



# FCC RADIO TEST REPORT

**FCC ID** : EJE-KSC001  
**Equipment** : Port Replicator (Cradle)  
**Brand Name** : FUJITSU  
**Model Name** : NDS36  
**Applicant** : Fujitsu Client Computing Limited  
1-1-2, Kashimada, Saiwai-Ku, Kawasaki,  
Kanagawa, 212-0058 Japan  
**Manufacturer** : Fujitsu Client Computing Limited  
1-1-2, Kashimada, Saiwai-Ku, Kawasaki,  
Kanagawa, 212-0058 Japan  
**Standard** : 47 CFR FCC Part 15.255

The product was received on Mar. 18, 2020, and testing was started from Mar. 20, 2020 and completed on Apr. 29, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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, Millimeter Wave Test Procedures, FCC KDB 414788 D01 v01r01 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Sam Chen

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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TEL : 886-3-656-9065  
FAX : 886-3-656-9085  
Report Temp.late No.: CB-A9\_1 Ver1.0



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	FCC 15.207	AC Power Conducted Emissions	PASS	-
3.2	FCC 15.255(e)	Occupied Bandwidth	PASS	-
3.3	FCC 15.255(c)	EIRP Power	PASS	-
3.4	FCC 15.255(c)	Peak Conducted Power	PASS	-
3.5	FCC 15.255(d)	Transmitter Spurious Emissions	PASS	-
3.6	FCC 15.255(f)	Frequency Stability	PASS	-
3.7	FCC 15.255(a),(h)	Operation Restriction and Group Installation	PASS	-

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Sam Chen**

**Report Producer: Cindy Peng**



# 1 General Description

## 1.1 Information

### 1.1.1 The Channel Plan(s)

Frequency Range	57-71 GHz
Operation Frequency	60.61 GHz

### 1.1.2 Modulation

Modulation	
The modulation is OOK.	
Can the transmitter operate un-modulated:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

### 1.1.3 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Keyssa	KSS104M	Built Antenna	N/A	5.3

Note: The above information was declared by manufacturer.

### 1.1.4 Power Levels

Applicable power levels	<input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP		
Antenna gain	5.3 dBi		
Frequency (GHz)	Highest setting ( $P_{high}$ ): (dBm)		
	Modulation	AV Power	Peak Power
60.61	OOK	-20.14	-17.24

### 1.1.5 Operating Conditions

Operating Conditions	
<input checked="" type="checkbox"/> 5 °C to +35 °C	
<input type="checkbox"/> 0 °C to +40 °C	
<input type="checkbox"/> Other:	
EUT Power Type	From power adapter
Supply Voltage	<input type="checkbox"/> AC State AC voltage V
Supply Voltage	<input checked="" type="checkbox"/> DC State DC voltage 19 V

**1.1.6 Equipment Use Condition**

Equipment Use Condition
<input type="checkbox"/> Fixed field disturbance sensors at 61-61.5GHz
<input type="checkbox"/> Except fixed field disturbance sensors at 61-61.5GHz
<input checked="" type="checkbox"/> Except fixed field disturbance sensors

**1.1.7 User Condition**

Intended Operation
<input checked="" type="checkbox"/> Indoor
<input type="checkbox"/> Outdoor (except outdoor fixed Point to Point)
<input type="checkbox"/> Outdoor fixed Point to Point

Note: The above information was declared by manufacturer.

**1.1.8 Duty Cycle**

Duty Cycle	Duty Cycle Factor (dB)
100%	0



## 1.2 Applicable Standards

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

- ♦ ANSI C63.10-2013 Section 9. "Procedures for testing millimeter-wave systems"

## 1.3 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	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 Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO02-CB	Wei Li	24.4~24.6°C / 61~69%	Mar. 31, 2020
Radiated	03CH05-CB	Stim Sung	21.5~23°C / 46~49%	Mar. 20, 2020~Apr. 29, 2020
RF Conducted	TH03-CB	Eddie Weng	23.4~24.4°C / 51~57%	Mar. 23, 2020~Mar. 27, 2020

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



## 2 Test Configuration of Equipment under Test

### 2.1 Test Channel Frequencies

Nominal Channel Bandwidth (GHz)
60.61

### 2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
AC Power Conducted Emissions	60.61
Occupied Bandwidth	60.61
EIRP Power	60.61
Peak Conducted Power	60.61
Transmitter Spurious Emissions (below 1 GHz)	60.61
Transmitter Spurious Emissions (1 GHz-40 GHz)	60.61
Transmitter Spurious Emissions (above 40 GHz)	60.61
Frequency Stability	60.61

Note: The EUT can only be used at Z axis position.

### 2.3 EUT Operation during Test

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

### 2.4 Accessories

Accessories				
No.	Equipment Name	Brand Name	Model Name	Rating
1	Adapter	Chicony	A13-090P1A	INPUT: 100-240V~1.5A, 50-60Hz OUTPUT: 19V, 4.74A





## 2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Flash disk3.0	Transcend	JetFlash-700	N/A
B	Flash disk3.0	Transcend	JetFlash-700	N/A
C	Flash disk3.0	Transcend	JetFlash-700	N/A

For Radiated and RF Conducted: N/A

## 2.6 Far Field Boundary Calculations

The far-field boundary is given as:

$$\text{far field} = (2 * L^2) / \lambda$$

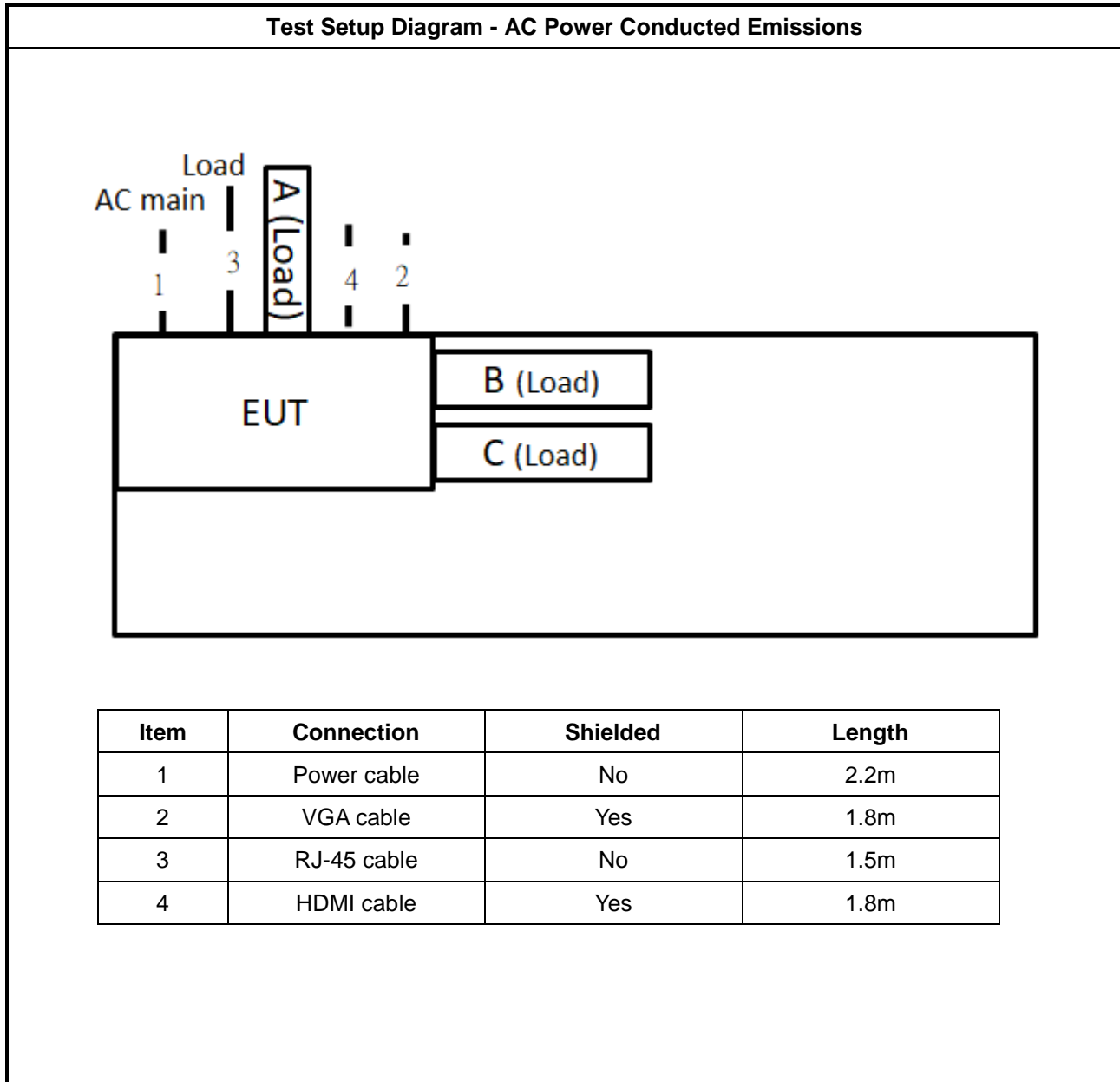
where:

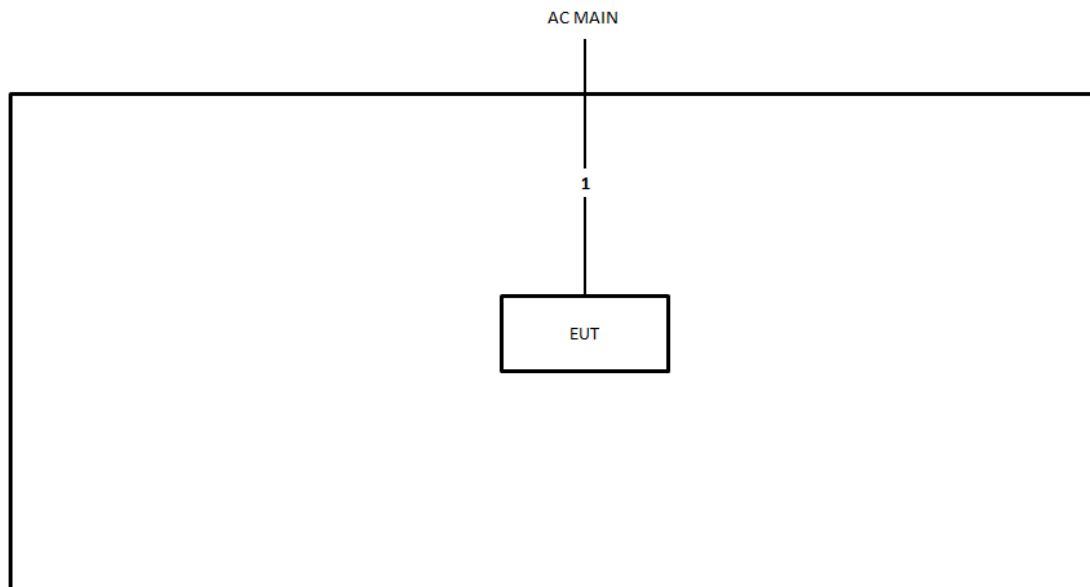
L = Largest Antenna Dimension, including the reflector, in meters

$\lambda$  = wavelength in meters

Far Field (m)				
Frequency (GHz)	L (m)	Lambda (m)	d(Far Field) (m)	d(Far Field) (cm)
60.61	0.00085	0.0049493	0.000	0.03

## 2.7 Test Setup Diagram



**Test Setup Diagram - Transmitter Spurious Emissions**


Item	Connection	Shielded	Length
1	Power cable	No	3.3m

### 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.		

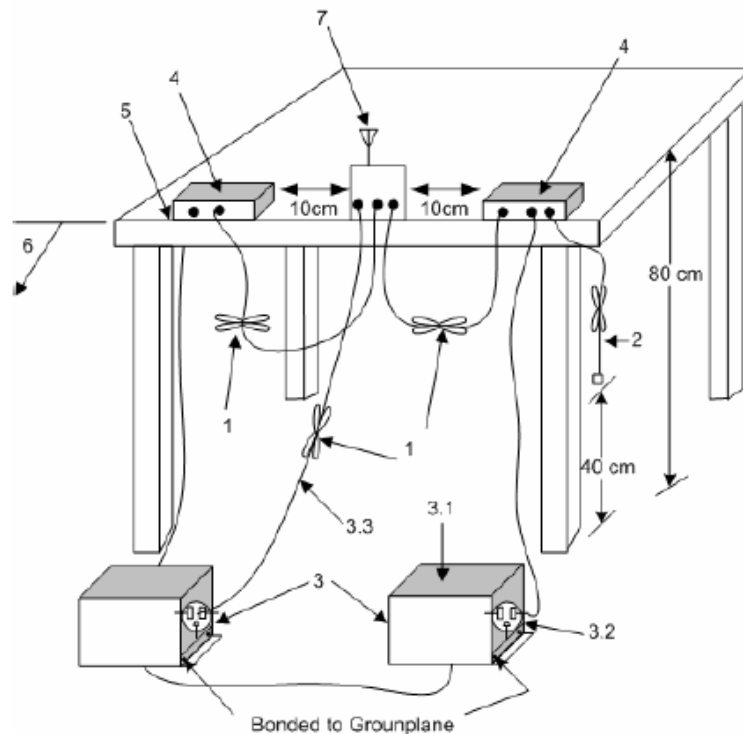
##### 3.1.2 Measuring Instruments

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



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.

2—The 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.

3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50  $\Omega$  loads. LISN may be placed on top of, or immediately beneath, reference ground plane.

3.1—All other equipment powered from additional LISN(s).

3.2—A multiple-outlet strip may 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.

6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.



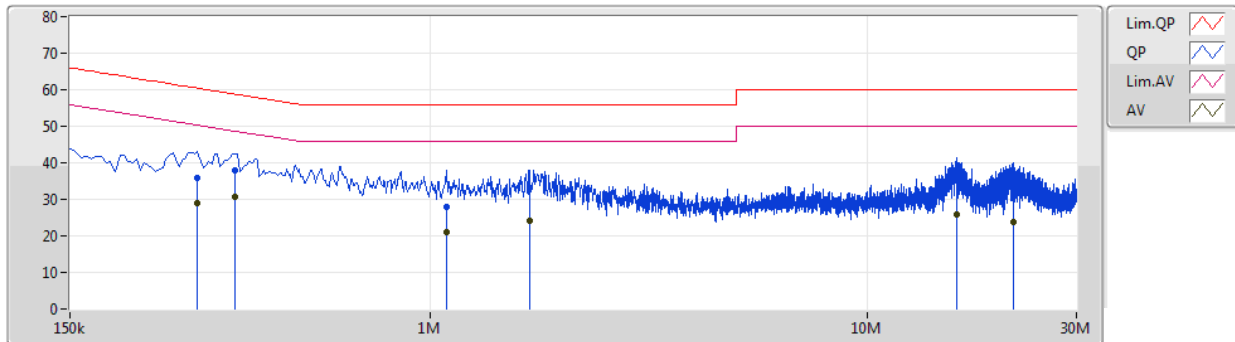
### 3.1.5 Test Result of AC Power Conducted Emissions

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11
<b>Test Setup</b>	see ANSI C63.10, clause 6.2.3
<p>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.</p> <p>NOTE 2: "&gt;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.</p>	



Phase	Line	Configuration	CTX
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31/03/2020

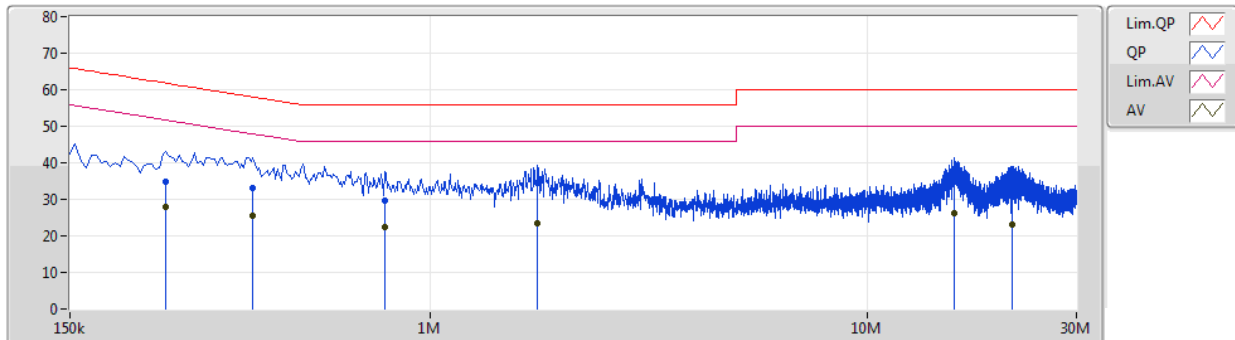


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor	Condition	Comment	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)			
QP	294k	35.81	60.42	-24.61	10.23	Line	-	25.58	0.05	0.08	10.10			
AV	294k	29.03	50.42	-21.39	10.23	Line	-	18.80	0.05	0.08	10.10			
QP	357k	38.06	58.79	-20.73	10.23	Line	-	27.83	0.05	0.08	10.10			
AV	357k	30.59	48.79	-18.20	10.23	Line	"Worst"	20.36	0.05	0.08	10.10			
QP	1.086M	27.78	56.00	-28.22	10.28	Line	-	17.50	0.06	0.12	10.10			
AV	1.086M	20.91	46.00	-25.09	10.28	Line	-	10.63	0.06	0.12	10.10			
QP	1.685M	33.02	56.00	-22.98	10.33	Line	-	22.69	0.08	0.15	10.10			
AV	1.685M	24.16	46.00	-21.84	10.33	Line	-	13.83	0.08	0.15	10.10			
QP	15.941M	37.15	60.00	-22.85	10.66	Line	-	26.49	0.34	0.21	10.11			
AV	15.941M	25.92	50.00	-24.08	10.66	Line	-	15.26	0.34	0.21	10.11			
QP	21.534M	34.59	60.00	-25.41	10.77	Line	-	23.82	0.44	0.22	10.11			
AV	21.534M	23.80	50.00	-26.20	10.77	Line	-	13.03	0.44	0.22	10.11			



Phase	Neutral	Configuration	CTX
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31/03/2020



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor	Condition	Comment	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)			
QP	249k	34.98	61.79	-26.81	10.22	Neutral	-	24.76	0.05	0.07	10.10			
AV	249k	27.80	51.79	-23.99	10.22	Neutral	-	17.58	0.05	0.07	10.10			
QP	393k	33.09	58.01	-24.92	10.23	Neutral	-	22.86	0.05	0.08	10.10			
AV	393k	25.61	48.01	-22.40	10.23	Neutral	-	15.38	0.05	0.08	10.10			
QP	789k	29.53	56.00	-26.47	10.27	Neutral	-	19.26	0.06	0.11	10.10			
AV	789k	22.49	46.00	-23.51	10.27	Neutral	-	12.22	0.06	0.11	10.10			
QP	1.761M	34.62	56.00	-21.38	10.33	Neutral	"Worst"	24.29	0.08	0.15	10.10			
AV	1.761M	23.61	46.00	-22.39	10.33	Neutral	-	13.28	0.08	0.15	10.10			
QP	15.779M	36.59	60.00	-23.41	10.56	Neutral	-	26.03	0.24	0.21	10.11			
AV	15.779M	26.11	50.00	-23.89	10.56	Neutral	-	15.55	0.24	0.21	10.11			
QP	21.426M	34.62	60.00	-25.38	10.61	Neutral	-	24.01	0.28	0.22	10.11			
AV	21.426M	23.14	50.00	-26.86	10.61	Neutral	-	12.53	0.28	0.22	10.11			





## 3.2 Occupied Bandwidth

### 3.2.1 Limit of Occupied Bandwidth

<b>6dBc Bandwidth</b> (see Note 1)	None
<b>99% Occupied Bandwidth</b> (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.	

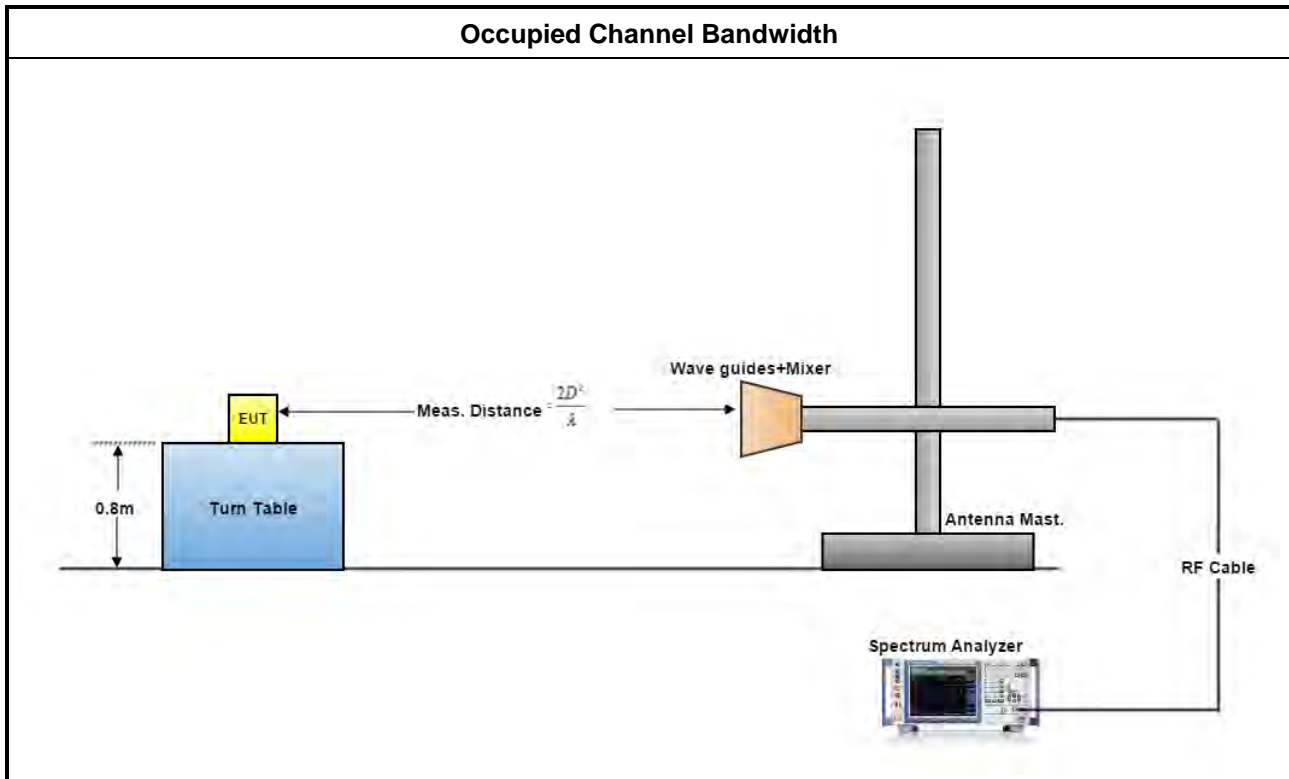
### 3.2.2 Measuring Instruments

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





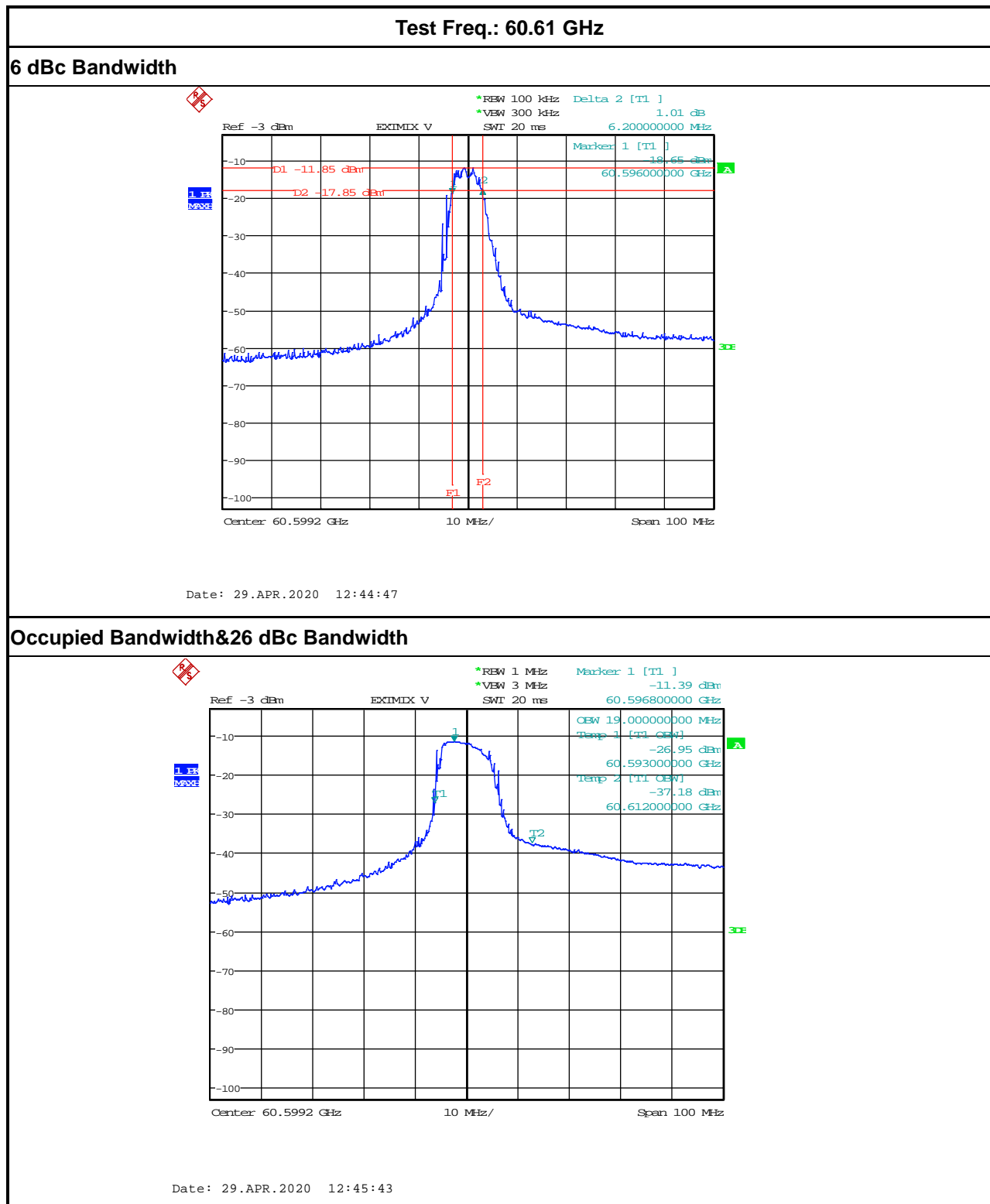
### 3.2.5 Test Result of Occupied Bandwidth

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11
<b>Test Setup</b>	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.	

Test Results			
Test Freq. (GHz)	6 dBc Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit (MHz)
60.61	6.20	19.00	N/A



### 3.2.5.1 Bandwidth Plots





### 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 outdoor fixed Point to Point	40 dBm	43 dBm
Outdoor fixed Point to Point	82 dBm	85 dBm
Note: For fixed point-to-point transmitters located outdoors, the average power of any emission shall not exceed 82 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi. The peak power of any emission shall not exceed 85 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi.		

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

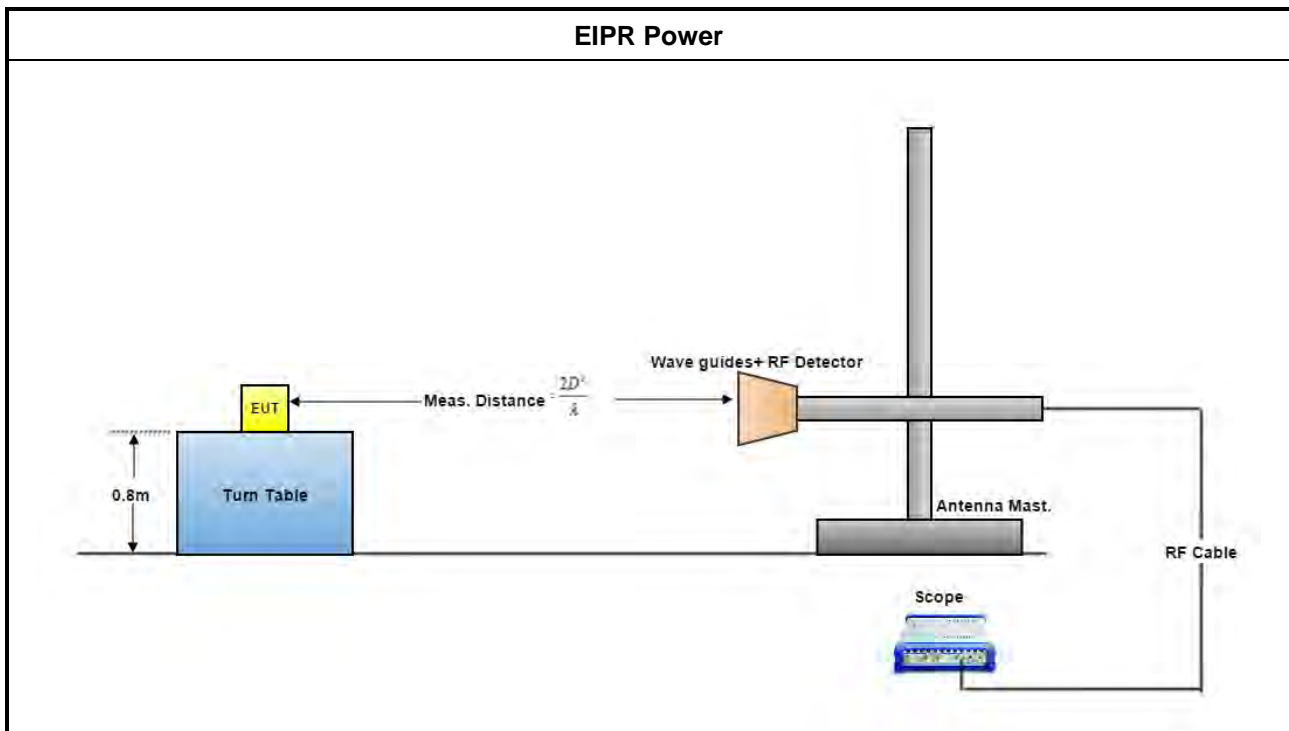
#### 3.3.2 Measuring Instruments

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



### 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**

Test Distance		0.50 m									
Test Results											
Test Freq. (GHz)	Rx Gain (dBi)	DSO (mV)		Power Measured (dBm)		E <sub>Meas</sub> (dBuV/m)		EIRP (dBm)		EIRP Limit (dBm) (note 1)	
		Peak	AV	Peak	AV	Peak	AV	Peak	AV	Peak	AV
60.61	23.6	7.14	4.22	-55.73	-58.63	93.58	90.68	-17.24	-20.14	43	40
<p>The measured power level is converted to EIRP using the Friis equation:</p> <p>For radiated emissions, calculate the field strength (E) in dBμV/meter.</p> <p>E = 126.8 – 20log(λ) + P - G</p> <p>where:</p> <p>E : is the field strength of the emission at the measurement distance, in dBμV/m</p> <p>P : is the power measured at the output of the test antenna, in dBm</p> <p>λ: is the wavelength of the emission under investigation [300/fMHz], in m</p> <p>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.</p> <p>EIRP = E-meas +20log(d-meas)-104.7</p> <p>where:</p> <p>EIRP : is the equivalent isotopically radiated power, in dBm</p> <p>E-meas. : is the field strength of the emission at the measurement distance, in dBμV/m</p> <p>d-meas. : is the measurement distance, in m</p> <p>NOTE 1: For the applicable limit, see FCC 15.255 (c)</p> <p>NOTE 2: The comparison method which replaces EUT with a signal generator is used to find the correct conversion factor between “DSO(mV)” &amp; “Power Measured(dBm)”.</p>											



### 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(c)	
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

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & clause 9
<b>Test Setup</b>	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**

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)
60.61	-17.24	5.3	-22.54	0.006	6.20	31.00
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(c)						
NOTE 4: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm) $P(\text{cond}) = \text{EIRP} - G(\text{dBi})$ where: G(dBi) is gain of EUT antenna.						

### 3.5 Transmitter Spurious Emissions

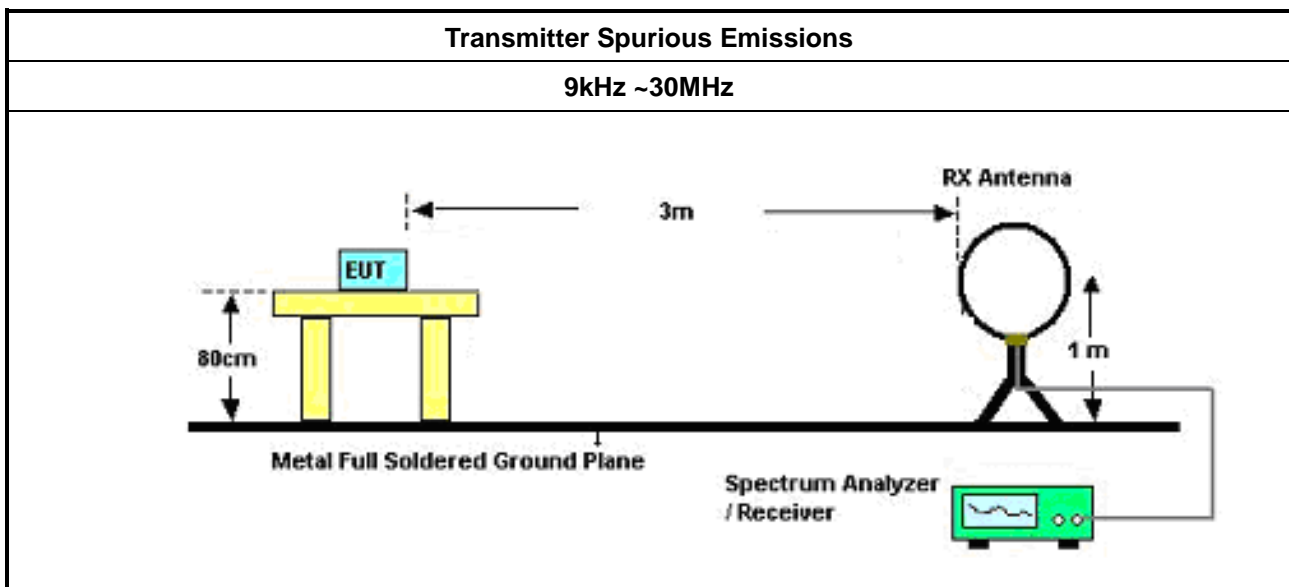
#### 3.5.1 Limit of Transmitter Spurious Emissions

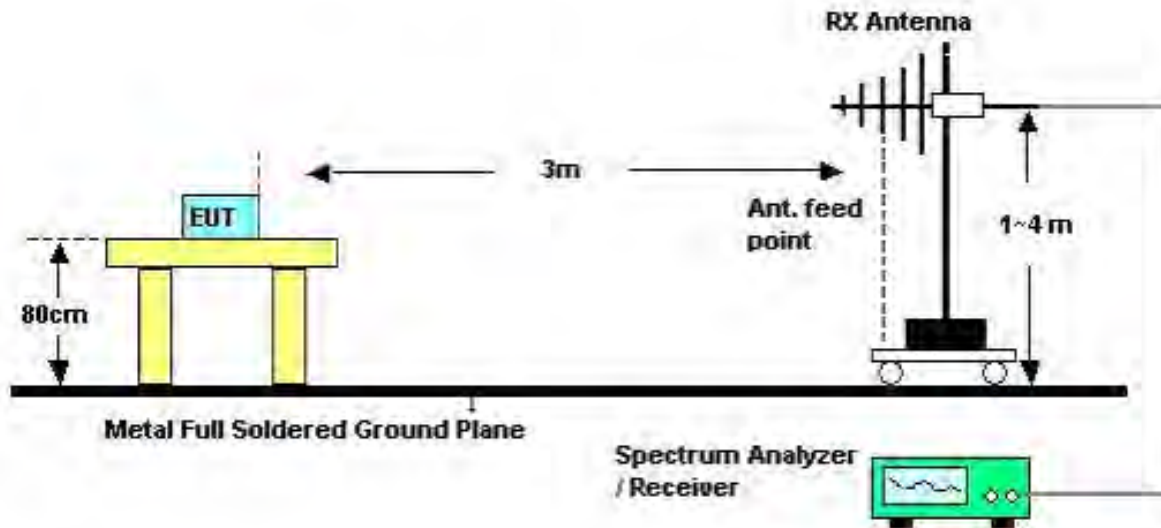
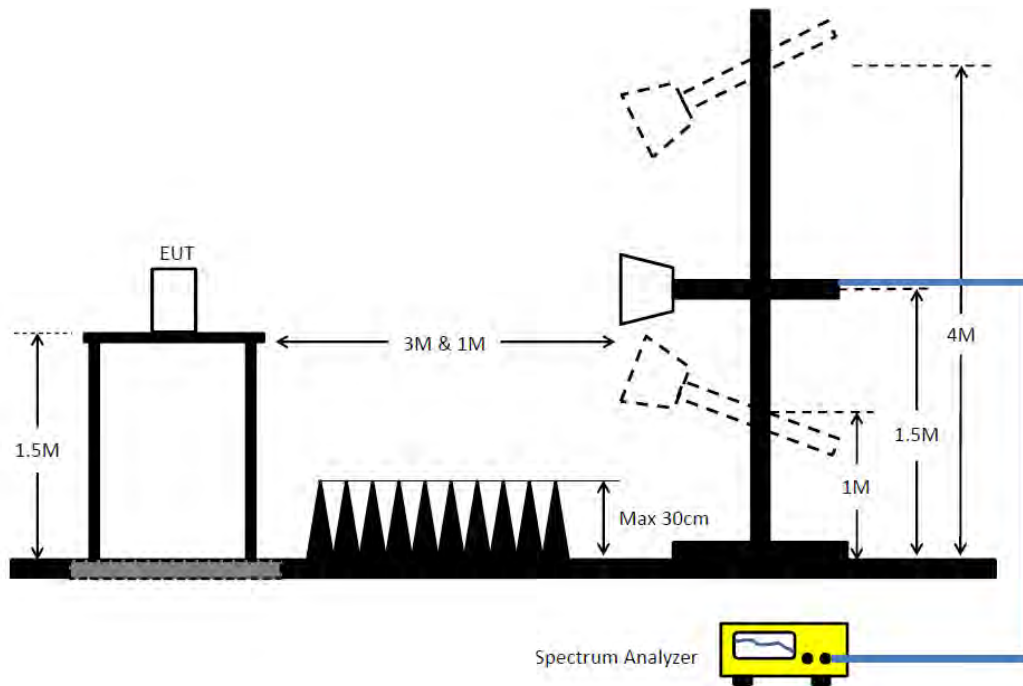
Frequency Range	Limit
Radiated emissions below 40 GHz	FCC 15.209
Radiated emissions above 40 GHz – 200GHz	90 pW/cm <sup>2</sup> @ 3 m (Equivalent EIRP 102 μW, -9.91dBm)
NOTE 1: For the applicable limit, see FCC 15.255(d)	
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

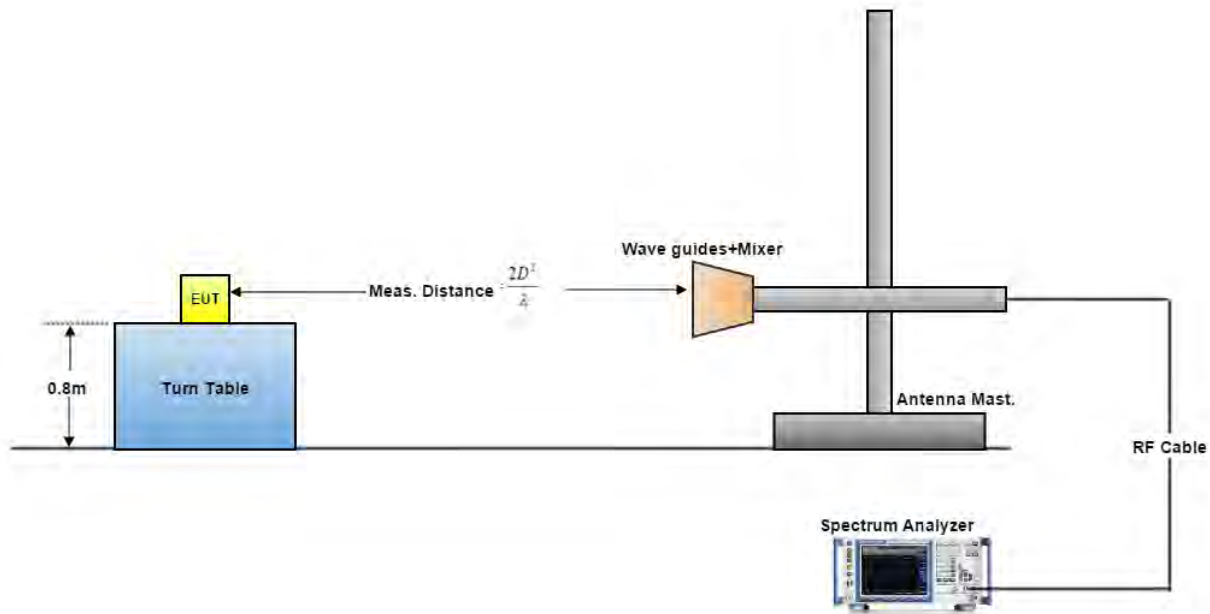
#### 3.5.2 Test Procedures

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

#### 3.5.3 Test Setup



**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 =  $20 \log (\text{spec. distance [3 m]} / \text{measurement distance [N m]})$  (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.



### **3.5.5 Measurement Results Calculation**

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

#### **3.5.5.1 Test Result of Transmitter Spurious Emissions (Below 30MHz)**

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

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

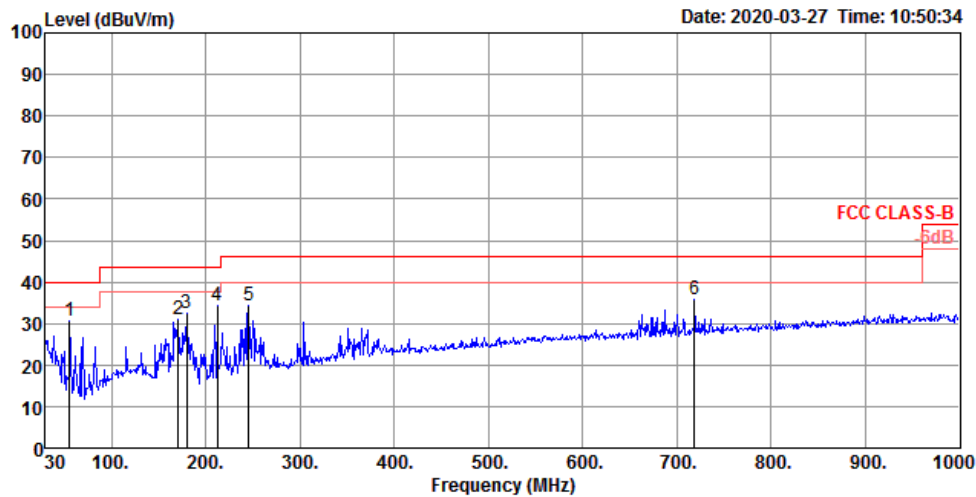
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.



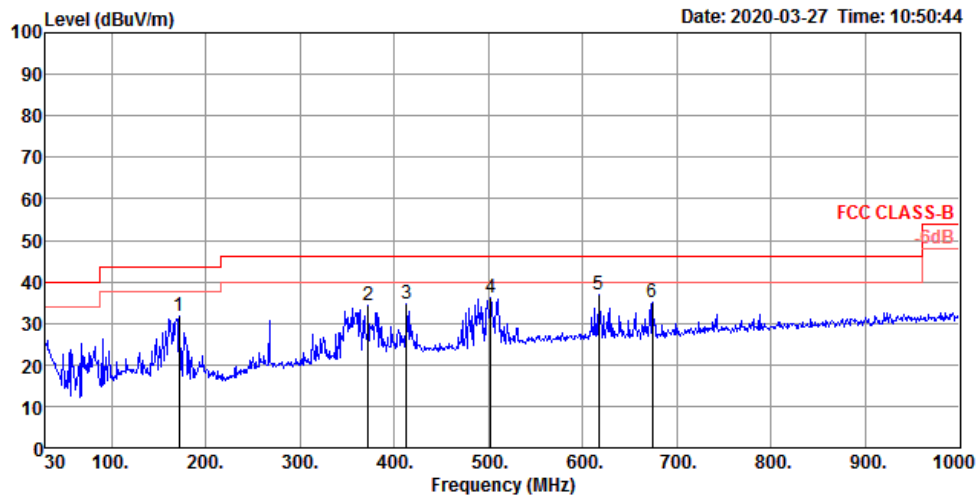
### 3.5.5.2 Test Result of Transmitter Spurious Emissions

Test Range	30 MHz – 1000 MHz	Test Distance	3 m
Test Configuration	CTX		

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	55.22	30.53	40.00	-9.47	47.79	0.92	13.62	31.80	150	84	Peak VERTICAL
2	170.65	30.96	43.50	-12.54	45.23	1.67	15.97	31.91	125	145	Peak VERTICAL
3	179.38	32.42	43.50	-11.08	47.16	1.72	15.53	31.99	150	106	Peak VERTICAL
4	212.36	34.45	43.50	-9.05	48.20	1.81	16.40	31.96	300	316	Peak VERTICAL
5	245.34	34.19	46.00	-11.81	45.70	2.01	18.50	32.02	300	328	Peak VERTICAL
6	718.70	35.87	46.00	-10.13	38.93	3.53	25.84	32.43	300	48	Peak VERTICAL

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	171.62	31.84	43.50	-11.66	46.15	1.67	15.94	31.92	100	28	Peak HORIZONTAL
2	372.41	34.43	46.00	-11.57	42.30	2.51	21.78	32.16	100	166	Peak HORIZONTAL
3	413.15	34.83	46.00	-11.17	41.79	2.62	22.64	32.22	100	2	Peak HORIZONTAL
4	502.39	36.32	46.00	-9.68	41.99	2.94	23.86	32.47	150	283	Peak HORIZONTAL
5	616.85	36.90	46.00	-9.10	40.88	3.29	25.11	32.38	100	4	Peak HORIZONTAL
6	674.08	35.12	46.00	-10.88	38.72	3.36	25.55	32.51	125	0	Peak HORIZONTAL

Note: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



<b>Test Range</b>	1 GHz – 18 GHz	<b>Test Distance</b>	3 m
<b>Test Freq. (GHz)</b>	60.61		

**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	4987.17	46.03	74.00	-27.97	44.71	6.15	31.46	36.29	183	283	Peak	VERTICAL
2	4987.49	37.61	54.00	-16.39	36.29	6.15	31.46	36.29	183	283	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	4987.46	45.75	74.00	-28.25	44.43	6.15	31.46	36.29	150	150	Peak	HORIZONTAL
2	4987.51	35.75	54.00	-18.25	34.43	6.15	31.46	36.29	150	150	Average	HORIZONTAL

Note: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.





<b>Test Range</b>	18 GHz – 40 GHz	<b>Test Distance</b>	1 m
<b>Test Freq. (GHz)</b>	60.61		

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	26398.10	50.77	63.54	-12.77	41.32	16.98	39.50	47.03	150	23	Average	VERTICAL
2	26398.50	63.96	83.54	-19.58	54.51	16.98	39.50	47.03	150	23	Peak	VERTICAL

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	26397.72	50.47	63.54	-13.07	41.02	16.98	39.50	47.03	150	330	Average	HORIZONTAL
2	26399.55	63.85	83.54	-19.69	54.40	16.98	39.50	47.03	150	330	Peak	HORIZONTAL

Note: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



<b>Test Range</b>	40GHz – 200GHz
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<b>Test Frequency (GHz)</b>	<b>Rx Antenna Gain (dBi)</b>	<b>Measurement Distance (m)</b>	<b>Read Worse Frequency (GHz)</b>	<b>Read Level (dBm)</b>
60.61	23.6	0.50	50.02	-95.43
<b>EIRP (dBm)</b>	<b>Specification Distance (m)</b>	<b>Power Density (pW/cm^2)</b>	<b>Limit (pW/cm^2)</b>	<b>Test Result</b>
-58.63	3	0.0012	90	PASS

Note:

$EIRP = Prx - Grx + \text{Free Space Path Loss} = Prx - Grx + 20\log(4\pi d / \lambda)^2$

Which

$Prx = \text{Read Level.}$

$Grx = \text{Rx Antenna Gain.}$

A distance factor is offset and the formula is  $20\log(D1/D2)$

Which

$D1 = \text{Specification Distance}$

$D2 = \text{Measurement Distance}$

### 3.6 Frequency Stability

#### 3.6.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 15.255(f) 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.	

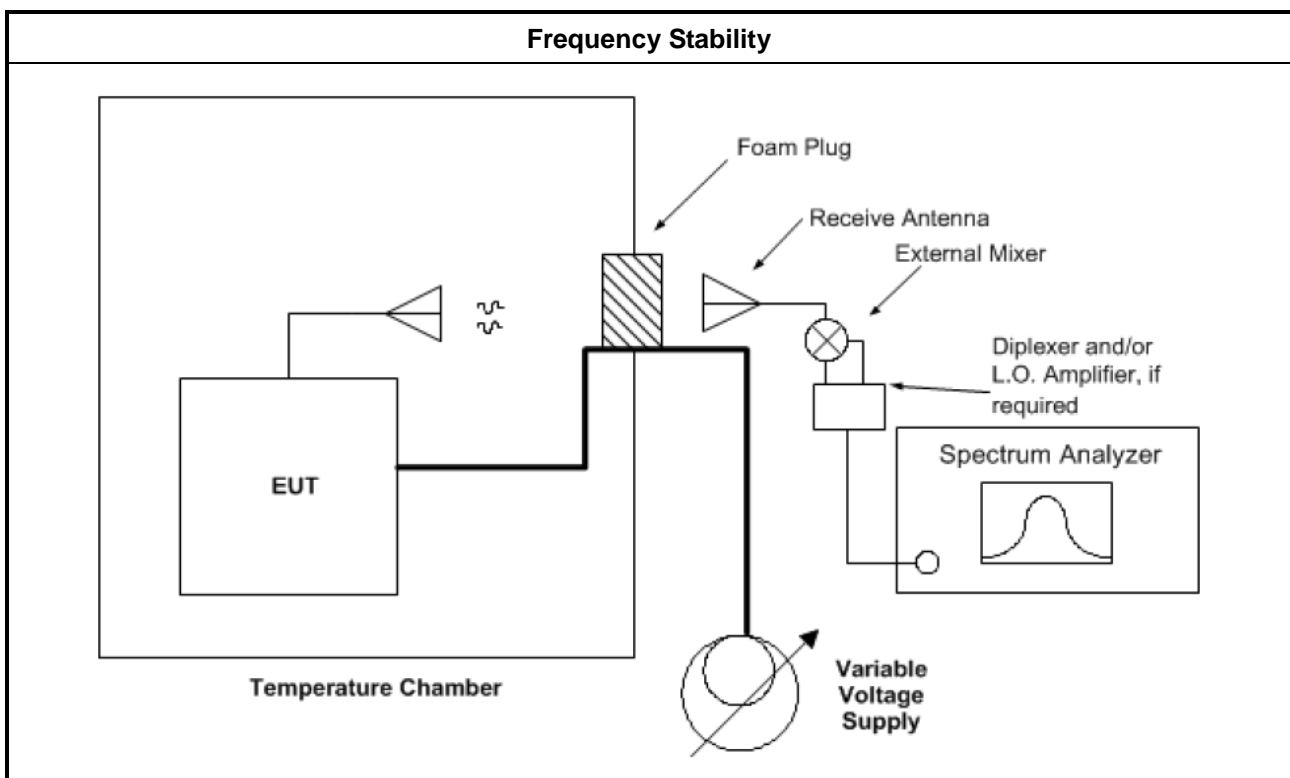
#### 3.6.2 Measuring Instruments

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



**3.6.5 Test Result of Frequency Stability**

<b>Test Conditions</b>	see ANSI C63.10, clause 5.11 & clause 9
<b>Test Setup</b>	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			
Test Results			
Test Temp.erature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
5	60.784	-1	Within band
10	60.785	0	Within band
20	60.785	Reference	Within band
30	60.785	0	Within band
35	60.785	0	Within band
NOTE: The manufacturer's specified temperature range of 5 to 35°C.			

**3.6.5.2 Frequency Stability When Varying Supply Voltage**

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vdc)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
16.15	60.784	-1	Within band
19	60.785	Reference	Within band
21.85	60.784	-1	Within band



### **3.7 Operation Restriction and Group Installation**

#### **3.7.1 Limit of Operation Restriction and Group Installation**

<b>Item</b>	<b>Limit</b>
Operation Restriction	Operation is not permitted for the following products: <ul style="list-style-type: none"><li>♦ Equipment used on aircraft or satellites. (Refer as FCC 15.255 (a))</li><li>♦ Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as FCC 15.255 (a))</li></ul>
Group Installation	Operation is not permitted for the following products: <ul style="list-style-type: none"><li>♦ External phase-locking (Refer as FCC 15.255 (h))</li></ul>

#### **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	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2019	Nov. 20, 2020	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Oct. 30, 2019	Oct. 29, 2020	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Mar. 10, 2020	Mar. 09, 2021	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Oct. 21, 2019	Oct. 20, 2020	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 16, 2020	Mar. 15, 2021	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCi	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCi	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 27, 2020	Mar. 26, 2021	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1291	1GHz~18GHz	Oct. 05, 2019	Oct. 04, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 01, 2019	Apr. 30, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz ~ 26.5GHz	Apr. 16, 2019	Apr. 15, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz ~ 26.5GHz	Apr. 15, 2020	Apr. 14, 2021	Radiation (03CH05-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Aug. 15, 2019	Aug. 14, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	LOW Cable-04+23	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Oct. 01 2019	Sep. 30, 2020	Radiation (03CH05-CB)
Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Oct. 25 2019	Oct. 24, 2020	Radiation (03CH05-CB)
Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Oct. 25 2019	Oct. 24, 2020	Radiation (03CH05-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Oct. 25 2019	Oct. 24, 2020	Radiation (03CH05-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Oct. 25 2019	Oct. 24, 2020	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	N.C.R	N.C.R	Radiation (03CH05-CB)
Detector	Millitech	DET-15-RPF W0	#A17807(067)	50 ~ 75 GHz	Dec. 12, 2019	Dec. 11, 2020	Radiation (03CH05-CB)
Pico Scope	Pico	Pico Scope 6402C	CX372/002	N/A	Jul. 07, 2019	Jul. 06, 2020	Radiation (03CH05-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	May 30, 2019	May 29, 2020	Conducted (TH03-CB)

Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.





## 5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 60GHz)	4.6 dB	Confidence levels of 95%
Radiated Emission (60GHz ~ 90GHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (90GHz ~ 200GHz)	5.6 dB	Confidence levels of 95%
Temperature	1°C	Confidence levels of 95%