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long (see ANSI C63.10, clause 6.2.3.2).
2. I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see ANSI C63.10, clause 6.2.2).
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 ohm loads. LISN can be placed on top of, or immediately beneath, reference ground plane (see ANSI C63.10, clauses 6.2.2 and 6.2.3).
3.1. All other equipment powered from additional LISN(s).
3.2. A multiple-outlet strip can be used for multiple power cords of non-EUT equipment.
3.3. LISN at least 80 cm from nearest part of EUT chassis.
4. Non-EUT components of EUT system being tested.
5. Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop (see ANSI C63.10, clause 6.2.3.2).
6. Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane (see ANSI C63.10, clause 6.2.2 for options).
7. Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

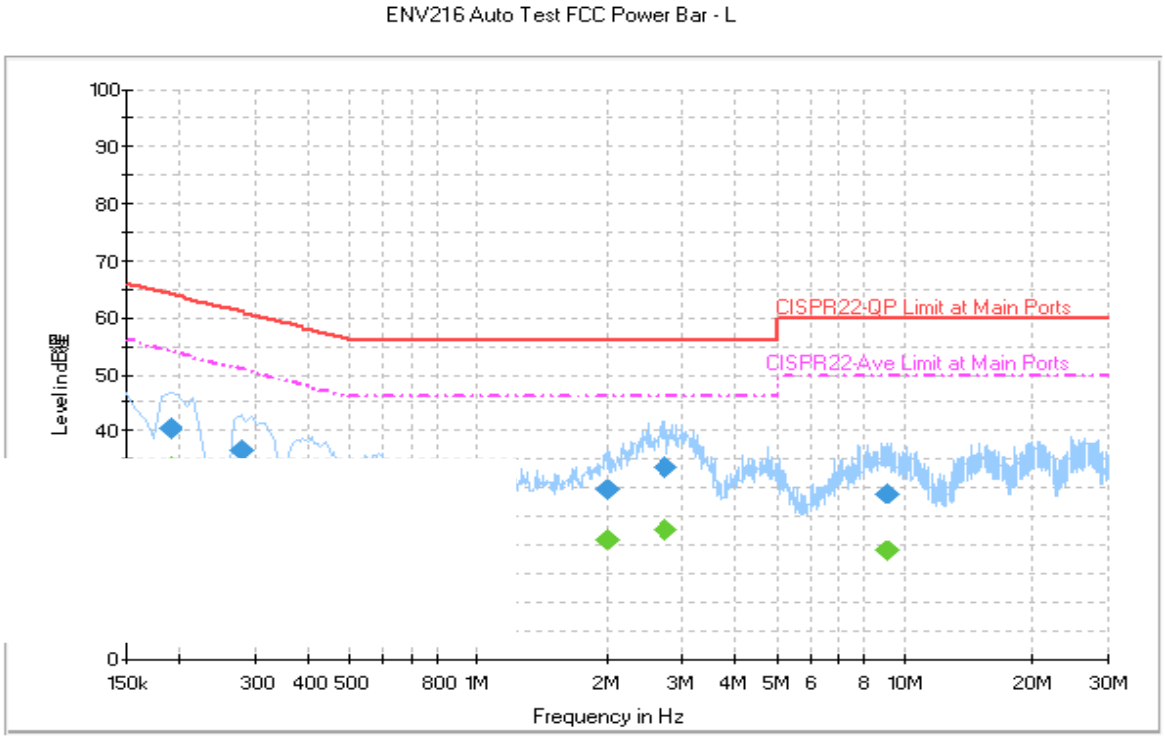
3.1.5 Test Result of AC Power Conducted Emissions

Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.2.3

NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.

NOTE 2: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.

Temp	22°C	**Humidity**	51%
Test Engineer	Arthur Hsieh	**Phase**	Line
Configuration	CTX	**Test Data**	Jun. 04, 2017



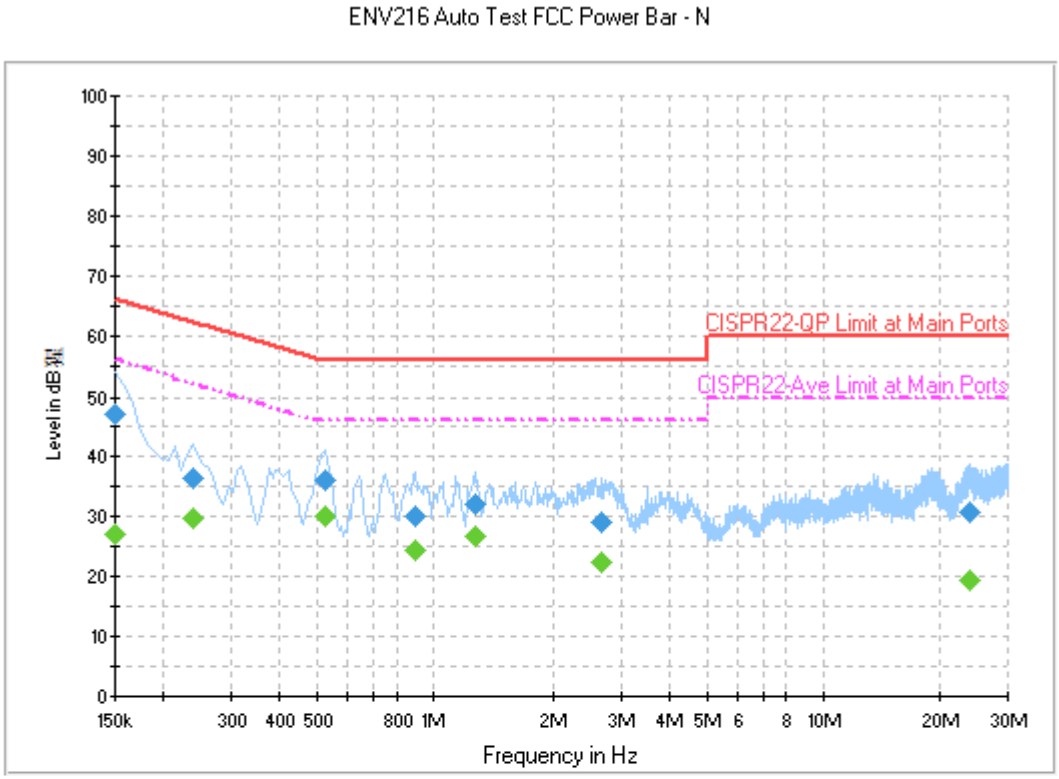
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	40.5	Off	L1	19.6	23.5	64.0
0.278000	36.7	Off	L1	19.6	24.2	60.9
0.406000	32.6	Off	L1	19.6	25.1	57.7
0.582000	33.2	Off	L1	19.6	22.8	56.0
2.006000	29.7	Off	L1	19.6	26.3	56.0
2.742000	33.6	Off	L1	19.4	22.4	56.0
9.102000	29.0	Off	L1	20.0	31.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	33.7	Off	L1	19.6	20.3	54.0
0.278000	29.5	Off	L1	19.6	21.4	50.9
0.406000	23.2	Off	L1	19.6	24.5	47.7
0.582000	28.8	Off	L1	19.6	17.2	46.0
2.006000	20.9	Off	L1	19.6	25.1	46.0
2.742000	22.6	Off	L1	19.4	23.4	46.0
9.102000	19.0	Off	L1	20.0	31.0	50.0

Temp	22°C	**Humidity**	51%
Test Engineer	Arthur Hsieh	**Phase**	Neutral
Configuration	CTX	**Test Data**	Jun. 04, 2017



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	47.2	Off	N	19.5	18.8	66.0
0.238000	36.4	Off	N	19.5	25.8	62.2
0.526000	36.1	Off	N	19.5	19.9	56.0
0.894000	30.2	Off	N	19.5	25.8	56.0
1.278000	32.0	Off	N	19.6	24.0	56.0
2.686000	29.0	Off	N	19.4	27.0	56.0
24.006000	30.8	Off	N	20.9	29.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.1	Off	N	19.5	28.9	56.0
0.238000	29.8	Off	N	19.5	22.4	52.2
0.526000	30.1	Off	N	19.5	15.9	46.0
0.894000	24.5	Off	N	19.5	21.5	46.0
1.278000	26.8	Off	N	19.6	19.2	46.0
2.686000	22.5	Off	N	19.4	23.5	46.0
24.006000	19.5	Off	N	20.9	30.5	50.0

3.2 Occupied Bandwidth

3.2.1 Limit of Occupied Bandwidth

6dBc Bandwidth (see Note 1)	None
26dBc Bandwidth	None
99% Occupied Bandwidth (see Note 2)	None

NOTE 1: The 6dBc bandwidth is the frequency bandwidth of the signal power at the -6 dBc points when measured with a 100 kHz resolution bandwidth. These measurements shall also be performed at normal test conditions.

NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions.

3.2.2 Measuring Instruments

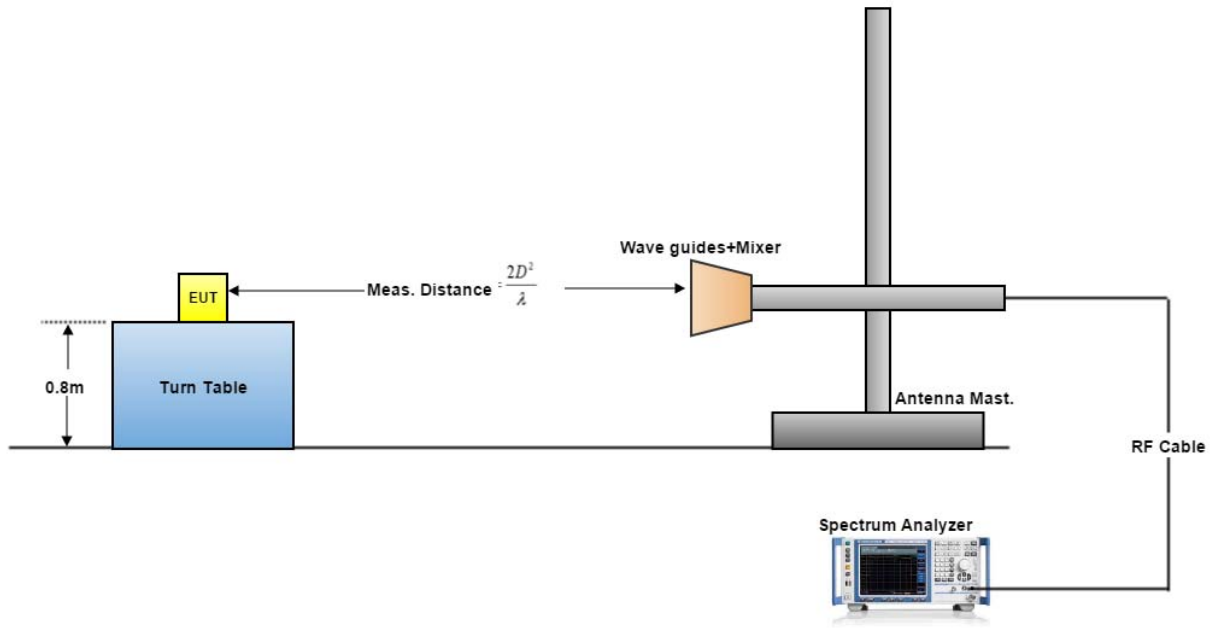
Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 6.9.2.

3.2.4 Test Setup

Occupied Channel Bandwidth



3.2.5 Test Result of Occupied Bandwidth

Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.9.2
NOTE: If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Refer as ANSI C63.10, clause 15, observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources.	

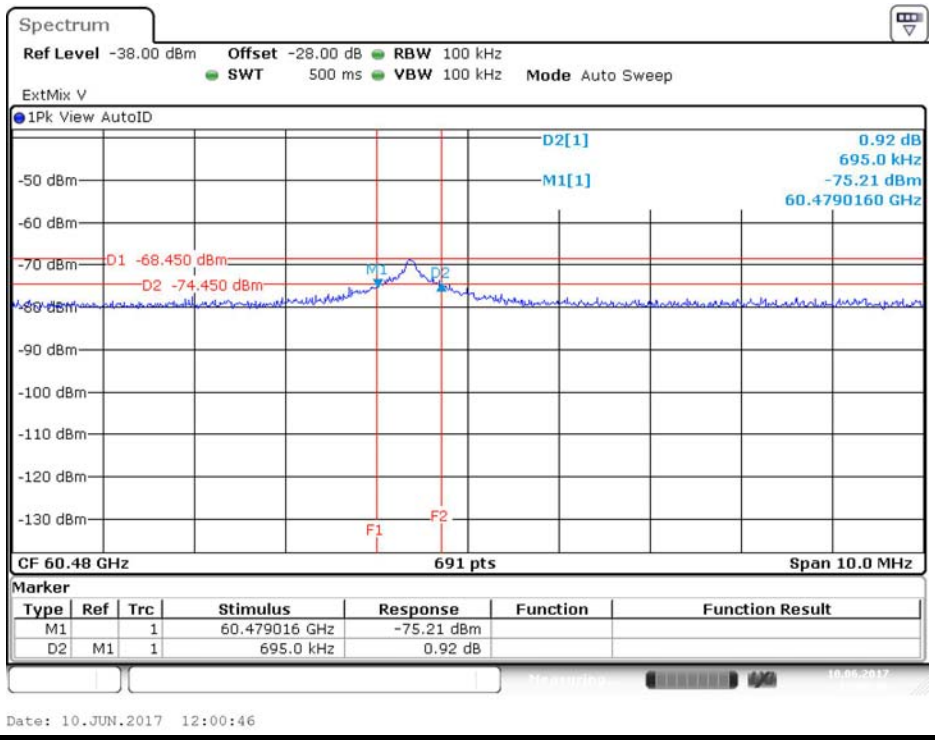
Temp	22℃	**Humidity**	54%
Test Engineer	Lucas Huang		

Test Results

Test Freq. (GHz)	6 dBc Bandwidth (MHz)	Occupied Bandwidth (MHz)	26 dBc Bandwidth (MHz)	Limit (MHz)
60.48	0.695	4510.00	7520.00	N/A

3.2.5.1 Bandwidth Plots

Test Frequency: 60.48 GHz
6 dBc Bandwidth



3.3 EIRP Power

3.3.1 Limit of EIRP Power

EIRP Power Limit		
Use Condition	**EIRP Average Power**	**EIRP Peak Power**
Fixed field disturbance sensors at within the frequency band 61-61.5GHz	40 dBm	43 dBm
Fixed field disturbance sensors at outside of the band 61-61.5GHz	10 dBm	13 dBm
Except fixed field disturbance sensors at 61-61.5GHz	N/A	10 dBm
Except fixed field disturbance sensors(indoor)	40 dBm	43 dBm
Except fixed field disturbance sensors(outdoor)	82 dBm	85 dBm

NOTE: For the applicable limit, see FCC 15.255 (b)

3.3.2 Measuring Instruments

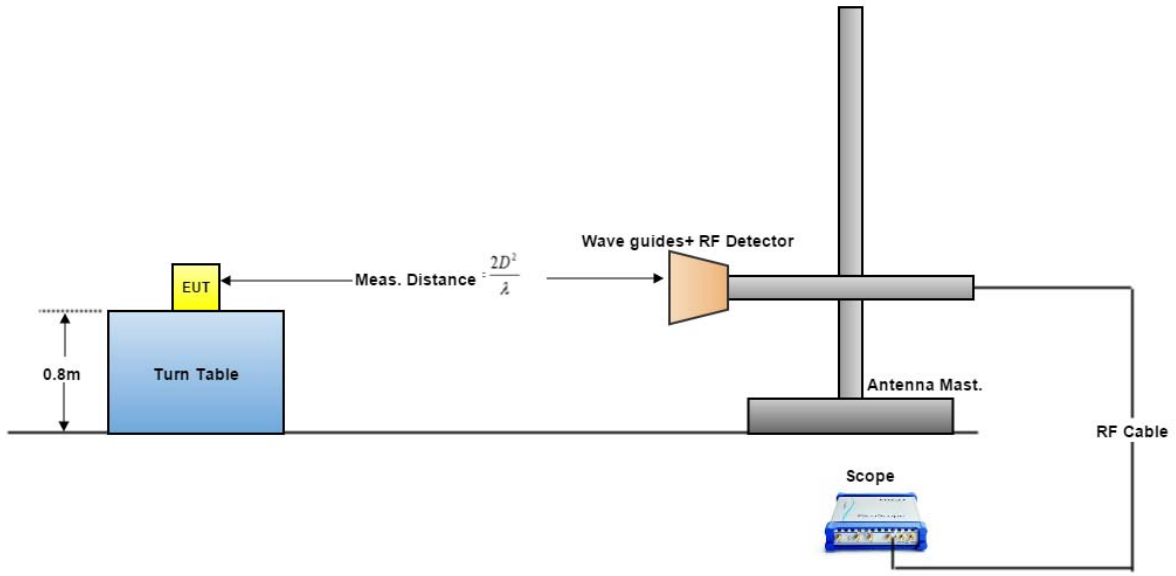
Refer a measuring instruments list in this test report.

3.3.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013 clause 9.3 & 9.5.

3.3.4 Test Setup

EIPR Power



3.3.5 Test Result of EIRP Power

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.11

NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing.

3.3.5.1 Test Result of EIRP Power

Temp	22℃		Humidity		54%					
Test Engineer	Lucas Huang		Test Distance		0.3 m					
Test Results										
Test Freq. (GHz)	DSO (mV)		Power Measured (dBm)		E_{Meas} (dBuV/m)		EIRP (dBm)		EIRP Limit (dBm) (note 1)	
	Peak	AV	Peak	AV	Peak	AV	Peak	AV	Peak	AV
60.48	2.1	0.409	-29.82	-38.71	120.07	111.18	4.81	-4.08	43	40

The measured power level is converted to EIRP using the Friis equation:

For radiated emissions, calculate the field strength (E) in dBμV/meter.

E = 126.8 – 20log(λ) + P - G

where:

E : is the field strength of the emission at the measurement distance, in dBμV/m

P : is the power measured at the output of the test antenna, in dBm

λ : is the wavelength of the emission under investigation [300/fMHz], in m

G : is the gain of the test antenna, in dBi For radiated emissions, calculate the EIRP (dBm). If the measurement was performed in the far field, calculate the EIRP.

EIRP = E-meas +20log(d-meas)-104.7

where:

EIRP : is the equivalent isotopically radiated power, in dBm

E-meas. : is the field strength of the emission at the measurement distance, in dBμV/m

d-meas. : is the measurement distance, in m

NOTE 1: For the applicable limit, see FCC 15.255 (b)

NOTE 2: The comparison method which replaces EUT with a signal generator is used to find the correct conversion factor between “DSO(mV)” & “Power Measured(dBm)”.

3.4 Peak Conducted Power

3.4.1 Limit of Peak Conducted Power

Peak Conducted Power Limit	
6dBc Bandwidth	**Peak Conducted Power (note 1)**
> 100MHz	500mW
≤ 100MHz	500mW x (BW/100) (see note 2)
NOTE 1: For the applicable limit, see FCC 15.255(d)	
NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)	

3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.4.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.5

3.4.4 Test Result of Peak Conducted Power

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.11
NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing.	

3.4.4.1 Peak Conducted Power

Temp	22℃	Humidity	54%
Test Engineer	Lucas Huang		
Test Date	Jun. 12, 2017		

Test Results

Test Freq. (GHz)	EIRP (dBm)	Max. Ant. Gain (dBi)	Peak Power (dBm) (note1)	Peak Power (mW)	6dBc BW (MHz) (note2)	Peak Power Limit (mW) (note3)
60.48	4.81	0	4.81	3.028	0.70	3.48

NOTE 1: Because EUT used for the integral antenna without temporary RF connector provided. Therefore peak conducted power is equal to EIRP power subtract the antenna gain.

NOTE 2: For the 6dBc bandwidth, see test report clause 3.2.5.

NOTE 3: For the applicable limit, see FCC 15.255(d)

NOTE 4: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm)

P(cond) = EIRP - G(dBi)

where:

G(dBi) is gain of EUT antenna.

3.5 Transmitter Spurious Emissions

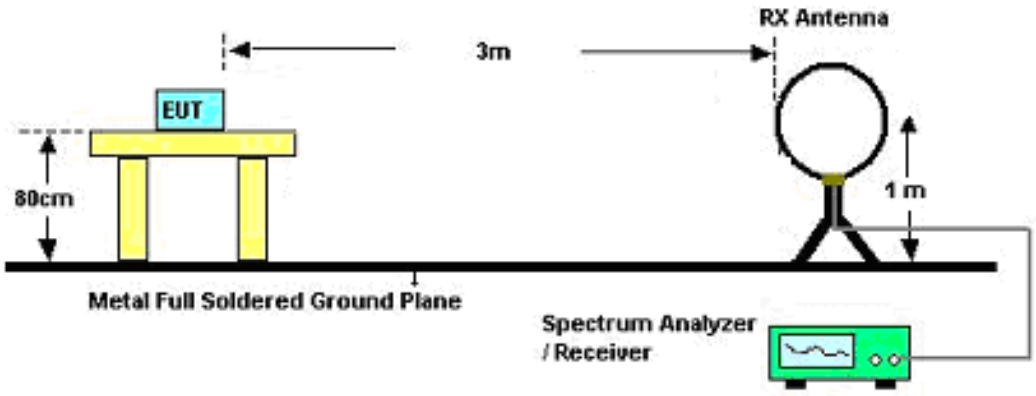
3.5.1 Limit of Transmitter Spurious Emissions

Frequency Range	Limit
Radiated emissions below 40 GHz	FCC 15.209
Radiated emissions above 40 GHz – 200GHz	90 pW/cm^2 @ 3 m (Equivalent EIRP 102 μW, -9.91dBm)
NOTE 1: For the applicable limit, see FCC 15.255(c) NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

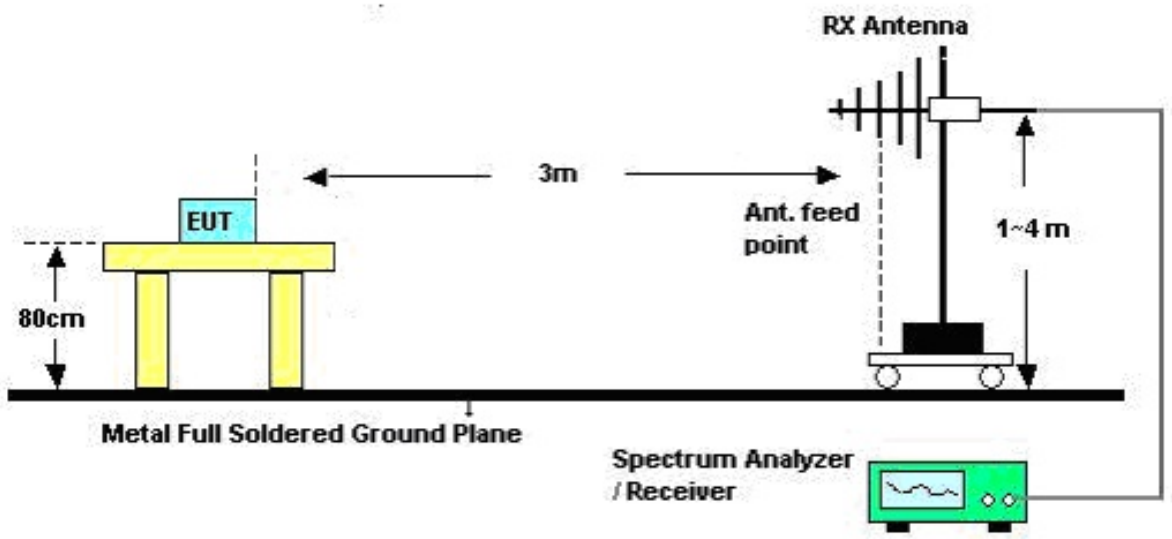
3.5.2 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.12

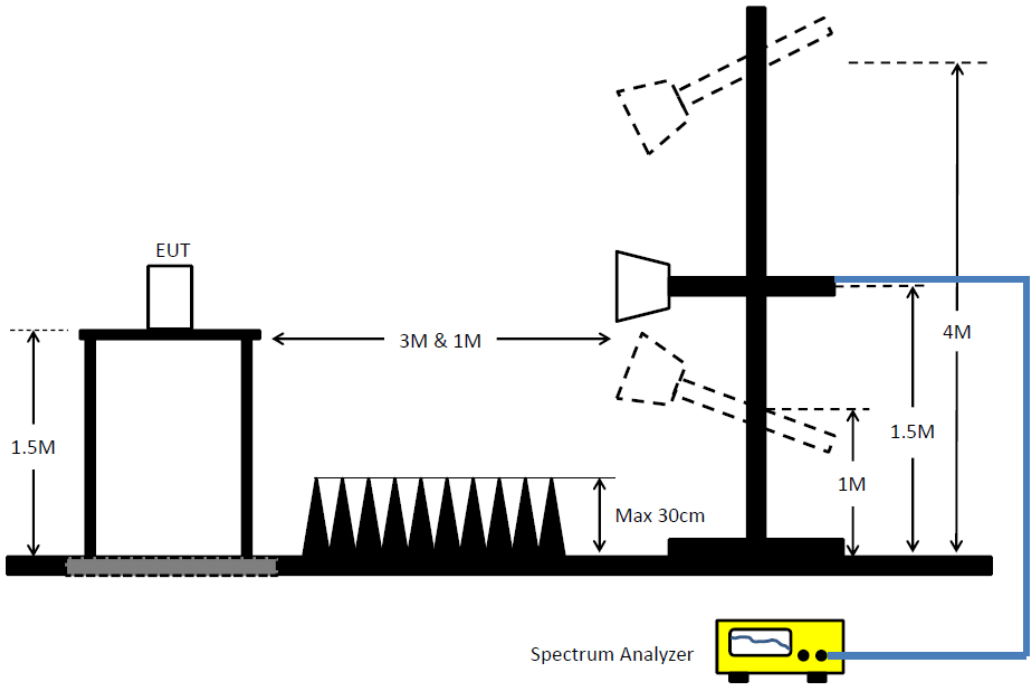
3.5.3 Test Setup

Transmitter Spurious Emissions
9kHz ~30MHz


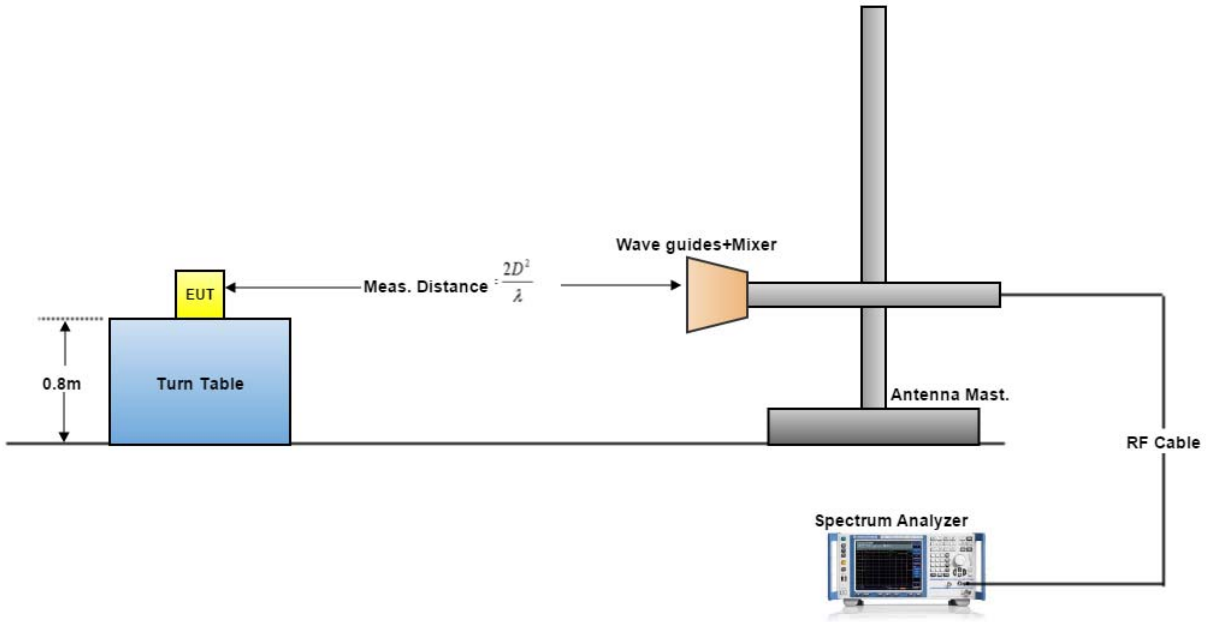
30MHz~1GHz



1GHz ~40GHz



Above 40GHz



A measuring distance of at 3 m shall be used for measurements at frequencies up to 15 GHz. For frequencies above 15 GHz, any suitable measuring distance may be used. The measurement distance is chosen up to far field distance, depending on the test system noise floor for detecting spurious emission signals. Then above 15 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from spec. distance (3 m) to measurement distance. Distance extrapolation factor = 20 log (spec. distance [3 m] / measurement distance [N m]) (dB) .The measurements described in ANSI C63.10, clause 7.8.6. If the emission cannot be detected at 1 m, reduce the RBW to increase system sensitivity. Note the value. If the emission still cannot be detected, move the horn closer to the EUT, noting the distance at which a measurement is made.

3.5.4 Test Result of Transmitter Spurious Emissions

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.12 、9.13
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	

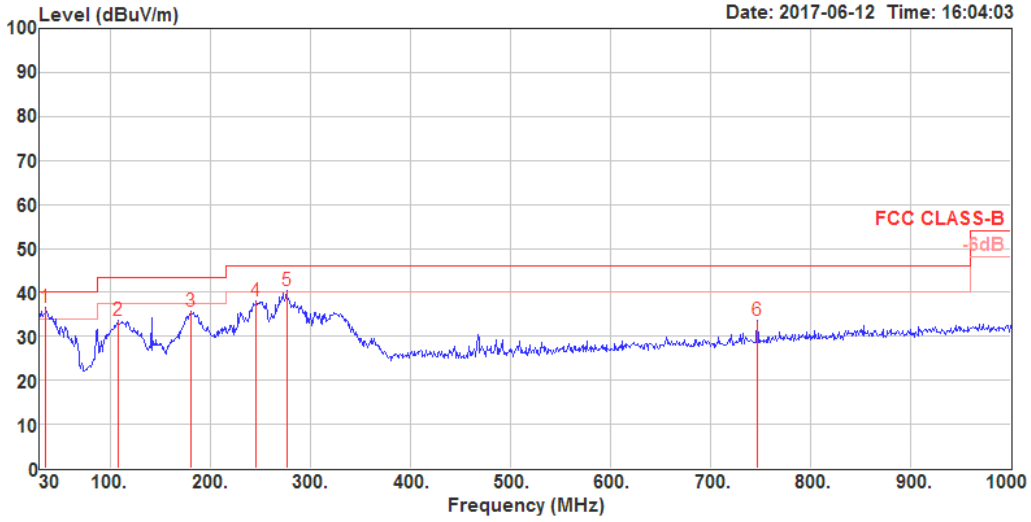
3.5.4.1 Test Result of Transmitter Spurious Emissions (Below 30MHz)

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

3.5.4.2 Test Result of Transmitter Spurious Emissions

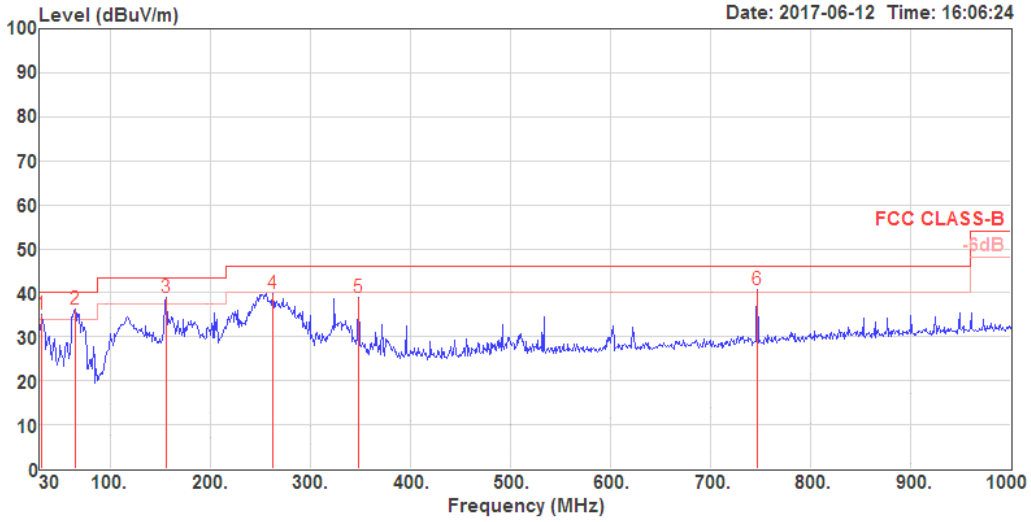
Temp	22°C	**Humidity**	54%
Test Engineer	Paul Chen	**Test Distance**	3 m
Test Range	30 MHz – 1000 MHz	**Test Configuration**	CTX

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	35.82	36.48	40.00	-3.52	46.05	0.69	22.17	32.43	100	45	Peak	VERTICAL
2	107.60	33.57	43.50	-9.93	46.81	1.20	17.93	32.37	100	150	Peak	VERTICAL
3	181.32	35.81	43.50	-7.69	50.97	1.56	15.60	32.32	100	117	Peak	VERTICAL
4	246.31	37.95	46.00	-8.05	49.96	1.81	18.47	32.29	100	80	Peak	VERTICAL
5	276.38	40.42	46.00	-5.58	51.48	1.92	19.30	32.28	100	86	Peak	VERTICAL
6	746.83	33.56	46.00	-12.44	36.55	3.18	26.07	32.24	150	359	Peak	VERTICAL

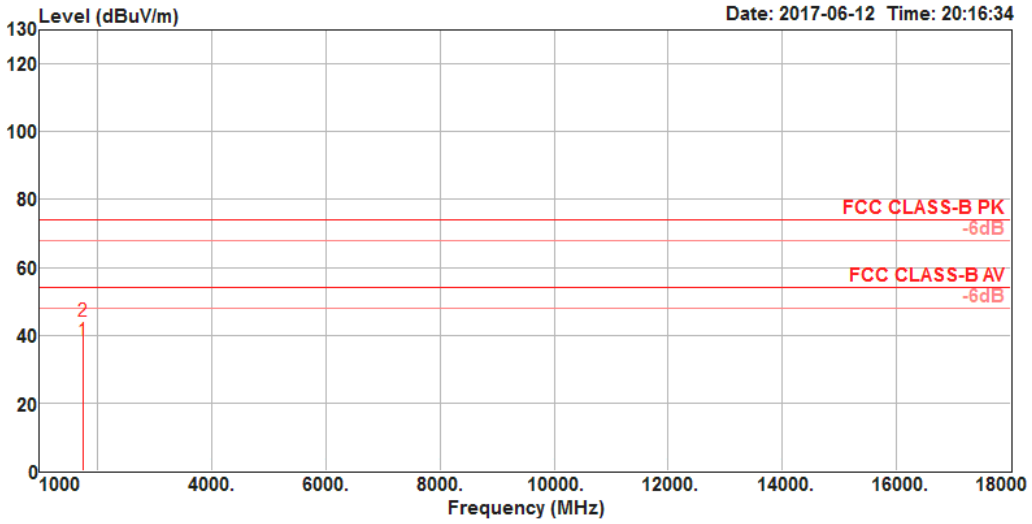
Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	35.18	40.00	-4.82	42.55	0.65	24.41	32.43	200	182	Peak	HORIZONTAL
2	64.92	36.30	40.00	-3.70	55.14	0.92	12.65	32.41	200	165	Peak	HORIZONTAL
3	156.10	38.91	43.50	-4.59	53.16	1.43	16.66	32.34	200	132	Peak	HORIZONTAL
4	262.80	39.97	46.00	-6.03	50.79	1.87	19.59	32.28	100	204	Peak	HORIZONTAL
5	348.16	39.02	46.00	-6.98	48.09	2.17	21.04	32.28	100	45	Peak	HORIZONTAL
6	746.83	40.86	46.00	-5.14	43.85	3.18	26.07	32.24	200	3	Peak	HORIZONTAL

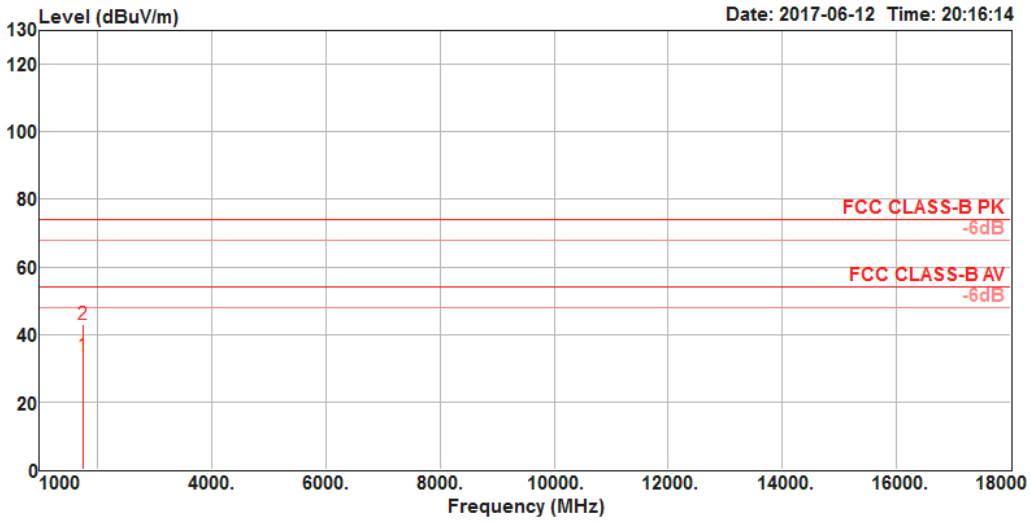
Temp	22°C	Humidity	54%
Test Engineer	Paul Chen	Test Distance	3 m
Test Range	1 GHz – 18 GHz	Test Freq. (GHz)	60.48
Test Date	Jun. 12, 2017		

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1756.49	38.18	54.00	-15.82	42.04	5.19	25.68	34.73	127	278	Average	VERTICAL
2	1757.38	44.18	74.00	-29.82	48.04	5.19	25.68	34.73	127	278	Peak	VERTICAL

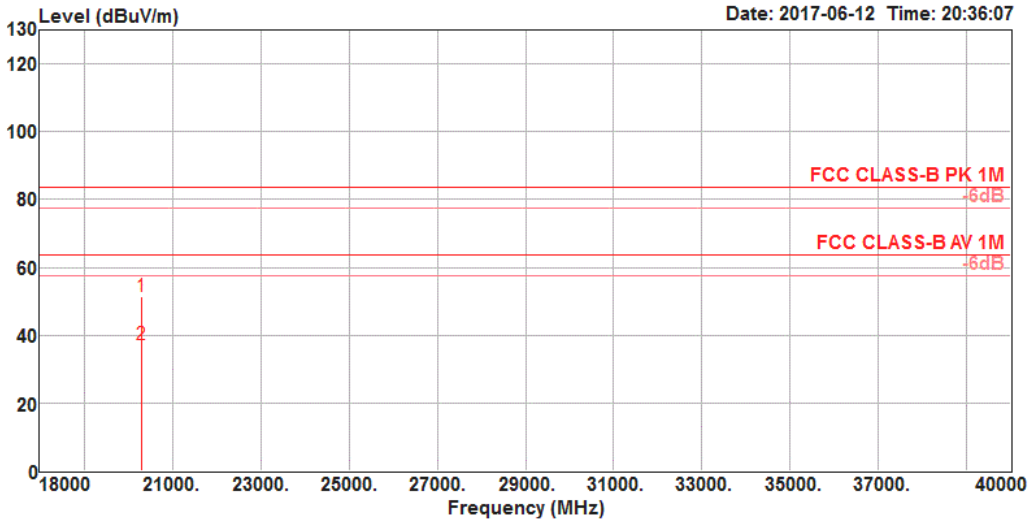
Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1756.34	33.62	54.00	-20.38	37.48	5.19	25.68	34.73	104	190	Average	HORIZONTAL
2	1758.23	43.04	74.00	-30.96	46.90	5.19	25.68	34.73	104	190	Peak	HORIZONTAL

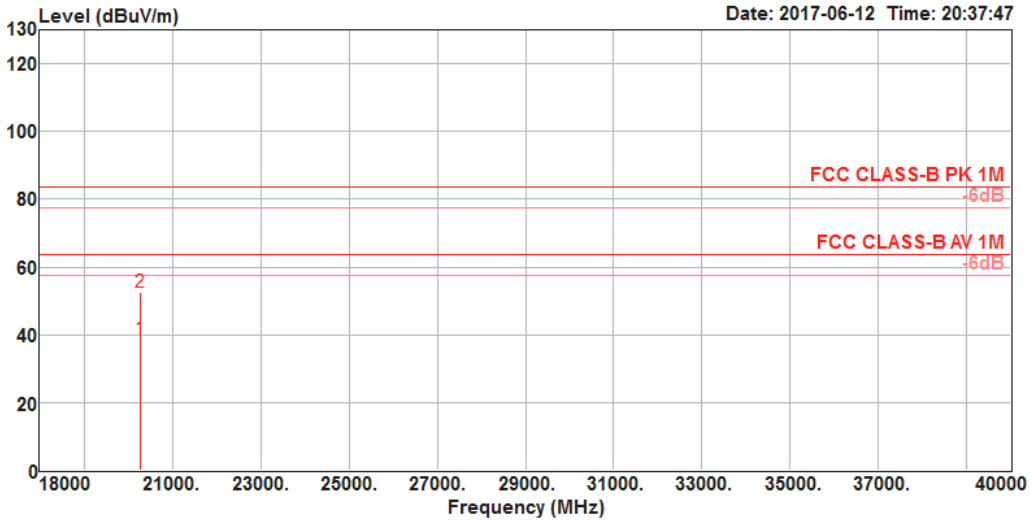
Temp	22°C	Humidity	54%
Test Engineer	Paul Chen	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	60.48
Test Date	Jun. 12, 2017		

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	20287.81	51.29	83.54	-32.25	56.97	8.65	37.72	52.05	104	190	Peak	VERTICAL
2	20287.81	37.40	83.54	-46.14	43.08	8.65	37.72	52.05	104	190	Average	VERTICAL

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	20268.01	38.56	63.54	-24.98	44.26	8.64	37.71	52.05	134	281	Average	HORIZONTAL
2	20271.55	52.50	83.54	-31.04	58.20	8.64	37.71	52.05	134	281	Peak	HORIZONTAL

Temp	22°C	**Humidity**	54%
Test Engineer	Paul Chen	**Test Date**	Jun. 12, 2017
Test Range	40GHz – 200GHz		

Test Frequency (GHz)	**Rx Antenna Gain (dBi)**	**Measurement Distance (m)**	**Read Worse Frequency (GHz)**	**Read Level (dBm)**
60.48	23.0	0.30	56.89	-74.84
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/m^2)**	**Limit (pW/cm^2)**	**Test Result**
-40.76	3	0.0743	90.00	Complied

Note:

EIRP = Prx – Grx + Free Space Path Loss = Prx – Grx + 20Log(4πd/ λ)2

Which

Prx = Read Level.

Grx = Rx Antenna Gain.

A distance factor is offset and the formula is 20LOG(D1/D2)

Which

D1 = Specification Distance

D2 = Measurement Distance

3.6 Frequency Stability

3.6.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 15.255(e) and ANSI C63.10-2013, clause 9.14	within the frequency bands
Note: These measurements shall also be performed at normal and extreme test conditions.	

3.6.2 Measuring Instruments

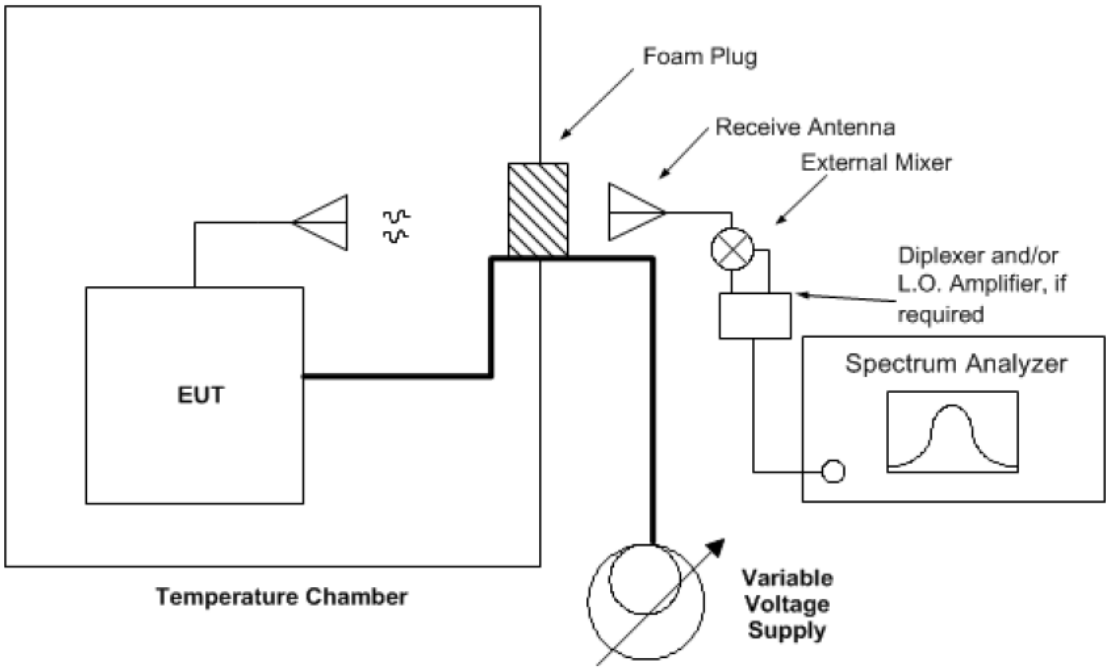
Refer a measuring instruments list in this test report.

3.6.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 9.14.

3.6.4 Test Setup

Frequency Stability



3.6.5 Test Result of Frequency Stability

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.14
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	

3.6.5.1 Frequency Stability with Respect to Ambient Temperature

Frequency Stability with Respect to Ambient Temperature			
Temp	22℃	**Humidity**	54%
Test Engineer	Lucas Huang	**Test Date**	Jun. 12, 2017
Test Results			
Test Temperature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-10	60479.3341	-8.80	within band
0	60479.3334	-9.50	within band
10	60479.3245	-18.40	within band
20	60479.3429	Reference	within band
30	60479.3421	-0.80	within band
40	60479.3368	-6.10	within band
50	60479.3327	-10.20	within band
55	60479.3347	-8.20	within band
NOTE: The manufacturer's specified temperature range of -10 to 55°C.			

3.6.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage			
Temp	22℃	**Humidity**	54%
Test Engineer	Paul Chen	**Test Date**	Jun. 12, 2017
Test Results			
Test Voltage: (Vdc)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
93.5	60479.3431	0.20	within band
110	60479.3429	Reference	within band
126.5	60479.3499	7.00	within band

3.7 Operation Restriction and Group Installation

3.7.1 Limit of Operation Restriction and Group Installation

Item	Limit
Operation Restriction	Operation is not permitted for the following products: ♦ Equipment used on aircraft or satellites. (Refer as FCC 15.255 (a)) ♦ Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as FCC 15.255 (a))
Group Installation	Operation is not permitted for the following products: ♦ External phase-locking (Refer as FCC 15.255(g))

3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not been used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for used on aircraft or satellites. EUT is a wireless video area network (WVAN) for the connection of consumer electronic (CE) audio and video devices.

3.7.3 Result of Group Installation

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.

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	May 02, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 05, 2017	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 05, 2017	Conduction (CO05-HY)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 10, 2016	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 25, 2016	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 16, 2017	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jun. 28, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 22, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-l0-7	N/A	N/A	Radiation (03CH01-CB)
*Mixer	OML	M19HW/A	U91113-1	40 ~ 60 GHz	Sep. 09, 2015	Radiation (03CH01-CB)
*Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Sep. 14, 2015	Radiation (03CH01-CB)
*Mixer	OML	M12HW/A	E91113-1	60 ~ 90 GHz	Sep. 17, 2015	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
*Mixer	OML	M08HW/A	F91113-1	90 ~ 140 GHz	Sep. 21, 2015	Radiation (03CH01-CB)
*Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Sep. 24, 2015	Radiation (03CH01-CB)
*Detector	Millitech	DET-15-RPFW0	#A16473(038)	50 ~ 75 GHz	Dec. 29, 2015	Radiation (03CH01-CB)
Pico Scope	Pico	Pico Scope 6402C	CX372/002	N/A	Jul. 06, 2016	Radiation (03CH01-CB)
*Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	Sep. 09, 2015	Radiation (03CH01-CB)
*Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	Sep. 14, 2015	Radiation (03CH01-CB)
*Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	Sep. 17, 2015	Radiation (03CH01-CB))
*Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	Sep. 21, 2015	Radiation (03CH01-CB)
*Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	Sep. 24, 2015	Radiation (03CH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-C2SP	TBN-1010206	-20~150 degree	Mar. 08. 2017	Conducted (TH01-CB)
Low Pass Filter	EMEC	LPF-24-200-40	S/N-001	24MHz below pass	Oct. 24, 2016	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.
"*" Calibration Interval of instruments listed above is two years.
N.C.R. means Non-Calibration required.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.7dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 220GHz)	4.7 dB	Confidence levels of 95%
Temperature	0.7°C	Confidence levels of 95%