FCC RADIO TEST REPORT

FCC ID	:	HED-ML60MDSB
Equipment	:	Metrolinq 60 GHz Module
Brand Name	:	IgniteNet
Model Name	:	RDO-60-FB-USBB-8
Applicant	:	Accton Technology Corporation No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer	:	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 Aug. 22, 2019 and completed on Oct. 14, 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 and 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.)

TEL : 886-3-656-9065
FAX : 886-3-656-9085

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR5N2614-20	01	Initial issue of report	Oct. 29, 2019
FR5N2614-20	02	The test distance of EIRP power was mistakenly typed to “55cm”, so revising to “55m”.	Oct. 31, 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: Cindy Peng

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information	
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	2.16GHz 1.08GHz

1.1.2 Modulation

MCS index	Modulation	N_{CBPS}	Repetition	Code rate	Data rate (Mbps)
1	π/2-BPSK	1	2	1/2	385
2	π/2-BPSK	1	1	1/2	770
3	π/2-BPSK	1	1	5/8	962.5
4	π/2-BPSK	1	1	3/4	1155
5	π/2-BPSK	1	1	13/16	1251.25
6	π/2-QPSK	2	1	1/2	1540
7	π/2-QPSK	2	1	5/8	1925
8	π/2-QPSK	2	1	3/4	2310
9	π/2-QPSK	2	1	13/16	2502.5
10	π/2-16QAM	4	1	1/2	3080
11	π/2-16QAM	4	1	5/8	3850
12	π/2-16QAM	4	1	3/4	4620

1.1.3 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Accton	123400001485A	Dish Ant.	N/A	42
2	Accton	123400001486A	Dish Ant.	N/A	38

Note1: The above information was declared by manufacturer.

Note2: Because Ant. 1 and Ant. 2 are the same type antennas, only the higher gain antenna “Ant.1” was tested.

1.1.4 EUT Power Type

EUT Power Type	From host system

1.1.5 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

1.1.6 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.

1.1.7 Duty Cycle

TX-on(ms)	TX-on+TX-off(ms)	Duty Cycle (%)	Duty Cycle factor(dB)
100	100	100	0

1.1.8 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR5N2614-19

Below is the table for the change of the product with respect to the original one.

<table>
<tr><th>Modifications</th><th>Performance Checking</th></tr>
<tr><td>1. Adding four channels of 2.16 GHz bandwidth as below:
<table>
<tr><th>Channel</th><th>Frequency (GHz)</th></tr>
<tr><td>1.5</td><td>59.40</td></tr>
<tr><td>2.5</td><td>61.56</td></tr>
<tr><td>3.5</td><td>63.72</td></tr>
<tr><td>4.5</td><td>65.88</td></tr>
</table>
2. Adding one new bandwidth “1.08GHz”, and it supports channels as below:
<table>
<tr><th>Channel</th><th>Frequency (GHz)</th></tr>
<tr><td>1</td><td>58.32</td></tr>
<tr><td>1.5</td><td>59.40</td></tr>
<tr><td>2</td><td>60.48</td></tr>
<tr><td>2.5</td><td>61.56</td></tr>
<tr><td>3</td><td>62.64</td></tr>
<tr><td>3.5</td><td>63.72</td></tr>
<tr><td>4</td><td>64.80</td></tr>
<tr><td>4.5</td><td>65.88</td></tr>
</table></td><td>1. Occupied Bandwidth.
2. EIRP Power.
3. Peak Conducted Power.
4. Transmitter Spurious Emissions.
5. Frequency Stability.</td></tr>
</table>

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	03CH04-CB	Eason Chen	24.3~25.1°C / 64~68%	Aug. 22, 2019~Aug. 25, 2019
RF Conducted	TH03-CB	Lucas Huang	23.8~24.9°C / 54~56%	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

For 2.16 GHz bandwidth:

Test Channel Frequencies Configuration	
Channel 1.5 (GHz)	59.40
Channel 2.5 (GHz)	61.56
Channel 3.5 (GHz)	63.72
Channel 4.5 (GHz)	65.88

For 1.08 GHz bandwidth:

Test Channel Frequencies Configuration	
Channel 1 (GHz)	58.32
Channel 3 (GHz)	62.64
Channel 4.5 (GHz)	65.88

2.2 Conformance Tests and Related Test Frequencies

For 2.16 GHz bandwidth:

Test Item	Test Frequencies (GHz)
Occupied Bandwidth	59.40, 61.56, 63.72, 65.88
EIRP Power	59.40, 61.56, 63.72, 65.88
Peak Conducted Power	59.40, 61.56, 63.72, 65.88
Transmitter Spurious Emissions (below 1 GHz)	61.56
Transmitter Spurious Emissions (1 GHz-40 GHz)	59.40, 61.56, 63.72, 65.88
Transmitter Spurious Emissions (above 40 GHz)	59.40, 61.56, 63.72, 65.88
Frequency Stability	61.56

For 1.08 GHz bandwidth:

Test Item	Test Frequencies (GHz)
Occupied Bandwidth	58.32, 62.64, 65.88
EIRP Power	58.32, 62.64, 65.88
Peak Conducted Power	58.32, 62.64, 65.88
Transmitter Spurious Emissions (below 1 GHz)	58.32
Transmitter Spurious Emissions (1 GHz-40 GHz)	58.32, 62.64, 65.88
Transmitter Spurious Emissions (above 40 GHz)	58.32, 62.64, 65.88
Frequency Stability	62.64

Note: The EUT can only be used in Y axis.

2.3 EUT Operation during Test

During the test, “Terminal” under WIN 7 was executed the test program to control the EUT continuously transmit RF signal.

2.4 Accessories

Accessories
Reflection board of antenna*1
USB cable*1, shielded, 0.7m

2.5 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	Test fixture	Accton	OAP920920	N/A

2.6 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 2.16 GHz bandwidth:

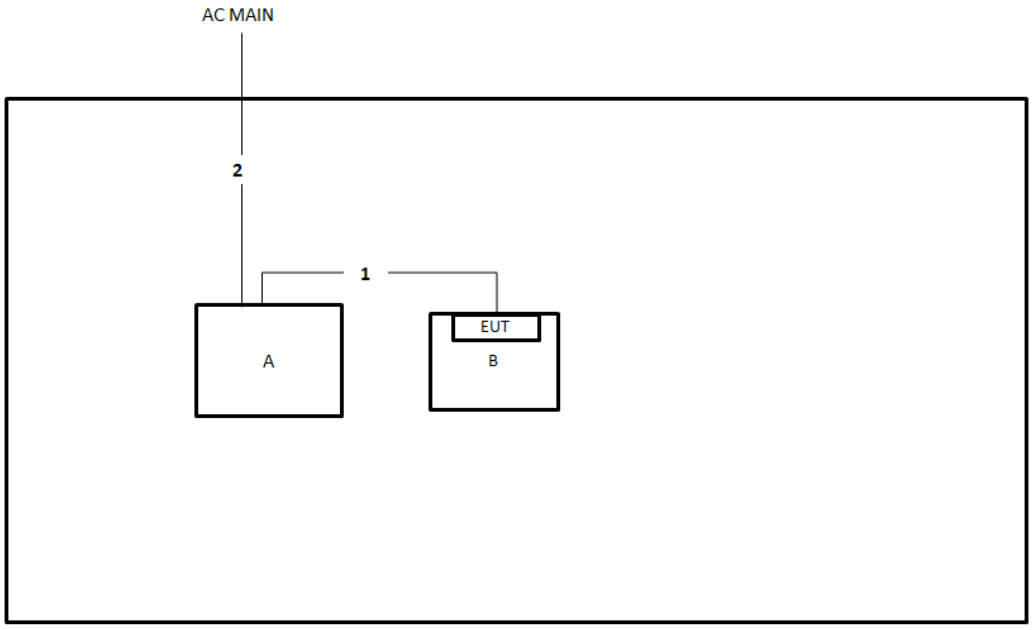
Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
59.40	0.35	0.0050505	48.510	4851.00
61.56	0.35	0.0048733	50.274	5027.40
63.72	0.35	0.0047081	52.038	5203.80
65.88	0.35	0.0045537	53.802	5380.20

For 1.08 GHz bandwidth:

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
58.32	0.35	0.0051440	47.628	4762.80
62.64	0.35	0.0047893	51.156	5115.60
65.88	0.35	0.0045537	53.802	5380.20

2.7 Test Setup Diagram

Test Setup Diagram - Transmitter Spurious Emissions



Item	Connection	Shielded	Length
1	USB cable	Yes	0.11m
2	Power cable	No	2.6m

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

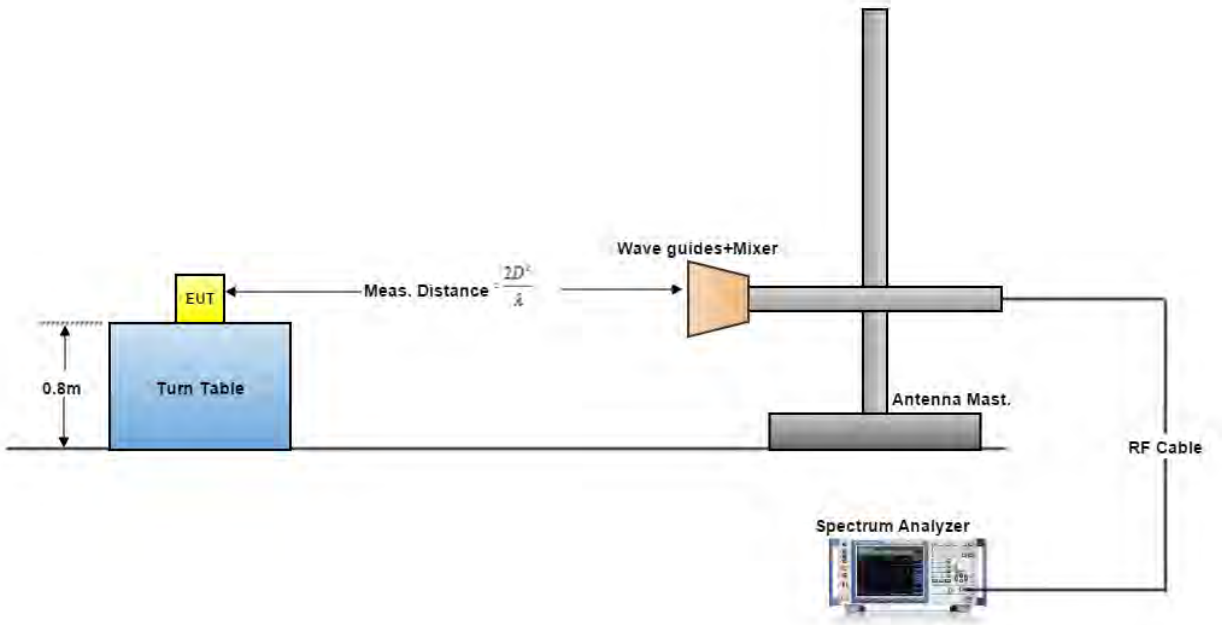
Refer a measuring instruments list in this test report.

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 2.16 GHz bandwidth:

Test Results			
Test Freq. (GHz)	**6 dBc Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**	**Limit (MHz)**
59.40	1700.40	1997.11	N/A
61.56	1570.20	1931.98	N/A
63.72	1454.40	1931.98	N/A
65.88	1678.70	1946.45	N/A

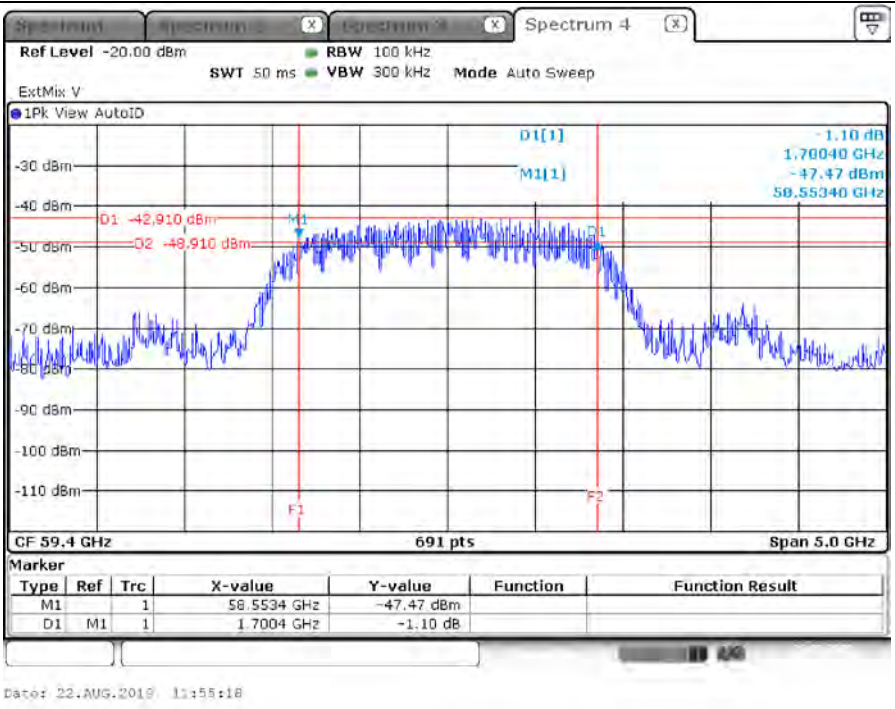
For 1.08 GHz bandwidth:

Test Results			
Test Freq. (GHz)	**6 dBc Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**	**Limit (MHz)**
58.32	824.90	1476.12	N/A
62.64	839.40	965.99	N/A
65.88	853.80	958.76	N/A

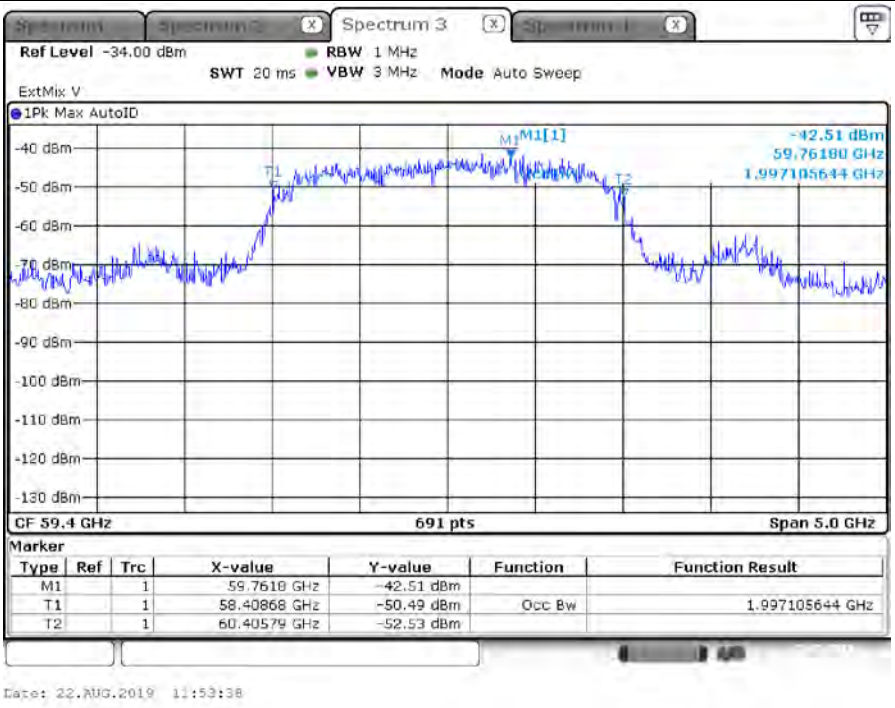
3.1.5.1 Bandwidth Plots

For 2.16 GHz bandwidth:

Test Frequency: 59.40 GHz
6 dBc Bandwidth

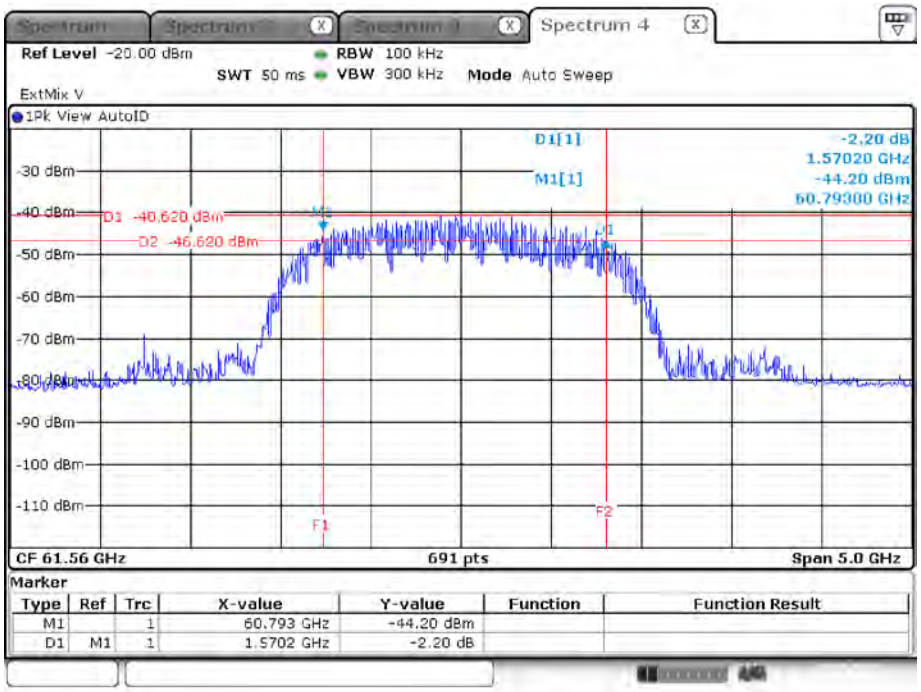


Occupied Bandwidth

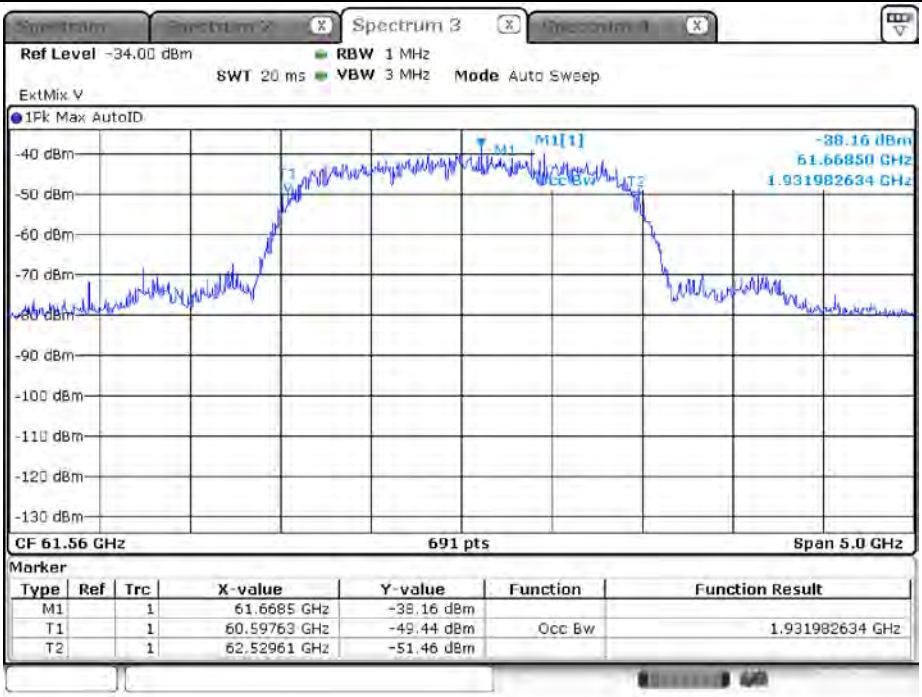


Test Frequency: 61.56 GHz

6 dBc Bandwidth

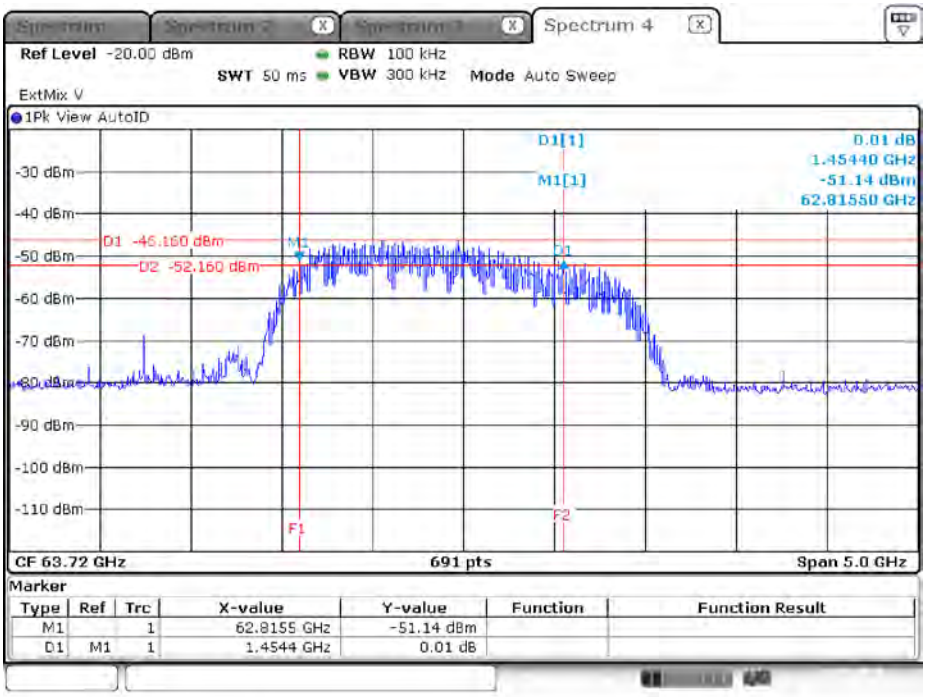


Occupied Bandwidth

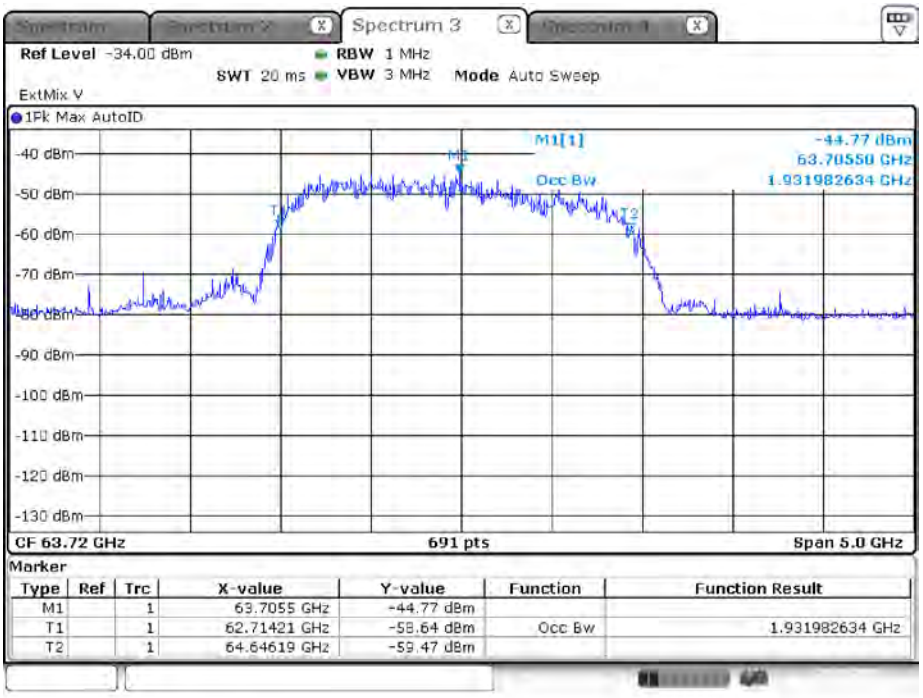


Test Frequency: 63.72 GHz

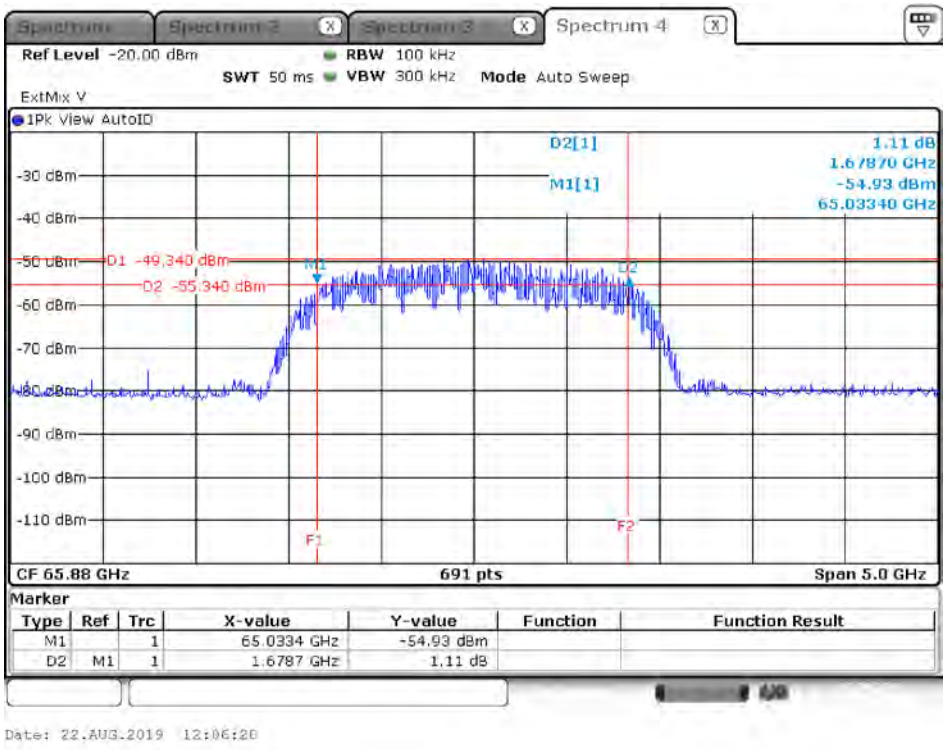
6 dBc Bandwidth



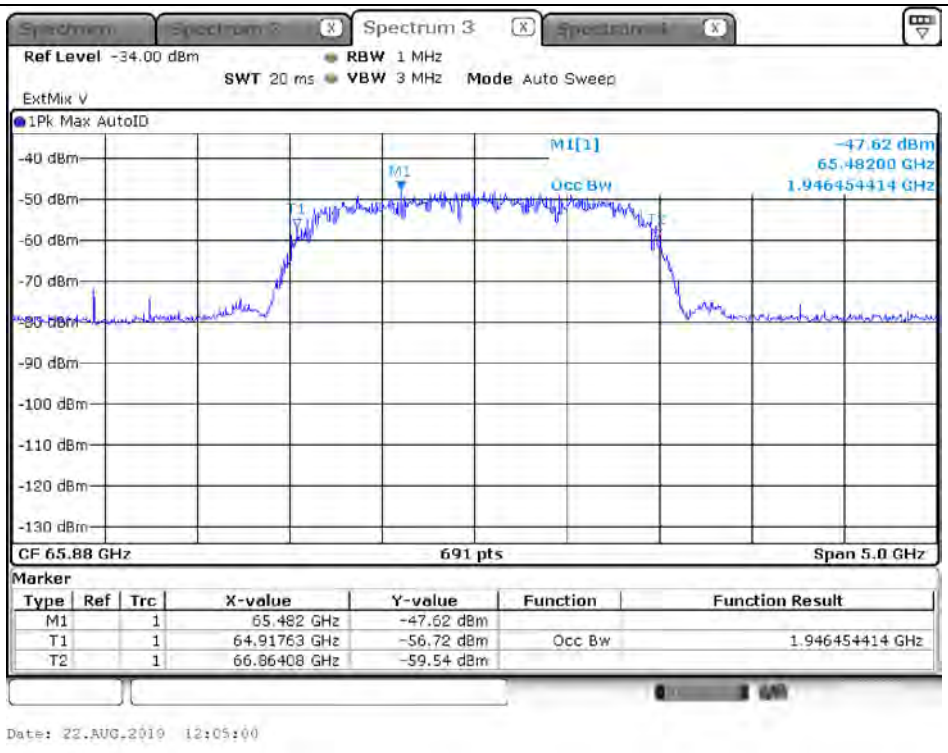
Occupied Bandwidth



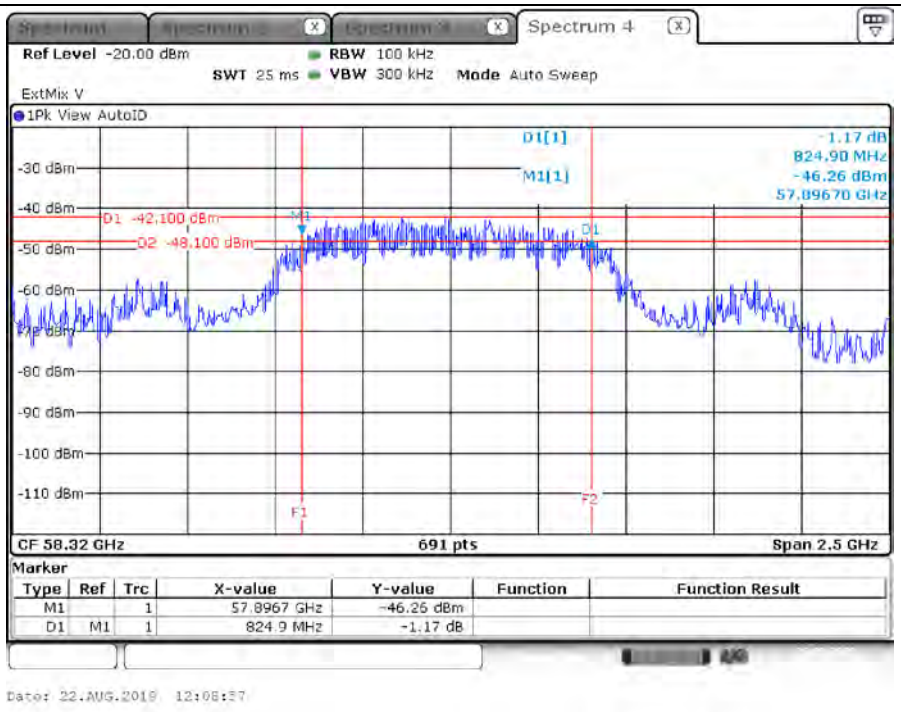
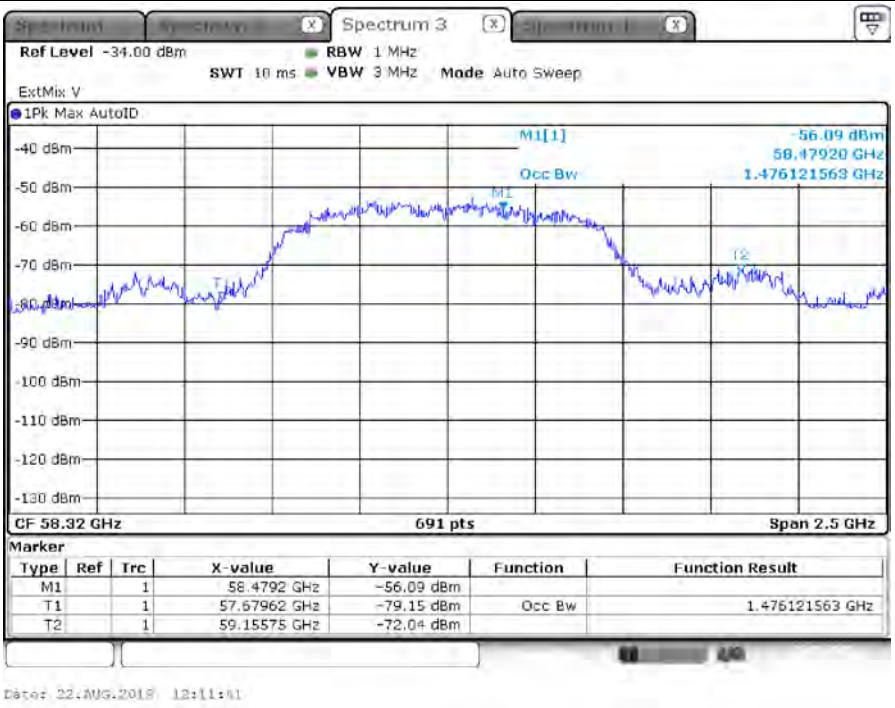
Test Frequency: 65.88 GHz
6 dBc Bandwidth



Occupied Bandwidth

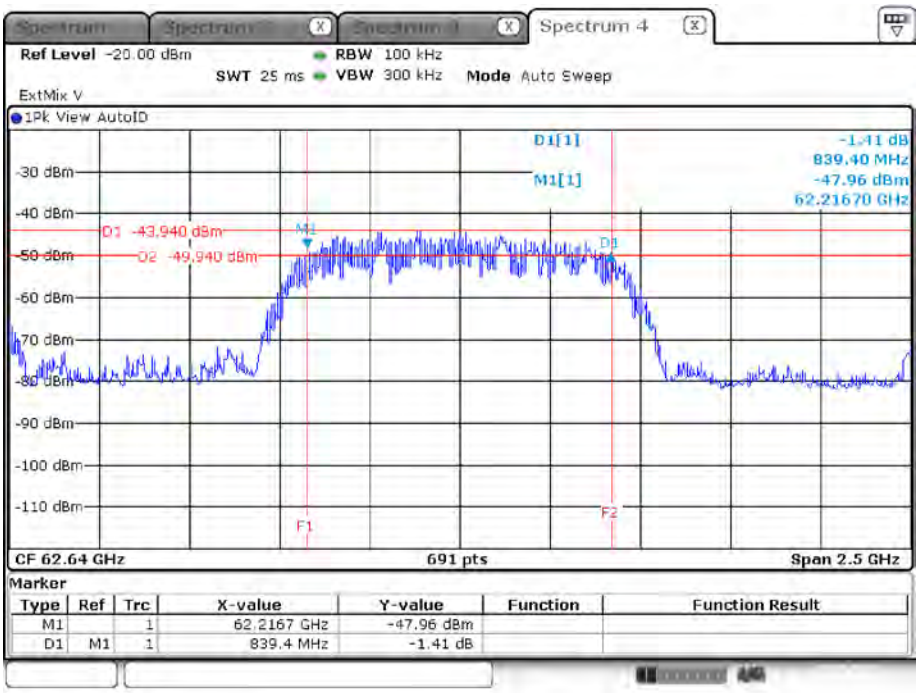


For 1.08 GHz bandwidth:

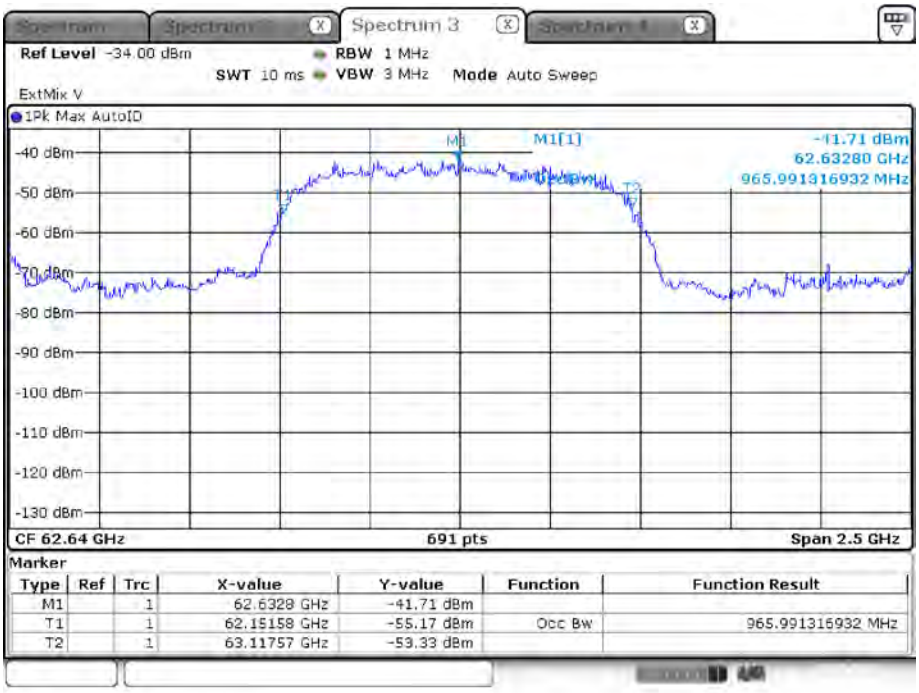
Test Frequency: 58.32 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth


Test Frequency: 62.64 GHz

6 dBc Bandwidth

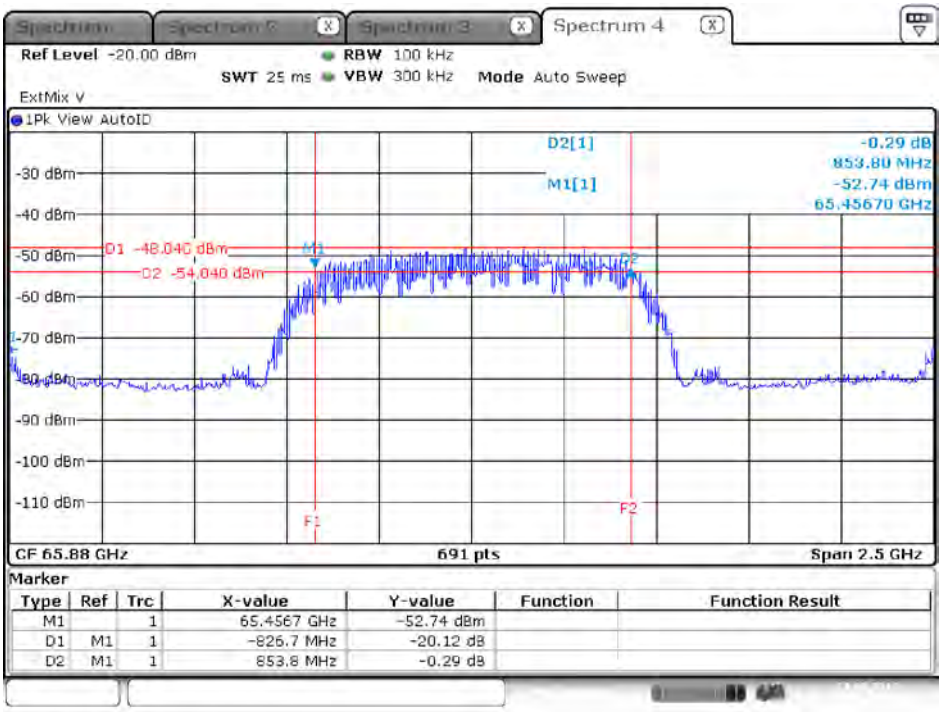


Occupied Bandwidth



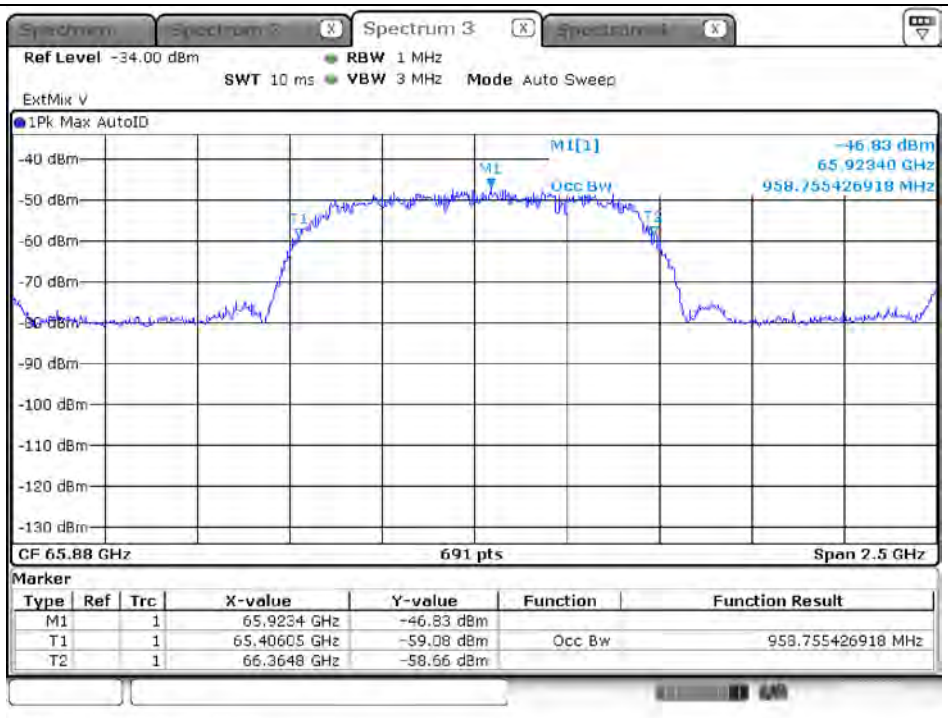
Test Frequency: 65.88 GHz

6 dBc Bandwidth



Date: 22.AUG.2019 10:17:24

Occupied Bandwidth



Date: 22.AUG.2019 12:27:07

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

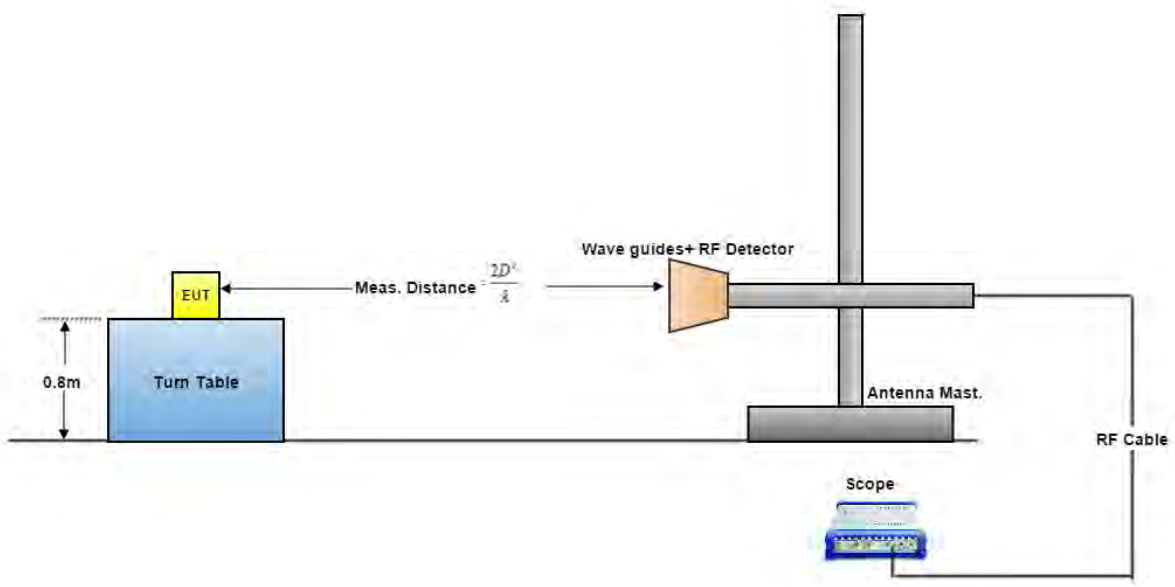
Refer a measuring instruments list in this test report.

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 2.16 GHz bandwidth:

Test Distance	55 m										
Test Results											
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
59.40	23.6	15.24	2.44	-23.88	-33.79	125.25	115.34	55.26	45.35	67	64
61.56	23.6	19.95	2.83	-23.69	-33.85	125.75	115.59	55.76	45.60	67	64
63.72	23.6	11.98	2.27	-25.01	-34.23	124.73	115.51	54.74	45.52	67	64
65.88	23.6	4.94	1.17	-29.73	-39.18	120.30	110.85	50.31	40.86	67	64

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 1.08 GHz bandwidth:

Test Distance	55 m										
Test Results											
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
58.32	23.6	15.08	2.59	-23.96	-33.41	125.01	115.56	55.02	45.57	67	64
62.64	23.6	12.33	2.73	-24.89	-34.05	124.70	115.54	54.71	45.55	67	64
65.88	23.6	2.85	1.14	-32.76	-39.46	117.27	110.57	47.28	40.58	67	64

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 (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 2.16 GHz bandwidth:

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)
59.40	55.26	42	13.26	21.186	1700.40	500.00
61.56	55.76	42	13.76	23.773	1570.20	500.00
63.72	54.74	42	12.74	18.795	1454.40	500.00
65.88	50.31	42	8.31	6.776	1678.70	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 1.08 GHz bandwidth:

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)
58.32	55.02	42	13.02	20.050	824.90	500.00
62.64	54.71	42	12.71	18.672	839.40	500.00
65.88	47.28	42	5.28	3.373	853.80	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.	

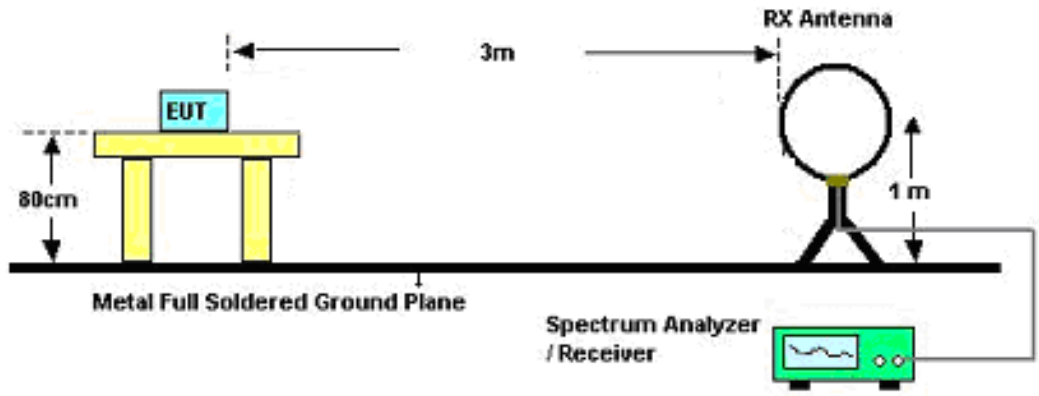
3.4.2 Test Procedures

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

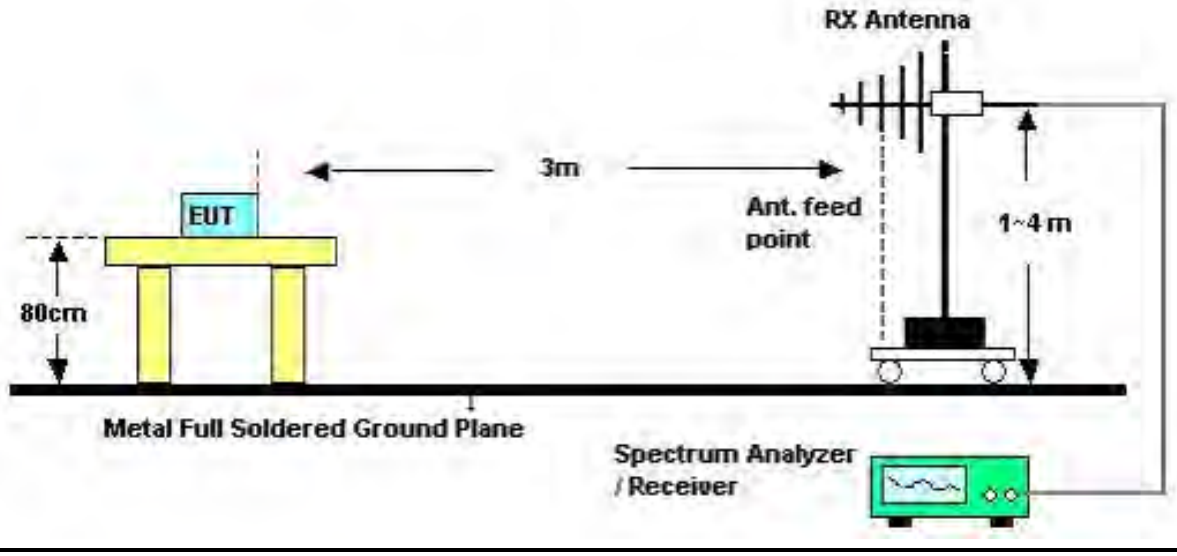
3.4.3 Test Setup

Transmitter Spurious Emissions

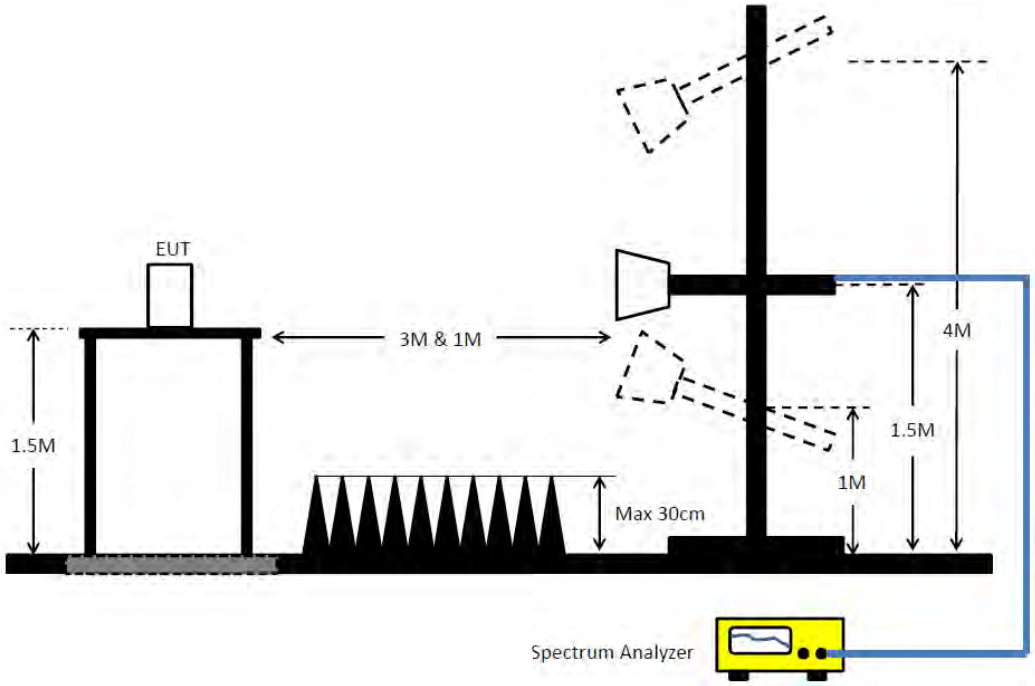
9kHz ~30MHz

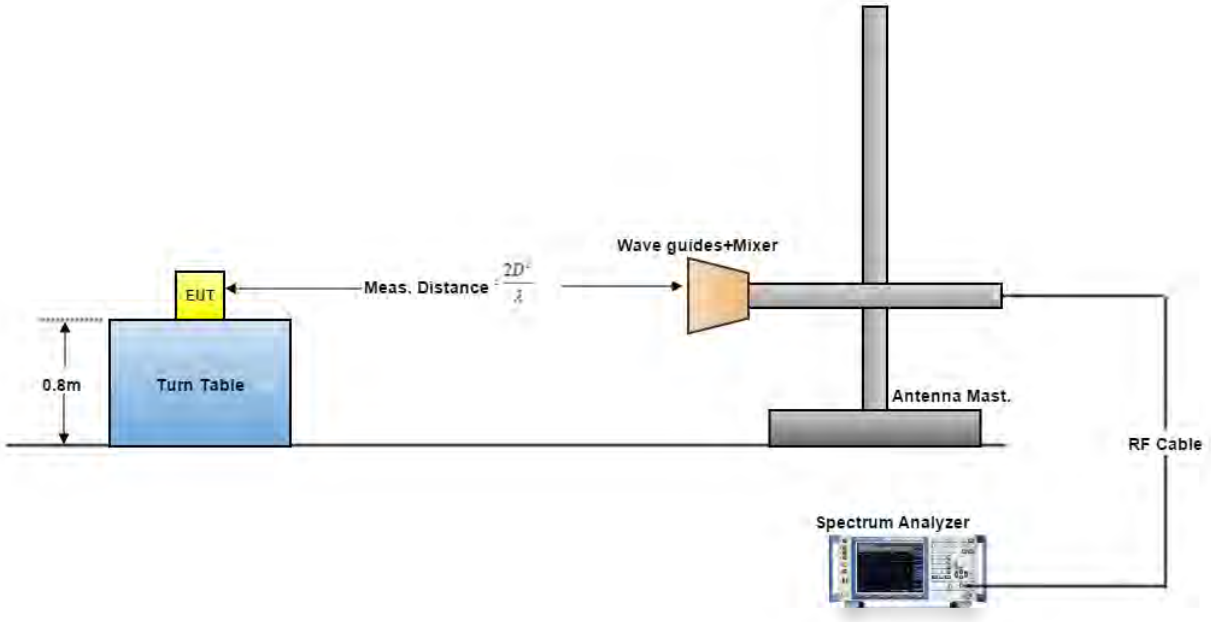


30MHz~1GHz



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.

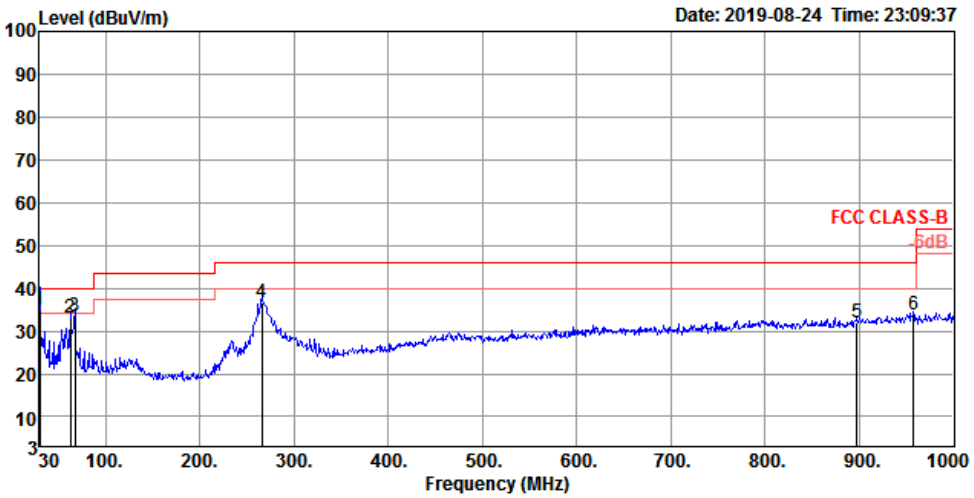
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.4.5.2 Test Result of Transmitter Spurious Emissions

For 2.16 GHz bandwidth:

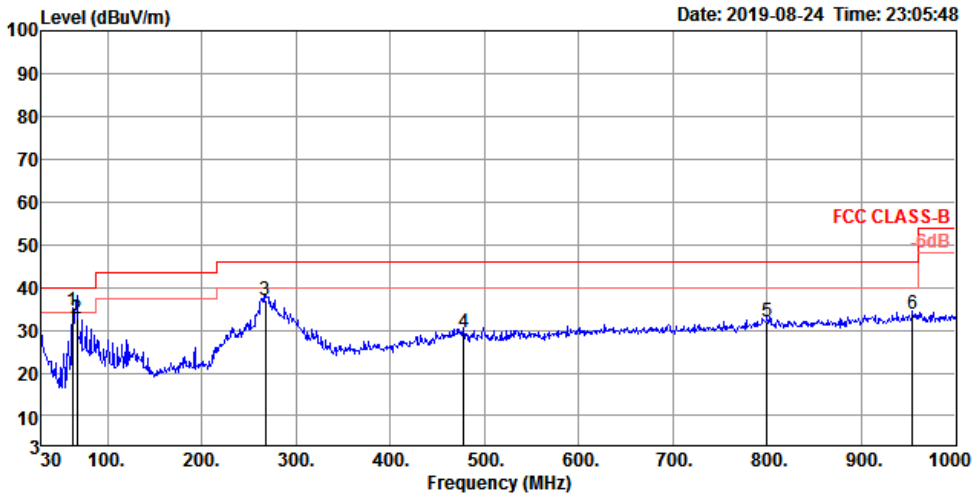
Test Range	30 MHz – 1000 MHz	**Test Distance**	3 m
Test Configuration	CTX	**Test Frequencies**	61.56

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	34.90	40.00	-5.10	42.50	0.49	24.10	32.19	184	222	QP	VERTICAL
2	62.98	32.94	40.00	-7.06	52.10	0.83	12.17	32.16	300	151	QP	VERTICAL
3	67.83	33.38	40.00	-6.62	52.60	0.85	12.07	32.14	300	135	QP	VERTICAL
4	265.71	36.72	46.00	-9.28	48.21	1.69	18.85	32.03	150	218	QP	VERTICAL
5	897.18	32.14	46.00	-13.86	33.59	3.09	26.71	31.25	300	191	QP	VERTICAL
6	957.32	33.91	46.00	-12.09	34.60	3.28	26.70	30.67	300	323	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	62.98	34.34	40.00	-5.66	53.50	0.83	12.17	32.16	300	201	QP	HORIZONTAL
2	67.83	32.77	40.00	-7.23	51.99	0.85	12.07	32.14	202	153	QP	HORIZONTAL
3	267.65	37.09	46.00	-8.91	48.59	1.70	18.83	32.03	150	100	QP	HORIZONTAL
4	478.14	29.37	46.00	-16.63	35.80	2.36	23.18	31.97	150	264	QP	HORIZONTAL
5	800.18	32.00	46.00	-14.00	34.30	3.08	26.27	31.65	300	276	QP	HORIZONTAL
6	954.41	33.89	46.00	-12.11	34.60	3.29	26.69	30.69	125	75	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 Frequencies	59.40		

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	10560.00	55.48	74.00	-18.52	44.37	6.10	38.93	33.92	162	3	Peak	VERTICAL
2	10560.13	50.38	54.00	-3.62	39.27	6.10	38.93	33.92	162	3	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	10560.01	56.70	74.00	-17.30	45.59	6.10	38.93	33.92	221	1	Peak	HORIZONTAL
2	10560.19	46.63	54.00	-7.37	35.52	6.10	38.93	33.92	221	1	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 Frequencies	59.40		

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	29520.42	59.19	83.54	-24.35	46.80	17.69	40.40	45.70	150	212	Peak	VERTICAL
2	29523.76	44.89	63.54	-18.65	32.50	17.69	40.40	45.70	150	212	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	29518.42	58.49	83.54	-25.05	46.11	17.68	40.40	45.70	150	44	Peak	HORIZONTAL
2	29523.46	44.97	63.54	-18.57	32.58	17.69	40.40	45.70	150	44	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 Frequencies	61.56		

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	10560.17	50.32	54.00	-3.68	39.21	6.10	38.93	33.92	162	4	Average	VERTICAL
2	10560.40	58.39	74.00	-15.61	47.26	6.11	38.97	33.95	162	4	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	10560.10	56.89	74.00	-17.11	45.78	6.10	38.93	33.92	217	4	Peak	HORIZONTAL
2	10560.26	47.08	54.00	-6.92	35.97	6.10	38.93	33.92	217	4	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 Frequencies	61.56		

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	29540.56	43.78	63.54	-19.76	31.39	17.69	40.40	45.70	150	258	Average	VERTICAL
2	29543.24	58.21	83.54	-25.33	45.83	17.69	40.40	45.71	150	258	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	29539.62	44.14	63.54	-19.40	31.75	17.69	40.40	45.70	150	14	Average	HORIZONTAL
2	29544.12	58.32	83.54	-25.22	45.94	17.69	40.40	45.71	150	14	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 Frequencies	63.72		

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	10560.21	50.65	54.00	-3.35	39.54	6.10	38.93	33.92	167	2	Average	VERTICAL
2	10560.27	58.42	74.00	-15.58	47.29	6.11	38.97	33.95	167	2	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	10560.19	47.50	54.00	-6.50	36.39	6.10	38.93	33.92	220	1	Average	HORIZONTAL
2	10560.26	56.62	74.00	-17.38	45.51	6.10	38.93	33.92	220	1	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 Frequencies	63.72		

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	29552.24	43.74	63.54	-19.80	31.36	17.69	40.40	45.71	150	184	Average	VERTICAL
2	29553.20	58.12	83.54	-25.42	45.74	17.69	40.40	45.71	150	184	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	29551.52	44.73	63.54	-18.81	32.35	17.69	40.40	45.71	150	85	Average	HORIZONTAL
2	29557.30	57.90	83.54	-25.64	45.52	17.69	40.40	45.71	150	85	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 Frequencies	65.88		

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	10560.04	57.63	74.00	-16.37	46.52	6.10	38.93	33.92	164	5	Peak	VERTICAL
2	10560.20	50.72	54.00	-3.28	39.61	6.10	38.93	33.92	164	5	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	10560.01	56.86	74.00	-17.14	45.75	6.10	38.93	33.92	222	3	Peak	HORIZONTAL
2	10560.17	47.37	54.00	-6.63	36.26	6.10	38.93	33.92	222	3	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 Frequencies	65.88		

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	29539.06	43.49	63.54	-20.05	31.10	17.69	40.40	45.70	150	176	Average	VERTICAL
2	29548.52	58.38	83.54	-25.16	46.00	17.69	40.40	45.71	150	176	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	29541.46	44.09	63.54	-19.45	31.70	17.69	40.40	45.70	150	133	Average	HORIZONTAL
2	29543.52	58.56	83.54	-24.98	46.18	17.69	40.40	45.71	150	133	Peak	HORIZONTAL

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

Test Range	40GHz – 200GHz

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
59.40	23.6	55.00	43.56	-90.36
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-13.93	3	35.7788	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
61.56	23.6	55.00	43.55	-90.85
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-14.42	3	31.9467	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
63.72	23.6	55.00	41.89	-91.25
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-15.16	3	26.9569	90.00	PASS

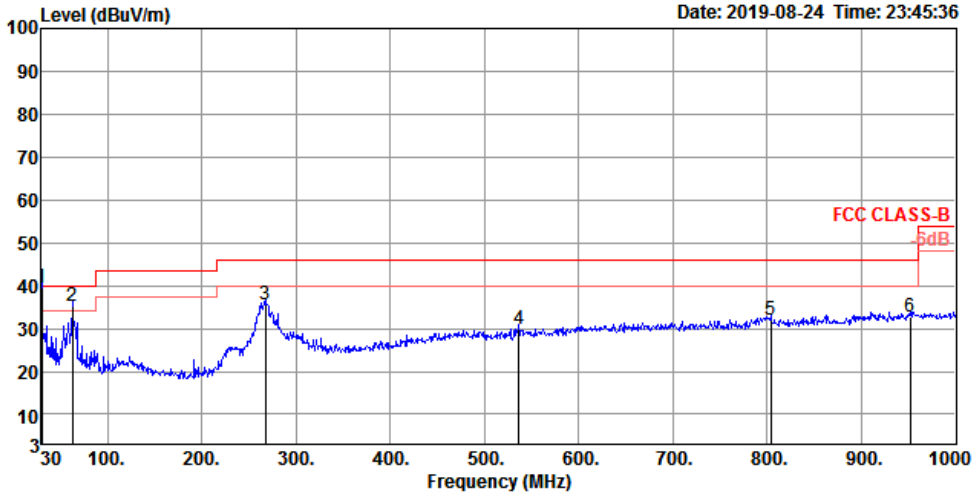
Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
65.88	23.6	55.00	42.13	-91.46
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-15.32	3	25.9796	90.00	PASS

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

For 1.08 GHz bandwidth:

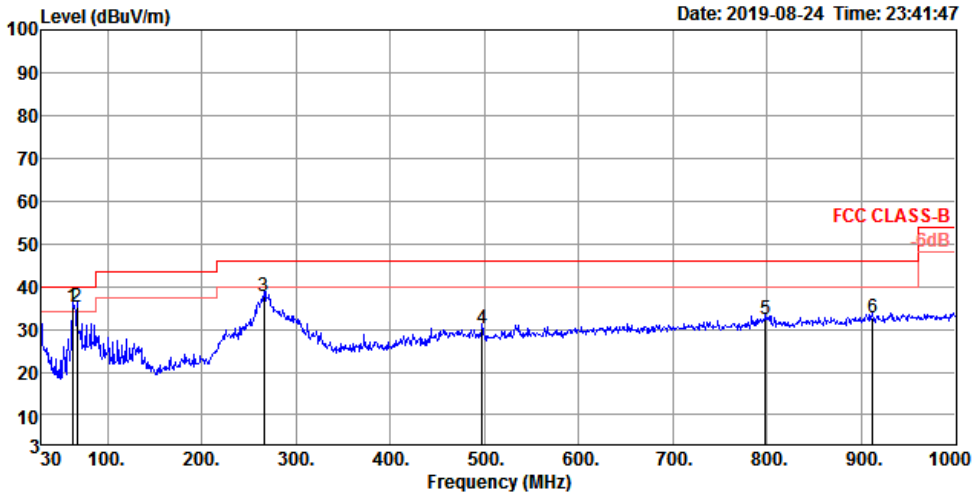
Test Range	30 MHz – 1000 MHz	**Test Distance**	3 m
Test Configuration	CTX	**Test Frequencies**	58.32

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	39.40	40.00	-0.60	47.00	0.49	24.10	32.19	185	277	QP	VERTICAL
2	62.98	35.24	40.00	-4.76	54.40	0.83	12.17	32.16	100	152	QP	VERTICAL
3	267.65	35.48	46.00	-10.52	46.98	1.70	18.83	32.03	200	210	QP	VERTICAL
4	536.34	29.82	46.00	-16.18	35.03	2.46	24.37	32.04	300	172	QP	VERTICAL
5	804.06	31.99	46.00	-14.01	34.37	3.08	26.19	31.65	150	276	QP	VERTICAL
6	951.50	32.70	46.00	-13.30	33.43	3.30	26.69	30.72	125	231	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	62.98	35.34	40.00	-4.66	54.50	0.83	12.17	32.16	300	192	QP	HORIZONTAL
2	67.83	35.23	40.00	-4.77	54.45	0.85	12.07	32.14	300	273	QP	HORIZONTAL
3	265.71	37.90	46.00	-8.10	49.39	1.69	18.85	32.03	125	242	QP	HORIZONTAL
4	497.54	30.27	46.00	-15.73	36.53	2.38	23.40	32.04	200	42	QP	HORIZONTAL
5	798.24	32.27	46.00	-13.73	34.57	3.08	26.27	31.65	100	229	QP	HORIZONTAL
6	911.73	32.61	46.00	-13.39	33.94	3.15	26.62	31.10	125	146	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 Frequencies	58.32		

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	1595.96	45.74	74.00	-28.26	53.69	2.30	25.40	35.65	150	11	Peak	VERTICAL
2	1597.20	31.07	54.00	-22.93	39.02	2.30	25.40	35.65	150	11	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	1599.16	28.10	54.00	-25.90	36.05	2.30	25.40	35.65	149	133	Average	HORIZONTAL
2	1599.64	44.30	74.00	-29.70	52.24	2.30	25.40	35.64	149	133	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 Frequencies	58.32		

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	29523.42	58.57	83.54	-24.97	46.18	17.69	40.40	45.70	150	115	Peak	VERTICAL
2	29523.90	45.30	63.54	-18.24	32.91	17.69	40.40	45.70	150	115	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	29520.28	45.17	63.54	-18.37	32.78	17.69	40.40	45.70	150	262	Average	HORIZONTAL
2	29524.56	58.64	83.54	-24.90	46.25	17.69	40.40	45.70	150	262	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 Frequencies	62.64		

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	1596.84	29.48	54.00	-24.52	37.43	2.30	25.40	35.65	150	256	Average	VERTICAL
2	1598.04	37.01	74.00	-36.99	44.96	2.30	25.40	35.65	150	256	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	1597.60	45.14	74.00	-28.86	53.09	2.30	25.40	35.65	102	91	Peak	HORIZONTAL
2	1598.16	29.21	54.00	-24.79	37.16	2.30	25.40	35.65	102	91	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 Frequencies	62.64		

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	29497.38	61.25	83.54	-22.29	48.87	17.68	40.40	45.70	150	192	Peak	VERTICAL
2	29499.62	45.65	63.54	-17.89	33.27	17.68	40.40	45.70	150	192	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	29494.80	59.66	83.54	-23.88	47.30	17.67	40.40	45.71	150	154	Peak	HORIZONTAL
2	29497.10	45.24	63.54	-18.30	32.86	17.68	40.40	45.70	150	154	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 Frequencies	65.88		

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	1597.08	45.45	74.00	-28.55	53.40	2.30	25.40	35.65	150	353	Peak	VERTICAL
2	1598.28	31.04	54.00	-22.96	38.99	2.30	25.40	35.65	150	353	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	1597.16	29.57	54.00	-24.43	37.52	2.30	25.40	35.65	150	89	Average	HORIZONTAL
2	1599.32	36.28	74.00	-37.72	44.23	2.30	25.40	35.65	150	89	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 Frequencies	65.88		

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	29544.48	59.24	83.54	-24.30	46.86	17.69	40.40	45.71	150	312	Peak	VERTICAL
2	29546.72	44.44	63.54	-19.10	32.06	17.69	40.40	45.71	150	312	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	29539.34	59.50	83.54	-24.04	47.11	17.69	40.40	45.70	150	103	Peak	HORIZONTAL
2	29544.06	44.57	63.54	-18.97	32.19	17.69	40.40	45.71	150	103	Average	HORIZONTAL

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

Test Range	40GHz – 200GHz

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
58.32	23.6	55.00	44.96	-91.56
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-14.85	3	28.9136	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.64	23.6	55.00	42.50	-90.78
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-14.56	3	30.9192	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
65.88	23.6	55.00	42.78	-90.32
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-14.05	3	34.8282	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

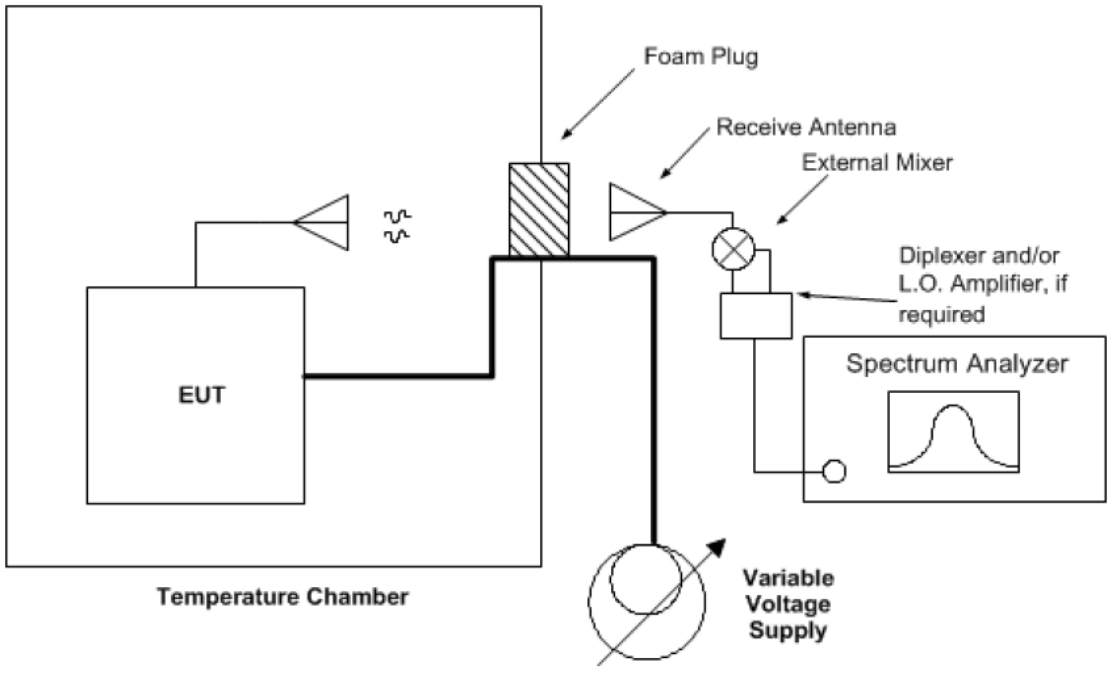
Refer a measuring instruments list in this test report.

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 2.16 GHz bandwidth:

Frequency Stability with Respect to Ambient Temperature			
Test Results			
Test Temperature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-40	61560.99	580	within band
-30	61560.88	470	within band
-20	61560.55	140	within band
-10	61560.84	430	within band
0	61560.85	440	within band
10	61560.65	240	within band
20	61560.41	Reference	within band
30	61560.36	-50	within band
40	61560.32	-90	within band
50	61560.30	-110	within band
60	61560.28	-130	within band
70	61560.04	-370	within band
NOTE: The manufacturer's specified temperature range of -40 to 70°C.			

For 1.08 GHz bandwidth:

Frequency Stability with Respect to Ambient Temperature			
Test Results			
Test Temperature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-40	62640.863	499	within band
-30	62640.741	377	within band
-20	62640.647	283	within band
-10	62640.589	225	within band
0	62640.512	148	within band
10	62640.450	86	within band
20	62640.364	Reference	within band
30	62640.311	-53	within band
40	62640.352	-12	within band
50	62640.235	-129	within band
60	62640.245	-119	within band
70	62640.198	-166	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 2.16 GHz bandwidth:

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vdc)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
4.25	61560.91	500	within band
5	61560.41	Reference	within band
5.75	61560.22	-190	within band
NOTE: For the applicable limit, see FCC 15.255(f).			

For 1.08 GHz bandwidth:

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vdc)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
4.25	62640.714	350	within band
5	62640.364	Reference	within band
5.75	62640.442	78	within band
NOTE: For the applicable limit, see FCC 15.255(f).			

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
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH04-CB)
BILOG ANTENNA with 6 dB attenuator	Schaffner & Woken	CBL6112B & N-6-06	22021&AT-N 0607	30MHz ~ 1GHz	Oct. 12, 2018	Oct. 11, 2019	Radiation (03CH04-CB)
Bilog Antenna with 6 dB attenuator	Schaffner	CBL6112B & N-6-06	2928 & AT-N0607	20MHz ~ 2GHz	Jan. 02, 2019	Jan. 01, 2020	Radiation (03CH04-CB)
Horn Antenna	ETS • Lindgren	3115	00143147	750MHz~18GHz	Oct. 26, 2018	Oct. 25, 2019	Radiation (03CH04-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	310N	187291	0.1MHz ~ 1GHz	Mar. 19, 2019	Mar. 18, 2020	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Mar. 19, 2019	Mar. 18, 2020	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35 -HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 26, 2018	Dec. 25, 2019	Radiation (03CH04-CB
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH04-CB)
RF Cable-low	Woken	RG402	Low Cable-03+22	30MHz – 1GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+22	1GHz - 18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH04-CB)
Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH04-CB)
Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH04-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH04-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Apr. 04 2019	Apr. 03, 2020	Radiation (03CH04-CB)
Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)
Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)
Detector	Millitech	DET-15-RP FW0	#A18185(074)	50 ~ 75 GHz	Jan. 29, 2018*	Jan. 28, 2020*	Radiation (03CH04-CB)
Pico Scope	Pico	Pico Scope 6402C	CX372/002	N/A	Jul. 07, 2019	Jul. 06, 2020	Radiation (03CH04-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%