FCC RADIO TEST REPORT

FCC ID	:	HEDML60PRS4601
Equipment	:	Metrolinq 60GHz Module
Brand Name	:	IgniteNet
Model Name	:	RDO-60-FB-USBB-18BF
Applicant	:	Accton Technology Corporation No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer (1)	:	Joy Technology (Shen Zhen) Co. Ltd HengKeng Ind., Shangpai, Shangwu, Aiqun Rd., Shiyan Town, Shenzhen 518108 China
Manufacturer (2)	:	Accton Technology Corporation No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Standard	:	47 CFR FCC Part 15.255

The product was received on Aug. 15, 2019, and testing was started from Sep. 27, 2019 and completed on Oct. 08, 2019. 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 variant 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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History of this test report

Report No.	Version	Description	Issued Date
FR791405-12	01	Initial issue of report	Oct. 29, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	FCC 15.255(e)	Occupied Bandwidth	PASS	-
3.2	FCC 15.255(c)	EIRP Power	PASS	-
3.3	FCC 15.255(c)	Peak Conducted Power	PASS	-
3.4	FCC 15.255(d)	Transmitter Spurious Emissions	PASS	-
3.5	FCC 15.255(f)	Frequency Stability	PASS	-
3.6	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: Viola Huang

1 General Description

1.1 Information

1.1.1 The Channel Plan(s)

Frequency Range	57-71 GHz
The Channel Plan(s)	Channel 1: 58.32 GHz Channel 1.5: 59.40 GHz Channel 2: 60.48 GHz Channel 2.5: 61.56 GHz Channel 3: 62.64 GHz Channel 3.5: 63.72 GHz Channel 4: 64.80 GHz Channel 4.5: 65.88 GHz
Bandwidth	1.08GHz / 2.16 GHz

1.1.2 Modulation

IEEE 802.11ad Modulation Scheme

MCS Index	Modulation	Code rate	Data rate (Mbit/s)
0	π/2-BPSK	1/2	27.5
1	π/2-BPSK	1/2	385
2	π/2-BPSK	1/2	770
3	π/2-BPSK	5/8	962.5
4	π/2-BPSK	3/4	1155
5	π/2-BPSK	13/16	1251.25
6	π/2-QPSK	1/2	1540
7	π/2-QPSK	5/8	1925
8	π/2-QPSK	3/4	2310
9	π/2-QPSK	13/16	2502.5
10	π/2-16QAM	1/2	3080
11	π/2-16QAM	5/8	3850
12	π/2-16QAM	3/4	4620
12.1	π/2-16QAM	13/16	5005

1.1.3 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Accton	120300000225X	Chip Ant.	N/A	17.2

Note: The above information was declared by manufacturer.

1.1.4 Operating Conditions

Operating Conditions				
☐ -20 °C to +50 °C				
☐ 0 °C to +40 °C				
☒ Other: -40 °C to +70 °C				
EUT Power Type	From Host System			
Supply Voltage	☐ AC	State AC voltage		V
Supply Voltage	☒ DC	State DC voltage	5	V

1.1.5 Duty Cycle

Duty Cycle	Duty Cycle Factor (dB)
100 %	0

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 (except outdoor fixed Point to Point)
☐ Outdoor fixed Point to Point

Note: The above information was declared by manufacturer.

1.1.8 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR791405

Below is the table for the change of the product with respeco the orit tginal one.

Modifications	Performance Checking
Adding bandwidth 1.08GHz channel 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5 and bandwidth 2.16GHz channel 1.5, 2.5, 3.5, 4.5. (Please refer to section 1.1.1 for detail information.)	1. Occupied Bandwidth 2. EIRP Power 3. Peak Conducted Power 4. Transmitter Spurious Emissions 5. Frequency Stability

1.2 Applicable 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”

1.3 Testing Location

Testing Location			
☐	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
☒	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
Radiated	03CH05-CB	RJ Huang	23.7~25°C / 59~61%	Sep. 27, 2019 ~ Oct. 08, 2019
RF Conducted	TH03-CB	Lucas Huang	24.1~25.2°C / 50~54%	Oct. 14, 2019

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

Test Channel Frequencies Configuration	
Channel 1	58.32 GHz
Channel 1.5	59.40 GHz
Channel 2	60.48 GHz
Channel 2.5	61.56 GHz
Channel 3	62.64 GHz
Channel 3.5	63.72 GHz
Channel 4	64.80 GHz
Channel 4.5	65.88 GHz

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
Occupied Bandwidth	For bandwidth 1.08GHz: 58.32, 62.64, 65.88 For bandwidth 2.16GHz: 59.40, 61.56, 63.72, 65.88
EIRP Power	For bandwidth 1.08GHz: 58.32, 62.64, 65.88 For bandwidth 2.16GHz: 59.40, 61.56, 63.72, 65.88
Peak Conducted Power	For bandwidth 1.08GHz: 58.32, 62.64, 65.88 For bandwidth 2.16GHz: 59.40, 61.56, 63.72, 65.88
Transmitter Spurious Emissions (below 1 GHz)	65.88
Transmitter Spurious Emissions (1 GHz-40 GHz)	For bandwidth 1.08GHz: 58.32, 62.64, 65.88 For bandwidth 2.16GHz: 59.40, 61.56, 63.72, 65.88
Transmitter Spurious Emissions (above 40 GHz)	For bandwidth 1.08GHz: 58.32, 62.64, 65.88 For bandwidth 2.16GHz: 59.40, 61.56, 63.72, 65.88
Frequency Stability	For bandwidth 1.08GHz: 62.64 For bandwidth 2.16GHz: 61.56

The following test modes were performed for all tests:

For Radiated Emission Below 1GHz test:

The EUT was performed at X axis, Y axis and Z axis position for Transmitter Spurious Emissions (above 1 GHz) test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. EUT in Y axis / Bandwidth 1.08GHz

Mode 2. EUT in Y axis / Bandwidth 2.16GHz

For Radiated Emission Above 1GHz test:

The EUT was performed at X axis, Y axis and Z axis position and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. EUT in Y axis / Bandwidth 1.08GHz

Mode 2. EUT in Y axis / Bandwidth 2.16GHz

2.3 Accessories

Accessories
USB cable*1: Shielded, 0.7m

2.4 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A

2.5 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

For mode 1: 1.08 GHz

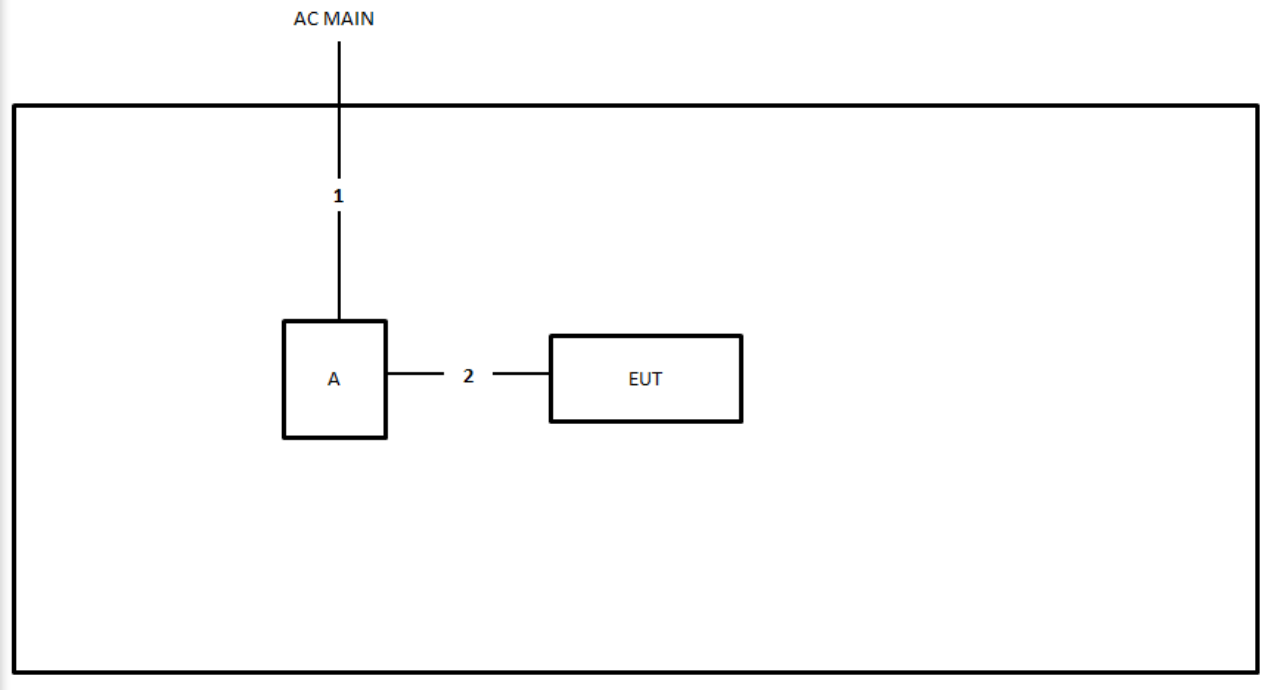
Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
58.32	0.03	0.0051440	0.350	34.99
62.64	0.03	0.0047893	0.376	37.58
65.88	0.03	0.0045537	0.395	39.53

For mode 2: 2.16 GHz

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
59.40	0.03	0.0050505	0.356	35.64
61.56	0.03	0.0048733	0.369	36.94
63.72	0.03	0.0047081	0.382	38.23
65.88	0.03	0.0045537	0.395	39.53

2.6 Test Setup Diagram

Test Setup Diagram - Transmitter Spurious Emissions



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	USB cable	Yes	0.7m

3 Transmitter Test Result

3.1 Occupied Bandwidth

3.1.1 Limit of Occupied Bandwidth

6dBc Bandwidth (see Note 1)	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.

3.1.2 Measuring Instruments

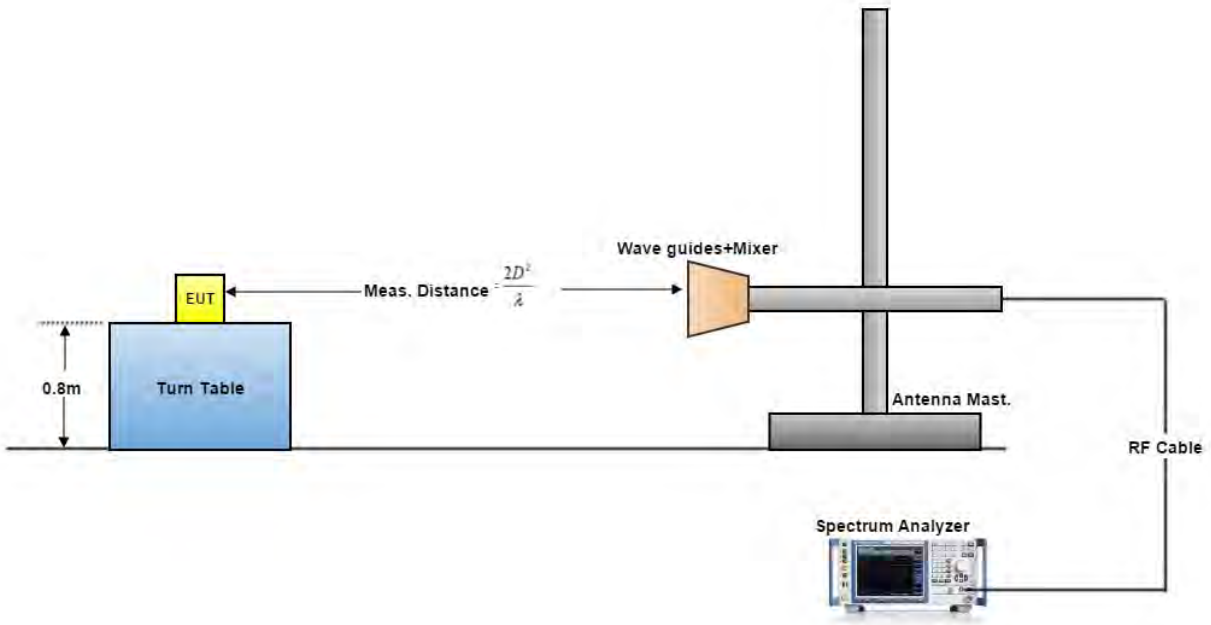
Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup

Occupied Channel Bandwidth



3.1.5 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.

For mode 1: 1.08 GHz

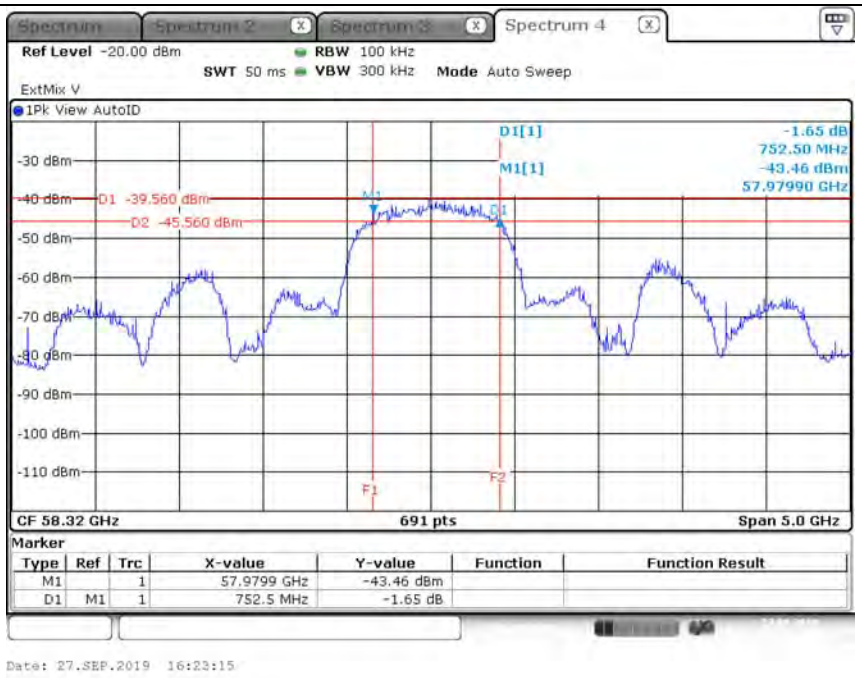
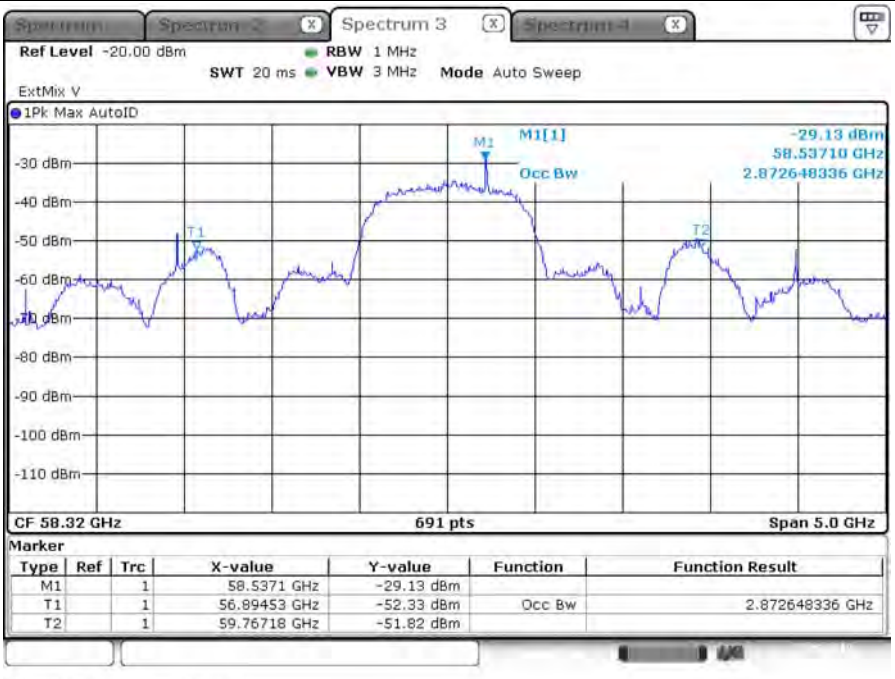
Test Results				
Channel Plan (GHz)	**Test Freq. (GHz)**	**6 dBc Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**	**Limit (MHz)**
Channel 1	58.32	752.50	2872.65	N/A
Channel 3	62.64	897.30	2778.58	N/A
Channel 4.5	65.88	795.90	2858.17	N/A

For mode 2: 2.16 GHz

Test Results				
Channel Plan (GHz)	**Test Freq. (GHz)**	**6 dBc Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**	**Limit (MHz)**
Channel 1.5	59.40	1512.30	1939.22	N/A
Channel 2.5	61.56	1476.10	1968.16	N/A
Channel 3.5	63.72	1570.20	1975.40	N/A
Channel 4.5	65.88	1418.20	2395.00	N/A

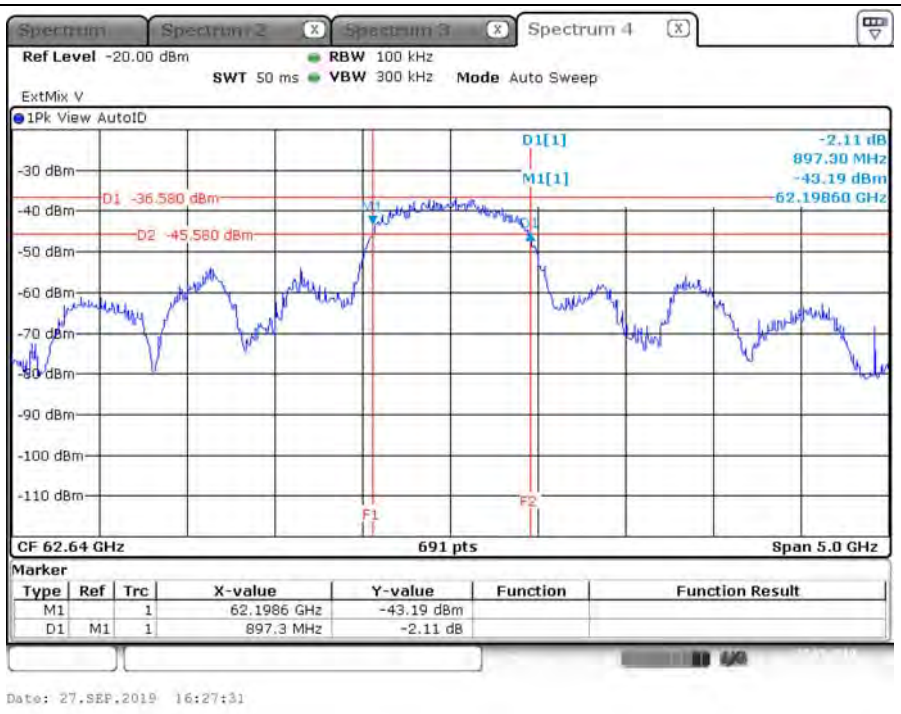
3.1.5.1 Bandwidth Plots

For mode 1: 1.08 GHz

Test Frequency: 58.32 GHz
6 dBc Bandwidth

Occupied Bandwidth


Test Frequency: 62.64 GHz

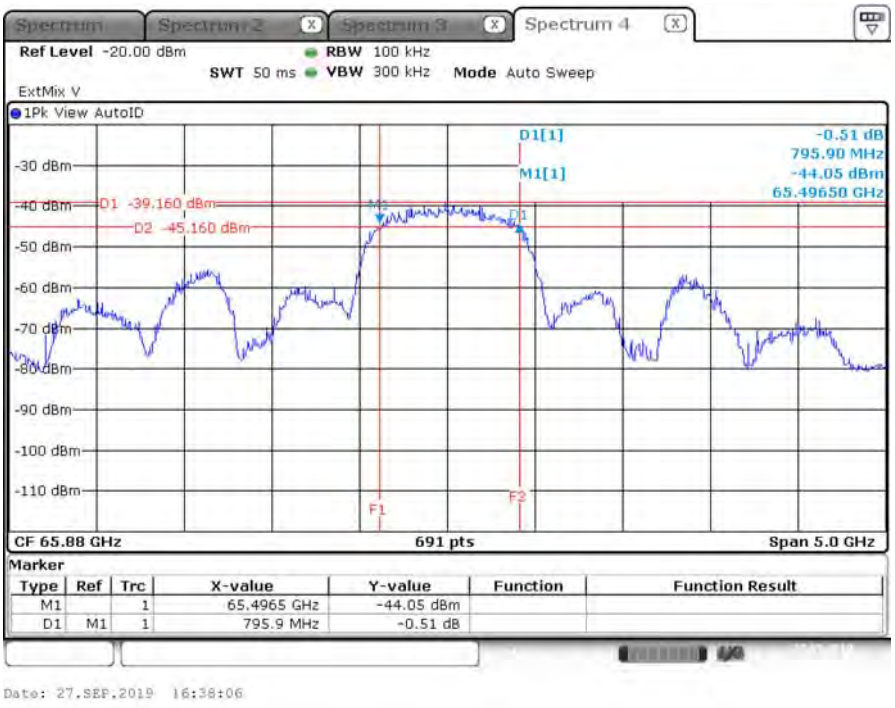
6 dBc Bandwidth



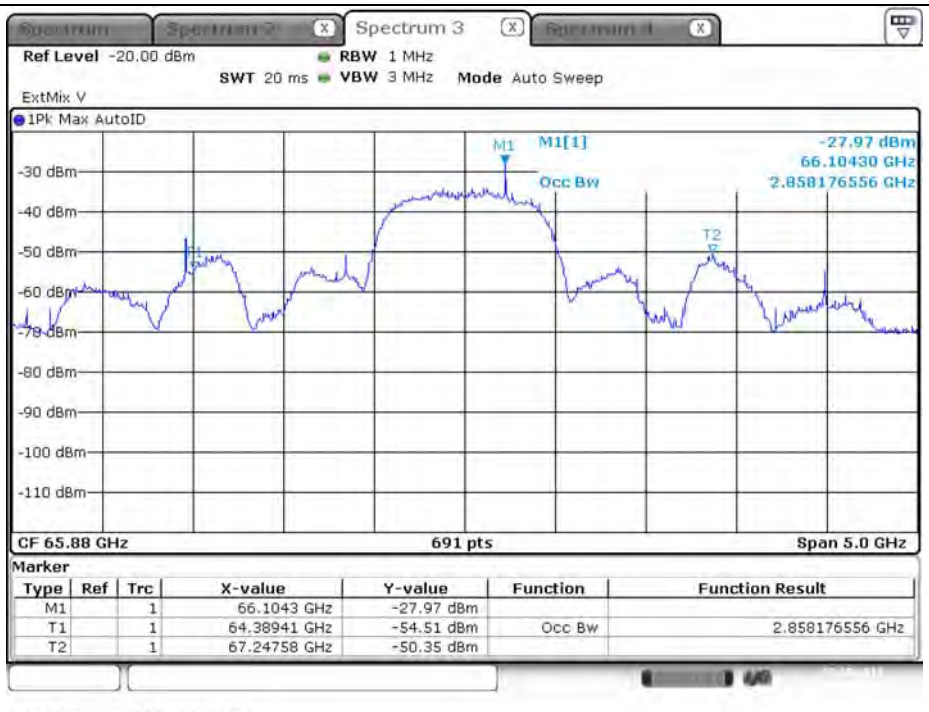
Occupied Bandwidth

Test Frequency: 65.88 GHz

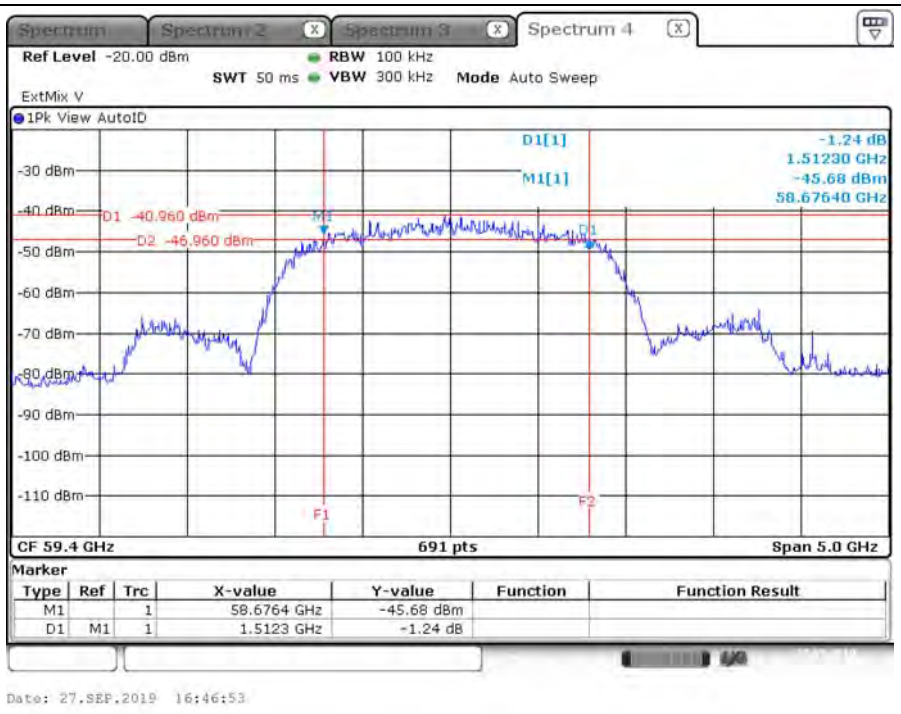
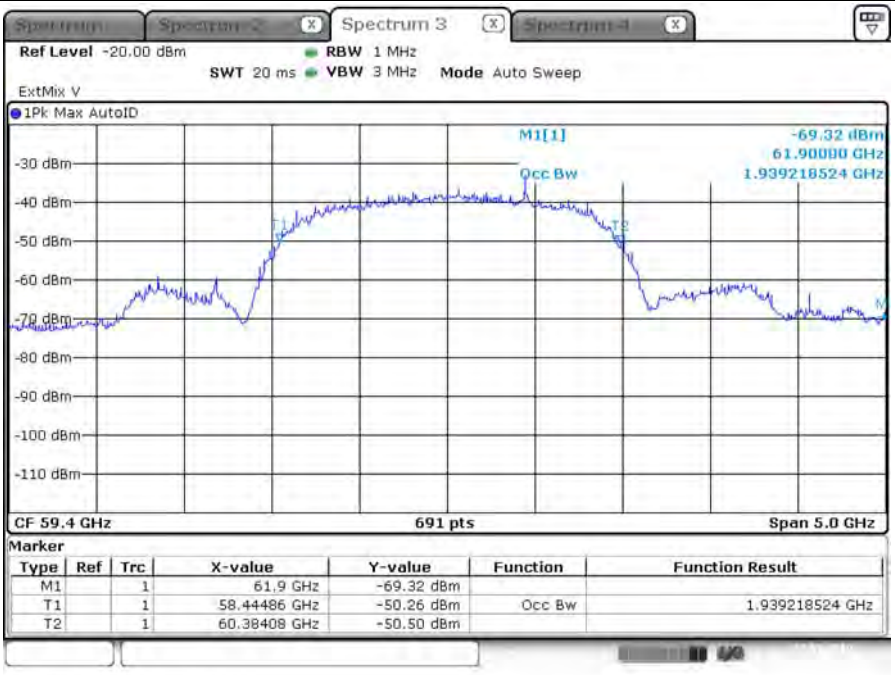
6 dBc Bandwidth



Occupied Bandwidth

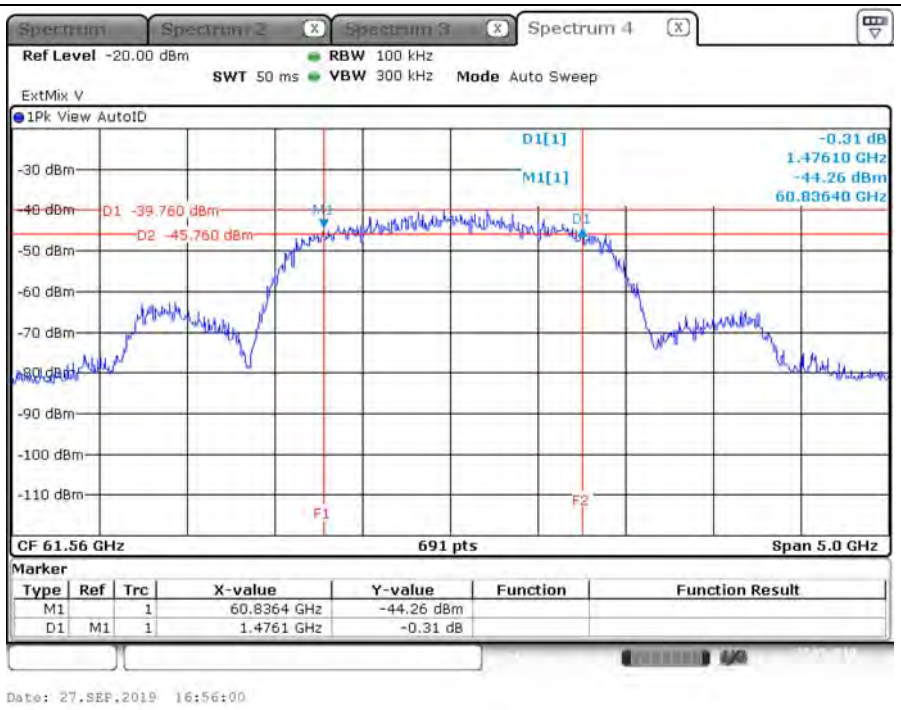


For mode 2: 2.16 GHz

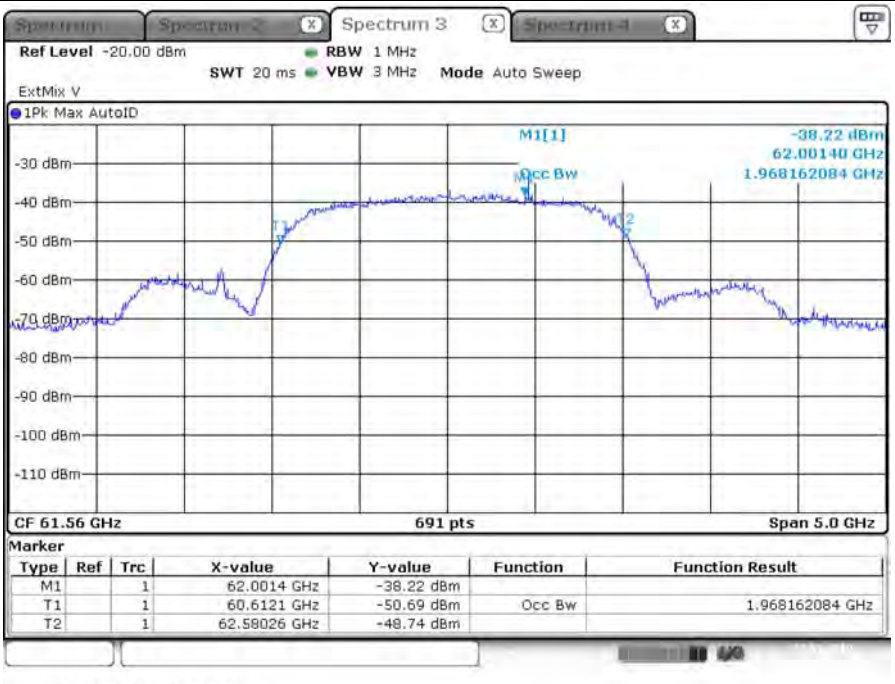
Test Frequency: 59.40 GHz
6 dBc Bandwidth

Occupied Bandwidth


Test Frequency: 61.56 GHz

6 dBc Bandwidth

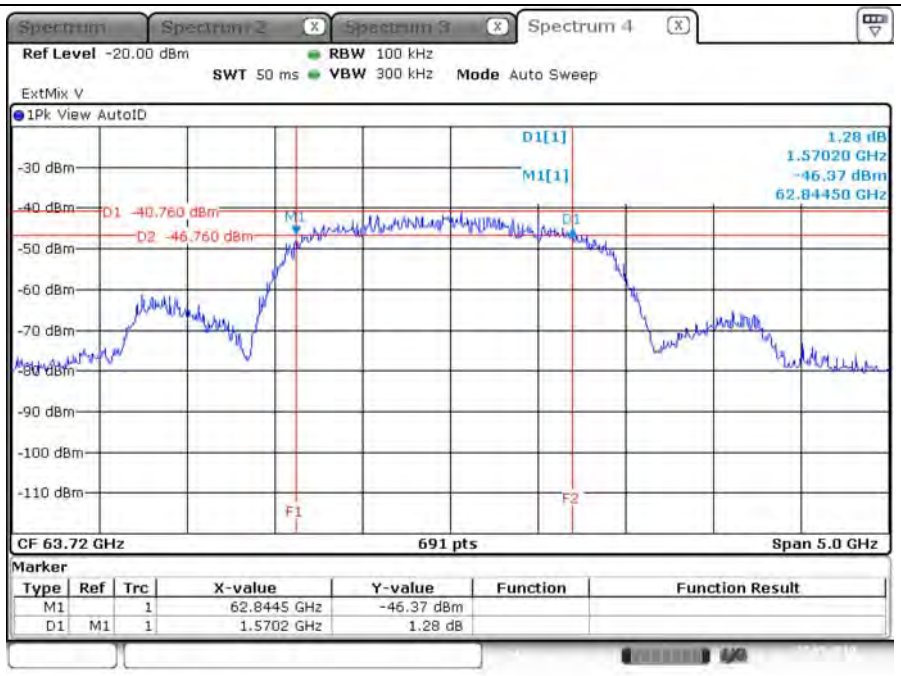


Occupied Bandwidth

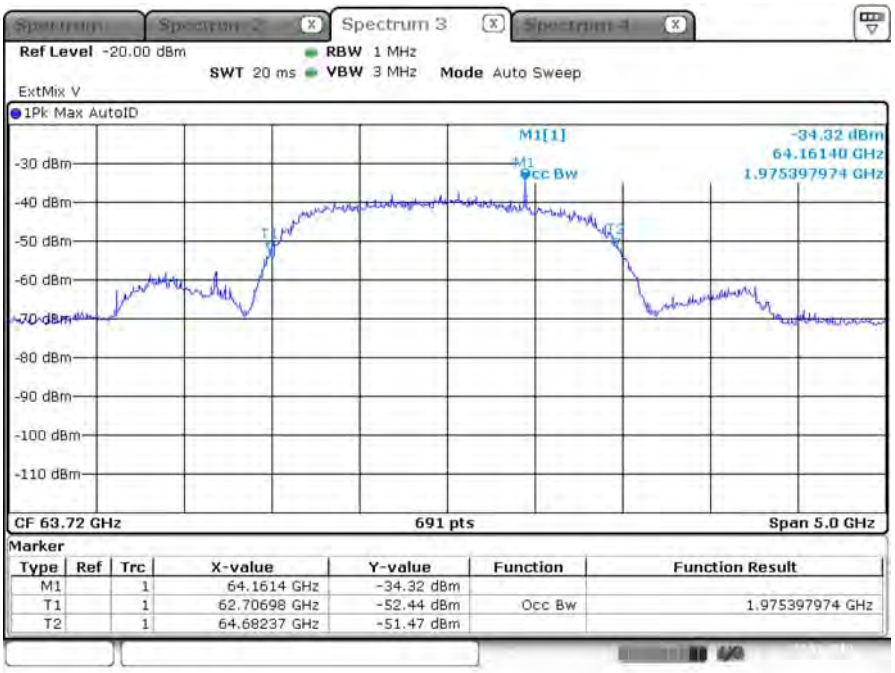


Test Frequency: 63.72 GHz

6 dBc Bandwidth

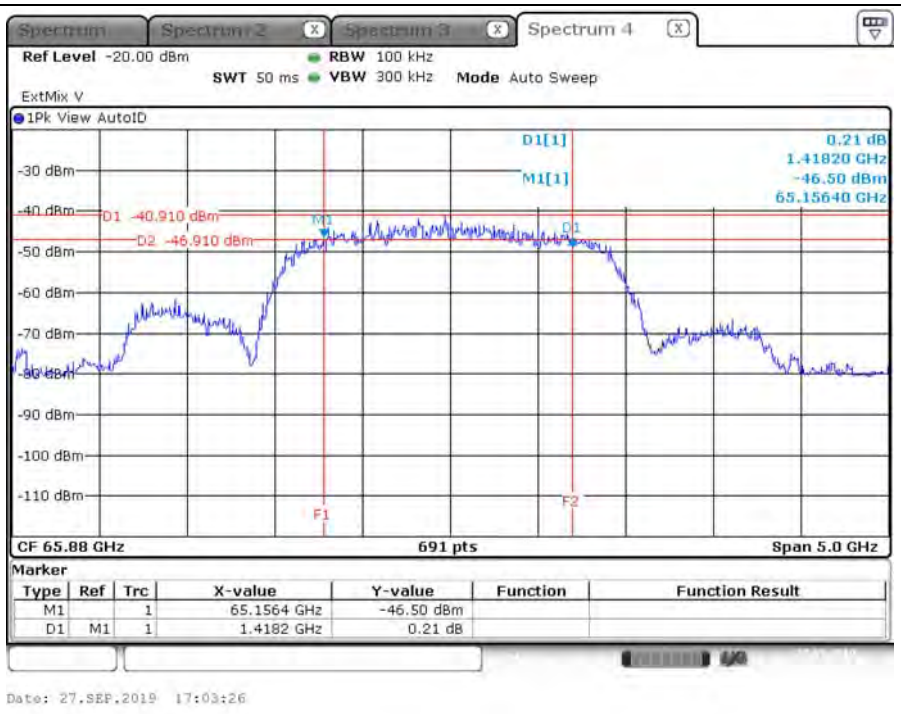


Occupied Bandwidth

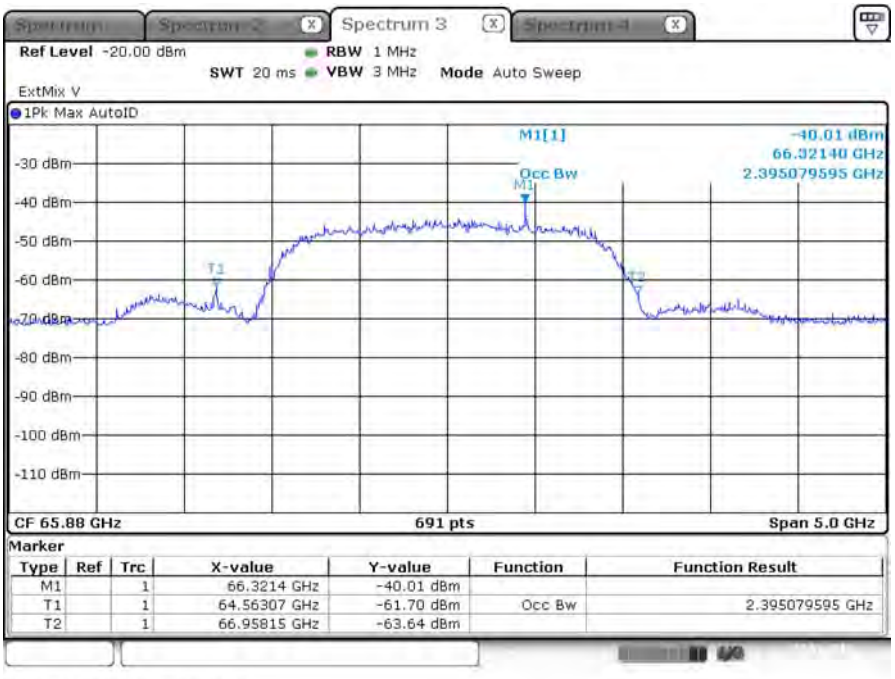


Test Frequency: 65.88 GHz

6 dBc Bandwidth



Occupied Bandwidth



3.2 EIRP Power

3.2.1 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)

3.2.2 Measuring Instruments

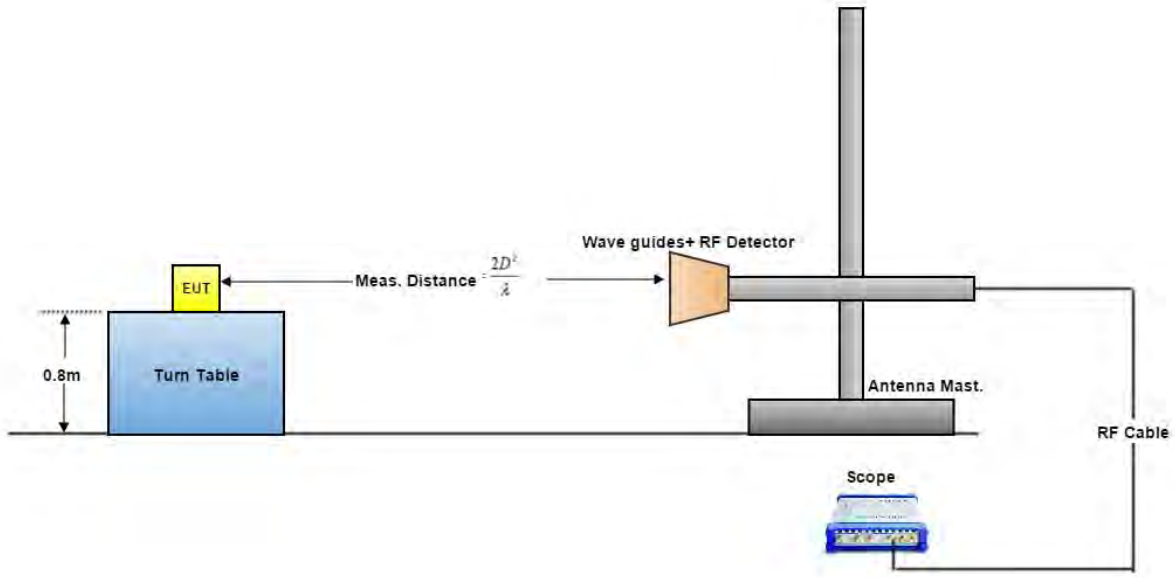
Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup

EIPR Power



3.2.5 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.

3.2.5.1 Test Result of EIRP Power

For mode 1: 1.08 GHz

Test Distance	1 m											
Test Results												
Channel Plan (GHz)	**Test Freq. (GHz)**	**Rx Gain (dBi)**	**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
Channel 1	58.32	23.6	356.32	79.68	-4.04	-14.06	144.93	134.91	40.13	30.11	43	40
Channel 3	62.64	23.6	335.32	87.22	-4.54	-14.64	145.05	134.95	40.25	30.15	43	40
Channel 4.5	65.88	23.6	343.30	80.59	-4.62	-14.57	145.41	135.46	40.61	30.66	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.

$E = 126.8 – 20\log(\lambda) + P - G$

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 (c)

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)”.

For mode 2: 2.16 GHz

Test Distance	1 m											
Test Results												
Channel Plan (GHz)	**Test Freq. (GHz)**	**Rx Gain (dBi)**	**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
Channel 1.5	59.40	23.6	348.76	81.50	-4.22	-14.05	144.91	135.08	40.11	30.28	43	40
Channel 2.5	61.56	23.6	334.90	78.77	-4.56	-14.41	144.88	135.03	40.08	30.23	43	40
Channel 3.5	63.72	23.6	330.70	82.67	-4.55	-14.58	145.19	135.16	40.39	30.36	43	40
Channel 4.5	65.88	23.6	337.84	76.69	-4.48	-14.87	145.55	135.16	40.75	30.36	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.

$E = 126.8 – 20\log(\lambda) + P - G$

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.

$EIRP = E\text{-meas} + 20\log(d\text{-meas}) - 104.7$

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 (c)

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)”.

3.3 Peak Conducted Power

3.3.1 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)	

3.3.2 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 9.5

3.3.4 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.	

3.3.4.1 Peak Conducted Power

For mode 1: 1.08 GHz

Test Results							
Channel Plan (GHz)	**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)
Channel 1	58.32	40.13	17.2	22.93	196.514	752.50	500.00
Channel 3	62.64	40.25	17.2	23.05	202.051	897.30	500.00
Channel 4.5	65.88	40.61	17.2	23.41	219.414	795.90	500.00

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 3.1.5.

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(cond) = EIRP - G(dBi)

where:

G(dBi) is gain of EUT antenna.

For mode 2: 2.16 GHz

Test Results							
Channel Plan (GHz)	**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)
Channel 1.5	59.40	40.11	17.2	22.91	195.583	1512.30	500.00
Channel 2.5	61.56	40.08	17.2	22.88	194.247	1476.10	500.00
Channel 3.5	63.72	40.39	17.2	23.19	208.597	1570.20	500.00
Channel 4.5	65.88	40.75	17.2	23.55	226.602	1418.20	500.00

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 3.1.5.

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(cond) = EIRP - G(dBi)

where:

G(dBi) is gain of EUT antenna.

3.4 Transmitter Spurious Emissions

3.4.1 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(d)	
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

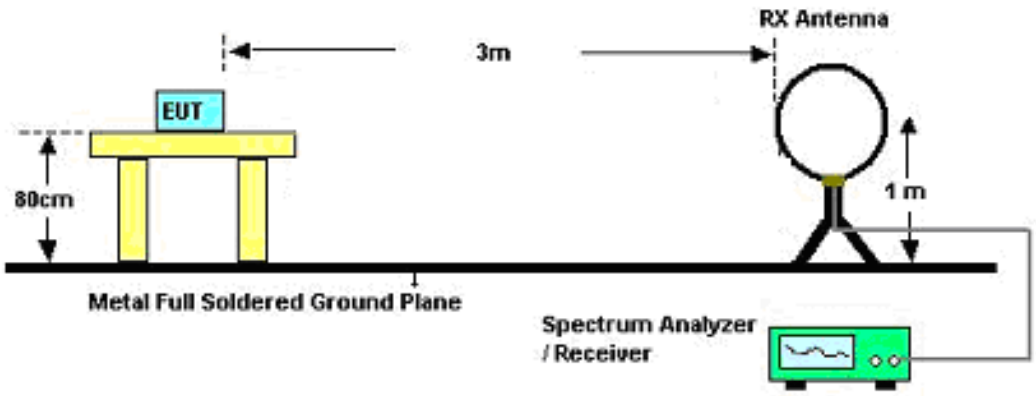
3.4.2 Test Procedures

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

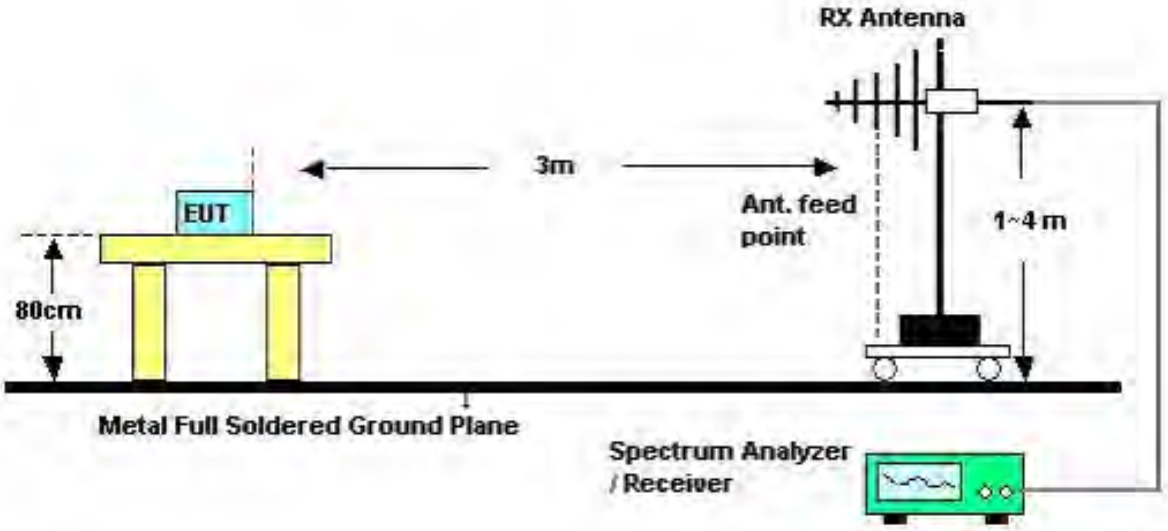
3.4.3 Test Setup

Transmitter Spurious Emissions

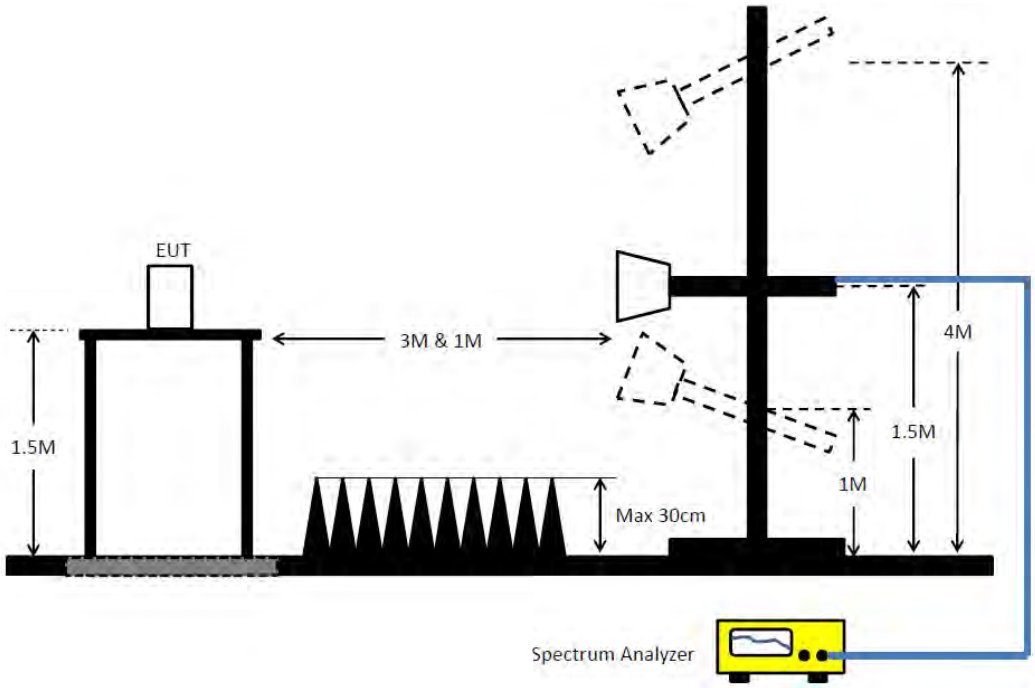
9kHz ~30MHz



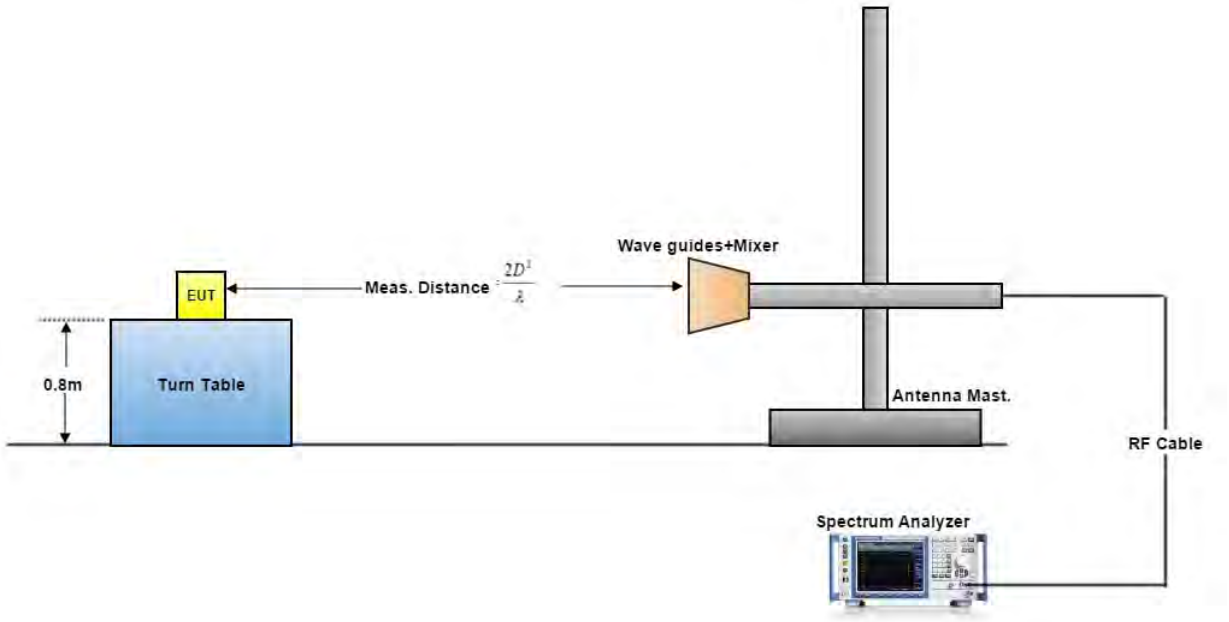
30MHz~1GHz



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.

3.4.4 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.	

3.4.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.4.5.1 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.

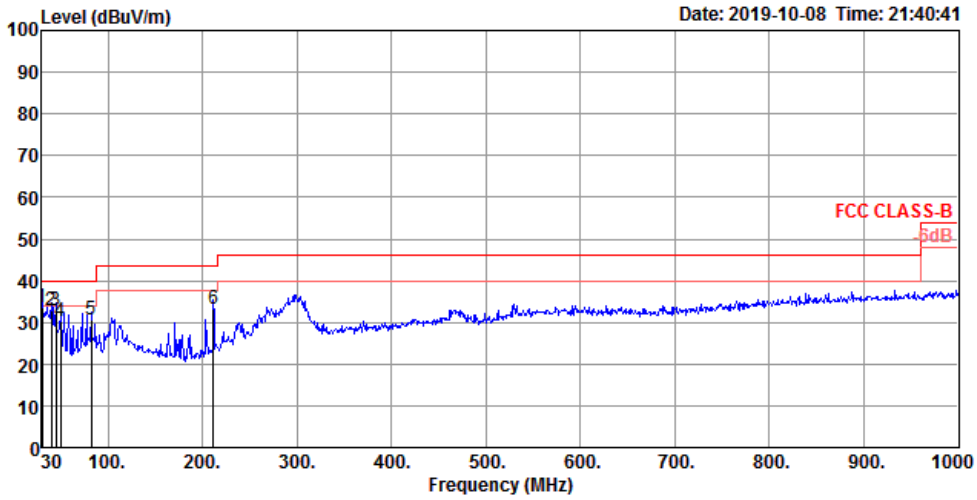
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

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.

3.4.5.2 Test Result of Transmitter Spurious Emissions

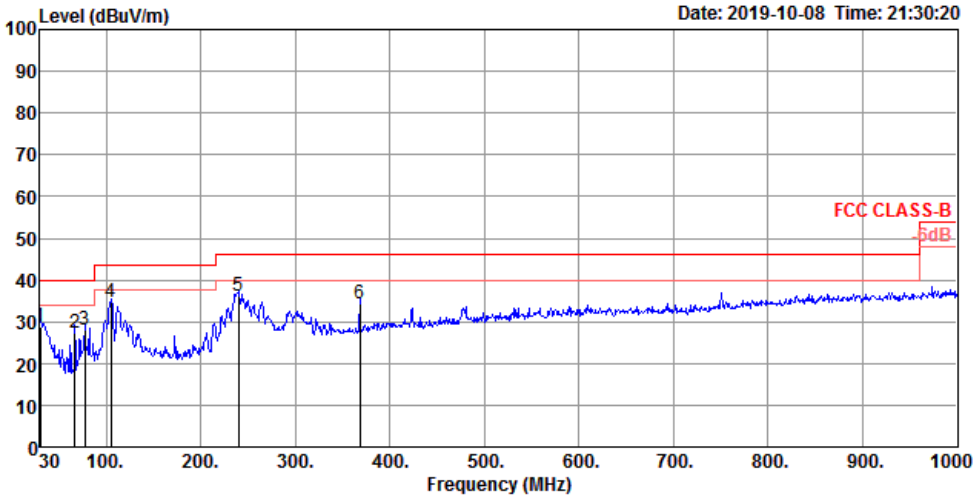
Test Range	30 MHz – 1000 MHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	mode 1: 1.08 GHz
Test Freq. (GHz)	65.88 GHz		

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	30.00	33.72	40.00	-6.28	38.93	0.67	25.70	31.58	125	264	QP	VERTICAL
2	39.70	32.70	40.00	-7.30	43.42	0.83	19.96	31.51	100	252	QP	VERTICAL
3	44.55	32.76	40.00	-7.24	46.21	0.89	17.25	31.59	100	244	QP	VERTICAL
4	49.40	30.23	40.00	-9.77	45.94	0.92	15.09	31.72	100	252	QP	VERTICAL
5	82.38	30.54	40.00	-9.46	47.50	1.14	13.76	31.86	100	228	QP	VERTICAL
6	211.39	33.35	43.50	-10.15	47.10	1.81	16.40	31.96	200	318	QP	VERTICAL

Horizontal

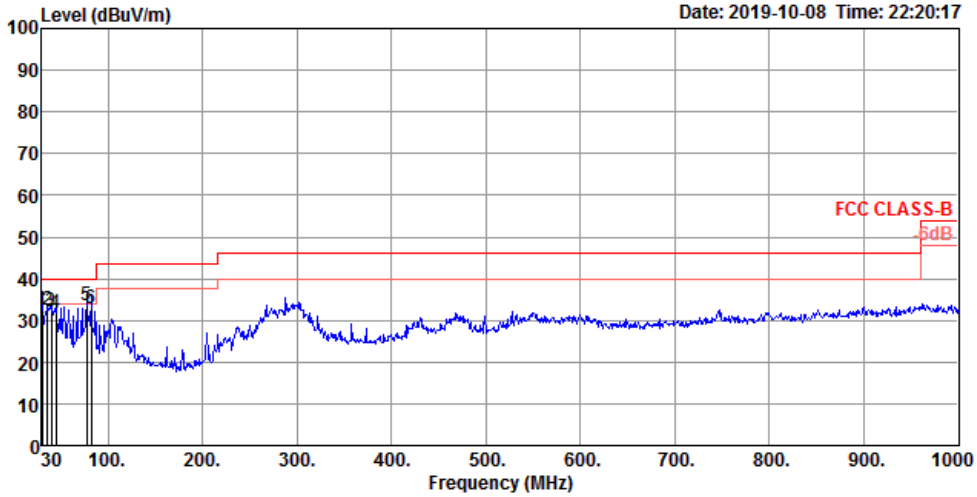


	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.00	28.61	40.00	-11.39	33.82	0.67	25.70	31.58	200	0	QP	HORIZONTAL
2	66.86	27.31	40.00	-12.69	45.57	1.01	12.60	31.87	100	327	QP	HORIZONTAL
3	77.53	28.15	40.00	-11.85	45.75	1.14	13.13	31.87	200	176	QP	HORIZONTAL
4	104.69	34.55	43.50	-8.95	47.55	1.33	17.61	31.94	300	318	QP	HORIZONTAL
5	239.52	36.15	46.00	-9.85	48.17	1.97	18.02	32.01	125	218	QP	HORIZONTAL
6	368.53	34.48	46.00	-11.52	42.46	2.50	21.68	32.16	125	76	QP	HORIZONTAL

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

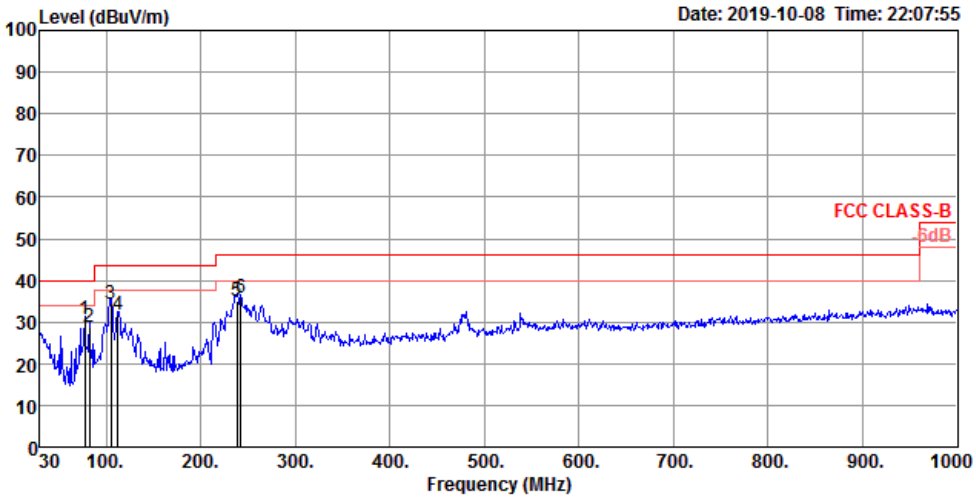
Test Range	30 MHz – 1000 MHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	mode 2: 2.16 GHz
Test Freq. (GHz)	65.88 GHz		

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	30.00	32.29	40.00	-7.71	37.50	0.67	25.70	31.58	100	244	QP	VERTICAL
2	35.82	32.58	40.00	-7.42	41.05	0.77	22.25	31.49	100	0	QP	VERTICAL
3	39.70	31.92	40.00	-8.08	42.64	0.83	19.96	31.51	150	252	QP	VERTICAL
4	44.55	31.59	40.00	-8.41	45.04	0.89	17.25	31.59	100	244	QP	VERTICAL
5	77.53	33.63	40.00	-6.37	51.23	1.14	13.13	31.87	100	287	QP	VERTICAL
6	82.38	32.77	40.00	-7.23	49.73	1.14	13.76	31.86	150	243	QP	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	77.53	30.48	40.00	-9.52	48.08	1.14	13.13	31.87	200	310	QP	HORIZONTAL
2	82.38	28.72	40.00	-11.28	45.68	1.14	13.76	31.86	200	165	QP	HORIZONTAL
3	104.69	34.38	43.50	-9.12	47.38	1.33	17.61	31.94	300	316	QP	HORIZONTAL
4	112.45	31.81	43.50	-11.69	43.95	1.37	18.33	31.84	300	325	QP	HORIZONTAL
5	238.55	34.99	46.00	-11.01	47.10	1.97	17.93	32.01	100	199	QP	HORIZONTAL
6	242.43	35.87	46.00	-10.13	47.60	1.99	18.30	32.02	100	199	QP	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	58.32	Test Mode	mode 1: 1.08 GHz

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	3520.03	32.64	54.00	-21.36	35.82	4.77	28.78	36.73	150	305	Average	VERTICAL
2	3520.13	40.10	74.00	-33.90	43.28	4.77	28.78	36.73	150	305	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	3520.07	28.28	54.00	-25.72	31.46	4.77	28.78	36.73	123	169	Average	HORIZONTAL
2	3520.61	39.16	74.00	-34.84	42.34	4.77	28.78	36.73	123	169	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	58.32	Test Mode	mode 1: 1.08 GHz

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	20264.88	60.75	83.54	-22.79	57.94	14.61	38.00	49.80	152	38	Peak	VERTICAL
2	20265.62	46.84	63.54	-16.70	44.03	14.61	38.00	49.80	152	38	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	20263.01	60.32	83.54	-23.22	57.51	14.61	38.00	49.80	156	288	Peak	HORIZONTAL
2	20264.13	46.86	63.54	-16.68	44.05	14.61	38.00	49.80	156	288	Average	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	62.64	Test Mode	mode 1: 1.08 GHz

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	3520.04	32.69	54.00	-21.31	35.87	4.77	28.78	36.73	150	305	Average	VERTICAL
2	3520.05	40.23	74.00	-33.77	43.41	4.77	28.78	36.73	150	305	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	3520.03	28.85	54.00	-25.15	32.03	4.77	28.78	36.73	102	162	Average	HORIZONTAL
2	3520.18	38.30	74.00	-35.70	41.48	4.77	28.78	36.73	102	162	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	62.64	Test Mode	mode 1: 1.08 GHz

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	20265.32	46.71	63.54	-16.83	43.90	14.61	38.00	49.80	157	15	Average	VERTICAL
2	20265.46	60.04	83.54	-23.50	57.23	14.61	38.00	49.80	157	15	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	20264.39	46.67	63.54	-16.87	43.86	14.61	38.00	49.80	153	314	Average	HORIZONTAL
2	20265.01	59.97	83.54	-23.57	57.16	14.61	38.00	49.80	153	314	Peak	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	65.88	Test Mode	mode 1: 1.08 GHz

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	3520.03	41.10	74.00	-32.90	44.28	4.77	28.78	36.73	150	305	Peak	VERTICAL
2	3520.04	32.88	54.00	-21.12	36.06	4.77	28.78	36.73	150	305	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	3520.04	28.85	54.00	-25.15	32.03	4.77	28.78	36.73	140	170	Average	HORIZONTAL
2	3520.25	39.07	74.00	-34.93	42.25	4.77	28.78	36.73	140	170	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	65.88	Test Mode	mode 1: 1.08 GHz

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	20262.20	60.33	83.54	-23.21	57.52	14.61	38.00	49.80	152	27	Peak	VERTICAL
2	20265.11	46.65	63.54	-16.89	43.84	14.61	38.00	49.80	152	27	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	20263.22	60.80	83.54	-22.74	57.99	14.61	38.00	49.80	151	298	Peak	HORIZONTAL
2	20265.95	46.70	63.54	-16.84	43.89	14.61	38.00	49.80	151	298	Average	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	59.40	Test Mode	mode 2: 2.16 GHz

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	3519.98	40.40	74.00	-33.60	43.58	4.77	28.78	36.73	148	304	Peak	VERTICAL
2	3520.03	33.71	54.00	-20.29	36.89	4.77	28.78	36.73	148	304	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	3520.02	31.63	54.00	-22.37	34.81	4.77	28.78	36.73	101	192	Average	HORIZONTAL
2	3520.12	39.92	74.00	-34.08	43.10	4.77	28.78	36.73	101	192	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	59.40	Test Mode	mode 2: 2.16 GHz

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	20264.97	46.64	63.54	-16.90	43.83	14.61	38.00	49.80	155	43	Average	VERTICAL
2	20265.26	61.87	83.54	-21.67	59.06	14.61	38.00	49.80	155	43	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	20265.03	46.69	63.54	-16.85	43.88	14.61	38.00	49.80	152	271	Average	HORIZONTAL
2	20266.07	60.57	83.54	-22.97	57.76	14.61	38.00	49.80	152	271	Peak	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	61.56	Test Mode	mode 2: 2.16 GHz

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	3520.04	33.92	54.00	-20.08	37.10	4.77	28.78	36.73	152	305	Average	VERTICAL
2	3520.05	41.00	74.00	-33.00	44.18	4.77	28.78	36.73	152	305	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	3520.02	31.49	54.00	-22.51	34.67	4.77	28.78	36.73	101	194	Average	HORIZONTAL
2	3520.10	39.26	74.00	-34.74	42.44	4.77	28.78	36.73	101	194	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	61.56	Test Mode	mode 2: 2.16 GHz

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	20263.76	61.18	83.54	-22.36	58.37	14.61	38.00	49.80	151	17	Peak	VERTICAL
2	20263.82	46.68	63.54	-16.86	43.87	14.61	38.00	49.80	151	17	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	20261.58	60.30	83.54	-23.24	57.49	14.61	38.00	49.80	153	348	Peak	HORIZONTAL
2	20265.85	46.61	63.54	-16.93	43.80	14.61	38.00	49.80	153	348	Average	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	63.72	Test Mode	mode 2: 2.16 GHz

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	3520.03	33.71	54.00	-20.29	36.89	4.77	28.78	36.73	151	305	Average	VERTICAL
2	3520.06	40.72	74.00	-33.28	43.90	4.77	28.78	36.73	151	305	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	3519.91	39.67	74.00	-34.33	42.85	4.77	28.78	36.73	114	196	Peak	HORIZONTAL
2	3520.01	31.22	54.00	-22.78	34.40	4.77	28.78	36.73	114	196	Average	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	63.72	Test Mode	mode 2: 2.16 GHz

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	20261.74	60.74	83.54	-22.80	57.93	14.61	38.00	49.80	155	20	Peak	VERTICAL
2	20265.24	46.77	63.54	-16.77	43.96	14.61	38.00	49.80	155	20	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	20265.31	46.59	63.54	-16.95	43.78	14.61	38.00	49.80	157	291	Average	HORIZONTAL
2	20265.96	59.96	83.54	-23.58	57.15	14.61	38.00	49.80	157	291	Peak	HORIZONTAL

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

Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Freq. (GHz)	65.88	Test Mode	mode 2: 2.16 GHz

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	3520.03	33.89	54.00	-20.11	37.07	4.77	28.78	36.73	147	305	Average	VERTICAL
2	3520.05	41.81	74.00	-32.19	44.99	4.77	28.78	36.73	147	305	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	3520.01	31.57	54.00	-22.43	34.75	4.77	28.78	36.73	101	193	Average	HORIZONTAL
2	3520.07	39.51	74.00	-34.49	42.69	4.77	28.78	36.73	101	193	Peak	HORIZONTAL

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

Test Range	18 GHz – 40 GHz	Test Distance	1 m
Test Freq. (GHz)	65.88	Test Mode	mode 2: 2.16 GHz

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	20261.86	60.78	83.54	-22.76	57.97	14.61	38.00	49.80	159	44	Peak	VERTICAL
2	20264.13	46.65	63.54	-16.89	43.84	14.61	38.00	49.80	159	44	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	20261.48	59.79	83.54	-23.75	56.98	14.61	38.00	49.80	153	324	Peak	HORIZONTAL
2	20264.18	46.38	63.54	-17.16	43.57	14.61	38.00	49.80	153	324	Average	HORIZONTAL

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

Test Range	40GHz – 200GHz

For mode 1: 1.08 GHz

Test Plan: Channel 1

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
58.32	23.6	1.00	45.89	-81.25
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-39.17	3	0.1069	90.00	PASS

Test Plan: Channel 3

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.64	23.6	1.00	42.55	-82.12
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-40.70	3	0.0753	90.00	PASS

Test Plan: Channel 4.5

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
65.88	23.6	1.00	42.69	-81.66
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-40.21	3	0.0842	90.00	PASS

For mode 2: 2.16 GHz

Test Plan: Channel 1.5

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
59.40	23.6	1.00	46.56	-80.56
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-38.36	3	0.1290	90.00	PASS

Test Plan: Channel 2.5

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
61.56	23.6	1.00	45.55	-80.12
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-38.11	3	0.1367	90.00	PASS

Test Plan: Channel 3.5

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
63.72	23.6	1.00	41.85	-80.46
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-39.18	3	0.1067	90.00	PASS

Test Plan: Channel 4.5

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
65.88	23.6	1.00	41.98	-81.44
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-40.14	3	0.0857	90.00	PASS

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

3.5 Frequency Stability

3.5.1 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.	

3.5.2 Measuring Instruments

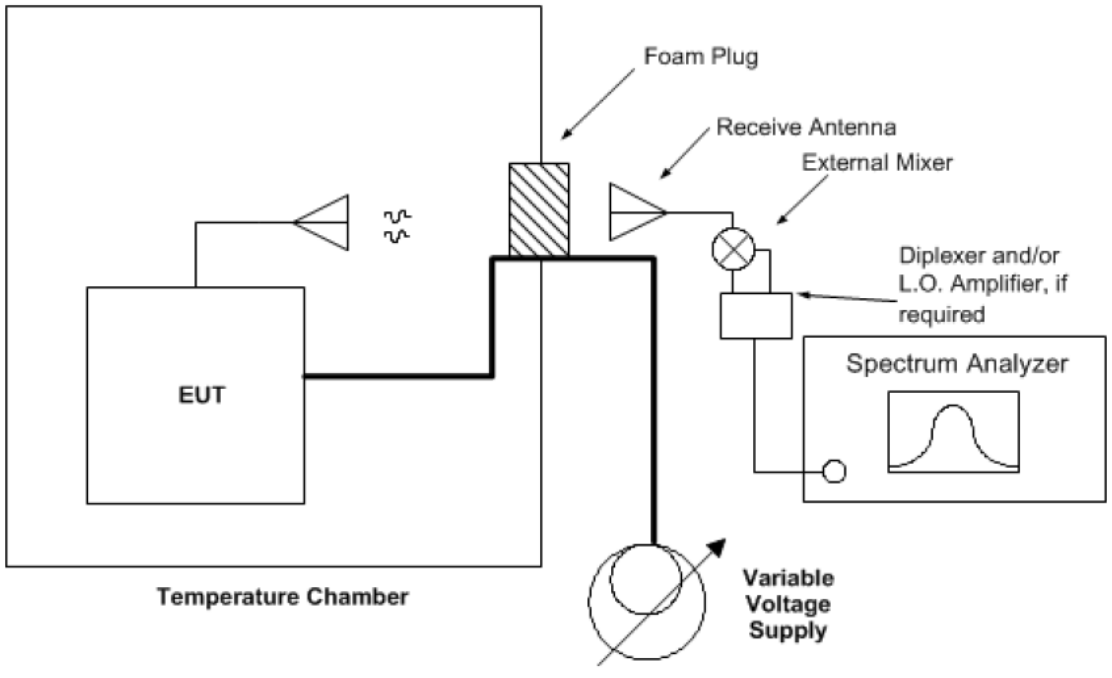
Refer a measuring instruments list in this test report.

3.5.3 Test Procedures

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

3.5.4 Test Setup

Frequency Stability



3.5.5 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.	

3.5.5.1 Frequency Stability with Respect to Ambient Temperature

For mode 1: 1.08 GHz

Frequency Stability with Respect to Ambient Temperature			
Test Results			
Test Temp.erature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-40	62640.974	462	within band
-30	62640.898	386	within band
-20	62640.842	330	within band
-10	62640.775	263	within band
0	62640.623	111	within band
10	62640.589	77	within band
20	62640.512	Reference	within band
30	62640.458	-54	within band
40	62640.431	-81	within band
50	62640.428	-84	within band
60	62640.369	-143	within band
70	62640.245	-267	within band
NOTE: The manufacturer's specified temperature range of -40 to 70°C.			

For mode 2: 2.16 GHz

Frequency Stability with Respect to Ambient Temperature			
Test Results			
Test Temp.erature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-40	61560.742	380	within band
-30	61560.695	333	within band
-20	61560.458	96	within band
-10	61560.432	70	within band
0	61560.401	39	within band
10	61560.384	22	within band
20	61560.362	Reference	within band
30	61560.31	-52	within band
40	61560.254	-108	within band
50	61560.189	-173	within band
60	61560.145	-217	within band
70	61560.063	-299	within band
NOTE: The manufacturer’s specified temperature range of -40 to 70°C.			

3.5.5.2 Frequency Stability When Varying Supply Voltage

For mode 1: 1.08 GHz

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vdc)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
4.25	62640.722	210	within band
5	62640.512	Reference	within band
5.75	62640.265	-247	within band

For mode 2: 2.16 GHz

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vdc)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
4.25	61560.579	217	within band
5	61560.362	Reference	within band
5.75	61560.113	-249	within band

3.6 Operation Restriction and Group Installation

3.6.1 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 (h))

3.6.2 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.

3.6.3 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
Bilog Antenna with 6dB Attenuator	TESE & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1291	1GHz~18GHz	Oct. 05, 2018*	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 02, 2019	May 01, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Mar. 28, 2019	Mar. 27, 2020	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. 08, 2018	Oct. 07, 2019	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-04	1GHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+23	30MHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+23	30MHz~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)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH05-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
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-RPFW0	#A18185(074)	50 ~ 75 GHz	Jan. 29, 2018*	Jan. 29, 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	Gaint Force	GTH-408-40-CP-AR	MAA1410-011	-40~100 degree	Sep. 12, 2019	Sep. 11, 2020	Conducted (TH03-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
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%