Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	: HEDMLTG360N
Equipment	: 60GHz backhaul transmitter
Brand Name	: Edge-core、Kwikbit
Model Name	: MLTG-360、K60DNxy (Refer to section 1.1.9 for detail information)
Applicant	: Accton Technology Corp No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer	: Accton Technology Corp 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 Jun. 16, 2022, and testing was started from Jul. 02, 2022 and completed on Sep. 01, 2022. We, Sporton International Inc. Hsinchu 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 shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR0D1524-04	01	Initial issue of report	May 11, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.207	AC Power Conducted Emissions	PASS	-
3.2	15.255(e)	Occupied Bandwidth	PASS	-
3.3	15.255(c)	EIRP Power	PASS	-
3.4	15.255(c)	Peak Conducted Power	PASS	-
3.5	15.255(d)	Transmitter Spurious Emissions	PASS	-
3.6	15.255(f)	Frequency Stability	PASS	-
3.7	15.255(a),(h)	Operation Restriction and Group Installation	PASS	-
Note: Reference to Sporton Project No.: 0D1524-02				

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Cathy Chiu

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information		
Frequency Range (GHz)	**Operating Frequency Range (GHz)**	**Modulation**
57-71 GHz	58.32, 60.48, 62.64, 64.80 GHz	OFDM

Note: The EUT contains a certified module (Brand Name: WROOM, Model No.:ESP32-WROOM-32U, FCC: 2AC7Z-ESP32WROOM32U), and the EUT only use its WIFI 2.4GHz function at this time.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Murata	LBKA0ZZ1SV-TEMP	Array	N/A	28

Note: The above information was declared by manufacturer.

1.1.3 Power Levels

Worst Power Levels for Channel 1			
Applicable power levels	☐ Conducted ☒ EIRP		
Frequency (GHz)	Highest (P_{high}):		
	Mode	AV Power (dBm)	Peak Power (dBm)
58.32	OFDM	35.89	36.48

Worst Power Levels for Channel 3			
Applicable power levels	☐ Conducted ☒ EIRP		
Frequency (GHz)	Highest (P_{high}): (dBm)		
	Mode	AV Power (dBm)	Peak Power (dBm)
62.64	OFDM	35.66	36.38

Worst Power Levels for Channel 4			
Applicable power levels	☐ Conducted ☒ EIRP		
Frequency (GHz)	Highest (P_{high}): (dBm)		
	Mode	AV Power (dBm)	Peak Power (dBm)
64.80	OFDM	29.20	29.73

1.1.4 Operating Conditions

Operating Conditions				
☒ -20 °C to +50 °C				
☐ 0 °C to +40 °C				
☐ Other:				
EUT Power Type	From PoE or DC power (48V)			
Test Software Version	TeraTerm 4.75			
Supply Voltage	☐ AC	State AC voltage	-	V
Supply Voltage	☒ DC	State DC voltage	48	V

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

Duty Cycle	Duty Cycle Factor (dB)
51 %	2.92

1.1.8 Table For Radio List

Radio 1	Radio 2	Radio 3	Radio 4
V	V	V	V

Note: According to above, Radio 2 has been evaluated to be the worst case among Radio 1~Radio 4, thus it was selected to test and record in the report as a result.

1.1.9 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Description
Edge-core	MLTG-360	There is nothing different for brand names and model names, just for marketing purposes only.
Kwikbit	K60DNxy (where “x” is [1..4] , “y“ is [P|R] if x = 2, otherwise y = blank, not a space)	

Note 1: From the above models, model: MLTG-360 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

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”

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 414788 D01 v01r01

1.3 Testing Location

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo’ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated (For Frequency Stability)	TH03-CB	Eddie Weng	26.1~26.5 / 66~71	Jul. 06, 2022
Radiated below 1GHz	10CH01-CB	Bob Chang	22~23 / 63~64	Aug. 25, 2022
Radiated 1GHz~40GHz (For Occupied Bandwidth, EIRP Power, Peak Conducted Power, Transmitter Spurious Emissions–CTX)	03CH03-CB	KJ Chang	24.1~25.7 / 64~66	Jul. 02, 2022~ Aug. 26, 2022
	03CH04-CB	KJ Chang	25.5~26.3 / 67~68	Jul. 02, 2022~ Aug. 26, 2022
AC Conduction	CO01-CB	Dean Chang	22~23 / 52~53	Sep. 01, 2022

2 Test Configuration of Equipment under Test

2.1 Parameters of Test Software Setting

Channel Plan (GHz)		Software Setting
Channel 1	58.32	29
Channel 3	62.64	29
Channel 4	64.80	29

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
AC Power Conducted Emissions Test Voltage: 120Vac / 60Hz	Random Frequency
Occupied Bandwidth	58.32, 62.64, 64.80
EIRP Power	58.32, 62.64, 64.80
Peak Conducted Power	58.32, 62.64, 64.80
Transmitter Spurious Emissions (below 1 GHz)	Random Frequency
Transmitter Spurious Emissions (1 GHz-40 GHz)	58.32, 62.64, 64.80
Transmitter Spurious Emissions (above 40 GHz)	58.32, 62.64, 64.80
Frequency Stability	62.64

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Normal Link
	The EUT was performed with PoE in and DC power in, “DC power in” has been evaluated to be the worst case. So the measurement will follow this same test configuration.
1	EUT with DC power in
Tests Item	Occupied Bandwidth EIRP Power Peak Conducted Power Frequency Stability
	The EUT was performed at X axis, Y axis and Z axis position for Transmitter Spurious Emissions Intentional above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.
Test Condition	Radiated measurement
1	EUT in Y axis
Tests Item	Transmitter Spurious Emissions
Operating Mode <1GHz	CTX
	1. The EUT was performed at X axis, Y axis and Z axis, and the worst case was found at Y axis for Transmitter Spurious Emissions Intentional above 1GHz test. So the measurement will follow this same test configuration. 2. The EUT was performed with PoE in and DC power in, “PoE in” has been evaluated to be the worst case. So the measurement will follow this same test configuration
1	EUT in Y axis with PoE in
Operating Mode >1GHz	CTX
	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
1	EUT in Y axis_58.32 GHz
2	EUT in Y axis_62.64 GHz
3	EUT in Y axis_64.80 GHz

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	60 GHz + WLAN 2.4GHz
Refer to Sporton Test Report No.: FA0D1524-04 for Co-location RF Exposure Evaluation.	

2.3 EUT Operation during Test

For CTX:

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

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Others
Splash-proof cover *1
Wall-mounted rack *1
Metal band*1

2.5 Support Equipment

For AC Conduction

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	LAN1 NB	DELL	E6430	N/A
B	LAN2 NB	DELL	E6430	N/A
C	POE Load	IgniteNet	SP-AC750	N/A
D	MGMT NB	DELL	E6430	N/A
E	2.4G NB	DELL	E6430	N/A
F	60G Radio Client	Edgecore	MLTG-CN	N/A
G	LAN3 NB	DELL	E6430	N/A
H	LAN4 NB	DELL	E6430	N/A
I	10G SFP+ PC	DELL	T3400	N/A
J	60G Radio Client NB	DELL	E6430	N/A
K	POE Load	IgniteNet	SP-AC750	N/A
L	POE Load	IgniteNet	SP-AC750	N/A
M	POE Load	IgniteNet	SP-AC750	N/A
N	Fiber Converter	Eopto	EOLT-V96-02	N/A
O	Adapter	DELTA	ADP-280BR B	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PoE	Carrier	GME40B-480135FDA-2	N/A
B	Notebook	DELL	E4300	N/A

For Radiated (above 1GHz), Occupied Bandwidth, EIRP Power, Peak Conducted Power test:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PoE	Carrier	GME40B-480135FDA-2	N/A
B	Notebook	DELL	E4300	N/A

For Frequency Stability test:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PoE	Carrier	GME40B-480135FDA-2	N/A
B	Notebook	DELL	E4300	N/A

2.6 Far Field Boundary Calculations

The far-field boundary is given as:

far field = (2 * L^2) /**λ**

where:

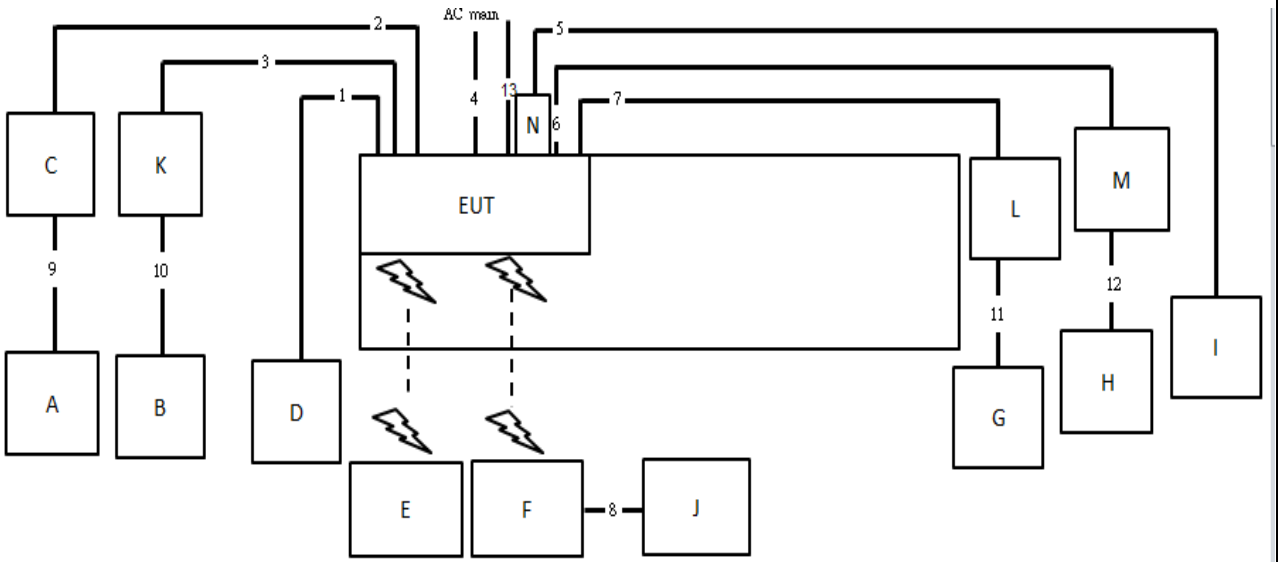
L = Largest Antenna Dimension, including the reflector, in meters

λ= wavelength in meters

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
58.32	0.13	0.0051440	6.571	657.07
62.64	0.13	0.0047893	7.057	705.74
64.80	0.13	0.0046296	7.301	730.08

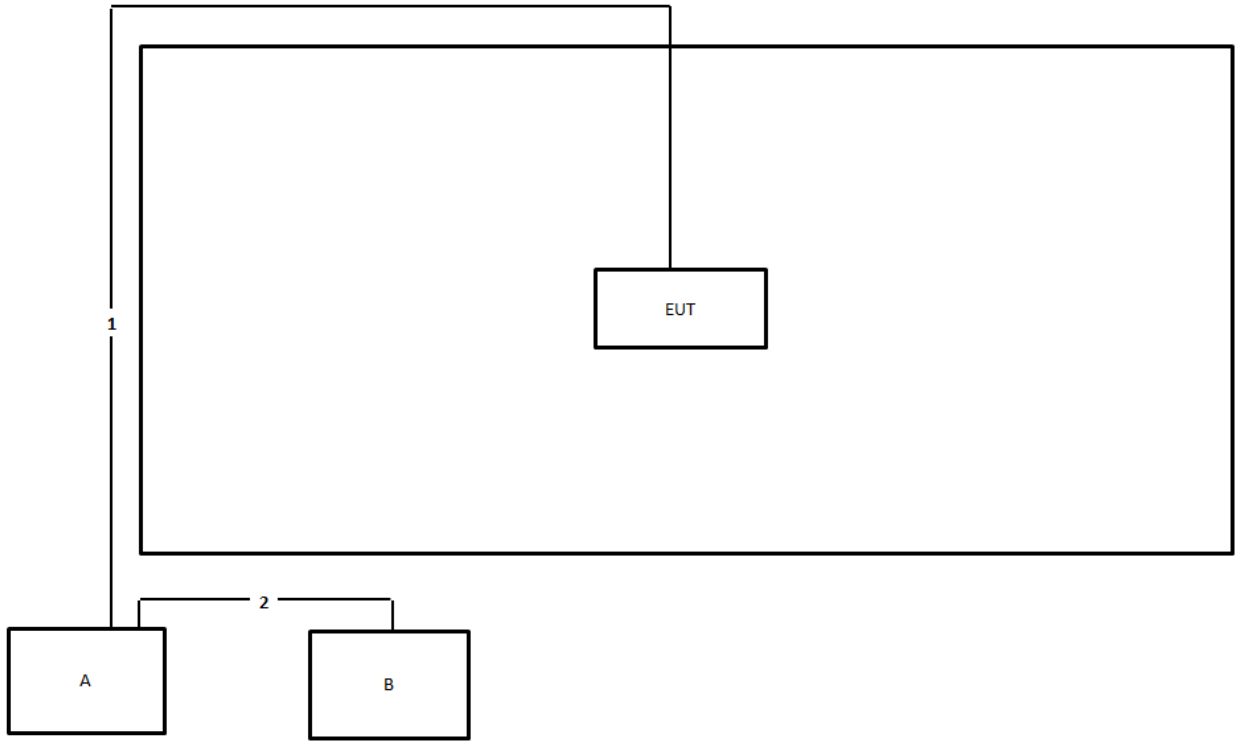
2.7 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



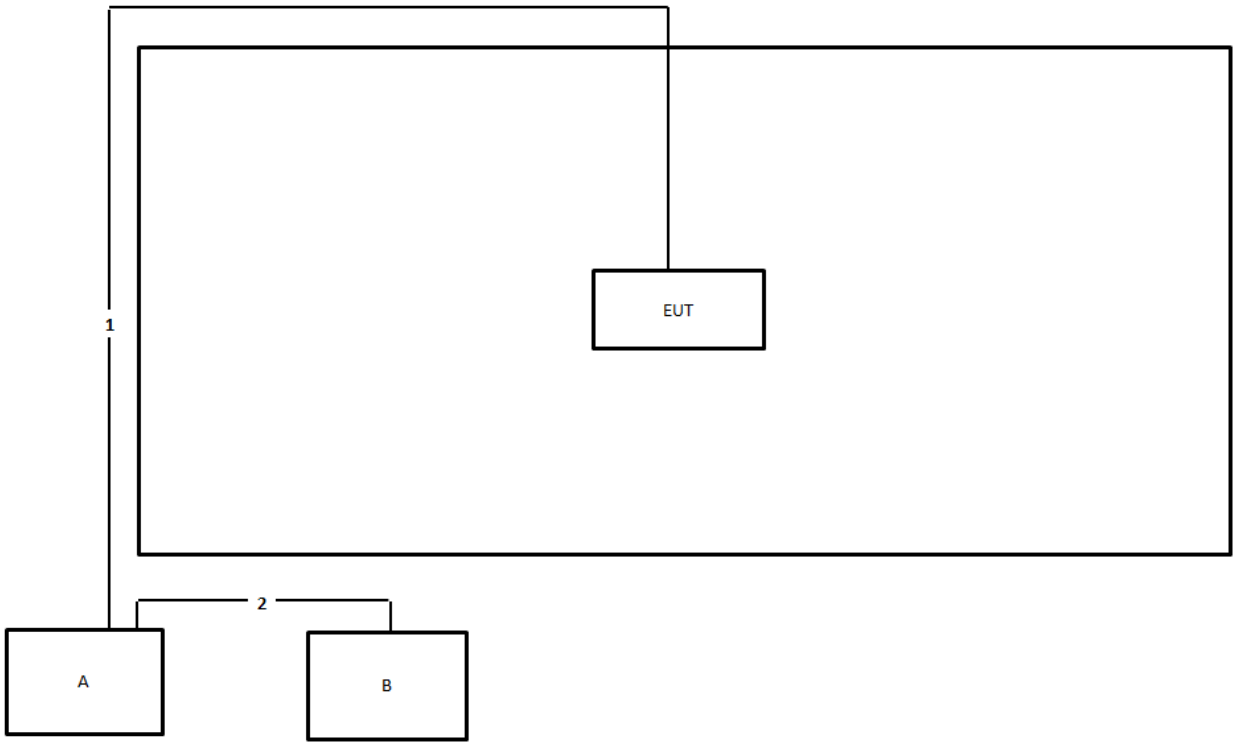
Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	Power cable	No	3.8m
5	RJ-45 cable	No	10m
6	RJ-45 cable	No	10m
7	RJ-45 cable	No	10m
8	RJ-45 cable	No	3m
9	RJ-45 cable	No	3m
10	RJ-45 cable	No	3m
11	RJ-45 cable	No	3m
12	RJ-45 cable	No	3m
13	Ground cable	No	1.8m

Test Setup Diagram - Transmitter Spurious Emissions below 1 GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m

Test Setup Diagram - Transmitter Spurious Emissions above 1 GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m

3 Transmitter Test Result

3.1 AC Power Conducted Emissions

3.1.1 Limit of AC Power Conducted Emissions

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

3.1.2 Measuring Instruments

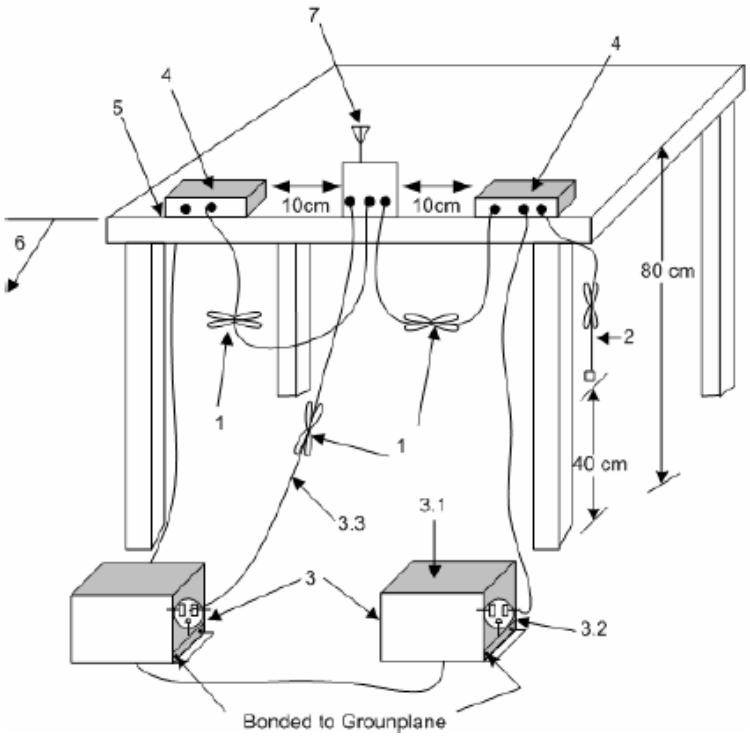
Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup

AC Power Conducted Emissions



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

3.1.5 Measurement Results Calculation

The measured Level is calculated using:

a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level

b. Margin = -Limit + Level

3.1.6 Test Result of AC Power Conducted Emissions

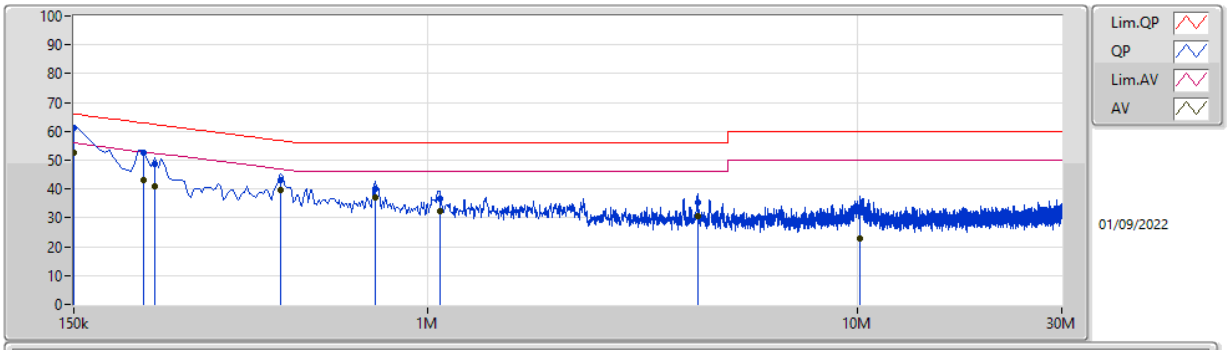
Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.2.3

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

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

Phase	Line	Configuration	Normal Link

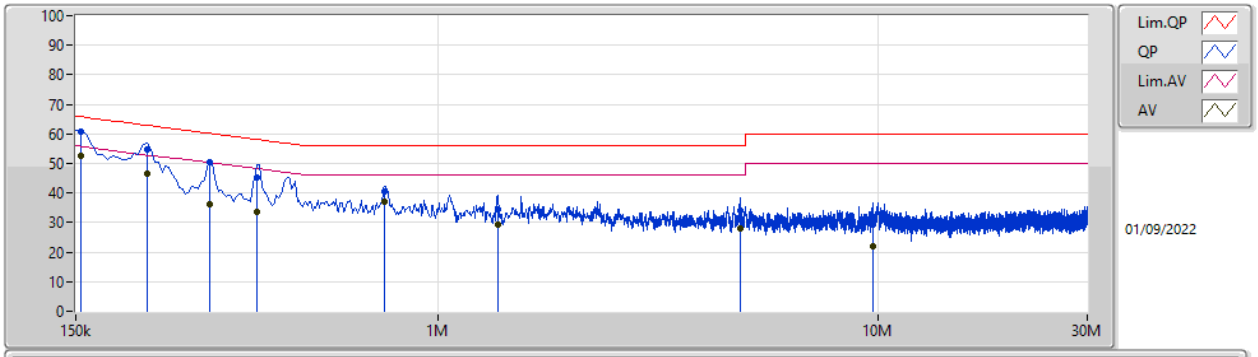
Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	61.00	66.00	-5.00	9.99	Line	-	51.01	0.06	0.04	9.89
AV	150k	52.80	56.00	-3.20	9.99	Line	"Worst"	42.81	0.06	0.04	9.89
QP	217.5k	52.59	62.92	-10.33	9.99	Line	-	42.60	0.06	0.04	9.89
AV	217.5k	43.22	52.92	-9.70	9.99	Line	-	33.23	0.06	0.04	9.89
QP	231k	48.84	62.41	-13.57	9.99	Line	-	38.85	0.06	0.04	9.89
AV	231k	40.82	52.41	-11.59	9.99	Line	-	30.83	0.06	0.04	9.89
QP	456k	42.92	56.76	-13.84	10.01	Line	-	32.91	0.06	0.06	9.89
AV	456k	39.55	46.76	-7.21	10.01	Line	-	29.54	0.06	0.06	9.89
QP	757.5k	40.28	56.00	-15.72	10.01	Line	-	30.27	0.07	0.05	9.89
AV	757.5k	36.93	46.00	-9.07	10.01	Line	-	26.92	0.07	0.05	9.89
QP	1.068M	36.45	56.00	-19.55	10.00	Line	-	26.45	0.07	0.04	9.89
AV	1.068M	32.49	46.00	-13.51	10.00	Line	-	22.49	0.07	0.04	9.89
QP	4.254M	35.51	56.00	-20.49	10.12	Line	-	25.39	0.13	0.10	9.89
AV	4.254M	30.44	46.00	-15.56	10.12	Line	-	20.32	0.13	0.10	9.89
QP	10.172M	31.87	60.00	-28.13	10.29	Line	-	21.58	0.22	0.16	9.91
AV	10.172M	23.03	50.00	-26.97	10.29	Line	-	12.74	0.22	0.16	9.91

Phase	Neutral	Configuration	Normal Link

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	154.5k	60.58	65.75	-5.17	10.00	Neutral	-	50.58	0.07	0.04	9.89
AV	154.5k	52.48	55.75	-3.27	10.00	Neutral	"Worst"	42.48	0.07	0.04	9.89
QP	217.5k	54.86	62.92	-8.06	10.00	Neutral	-	44.86	0.07	0.04	9.89
AV	217.5k	46.56	52.92	-6.36	10.00	Neutral	-	36.56	0.07	0.04	9.89
QP	303k	50.38	60.17	-9.79	10.01	Neutral	-	40.37	0.07	0.05	9.89
AV	303k	36.41	50.17	-13.76	10.01	Neutral	-	26.40	0.07	0.05	9.89
QP	388.5k	45.08	58.10	-13.02	10.02	Neutral	-	35.06	0.07	0.06	9.89
AV	388.5k	33.42	48.10	-14.68	10.02	Neutral	-	23.40	0.07	0.06	9.89
QP	757.5k	40.52	56.00	-15.48	10.02	Neutral	-	30.50	0.08	0.05	9.89
AV	757.5k	36.92	46.00	-9.08	10.02	Neutral	-	26.90	0.08	0.05	9.89
QP	1.365M	34.39	56.00	-21.61	10.04	Neutral	-	24.35	0.09	0.06	9.89
AV	1.365M	29.43	46.00	-16.57	10.04	Neutral	-	19.39	0.09	0.06	9.89
QP	4.866M	34.15	56.00	-21.85	10.15	Neutral	-	24.00	0.15	0.11	9.89
AV	4.866M	27.83	46.00	-18.17	10.15	Neutral	-	17.68	0.15	0.11	9.89
QP	9.758M	29.30	60.00	-30.70	10.31	Neutral	-	18.99	0.24	0.16	9.91
AV	9.758M	22.12	50.00	-27.88	10.31	Neutral	-	11.81	0.24	0.16	9.91

3.2 Occupied Bandwidth

3.2.1 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.

3.2.2 Measuring Instruments

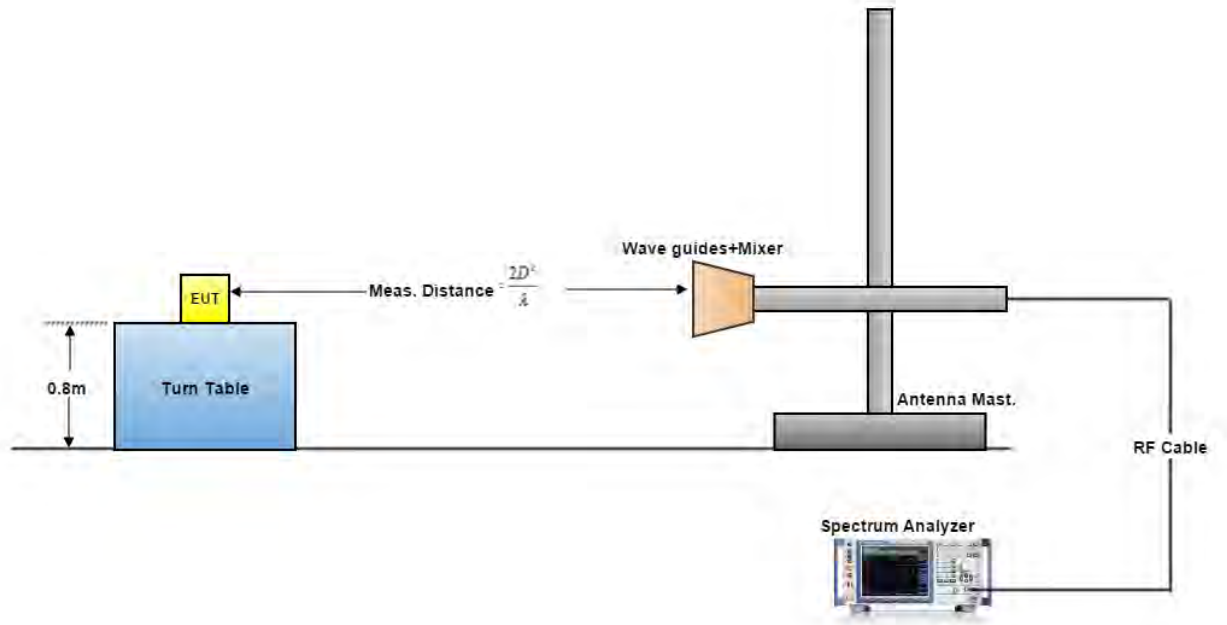
Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup

Occupied Channel Bandwidth



3.2.5 Test Result of Occupied Bandwidth

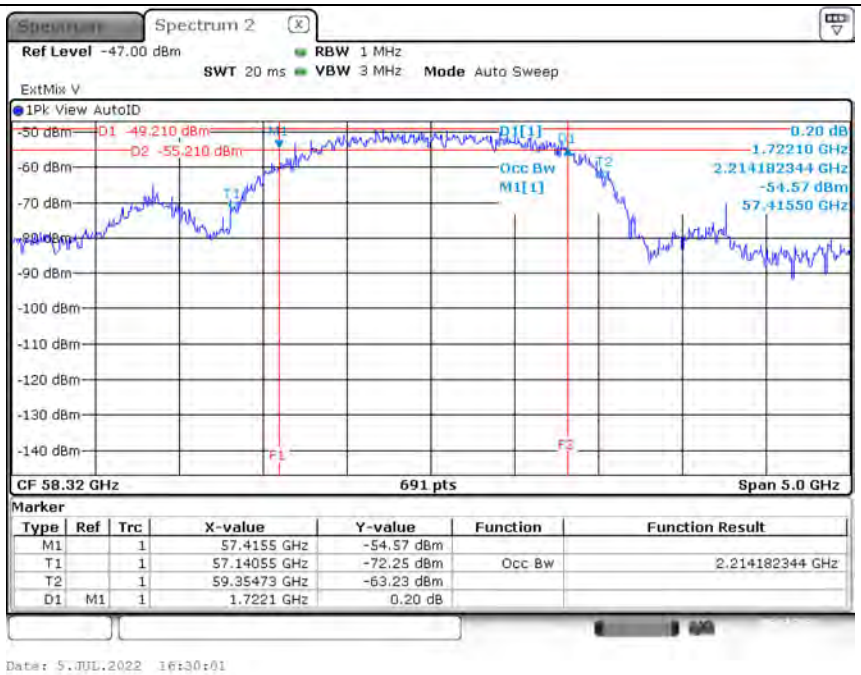
Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.9.2

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

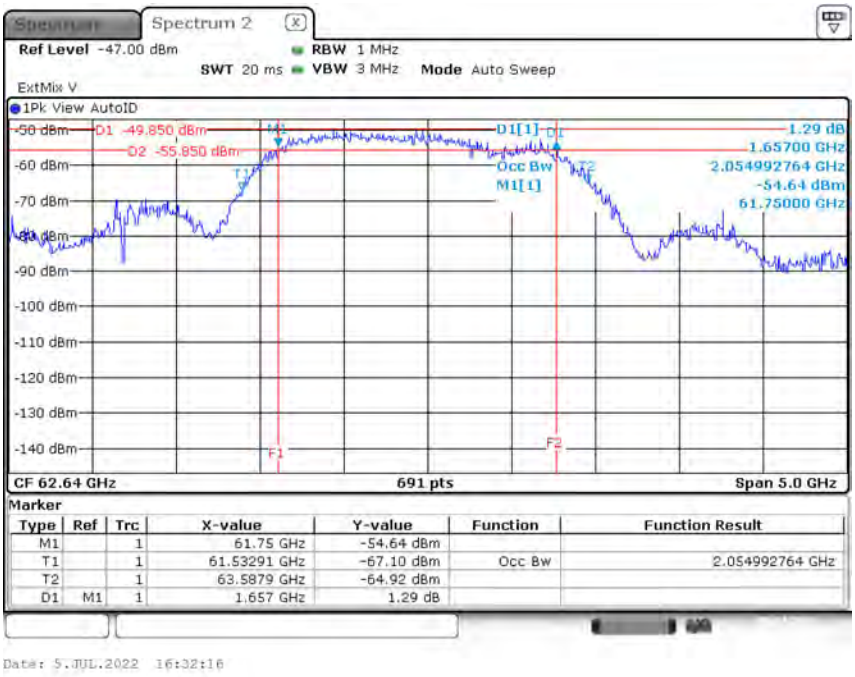
Test Results				
Channel Plan (GHz)	**Test Freq. (GHz)**	**6 dBc Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**	**Limit (MHz)**
Channel 1	58.32	2214.18	1722.10	N/A
Channel 3	62.64	2054.92	1657.00	N/A
Channel 4	64.80	2004.34	1512.30	N/A

3.2.5.1 Bandwidth Plots

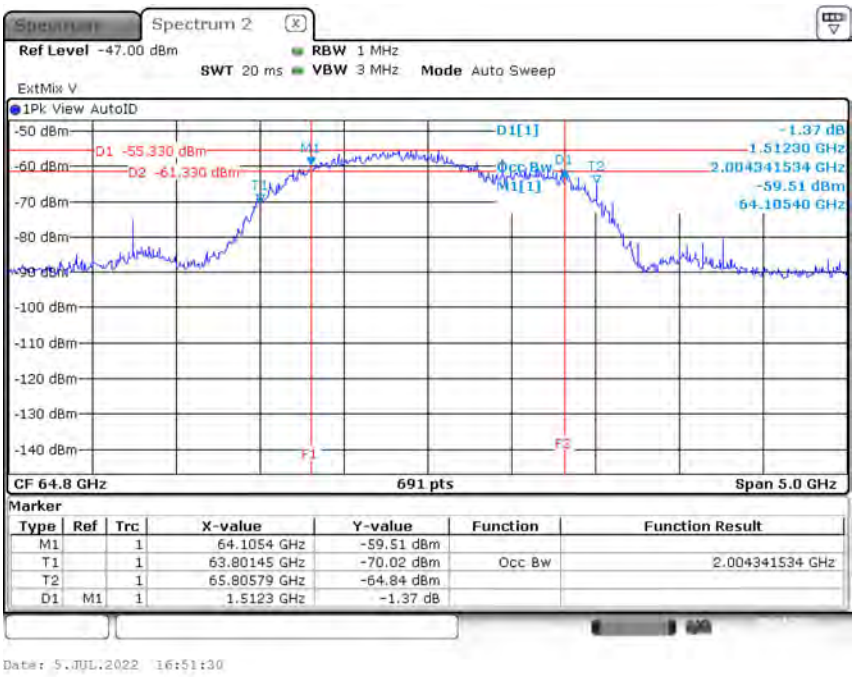
Channel Plan: Channel 1 GHz
Test Frequency: 58.32 GHz
6 dBc Bandwidth & Occupied Bandwidth



Channel Plan: Channel 3 GHz
Test Frequency: 62.64 GHz
6 dBc Bandwidth & Occupied Bandwidth



Channel Plan: Channel 4 GHz
Test Frequency: 64.80 GHz
6 dBc Bandwidth & Occupied Bandwidth



3.3 EIRP Power

3.3.1 Limit of EIRP Power

EIRP Power Limit		
Use Condition	**EIRP Average Power**	**EIRP Peak Power**
Fixed field disturbance sensors at within the frequency band 61-61.5GHz	40 dBm	43 dBm
Fixed field disturbance sensors at outside of the band 61-61.5GHz	10 dBm	13 dBm
Except fixed field disturbance sensors at 61-61.5GHz	N/A	10 dBm
Except 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 15.255(c)

3.3.2 Measuring Instruments

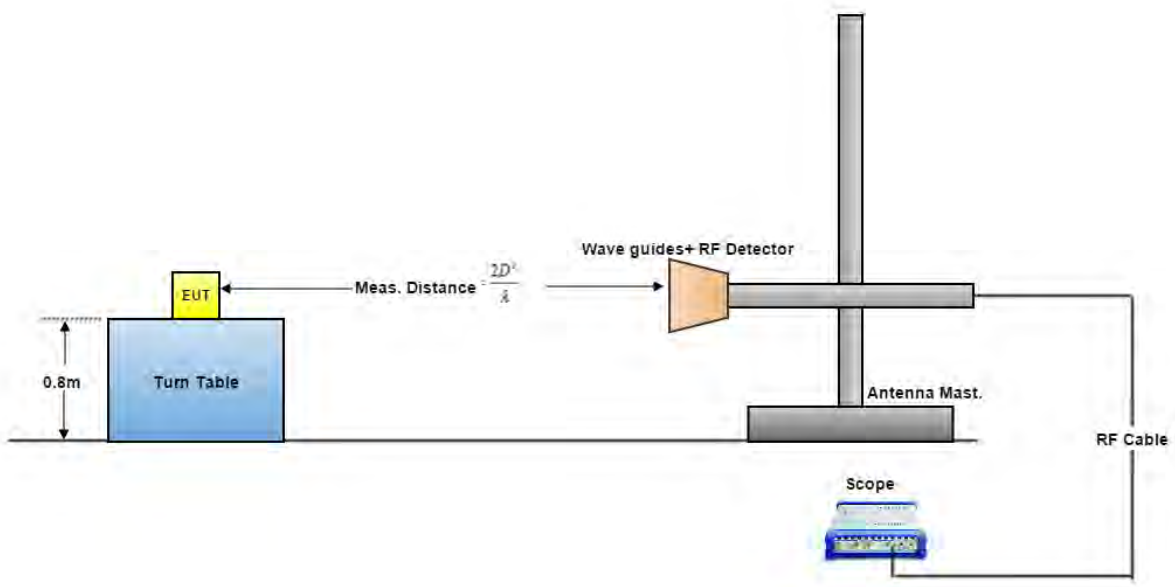
Refer a measuring instruments list in this test report.

3.3.3 Test Procedures

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

3.3.4 Test Setup

EIPR Power



3.3.5 Test Result of EIRP Power

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

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

3.3.5.1 Test Result of EIRP Power

Test Distance	8 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	23.78	21.04	-25.76	-26.35	123.21	122.62	36.48	35.89	43	40
Channel 3	62.64	23.6	20.38	17.09	-26.48	-27.20	123.11	122.39	36.38	35.66	43	40
Channel 4	64.80	23.6	4.39	3.98	-33.42	-33.95	116.47	115.94	29.73	29.20	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 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)”.

3.4 Peak Conducted Power

3.4.1 Limit of Peak Conducted Power

Peak Conducted Power Limit			
Use Condition	**6dBc Bandwidth**	**Occupied Bandwidth**	**Peak Conducted Power (note 1)**
Fixed field disturbance sensors at within the frequency band 61-61.5GHz	> 100MHz	≤500MHz	500mW
	≤ 100MHz		500mW x (BW/100) (see note 2)
Fixed field disturbance sensors at outside of the band 61-61.5GHz and within 57 -71 GHz	> 100MHz	N/A	500mW
	≤ 100MHz		500mW x (BW/100) (see note 2)
Except fixed field disturbance sensors at 61-61.5GHz	N/A	> 500MHz	-10 dBm
Except outdoor fixed Point to Point,	> 100MHz	N/A	500mW
Outdoor fixed Point to Point	≤ 100MHz	N/A	500mW x (BW/100) (see note 2)
NOTE 1: For the applicable limit, see NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)			

3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.4.3 Test Procedures

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

3.4.4 Test Result of Peak Conducted Power

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

3.4.4.1 Peak Conducted Power

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	36.48	28	8.48	7.040	2214.18	500.00
Channel 3	62.64	36.38	28	8.38	6.881	2054.92	500.00
Channel 4	64.80	29.73	28	1.73	1.490	2004.34	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 3.2.5.

NOTE 3: For the applicable limit, see

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

P(cond) = EIRP - G(dBi)

where:

G(dBi) is gain of EUT antenna.

3.5 Transmitter Spurious Emissions

3.5.1 Limit of Transmitter Spurious Emissions

Frequency Range	Limit
Radiated emissions below 40 GHz	Reference to section 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 15.255(d)	
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

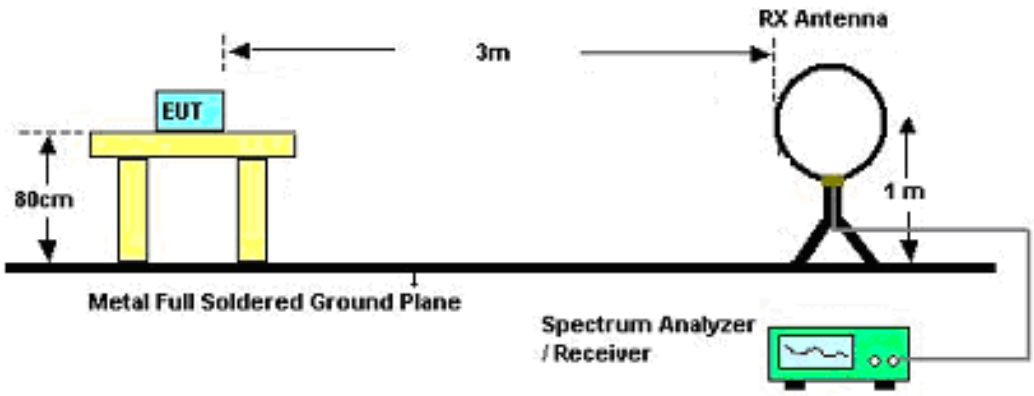
3.5.2 Test Procedures

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

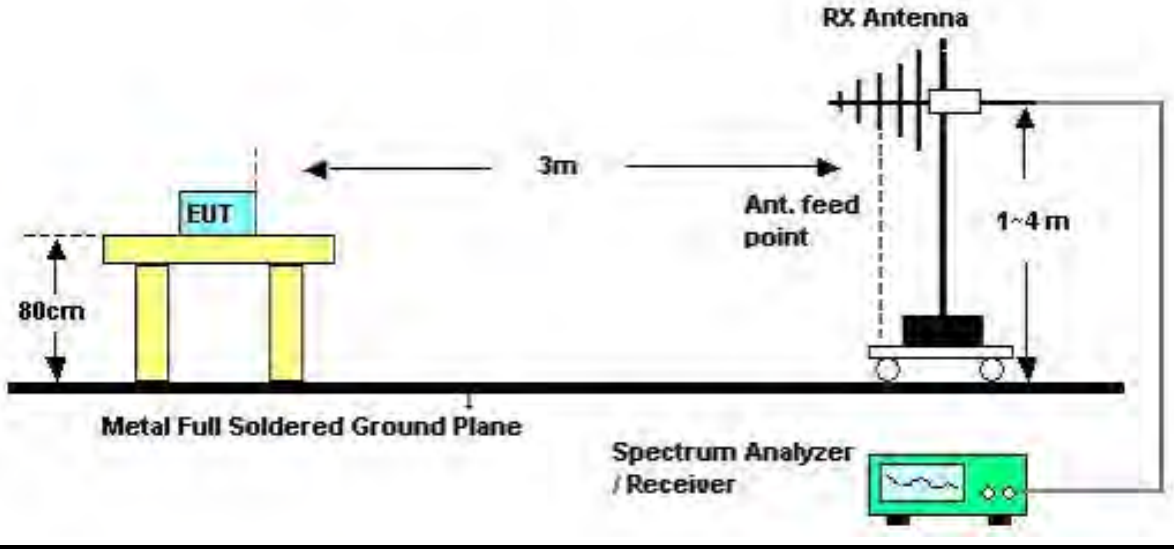
3.5.3 Test Setup

Transmitter Spurious Emissions

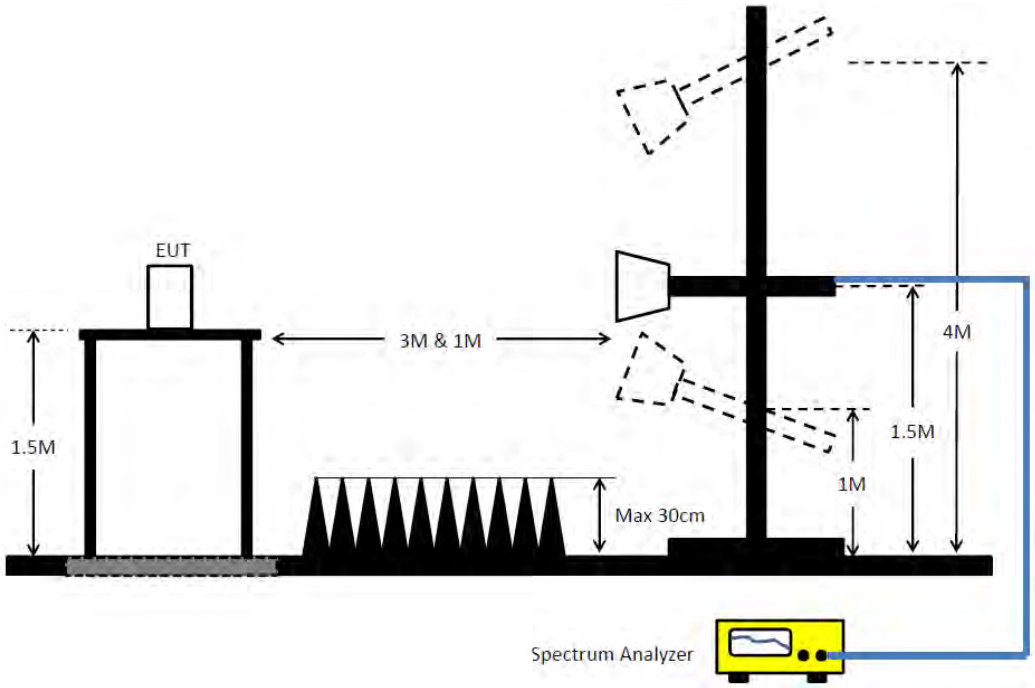
9kHz ~30MHz



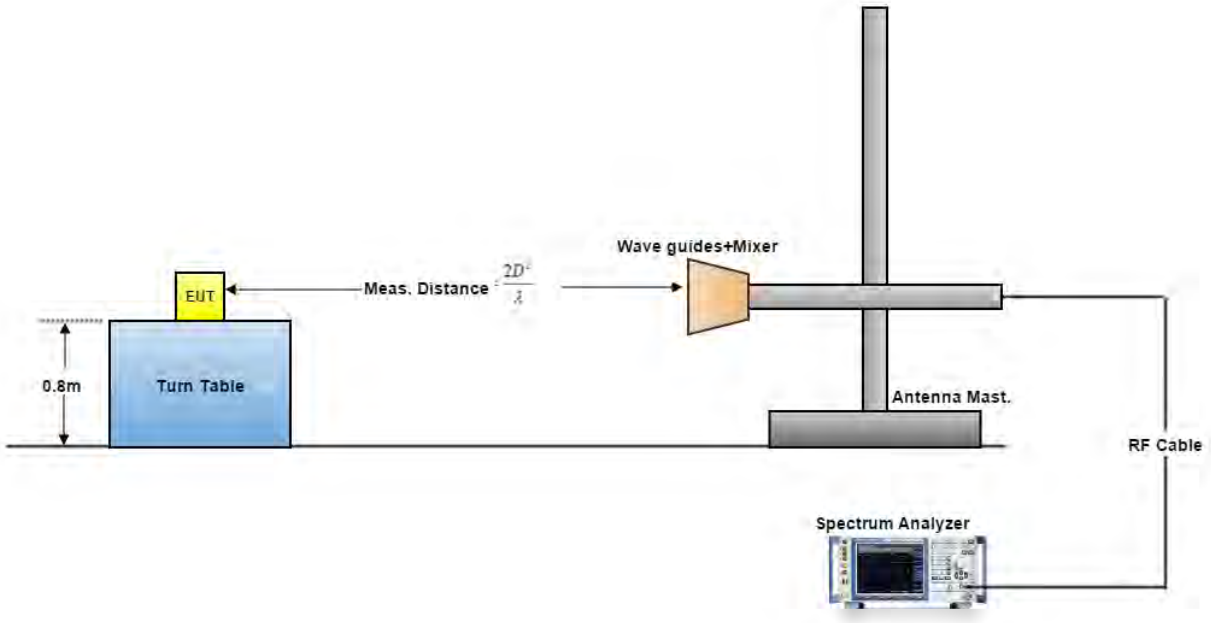
30MHz~1GHz



1GHz ~40GHz



Above 40GHz



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

3.5.4 Measurement Results Calculation

The measured Level is calculated using:

For below 40GHz

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

For above 40GHz

EIRP = Meas. Level - RX Antenna Gain + 20*log(4*Pi(3.14159)*D/(300/(Frequency*1000)))

3.5.5 Test Result of Transmitter Spurious Emissions

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

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

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

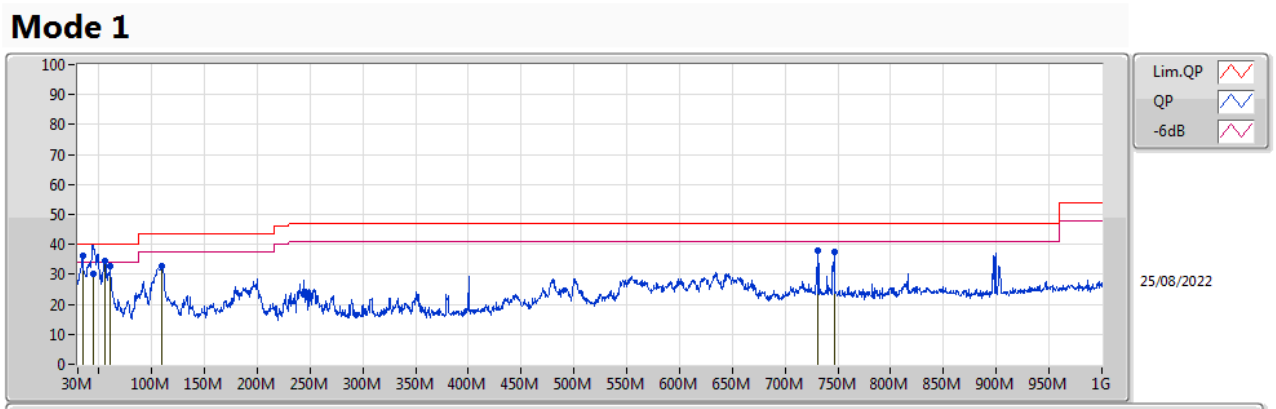
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

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

3.5.5.2 Test Result of Transmitter Spurious Emissions

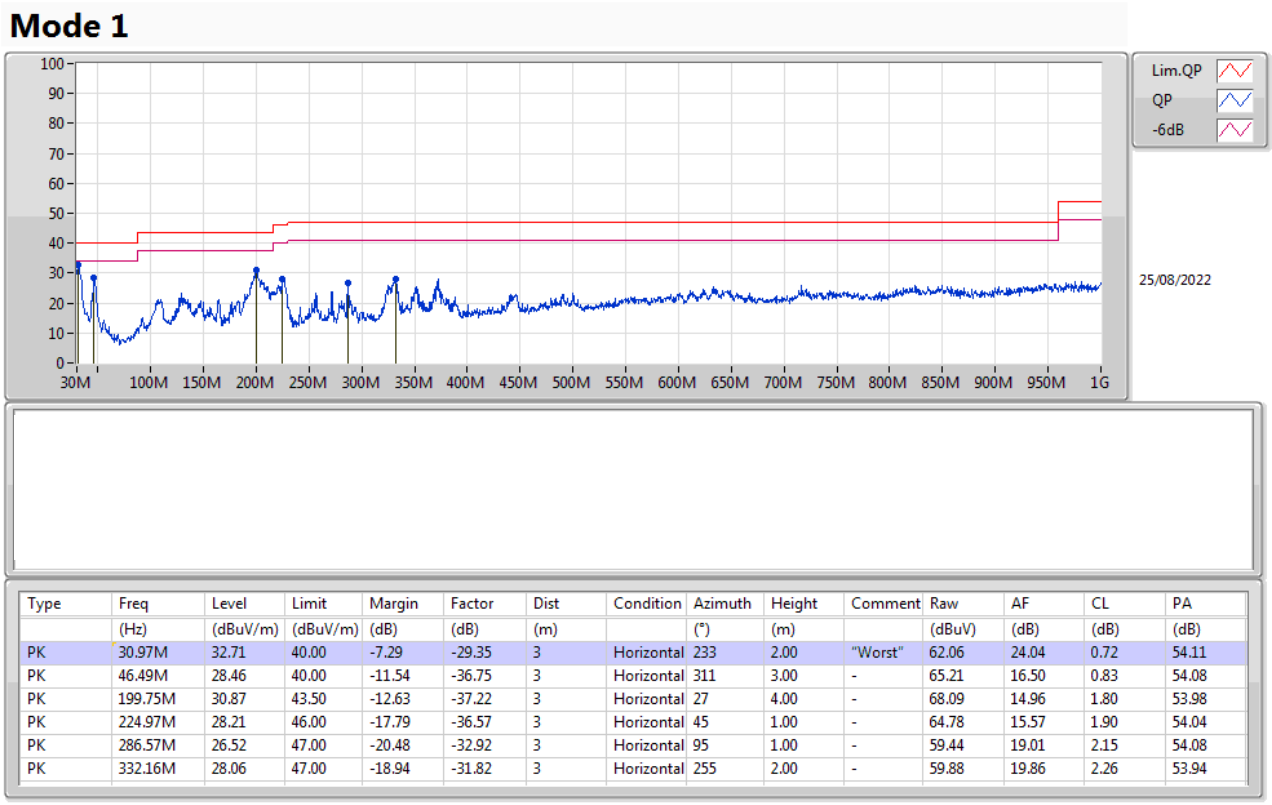
Test Range	30 MHz – 1000 MHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	Mode 1

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	34.85M	36.27	40.00	-3.73	-31.00	3	Vertical	233	2.00	"Worst"	67.27	22.29	0.80	54.09
QP	44.07M	29.98	40.00	-10.02	-35.62	3	Vertical	42	3.00	-	65.60	17.66	0.80	54.08
PK	55.71M	34.49	40.00	-5.51	-40.19	3	Vertical	313	1.00	-	74.68	12.89	1.01	54.09
PK	60.56M	32.88	40.00	-7.12	-40.76	3	Vertical	67	2.00	-	73.64	12.23	1.10	54.09
PK	110.03M	32.92	43.50	-10.58	-35.68	3	Vertical	60	1.00	-	68.60	16.95	1.35	53.98
PK	731.31M	37.77	47.00	-9.23	-21.19	3	Vertical	355	1.00	-	58.96	28.23	3.43	52.85
PK	746.35M	37.67	47.00	-9.33	-20.96	3	Vertical	213	2.00	-	58.63	28.34	3.49	52.79

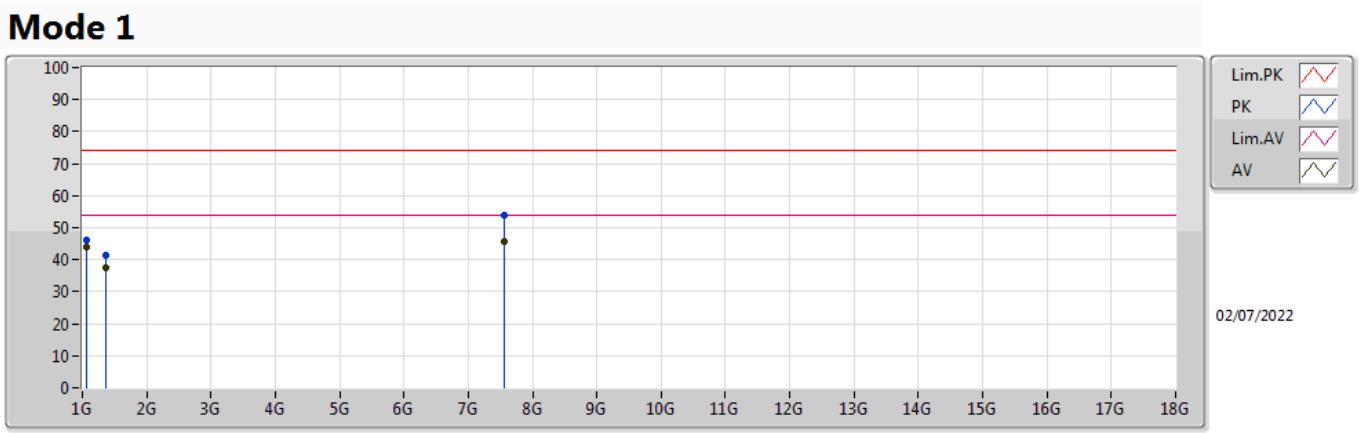
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	30.97M	32.71	40.00	-7.29	-29.35	3	Horizontal	233	2.00	"Worst"	62.06	24.04	0.72	54.11
PK	46.49M	28.46	40.00	-11.54	-36.75	3	Horizontal	311	3.00	-	65.21	16.50	0.83	54.08
PK	199.75M	30.87	43.50	-12.63	-37.22	3	Horizontal	27	4.00	-	68.09	14.96	1.80	53.98
PK	224.97M	28.21	46.00	-17.79	-36.57	3	Horizontal	45	1.00	-	64.78	15.57	1.90	54.04
PK	286.57M	26.52	47.00	-20.48	-32.92	3	Horizontal	95	1.00	-	59.44	19.01	2.15	54.08
PK	332.16M	28.06	47.00	-18.94	-31.82	3	Horizontal	255	2.00	-	59.88	19.86	2.26	53.94

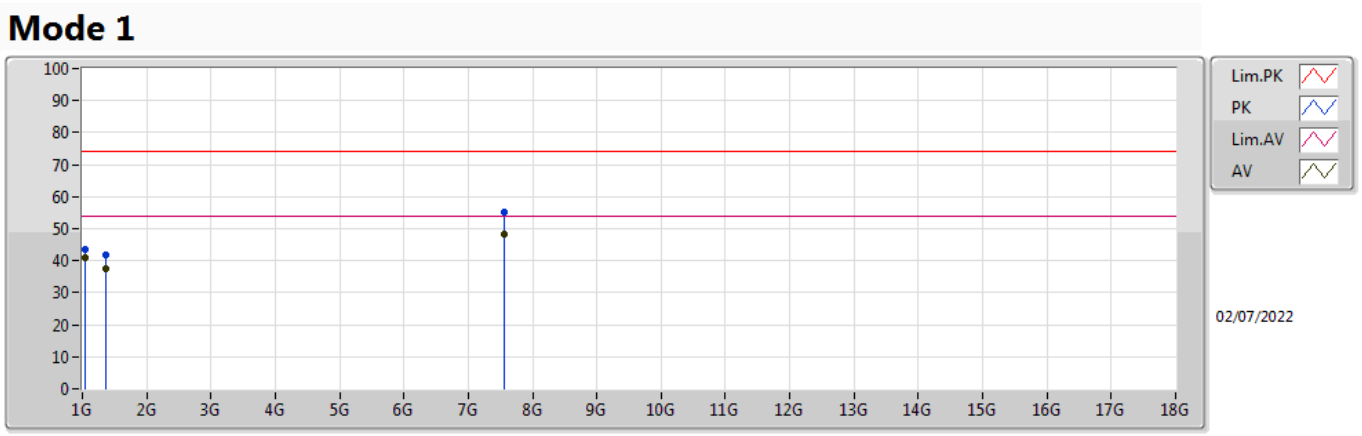
Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	Mode 1

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05365G	45.99	74.00	-28.01	-11.43	3	Vertical	267	1.05	-	57.42	23.61	2.18	37.22
AV	1.05369G	43.92	54.00	-10.08	-11.43	3	Vertical	267	1.05	"	55.35	23.61	2.18	37.22
PK	1.37496G	41.52	74.00	-32.48	-7.82	3	Vertical	317	1.20	-	49.34	25.45	2.57	35.84
AV	1.37501G	37.44	54.00	-16.56	-7.81	3	Vertical	317	1.20	-	45.25	25.45	2.58	35.84
PK	7.5601G	53.72	74.00	-20.28	9.76	3	Vertical	197	1.53	-	43.96	37.42	6.26	33.92
AV	7.56001G	45.59	54.00	-8.41	9.76	3	Vertical	197	1.53	"Worst"	35.83	37.42	6.26	33.92

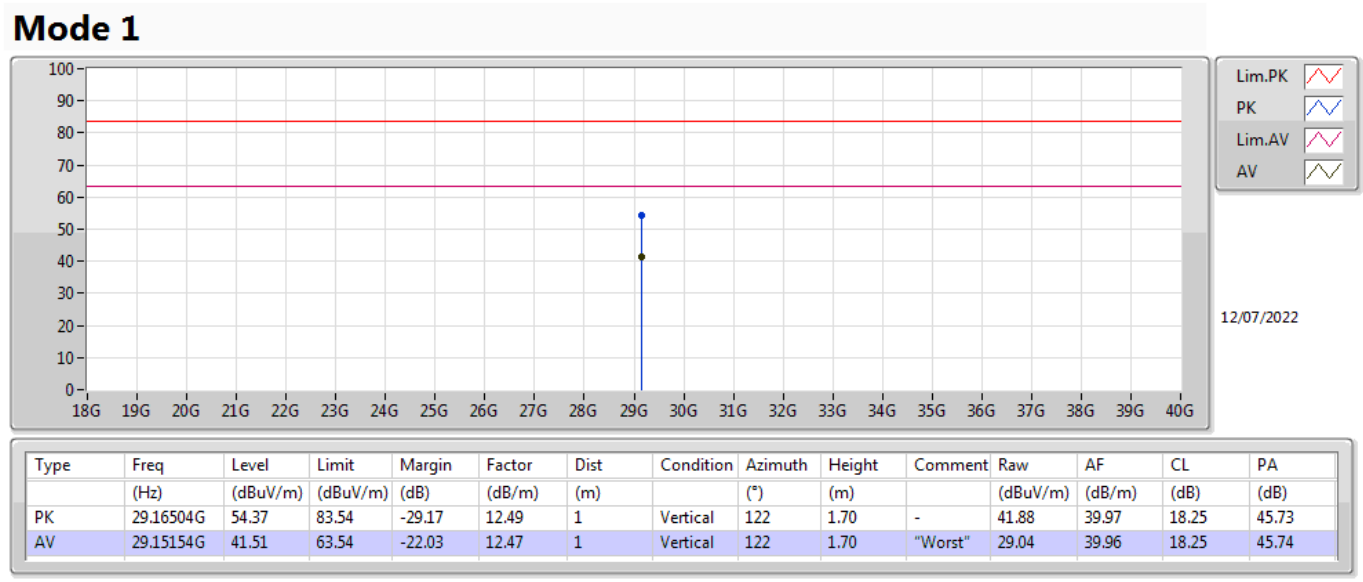
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05353G	43.71	74.00	-30.29	-11.43	3	Horizontal	157	1.50	-	55.14	23.61	2.18	37.22
AV	1.05307G	41.00	54.00	-13.00	-11.43	3	Horizontal	157	1.50	"	52.43	23.61	2.18	37.22
PK	1.37489G	41.61	74.00	-32.39	-7.82	3	Horizontal	221	1.92	-	49.43	25.45	2.57	35.84
AV	1.375G	37.63	54.00	-16.37	-7.81	3	Horizontal	221	1.92	-	45.44	25.45	2.58	35.84
PK	7.56G	55.12	74.00	-18.88	9.76	3	Horizontal	283	1.75	-	45.36	37.42	6.26	33.92
AV	7.55995G	48.07	54.00	-5.93	9.76	3	Horizontal	283	1.75	"Worst"	38.31	37.42	6.26	33.92

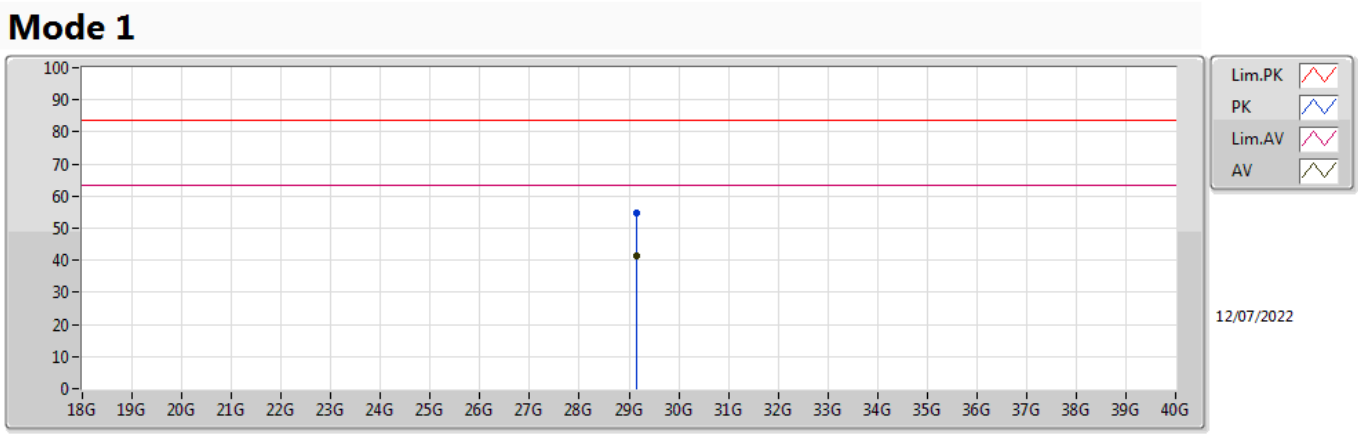
Test Range	18GHz – 40 GHz	Test Distance	1 m
Test Configuration	CTX	Test Mode	Mode 1

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	29.16504G	54.37	83.54	-29.17	12.49	1	Vertical	122	1.70	-	41.88	39.97	18.25	45.73
AV	29.15154G	41.51	63.54	-22.03	12.47	1	Vertical	122	1.70	"Worst"	29.04	39.96	18.25	45.74

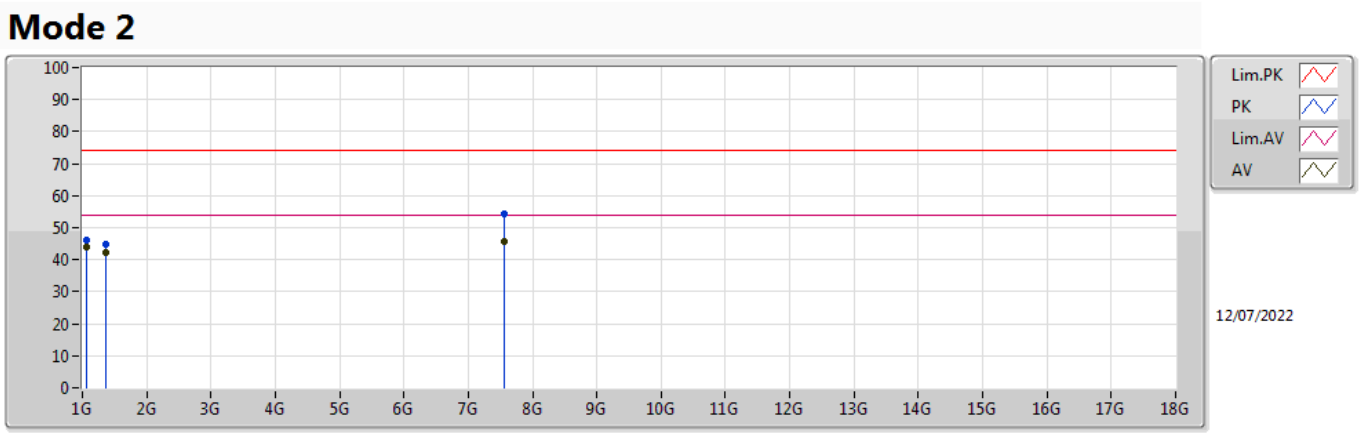
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	29.16336G	54.63	83.54	-28.91	12.49	1	Horizontal	251	1.70	-	42.14	39.97	18.25	45.73
AV	29.15294G	41.54	63.54	-22.00	12.47	1	Horizontal	251	1.70	"Worst"	29.07	39.96	18.25	45.74

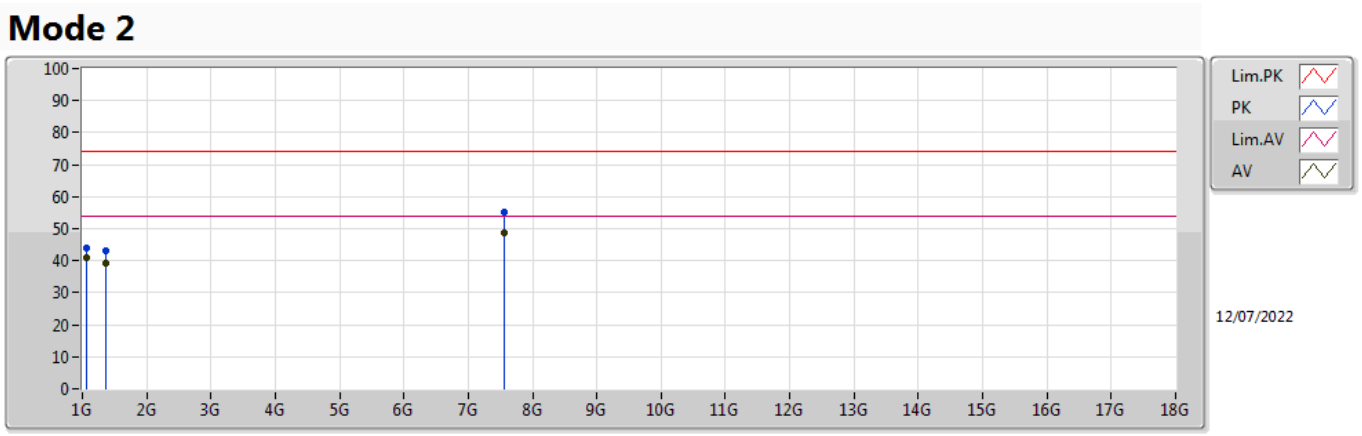
Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	Mode 2

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05402G	46.20	74.00	-27.80	-11.42	3	Vertical	269	1.57	-	57.62	23.62	2.18	37.22
AV	1.054G	44.13	54.00	-9.87	-11.42	3	Vertical	269	1.57	"	55.55	23.62	2.18	37.22
PK	1.37498G	44.81	74.00	-29.19	-7.82	3	Vertical	119	1.31	-	52.63	25.45	2.57	35.84
AV	1.37499G	42.11	54.00	-11.89	-7.82	3	Vertical	119	1.31	-	49.93	25.45	2.57	35.84
PK	7.56006G	54.12	74.00	-19.88	9.76	3	Vertical	191	1.66	-	44.36	37.42	6.26	33.92
AV	7.56001G	45.81	54.00	-8.19	9.76	3	Vertical	191	1.66	"Worst"	36.05	37.42	6.26	33.92

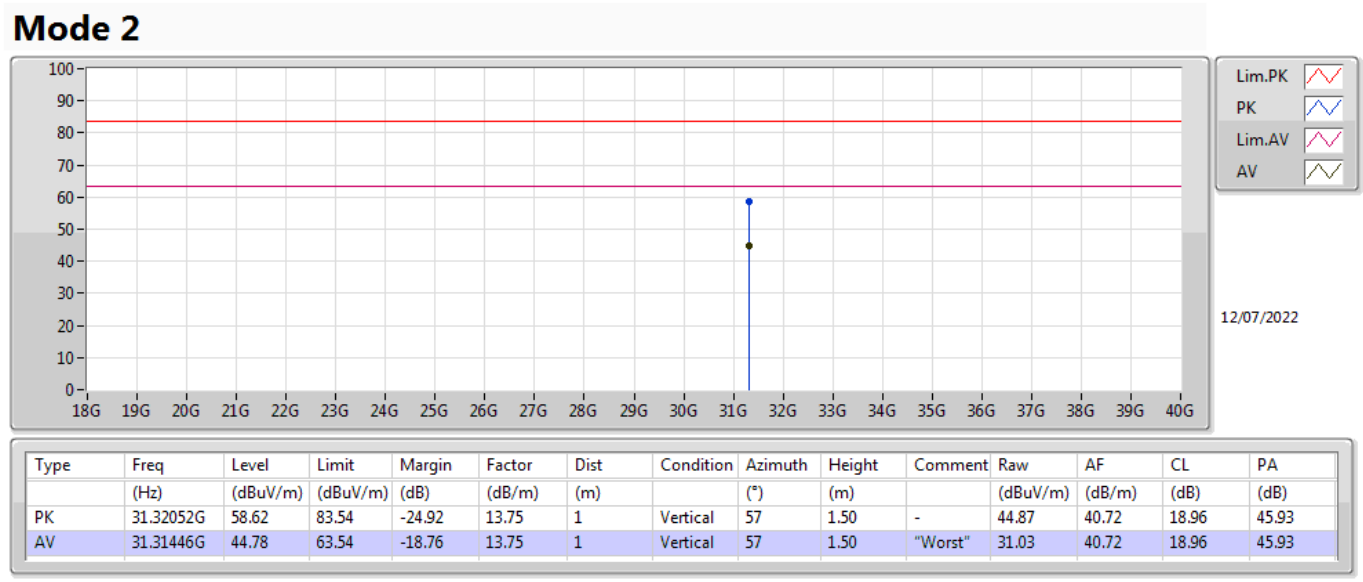
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05439G	43.88	74.00	-30.12	-11.42	3	Horizontal	292	1.98	-	55.30	23.62	2.18	37.22
AV	1.0539G	41.04	54.00	-12.96	-11.42	3	Horizontal	292	1.98	"	52.46	23.62	2.18	37.22
PK	1.37507G	42.93	74.00	-31.07	-7.81	3	Horizontal	309	1.41	-	50.74	25.45	2.58	35.84
AV	1.37499G	39.08	54.00	-14.92	-7.82	3	Horizontal	309	1.41	-	46.90	25.45	2.57	35.84
PK	7.56007G	55.32	74.00	-18.68	9.76	3	Horizontal	286	1.50	-	45.56	37.42	6.26	33.92
AV	7.56G	48.76	54.00	-5.24	9.76	3	Horizontal	286	1.50	"Worst"	39.00	37.42	6.26	33.92

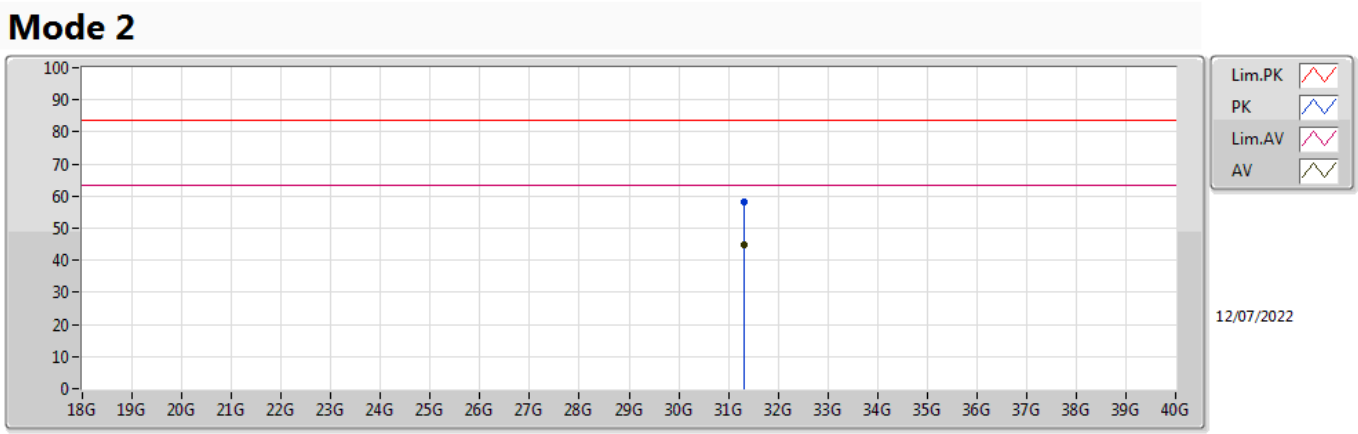
Test Range	18GHz – 40 GHz	Test Distance	1 m
Test Configuration	CTX	Test Mode	Mode 2

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	31.32052G	58.62	83.54	-24.92	13.75	1	Vertical	57	1.50	-	44.87	40.72	18.96	45.93
AV	31.31446G	44.78	63.54	-18.76	13.75	1	Vertical	57	1.50	"Worst"	31.03	40.72	18.96	45.93

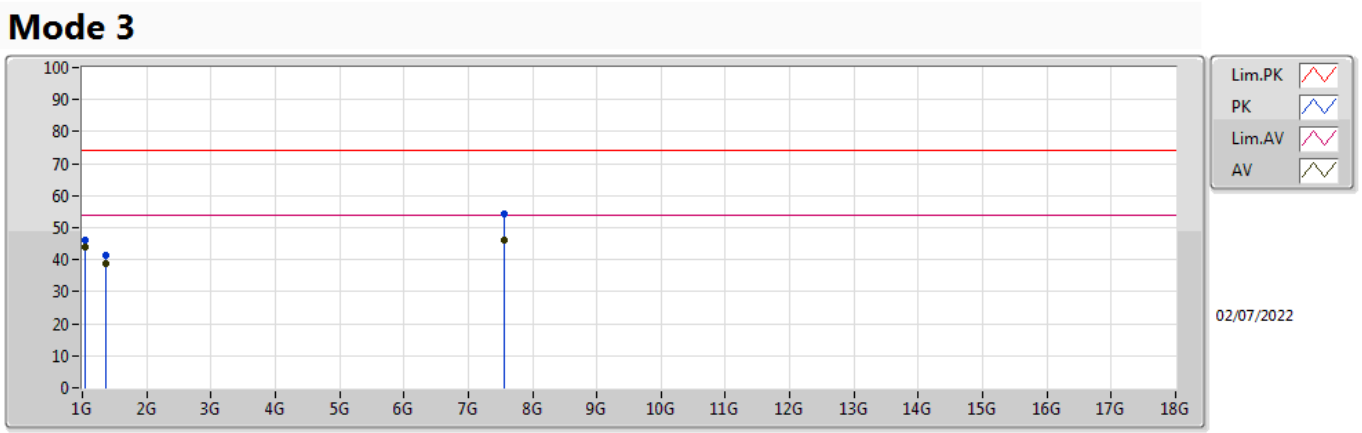
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	31.31784G	58.23	83.54	-25.31	13.75	1	Horizontal	320	1.56	-	44.48	40.72	18.96	45.93
AV	31.3293G	44.83	63.54	-18.71	13.74	1	Horizontal	320	1.56	"Worst"	31.09	40.70	18.97	45.93

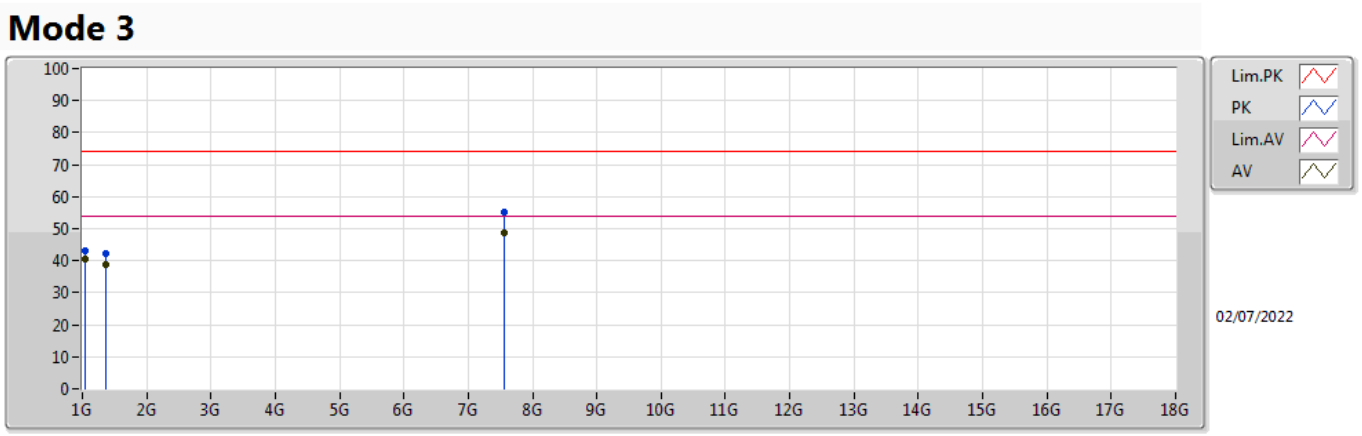
Test Range	1 GHz – 18 GHz	Test Distance	3 m
Test Configuration	CTX	Test Mode	Mode 3

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05352G	46.06	74.00	-27.94	-11.43	3	Vertical	269	1.59	-	57.49	23.61	2.18	37.22
AV	1.05348G	44.12	54.00	-9.88	-11.43	3	Vertical	269	1.59	-	55.55	23.61	2.18	37.22
PK	1.375G	41.48	74.00	-32.52	-7.81	3	Vertical	119	1.37	-	49.29	25.45	2.58	35.84
AV	1.375G	38.78	54.00	-15.22	-7.81	3	Vertical	119	1.37	-	46.59	25.45	2.58	35.84
PK	7.56009G	54.23	74.00	-19.77	9.76	3	Vertical	193	1.66	-	44.47	37.42	6.26	33.92
AV	7.56007G	46.26	54.00	-7.74	9.76	3	Vertical	193	1.66	"Worst"	36.50	37.42	6.26	33.92

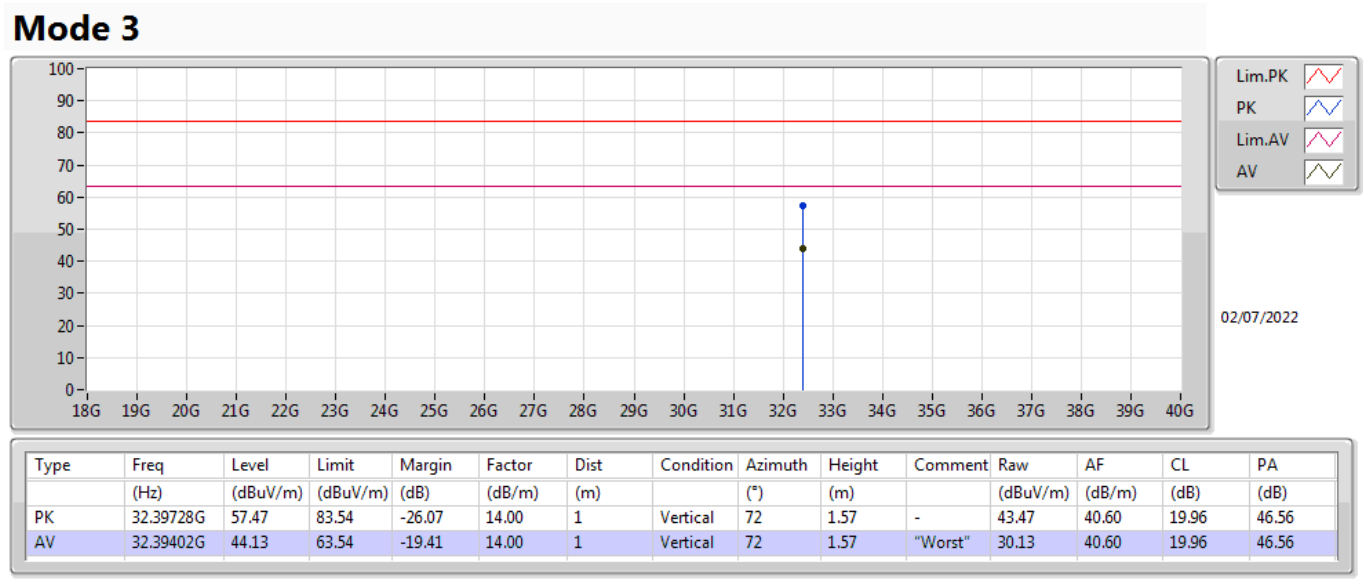
Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	1.05322G	43.15	74.00	-30.85	-11.43	3	Horizontal	291	1.98	-	54.58	23.61	2.18	37.22
AV	1.05339G	40.46	54.00	-13.54	-11.43	3	Horizontal	291	1.98	-	51.89	23.61	2.18	37.22
PK	1.375G	42.19	74.00	-31.81	-7.82	3	Horizontal	308	1.46	-	50.01	25.45	2.57	35.84
AV	1.37501G	38.68	54.00	-15.32	-7.81	3	Horizontal	308	1.46	-	46.49	25.45	2.58	35.84
PK	7.56004G	55.33	74.00	-18.67	9.76	3	Horizontal	282	1.50	-	45.57	37.42	6.26	33.92
AV	7.56001G	48.90	54.00	-5.10	9.76	3	Horizontal	282	1.50	"Worst"	39.14	37.42	6.26	33.92

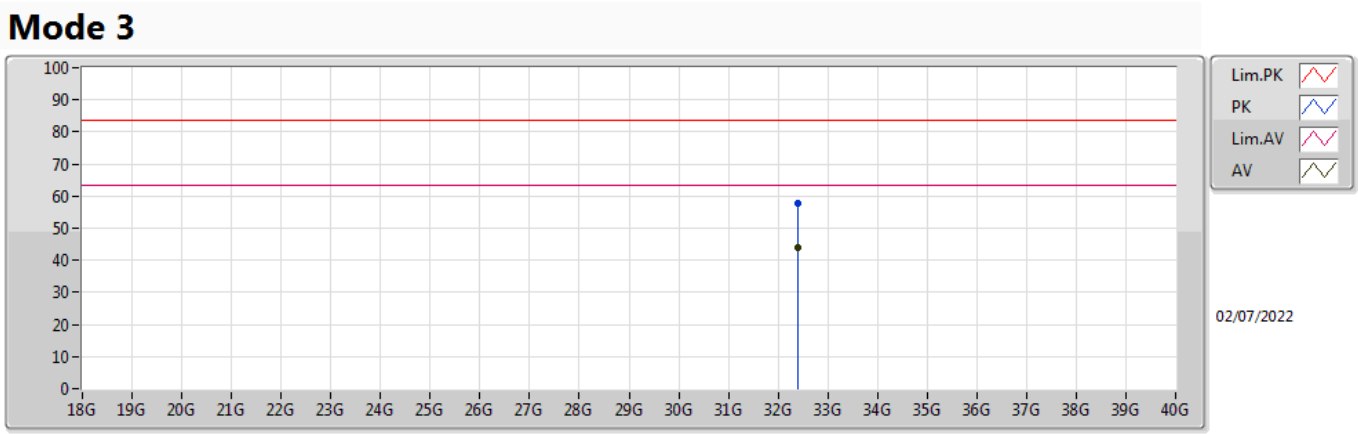
Test Range	18GHz – 40 GHz	Test Distance	1 m
Test Configuration	CTX	Test Mode	Mode 3

Vertical



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	32.39728G	57.47	83.54	-26.07	14.00	1	Vertical	72	1.57	-	43.47	40.60	19.96	46.56
AV	32.39402G	44.13	63.54	-19.41	14.00	1	Vertical	72	1.57	"Worst"	30.13	40.60	19.96	46.56

Horizontal



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	32.4068G	57.57	83.54	-25.97	14.00	1	Horizontal	360	1.70	-	43.57	40.60	19.96	46.56
AV	32.4047G	44.04	63.54	-19.50	14.00	1	Horizontal	360	1.70	"Worst"	30.04	40.60	19.96	46.56

Test Range	40GHz – 200GHz

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	8.00	52.70	-98.7
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-37.36	3	0.1624	90	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	8.00	51.45	-96.05
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-34.92	3	0.2849	90	PASS

Test Plan: Channel 4

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
64.80	23.6	8.00	54.31	-97.71
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-36.11	3	0.2166	90	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

3.6 Frequency Stability

3.6.1 Limit of Frequency Stability

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

3.6.2 Measuring Instruments

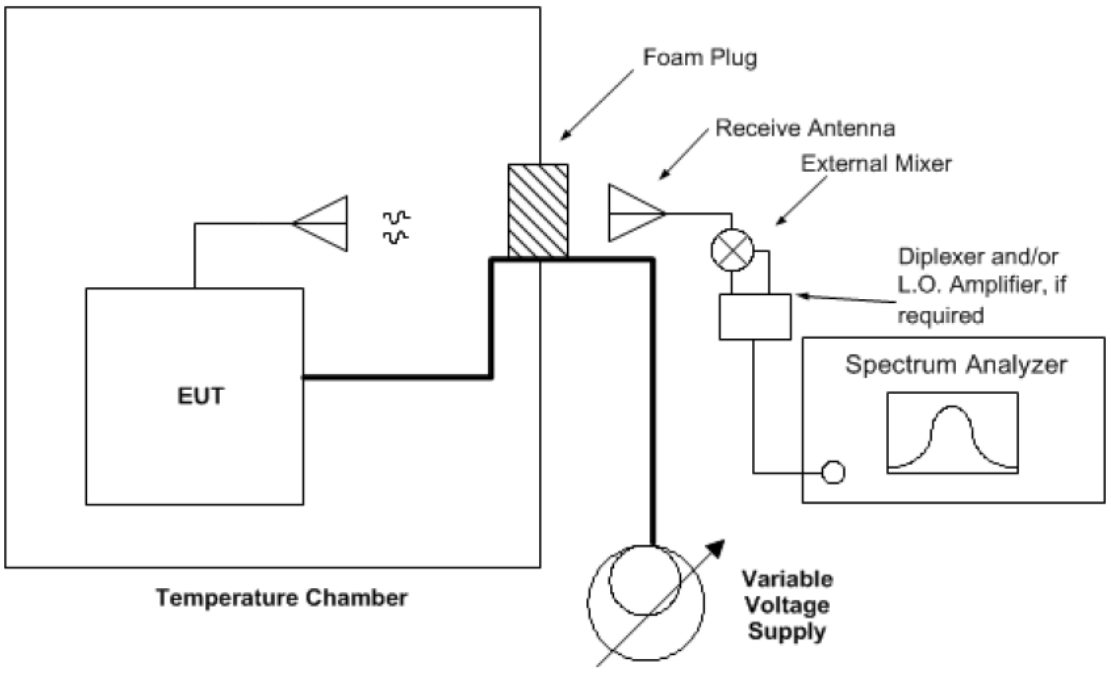
Refer a measuring instruments list in this test report.

3.6.3 Test Procedures

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

3.6.4 Test Setup

Frequency Stability



3.6.5 Test Result of Frequency Stability

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

3.6.5.1 Frequency Stability with Respect to Ambient Temperature

Frequency Stability with Respect to Ambient Temperature			
Test Results			
Test Temp.erature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-20	62621.91	61505	within band
-10	62618.80	58390	within band
0	62618.80	58390	within band
10	62560.41	0	within band
20	62560.41	Reference	within band
30	62582.12	21710	within band
40	62582.12	21710	within band
50	62574.88	14470	within band

3.6.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage			
Test Results			
Test Voltage: (Vac)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
93.5	62560.405	0	within band
110	62560.405	Reference	within band
126.5	62582.115	21710	within band

3.7 Operation Restriction and Group Installation

3.7.1 Limit of Operation Restriction and Group Installation

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

3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not been used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for used on aircraft or satellites.

3.7.3 Result of Group Installation

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

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 18, 2022	May 17, 2023	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	May 14, 2022	May 13, 2023	Radiation (10CH01-CB)
10m Semi Anechoic Chamber NSA	TDK	SAC-10M	10CH01-CB	30MHz~1GHz 10m,3m	Jan. 27, 2022	Jan. 26, 2023	Radiation (10CH01-CB)
Amplifier	Agilent	8447D	2944A10783	9kHz ~ 1.3GHz	Mar. 11, 2022	Mar. 10, 2023	Radiation (10CH01-CB)
Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 11, 2022	Mar. 10, 2023	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-01	25MHz ~ 1GHz	Oct. 19, 2021	Oct. 18, 2022	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-02	25MHz ~ 1GHz	Oct. 19, 2021	Oct. 18, 2022	Radiation (10CH01-CB)
Bilog Antenna with 6dB Attenuator	Chase & EMCI	CBL6111A &N-6-06	1543 &AT-N0609	30MHz ~ 1GHz	Jun. 25, 2022	Jun. 24, 2023	Radiation (10CH01-CB)
Amplifier	EM	EM101	060703	10MHz ~ 1GHz	Oct. 20, 2021	Oct. 19, 2022	Radiation (10CH01-CB)
Low Cable	TITAN	T318E	low cable-03	30MHz ~ 1GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (10CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	May 06, 2022	May 05, 2023	Radiation (10CH01-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (10CH01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (10CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 05, 2022	May 04, 2023	Radiation (03CH03-CB)
Horn Antenna	ETS・Lindgren	3115	6821	750MHz~18GHz	Jan. 21, 2022	Jan. 20, 2023	Radiation (03CH03-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH03-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jul. 05, 2022	Jul. 04, 2023	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH03-CB)
Pre-Amplifier	-	-	TF-130N-R1	18GHz ~ 40GHz	Jun. 21, 2022	Jun. 20, 2023	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 10, 2022	Jun. 09, 2023	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH03-CB)
*Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Nov. 13, 2020	Nov. 12, 2022	Radiation (03CH03-CB)
*Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Nov. 14, 2020	Nov. 13, 2022	Radiation (03CH03-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH03-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH03-CB)
Detector	Millitech	DET-15-RPFW0	#A18185(074)	50 ~ 75 GHz	Apr. 23, 2022	Apr. 22, 2023	Radiation (03CH03-CB)
PC Oscilloscope	PICO TECH	6402C	CX372/002	N/A	Jul. 08, 2021	Jul. 07, 2022	Radiation (03CH03-CB)
PC Oscilloscope	PICO TECH	6402C	CX372/002	N/A	Jul. 07, 2022	Jul. 06, 2023	Radiation (03CH03-CB)
Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	N.C.R	N.C.R	Radiation (03CH03-CB)
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH03-CB)
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH03-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH03-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	N.C.R	N.C.R	Radiation (03CH03-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 24, 2022	Feb. 23, 2023	Radiation (03CH04-CB)
Horn Antenna	ETS・Lindgren	3115	00143147	750MHz~18GHz	Oct. 25, 2021	Oct. 24, 2022	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH04-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jul. 05, 2022	Jul. 04, 2023	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz~26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH04-CB)
Pre-Amplifier	-	-	TF-130N-R1	18GHz ~ 40GHz	Jun. 21, 2022	Jun. 20, 2023	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 28, 2022	Mar. 27, 2023	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH04-CB)
*Mixer	OML	M15HWA	V91113-1	50 ~ 75 GHz	Nov. 13, 2020	Nov. 12, 2022	Radiation (03CH04-CB)
*Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Nov. 14, 2020	Nov. 13, 2022	Radiation (03CH04-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH04-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Mar. 10, 2022	Mar. 09, 2023	Radiation (03CH04-CB)
Detector	Millitech	DET-15-RPFW0	#A18185(074)	50 ~ 75 GHz	Apr. 23, 2022	Apr. 22, 2023	Radiation (03CH04-CB)
PC Oscilloscope	PICO TECH	6402C	CX372/002	N/A	Jul. 08, 2021	Jul. 07, 2022	Radiation (03CH04-CB)
PC Oscilloscope	PICO TECH	6402C	CX372/002	N/A	Jul. 07, 2022	Jul. 06, 2023	Radiation (03CH04-CB)

Instrument	Brand	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 (03CH04-CB)
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH04-CB)
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)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Jan. 07, 2022	Jan. 06, 2023	Radiation (TH03-CB)
Temp. and Humidity Chamber	Gaint Force	GTH-408-40-CP-AR	MAA1410-011	-40~100 degree	Sep. 09, 2021	Sep. 08, 2022	Radiation (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
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 60GHz)	3.0 dB	Confidence levels of 95%
Radiated Emission (60GHz ~ 90GHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (90GHz ~ 200GHz)	4.3 dB	Confidence levels of 95%
Temperature	1.2°C	Confidence levels of 95%