FCC RADIO TEST REPORT

FCC ID	:	W34UMRR1230S
Equipment	:	TRUGRD Stream
Brand Name	:	smartmicro
Model Name	:	UMRR-12 Type 48
Applicant	:	s.m.s, smart microwave sensors GmbH In den Waashainen 1, 38108 Braunschweig, Germany
Manufacturer	:	s.m.s, smart microwave sensors GmbH In den Waashainen 1, 38108 Braunschweig, Germany
Standard	:	47 CFR FCC Part 15 Subpart C § 15.249

The product was received on Nov. 30, 2020, and testing was started from Dec. 08, 2020 and completed on Jan. 23, 2021. 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 Subpart C 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. 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.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR0N2466	01	Initial issue of report	Feb. 01, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.207	AC Power Line Conducted Emissions	PASS	-
3.2	15.249(a)	Field Strength of Fundamental Emissions	PASS	-
3.3	15.215(c)	20dB Spectrum Bandwidth	PASS	-
3.4	15.249(a)/(d)	Radiated Emissions	PASS	-
3.5	15.249(d)	Band Edge Emissions	PASS	-
3.6	15.203	Antenna Requirements	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:
1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer. 2. 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: Wendy Pan

1 General Information

1.1 Product Details

Items	Description				
Power Type	From DC power supply				
Modulation	FMCW				
Frequency Range	24000 ~ 24250 MHz				
Operation Frequency Range	Waveform Index	Test Mode	Frequency Band (MHz)	Test Frequency (MHz)	Bandwidth (MHz)
	5	1	24050-24150	24100	100
	6	2	24150-24250	24200	100
	7	3	24075-24175	24125	100
	8	4	24050-24250	24150	200
	9	5	24050-24250	24150	200
Channel Bandwidth (99%)	For 100MHz: 86.251MHz For 200MHz: 180.607MHz				
Max. Field Strength	96.02 dBuV/m at 3m (Average) / 105.56dBuV/m at 1m(Average)				
Antenna	Type: PCB Antenna. Gain: 12.7 dBi.				
Accessories	Sensor cable*1: Shielded, 11m.				

Note: The above information was declared by manufacturer.

1.2 Table for Test Modes

The following table is a list of the test modes shown in this test report.

Test Items	Condition	Test Mode	Frequency Band (MHz)
AC Power Line Conducted Emissions	Normal Link	EUT with Sensor cable (CAN-USB Port)	Random
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	Mode 1 ~5	24100/24200/24125/24150 /24150
Radiated Emissions 30MHz~1GHz	Normal Link	EUT with Sensor cable (CAN-USB Port)	Random
Radiated Emissions 1GHz~40GHz	CTX	Mode 1 ~5	24100/24200/24125/24150 /24150
Radiated Emissions 40GHz~100GHz	CTX	Mode 1 ~5	24100/24200/24125/24150 /24150
Band Edge Emissions	CTX	Mode 1 ~5	24100/24200/24125/24150 /24150

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

1.3 Applicable Standards

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

- ANSI C63.10-2013
- 47 CFR FCC Part 15 Subpart C

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

- FCC KDB 414788 D01 v01r01

1.4 Table for Testing Locations

Testing Location			
ADD	:	No.8, Ln. 724, Bo'ai St., Zhubei 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 Emissions 30MHz~1GHz	03CH06-CB	Brian Sun	22.4-23.5°C / 55-58%	Dec. 08, 2020 ~ Jan. 23, 2021
Radiated (For others test item)	03CH06-CB	Brian Sun	22.4-23.5°C / 55-58%	Dec. 08, 2020 ~ Jan. 23, 2021
Radiated (Harmonic 18-40GHz)	03CH04-CB	Brian Sun	22.5-23.4°C / 56-69%	Dec. 08, 2020 ~ Jan. 23, 2021
AC Conduction	CO01-CB	Ryo Fan	20~22°C / 58~60%	Dec. 18, 2020

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

1.5 Table for Supporting Units

For Conducted Emissions test:

No.	Support Unit	Brand	Model	FCC ID
A	Power Supply	Advanced	LPS-305	N/A
B	NB	DELL	E6430	N/A
C	Earphone	e-Power	S90W	N/A
D	Mouse	HP	FM100	N/A

For Radiated Emissions Below 1GHz test:

No.	Support Unit	Brand	Model	FCC ID
A	Notebook	DELL	E4300	N/A
B	Power Supply	Advanced	LPS-305	N/A
C	Earphone	e-Power	S90W	N/A
D	Mouse	Logitech	M-U0026	N/A

For Radiated Emissions Above 1GHz test:

No.	Support Unit	Brand	Model	FCC ID
A	Notebook	DELL	E4300	N/A
B	Power Supply	Advanced	LPS-305	N/A

1.6 Duty Cycle

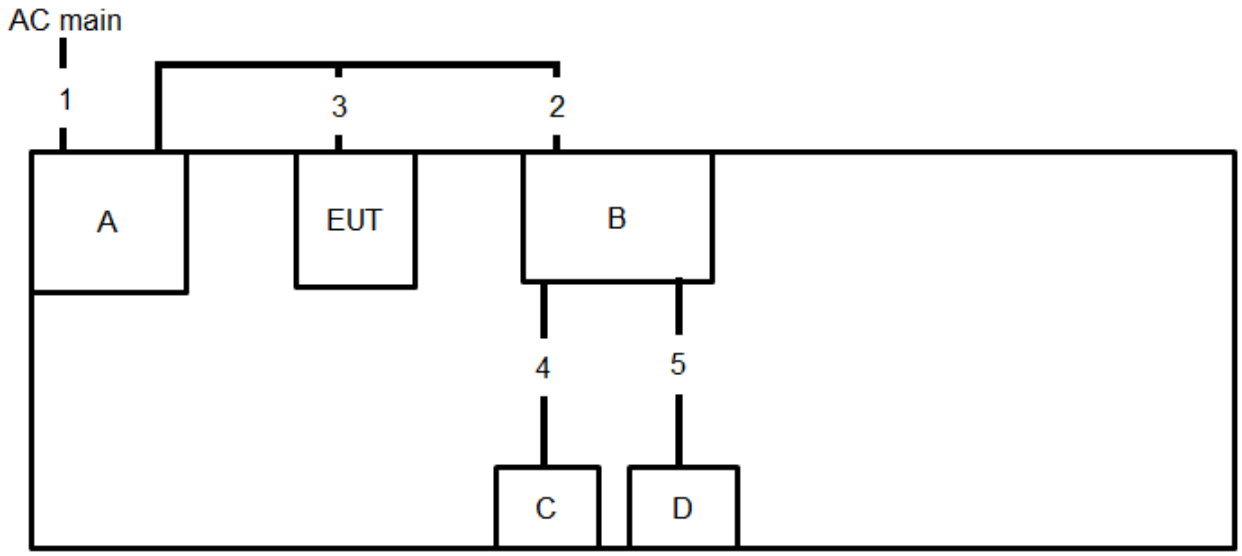
Waveform Index	Test Mode	Test Frequency (MHz)	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
5	1	24100	52.800	100.000	52.80%	2.77	0.02
6	2	24200	53.200	100.000	53.20%	2.74	0.02
7	3	24125	54.000	100.000	54.00%	2.68	0.02
8	4	24150	54.000	100.000	54.00%	2.68	0.02
9	5	24150	32.200	50.000	64.40%	1.91	0.03

1.7 Table for Parameters of Test Software Setting

Test Software Version	DriveRecorder3 Version:v 2.5.11589.0				
Waveform Index	5	6	7	8	9
Frequency (MHz)	24100	24200	24125	24150	24150
Software Setting	0	0	0	0	0

2 Test Configurations

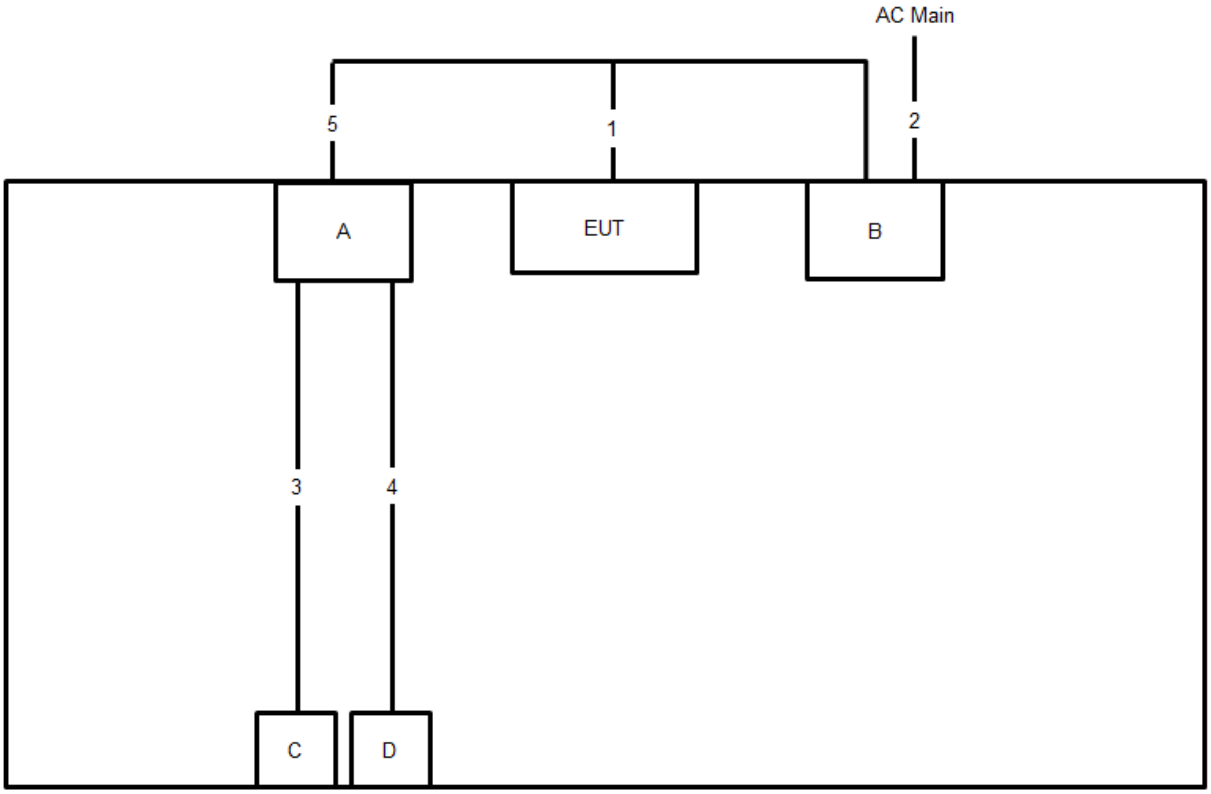
2.1.1 AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	Console cable	Yes	0.8m
3	Sensor Cable	Yes	11m
4	Audio cable	No	1.5m
5	USB cable	Yes	1.5m

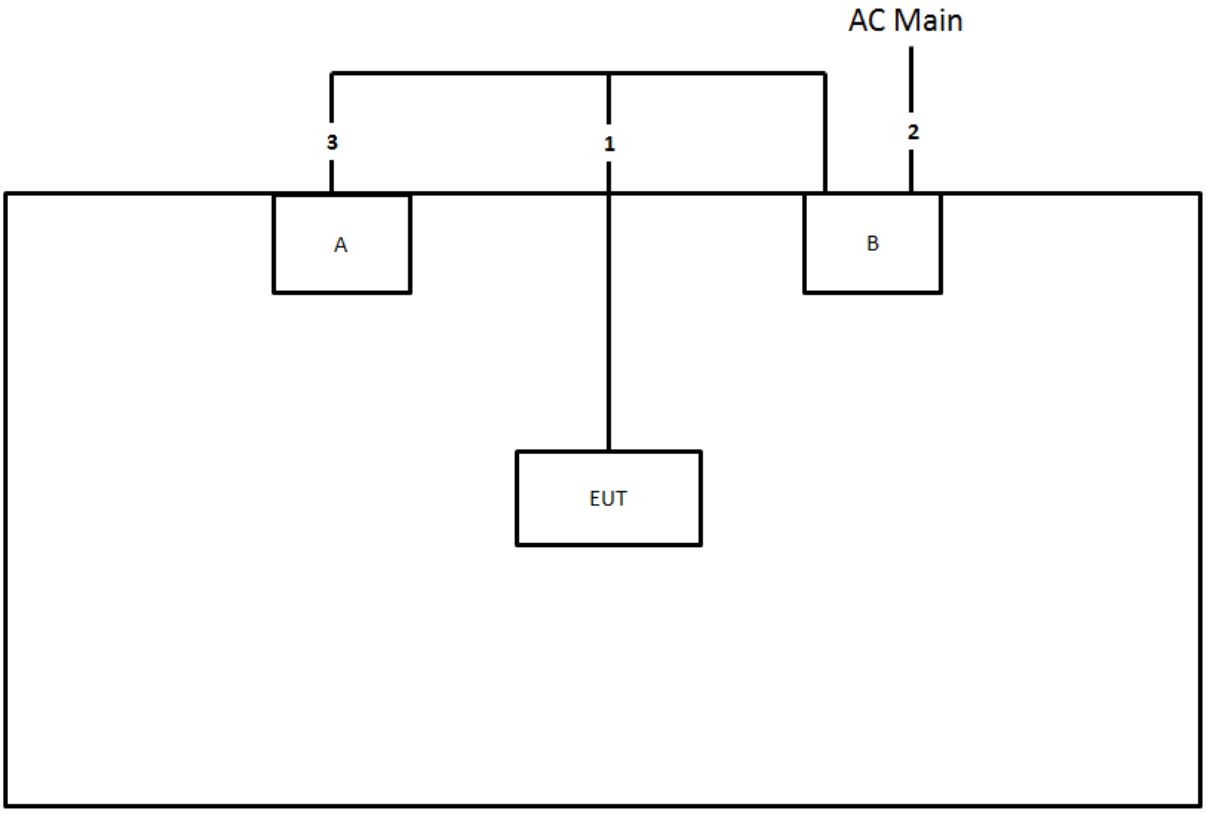
2.1.2 Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Sensor Cable	Yes	11m
2	Power Cable	No	1m
3	Audio Cable	No	1.4m
4	USB Cable	Yes	1.8m
5	Console cable	Yes	0.8m

Test Configuration: Above 1GHz



Item	Connection	Shielded	Length
1	Sensor Cable	Yes	11m
2	Power cable	No	1.5m
3	Console cable	Yes	0.8m

3 Test Result

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

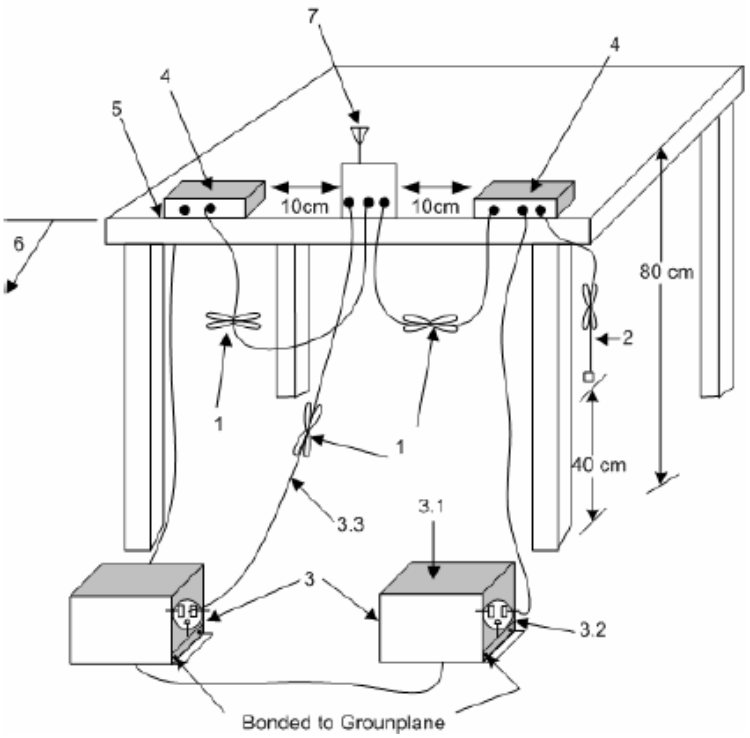
Refer a test equipment and calibration data table in this test report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



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 Test Deviation

There is no deviation with the original standard.

3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7 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

3.1.8 Test Results of AC Power Line Conducted Emissions Measurement

Refer as Appendix A

3.2 Field Strength of Fundamental Emissions Measurement

3.2.1 Limit

The field strength of fundamental emissions within these bands specified at a distance of 3 meters (measurement instrumentation employing an average detector) shall comply with the following table.

Frequency Band	Fundamental Emissions Limit Average/Peak (dBuV/m) at 3m
24000 ~ 24250 MHz	107.96/127.96

Note 1: 107.96 dBuV/m rounding to 108dBuV/m and 127.96 dBuV/m rounding to 128dBuV/m

Note 2: Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

Average limit = 108dBuV/m + distance extrapolation factor (9.54 dB) =117.54dBuV/m.

Peak limit = 128dBuV/m + distance extrapolation factor (9.54 dB) =137.54dBuV/m.

3.2.2 Measuring Instruments and Setting

Refer a test equipment and calibration data table in this test report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
RBW	1 MHz Peak / 3MHz Average
VBW	1 MHz Peak / 1/T Average
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

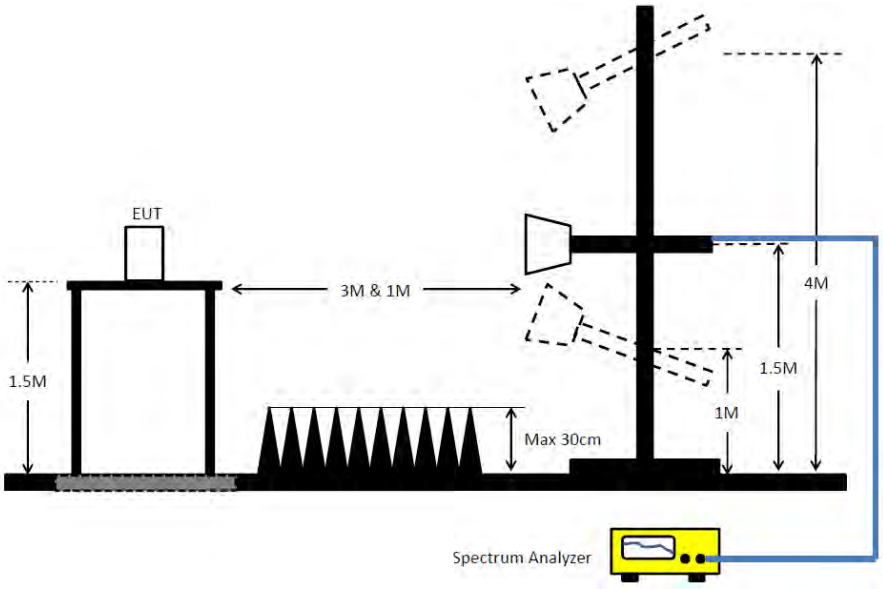
3.2.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For Fundamental emissions, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW

and 1/T VBW for average reading in spectrum analyzer.

6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Measurement Results Calculation

The measured Level is calculated using:

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

3.2.8 Test Result of Field Strength of Fundamental Emissions

Refer as Appendix B

3.3 20dB Spectrum Bandwidth Measurement

3.3.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (24000 ~ 24250 MHz).

3.3.2 Measuring Instruments and Setting

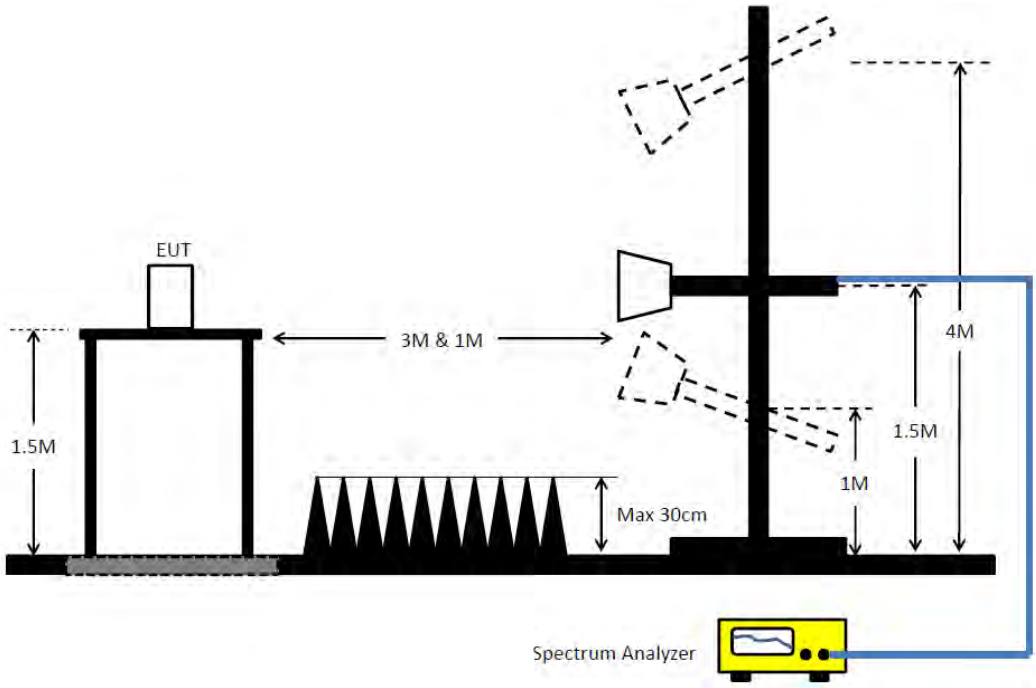
Refer a test equipment and calibration data table in this test report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 Test Procedures

1. The test procedure is the same as section 3.4.3.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of 20dB Spectrum Bandwidth

Refer as Appendix C

3.4 Radiated Emissions Measurement

3.4.1 Limit

For 9kHz~40GHz

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

For 40GHz~100GHz

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 47 CFR Part 15.249, whichever is the lesser attenuation.

Operating Frequencies	Harmonics Strength (micorvolts/meter)	Harmonics Strength (dBuV/m) at 3m
24000 ~ 24250 MHz	2500 at 3m	68 (Average)
24000 ~ 24250 MHz	2500 at 3m	88 (Peak)

3.4.2 Measuring Instruments and Setting

Refer a test equipment and calibration data table in this test report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average

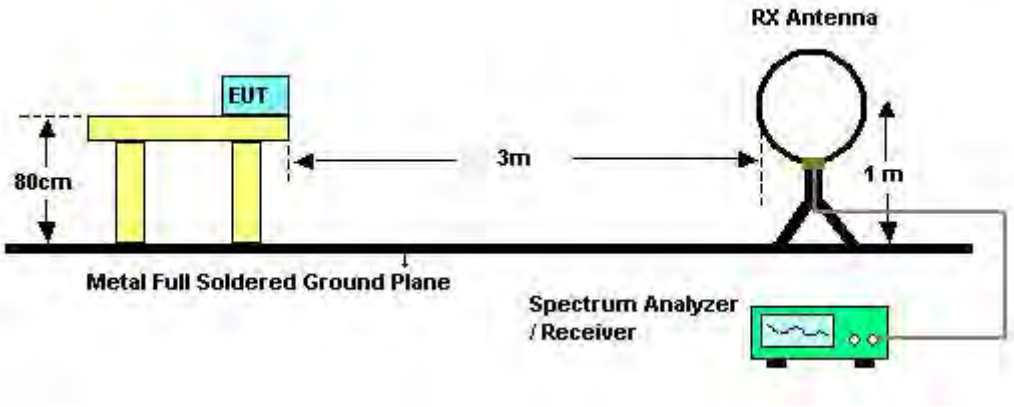
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

3.4.3 Test Procedures

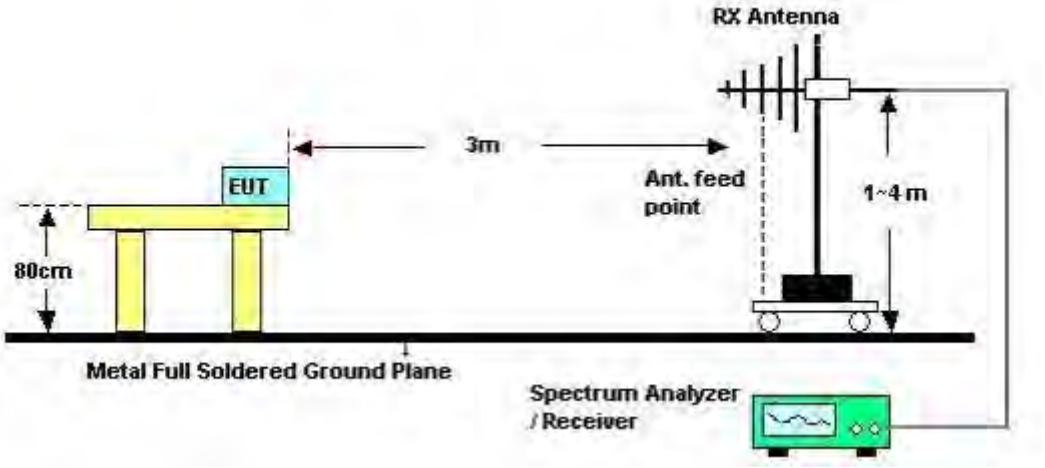
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.4.4 Test Setup Layout

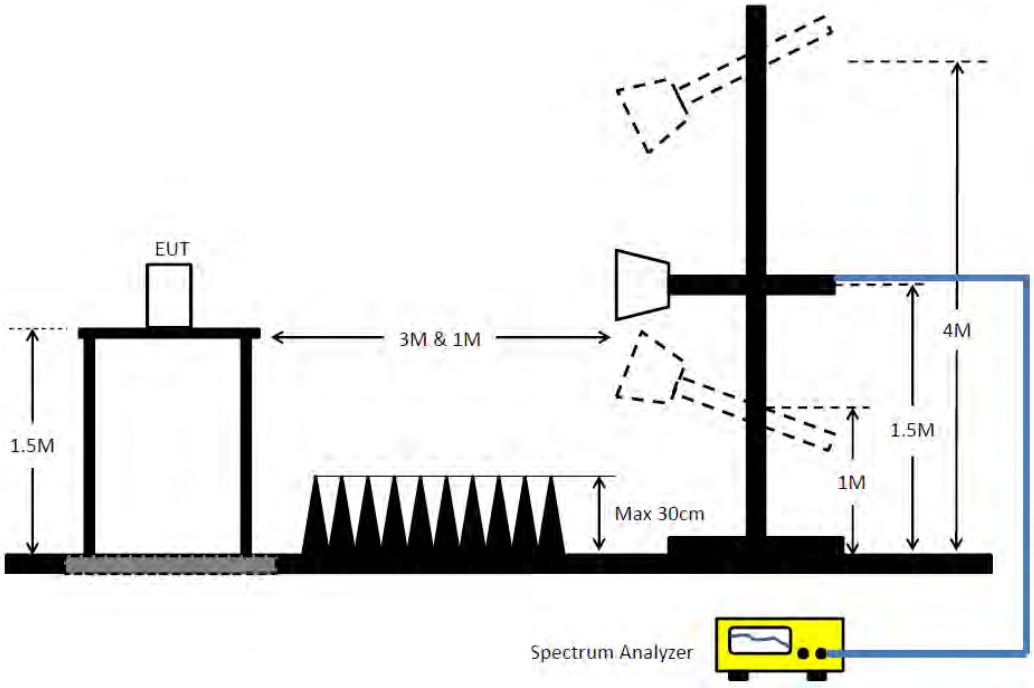
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: 1GHz~40GHz

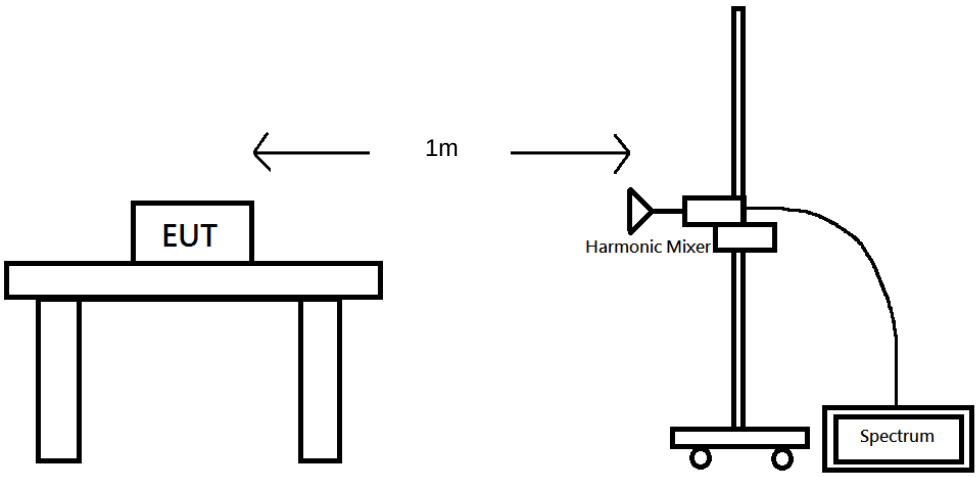


Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

For Radiated Emissions: 40GHz~100GHz



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 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)))

3.4.8 Emissions in Restricted Frequency Bands (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 10th harmonic or 40 GHz, whichever is appropriate.

3.4.9 Test Result of Radiated Emissions

Refer as Appendix D

3.5 Band Edge Emissions Measurement

3.5.1 Limit

Band edge emissions radiated outside of the specified frequency bands shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.5.2 Measuring Instruments and Setting

Refer a test equipment and calibration data table in this test report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average

3.5.3 Test Procedures

The test procedure is the same as section 3.4.3.

3.5.4 Test Setup Layout

This test setup layout is the same as that shown in section 3.4.4

3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7 Measurement Results Calculation

The measured Level is calculated using:

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

3.5.8 Test Result of Band Edge and Fundamental Emissions

Refer as Appendix B

3.6 Antenna Requirements

3.6.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.6.2 Antenna Connector Construction

The antenna connector complied with the requirements.

4 List of Measuring Equipments

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	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	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug, 09. 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2020	Oct. 01, 2021	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Aug. 02, 2020	Aug. 01, 2021	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 05, 2020	Nov. 04, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-05+24	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	Audix	E3	6.120210m	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Harmonic Mixer	RPG	RPG FS-Z60	101033	40 ~ 60 GHz	Mar. 07, 2020	Mar. 06, 2021	Radiation (03CH06-CB)
Mixer	OML	M19HWA	U91113-1	40 ~ 60 GHz	Nov. 02, 2020	Nov. 01, 2021	Radiation (03CH06-CB)
Mixer	OML	M12HWA	E91113-1	60 ~ 90 GHz	Nov. 14, 2020	Nov. 13, 2021	Radiation (03CH06-CB)
Mixer	OML	M08HWA	F91113-1	90 ~ 140 GHz	Nov. 02, 2020	Nov. 01, 2021	Radiation (03CH06-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 (03CH06-CB)
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH06-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH06-CB)
Detector	Millitech	DET-15-RPFW0	#A18185(074)	50 ~ 75 GHz	Apr. 02, 2020	Apr. 01, 2021	Radiation (03CH06-CB)
PC Oscilloscope	PICO TECH	6402C	CX372/002	N/A	Jul. 10, 2020	Jul. 09, 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 26, 2020	Feb. 25, 2021	Radiation (03CH04-CB)
Horn Antenna	ETS·Lindgren	3115	00143147	750MHz~18GHz	Oct. 23, 2020	Oct. 22, 2021	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH04-CB)
Pre-Amplifier	EMCI	EMC330N	980391	20MHz ~ 3GHz	May 21, 2020	May 20, 2021	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Jul. 14, 2020	Jul. 13, 2021	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 18, 2019	Dec. 17, 2020	Radiation (03CH04-CB
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Nov. 05, 2020	Nov. 04, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)

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

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

5 Measurement Uncertainty

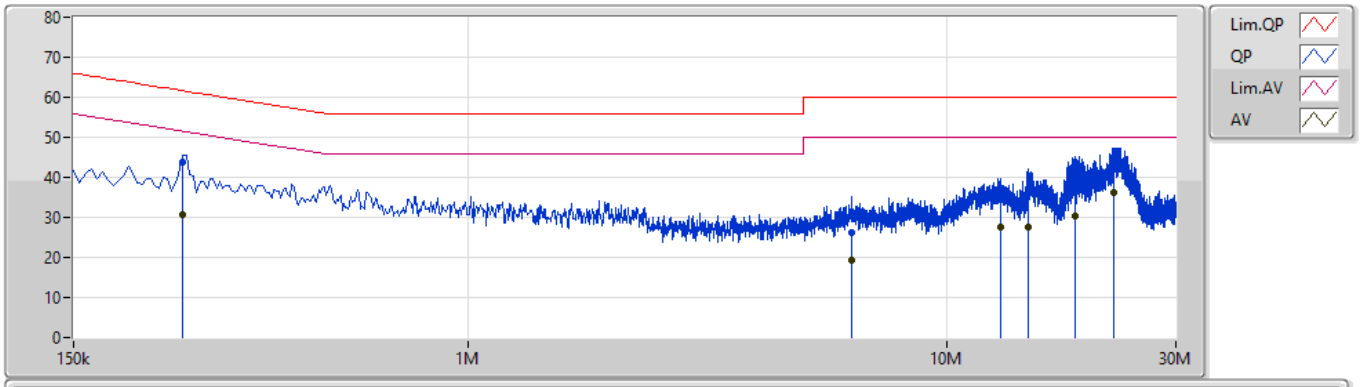
Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.8 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.9 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 60GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (60GHz ~ 90GHz)	4.5 dB	Confidence levels of 95%
Radiated Emission (90GHz ~ 200GHz)	5.3 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	22.313M	36.11	50.00	-13.89	Line

Mode 1

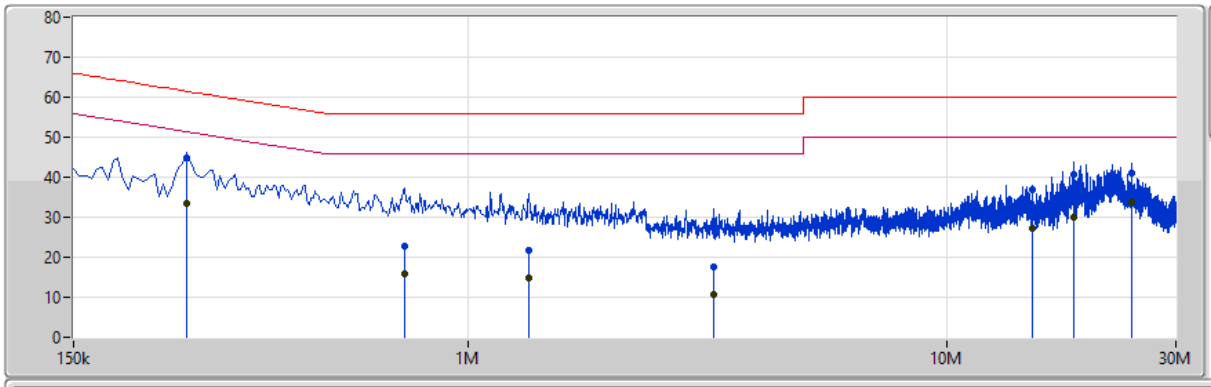
18/12/2020



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	253.5k	43.72	61.64	-17.92	9.89	Line	-	33.83	0.04	0.03	9.82
AV	253.5k	30.79	51.64	-20.85	9.89	Line	-	20.90	0.04	0.03	9.82
QP	6.315M	26.07	60.00	-33.93	10.14	Line	-	15.93	0.13	0.14	9.87
AV	6.315M	19.15	50.00	-30.85	10.14	Line	-	9.01	0.13	0.14	9.87
QP	12.899M	34.64	60.00	-25.36	10.31	Line	-	24.33	0.20	0.20	9.91
AV	12.899M	27.65	50.00	-22.35	10.31	Line	-	17.34	0.20	0.20	9.91
QP	14.735M	37.10	60.00	-22.90	10.35	Line	-	26.75	0.21	0.23	9.91
AV	14.735M	27.73	50.00	-22.27	10.35	Line	-	17.38	0.21	0.23	9.91
QP	18.456M	41.39	60.00	-18.61	10.50	Line	-	30.89	0.23	0.30	9.97
AV	18.456M	30.50	50.00	-19.50	10.50	Line	-	20.00	0.23	0.30	9.97
QP	22.313M	43.68	60.00	-16.32	10.60	Line	-	33.08	0.26	0.33	10.01
AV	22.313M	36.11	50.00	-13.89	10.60	Line	"Worst"	25.51	0.26	0.33	10.01

Mode 1

18/12/2020



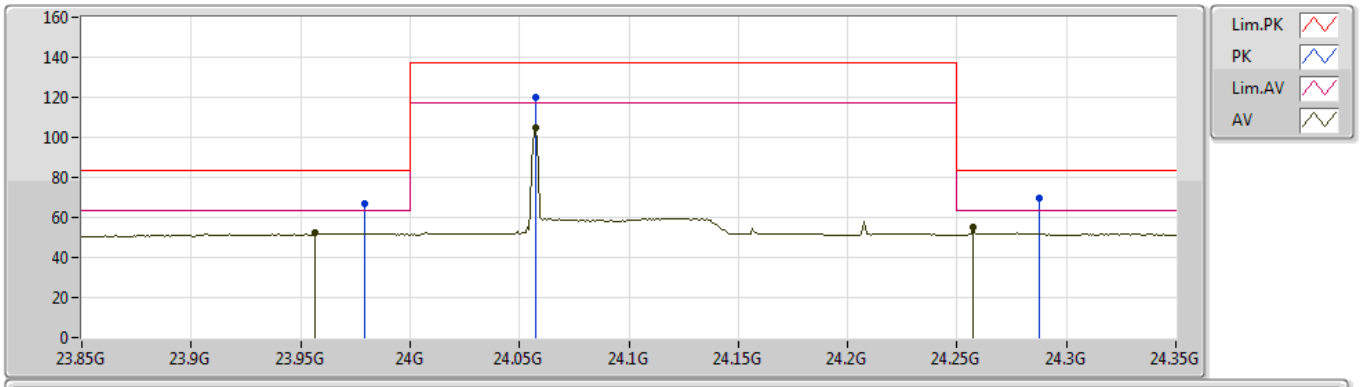
Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	258k	44.72	61.49	-16.77	9.89	Neutral	-	34.83	0.04	0.03	9.82
AV	258k	33.47	51.49	-18.02	9.89	Neutral	-	23.58	0.04	0.03	9.82
QP	735k	22.77	56.00	-33.23	9.92	Neutral	-	12.85	0.05	0.04	9.83
AV	735k	15.75	46.00	-30.25	9.92	Neutral	-	5.83	0.05	0.04	9.83
QP	1.338M	21.75	56.00	-34.25	9.95	Neutral	-	11.80	0.06	0.05	9.84
AV	1.338M	14.98	46.00	-31.02	9.95	Neutral	-	5.03	0.06	0.05	9.84
QP	3.264M	17.63	56.00	-38.37	10.04	Neutral	-	7.59	0.08	0.11	9.85
AV	3.264M	10.65	46.00	-35.35	10.04	Neutral	-	0.61	0.08	0.11	9.85
QP	15.041M	36.80	60.00	-23.20	10.33	Neutral	-	26.47	0.19	0.23	9.91
AV	15.041M	27.27	50.00	-22.73	10.33	Neutral	-	16.94	0.19	0.23	9.91
QP	18.321M	40.85	60.00	-19.15	10.47	Neutral	-	30.38	0.20	0.30	9.97
AV	18.321M	29.97	50.00	-20.03	10.47	Neutral	-	19.50	0.20	0.30	9.97
QP	24.288M	41.08	60.00	-18.92	10.62	Neutral	-	30.46	0.27	0.33	10.02
AV	24.288M	33.66	50.00	-16.34	10.62	Neutral	"Worst"	23.04	0.27	0.33	10.02

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	24.25725G	55.14	63.54	-8.40	Vertical
Mode 2	Pass	AV	24.30797G	56.01	63.54	-7.53	Vertical
Mode 3	Pass	AV	23.98225G	55.09	63.54	-8.45	Vertical
Mode 4	Pass	AV	23.96333G	55.89	63.54	-7.65	Vertical
Mode 5	Pass	AV	24.26246G	56.36	63.54	-7.18	Vertical

Mode 1

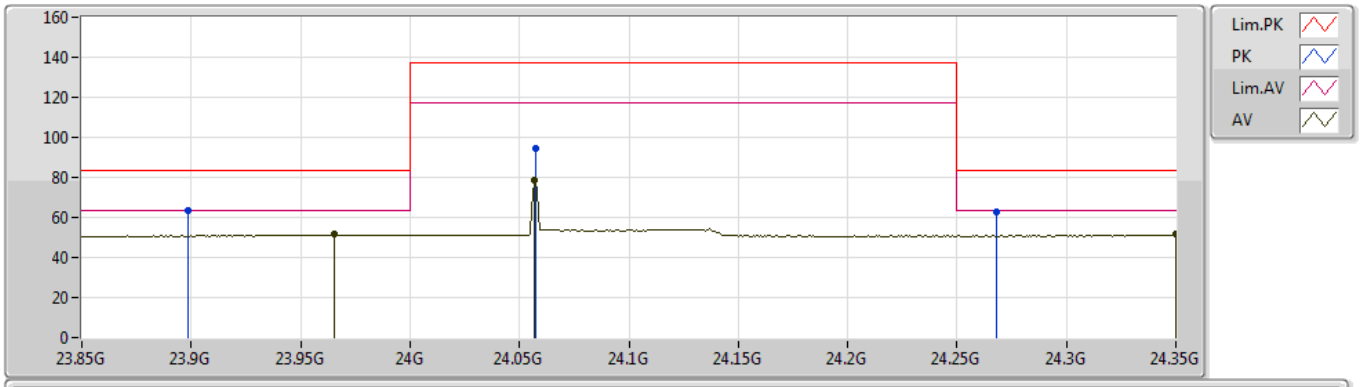
23/01/2021



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	23.97899G	66.95	83.54	-16.59	6.57	1	Vertical	4	1.52	-	60.38	38.99	16.29	48.71
AV	23.95652G	52.07	63.54	-11.47	6.53	1	Vertical	4	1.52	-	45.54	38.97	16.28	48.72
PK	24.05725G	119.89	137.54	-17.65	6.58	1	Vertical	4	1.52	-	113.31	38.97	16.30	48.69
AV	24.05725G	104.61	117.54	-12.93	6.58	1	Vertical	4	1.52	-	98.03	38.97	16.30	48.69
PK	24.28768G	69.76	83.54	-13.78	6.50	1	Vertical	4	1.52	-	63.26	38.83	16.31	48.64
AV	24.25725G	55.14	63.54	-8.40	6.51	1	Vertical	4	1.52	-	48.63	38.85	16.31	48.65

Mode 1

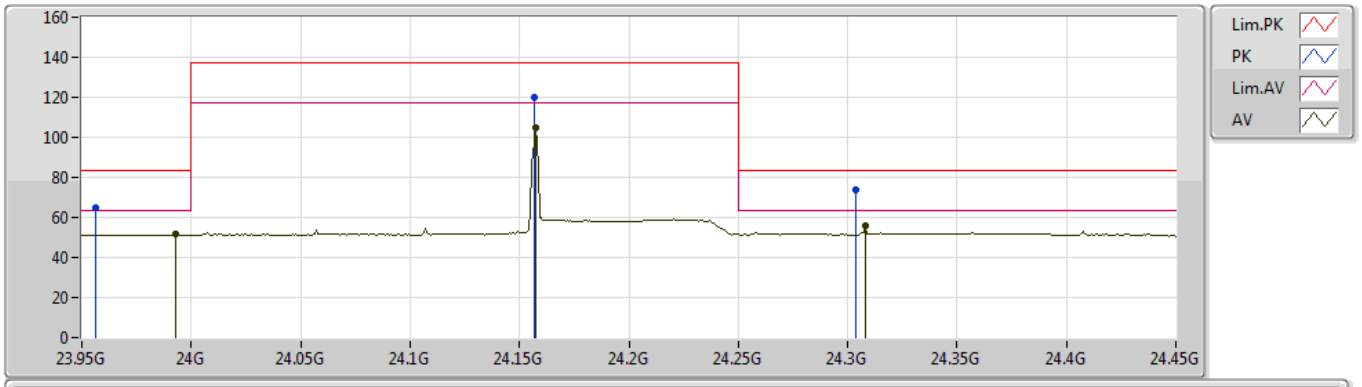
23/01/2021



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	23.89855G	63.17	83.54	-20.37	6.45	1	Horizontal	25	1.51	-	56.72	38.94	16.25	48.74
AV	23.96522G	51.46	63.54	-12.08	6.55	1	Horizontal	25	1.51	-	44.91	38.98	16.28	48.71
PK	24.05725G	94.46	137.54	-43.08	6.58	1	Horizontal	25	1.51	-	87.88	38.97	16.30	48.69
AV	24.05652G	78.61	117.54	-38.93	6.58	1	Horizontal	25	1.51	-	72.03	38.97	16.30	48.69
PK	24.26812G	62.42	83.54	-21.12	6.50	1	Horizontal	25	1.51	-	55.92	38.84	16.31	48.65
AV	24.35G	51.38	63.54	-12.16	6.48	1	Horizontal	25	1.51	-	44.90	38.79	16.32	48.63

Mode 2

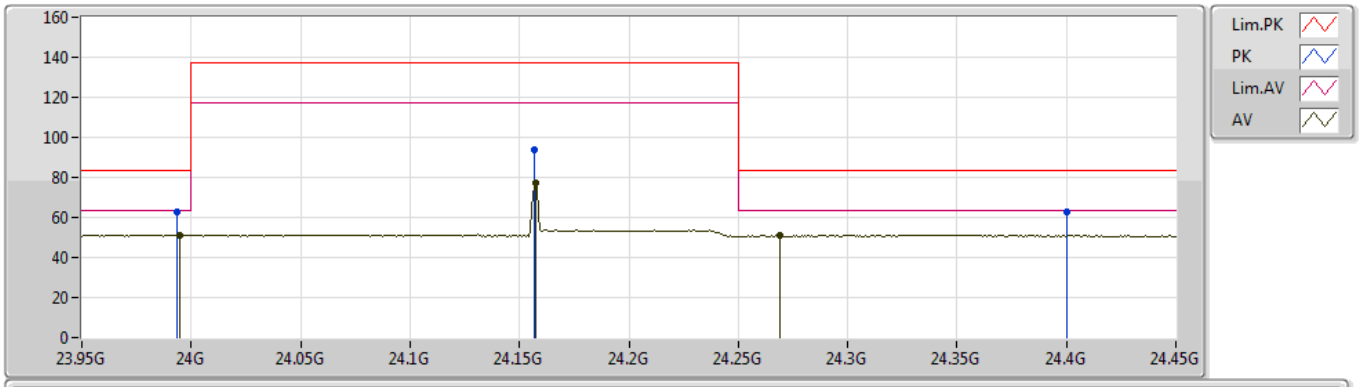
23/01/2021



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	23.95652G	64.69	83.54	-18.85	6.53	1	Vertical	4	1.52	-	58.16	38.97	16.28	48.72
AV	23.99275G	51.61	63.54	-11.93	6.60	1	Vertical	4	1.52	-	45.01	39.00	16.30	48.70
PK	24.15652G	120.19	137.54	-17.35	6.55	1	Vertical	4	1.52	-	113.64	38.91	16.31	48.67
AV	24.15725G	104.69	117.54	-12.85	6.55	1	Vertical	4	1.52	-	98.14	38.91	16.31	48.67
PK	24.30362G	73.74	83.54	-9.80	6.50	1	Vertical	4	1.52	-	67.24	38.82	16.32	48.64
AV	24.30797G	56.01	63.54	-7.53	6.50	1	Vertical	4	1.52	-	49.51	38.82	16.32	48.64

Mode 2

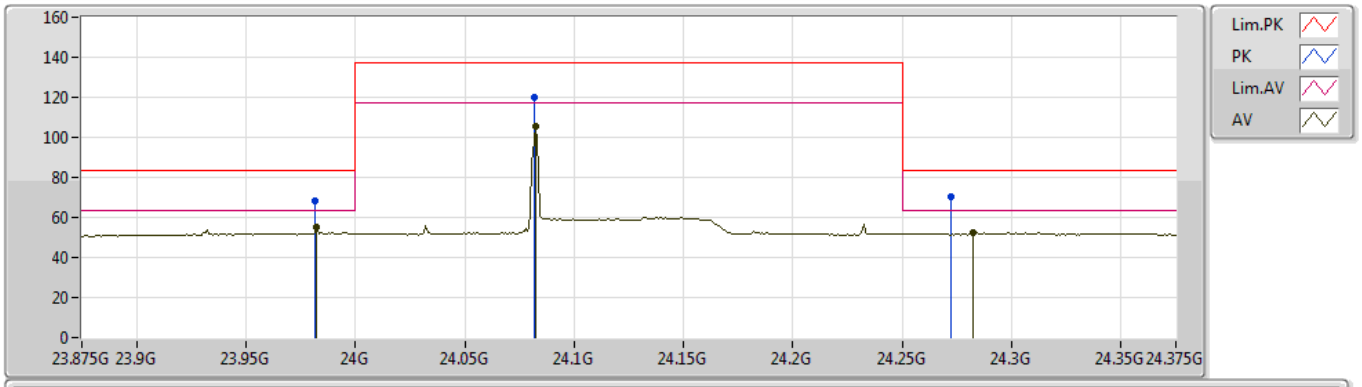
23/01/2021



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	23.99348G	62.84	83.54	-20.70	6.60	1	Horizontal	25	1.51	-	56.24	39.00	16.30	48.70
AV	23.99493G	51.22	63.54	-12.32	6.60	1	Horizontal	25	1.51	-	44.62	39.00	16.30	48.70
PK	24.15652G	93.89	137.54	-43.65	6.55	1	Horizontal	25	1.51	-	87.34	38.91	16.31	48.67
AV	24.15725G	77.12	117.54	-40.42	6.55	1	Horizontal	25	1.51	-	70.57	38.91	16.31	48.67
PK	24.4G	62.45	83.54	-21.09	6.46	1	Horizontal	25	1.51	-	55.99	38.76	16.32	48.62
AV	24.26884G	51.20	63.54	-12.34	6.50	1	Horizontal	25	1.51	-	44.70	38.84	16.31	48.65

Mode 3

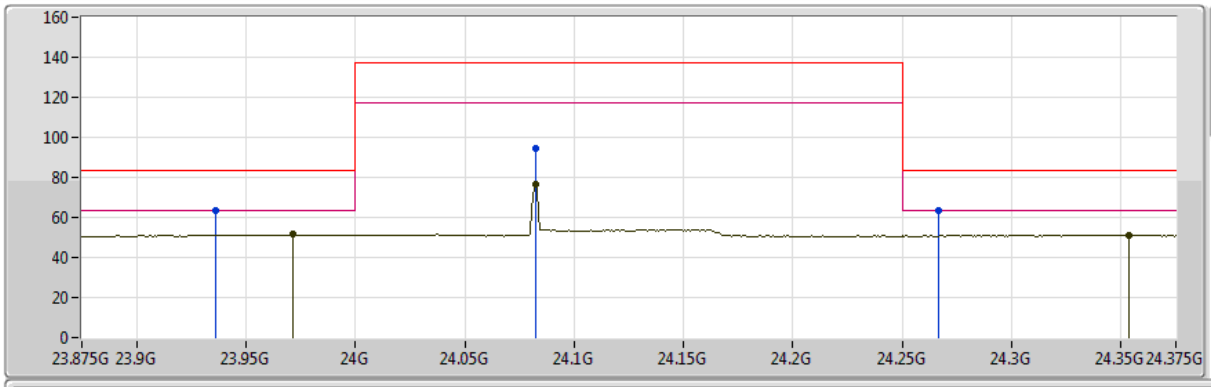
23/01/2021



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	23.98152G	68.19	83.54	-15.35	6.57	1	Vertical	4	1.51	-	61.62	38.99	16.29	48.71
AV	23.98225G	55.09	63.54	-8.45	6.57	1	Vertical	4	1.51	-	48.52	38.99	16.29	48.71
PK	24.08152G	120.10	137.54	-17.44	6.57	1	Vertical	4	1.51	-	113.53	38.95	16.30	48.68
AV	24.08225G	105.44	117.54	-12.10	6.57	1	Vertical	4	1.51	-	98.87	38.95	16.30	48.68
PK	24.2721G	70.35	83.54	-13.19	6.50	1	Vertical	4	1.51	-	63.85	38.84	16.31	48.65
AV	24.28225G	52.32	63.54	-11.22	6.50	1	Vertical	4	1.51	-	45.82	38.83	16.31	48.64

Mode 3

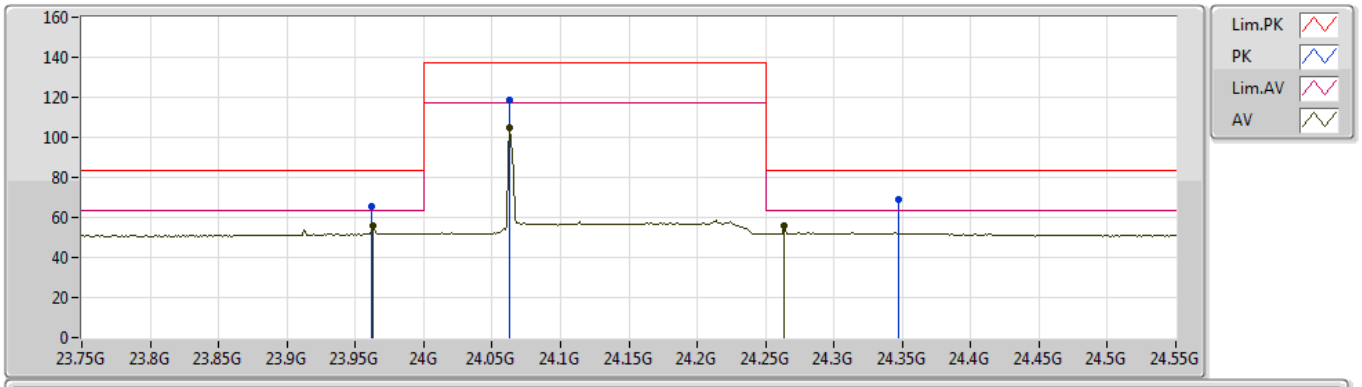
23/01/2021



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	23.93587G	63.56	83.54	-19.98	6.50	1	Horizontal	25	1.51	-	57.06	38.96	16.27	48.73
AV	23.97138G	51.59	63.54	-11.95	6.56	1	Horizontal	25	1.51	-	45.03	38.98	16.29	48.71
PK	24.08225G	94.22	137.54	-43.32	6.57	1	Horizontal	25	1.51	-	87.65	38.95	16.30	48.68
AV	24.08225G	76.68	117.54	-40.86	6.57	1	Horizontal	25	1.51	-	70.11	38.95	16.30	48.68
PK	24.2663G	63.11	83.54	-20.43	6.50	1	Horizontal	25	1.51	-	56.61	38.84	16.31	48.65
AV	24.35326G	51.30	63.54	-12.24	6.48	1	Horizontal	25	1.51	-	44.82	38.79	16.32	48.63

Mode 4

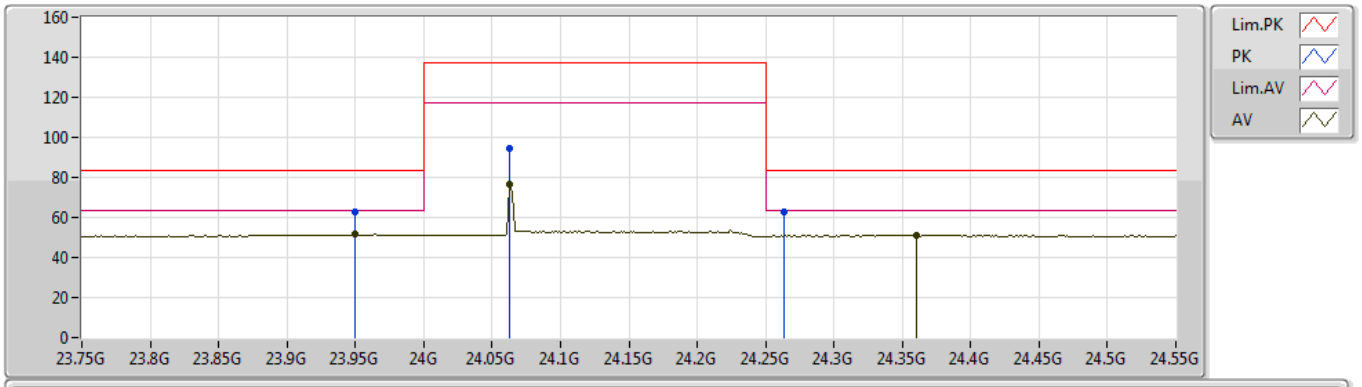
23/01/2021



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	23.96217G	65.75	83.54	-17.79	6.54	1	Vertical	4	1.51	-	59.21	38.98	16.28	48.72
AV	23.96333G	55.89	63.54	-7.65	6.55	1	Vertical	4	1.51	-	49.34	38.98	16.28	48.71
PK	24.06304G	118.60	137.54	-18.94	6.57	1	Vertical	4	1.51	-	112.03	38.96	16.30	48.69
AV	24.06304G	104.55	117.54	-12.99	6.57	1	Vertical	4	1.51	-	97.98	38.96	16.30	48.69
PK	24.3471G	68.63	83.54	-14.91	6.48	1	Vertical	4	1.51	-	62.15	38.79	16.32	48.63
AV	24.26362G	55.52	63.54	-8.02	6.50	1	Vertical	4	1.51	-	49.02	38.84	16.31	48.65

Mode 4

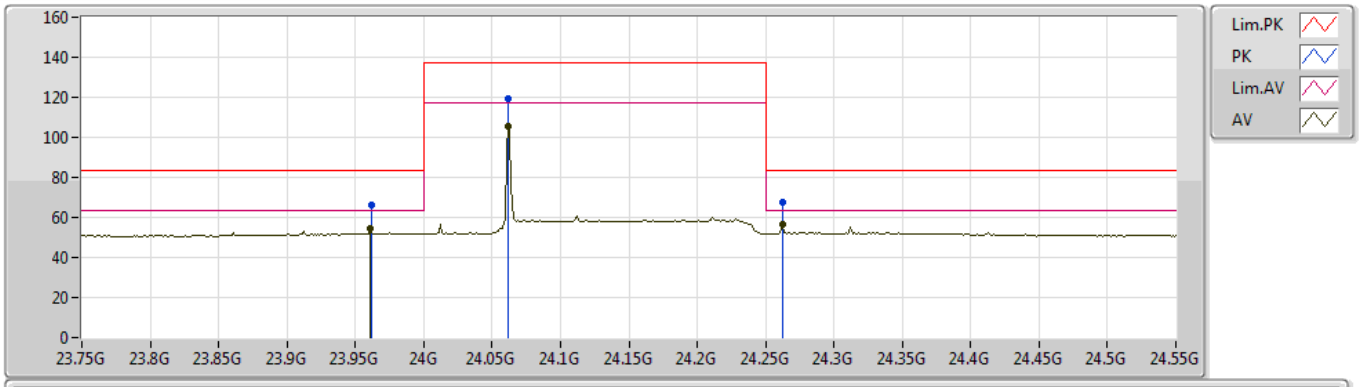
23/01/2021



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	23.94942G	62.84	83.54	-20.70	6.52	1	Horizontal	25	1.51	-	56.32	38.97	16.27	48.72
AV	23.94942G	51.47	63.54	-12.07	6.52	1	Horizontal	25	1.51	-	44.95	38.97	16.27	48.72
PK	24.06304G	94.38	137.54	-43.16	6.57	1	Horizontal	25	1.51	-	87.81	38.96	16.30	48.69
AV	24.06304G	76.64	117.54	-40.90	6.57	1	Horizontal	25	1.51	-	70.07	38.96	16.30	48.69
PK	24.26362G	63.01	83.54	-20.53	6.50	1	Horizontal	25	1.51	-	56.51	38.84	16.31	48.65
AV	24.35986G	51.15	63.54	-12.39	6.47	1	Horizontal	25	1.51	-	44.68	38.78	16.32	48.63

Mode 5

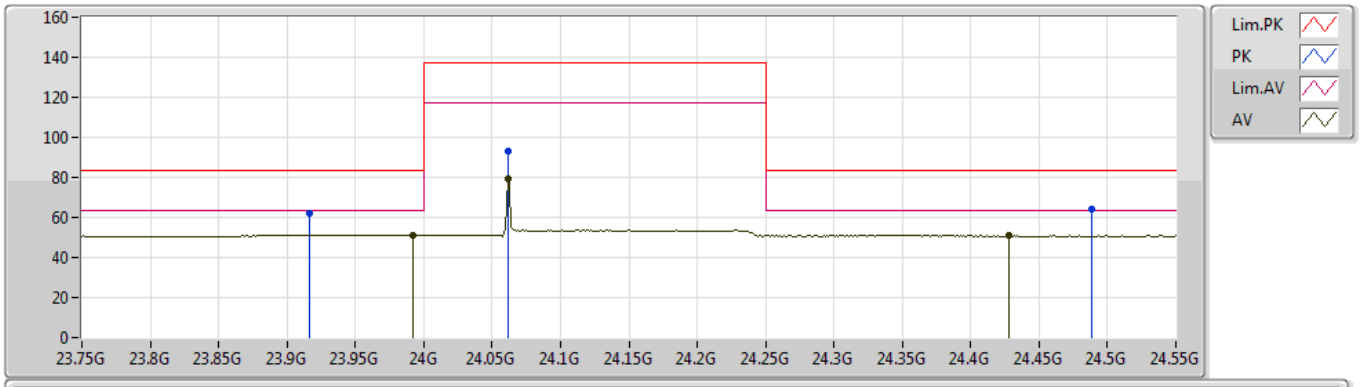
23/01/2021



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	23.96217G	66.37	83.54	-17.17	6.54	1	Vertical	4	1.52	-	59.83	38.98	16.28	48.72
AV	23.96101G	54.40	63.54	-9.14	6.54	1	Vertical	4	1.52	-	47.86	38.98	16.28	48.72
PK	24.06188G	119.28	137.54	-18.26	6.57	1	Vertical	4	1.52	-	112.71	38.96	16.30	48.69
AV	24.06188G	105.56	117.54	-11.98	6.57	1	Vertical	4	1.52	-	98.99	38.96	16.30	48.69
PK	24.26246G	67.51	83.54	-16.03	6.50	1	Vertical	4	1.52	-	61.01	38.84	16.31	48.65
AV	24.26246G	56.36	63.54	-7.18	6.50	1	Vertical	4	1.52	-	49.86	38.84	16.31	48.65

Mode 5

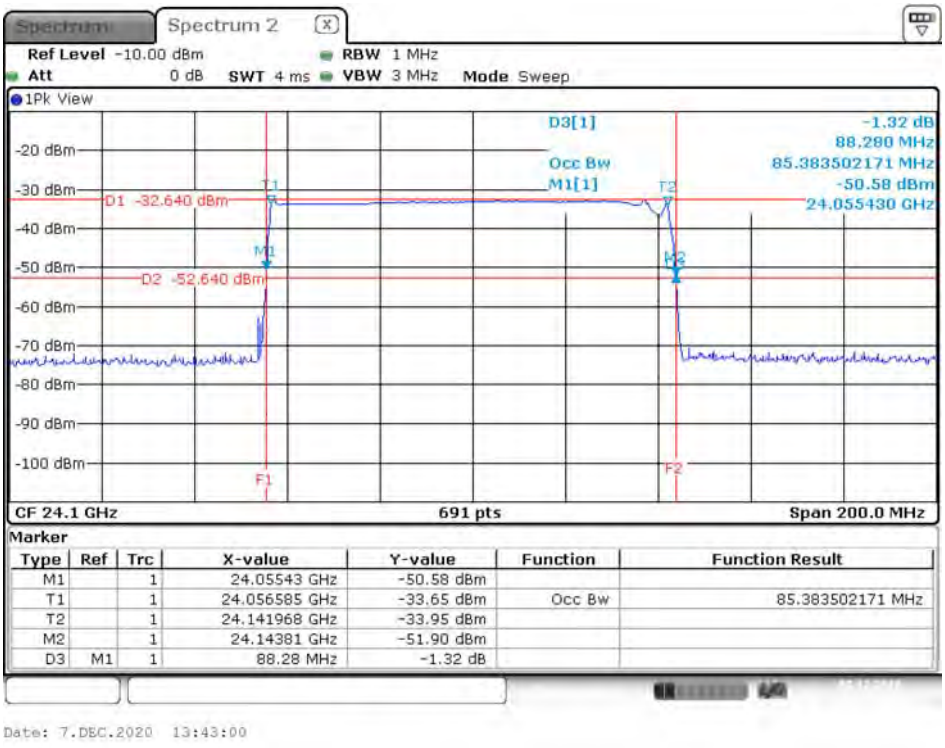
23/01/2021



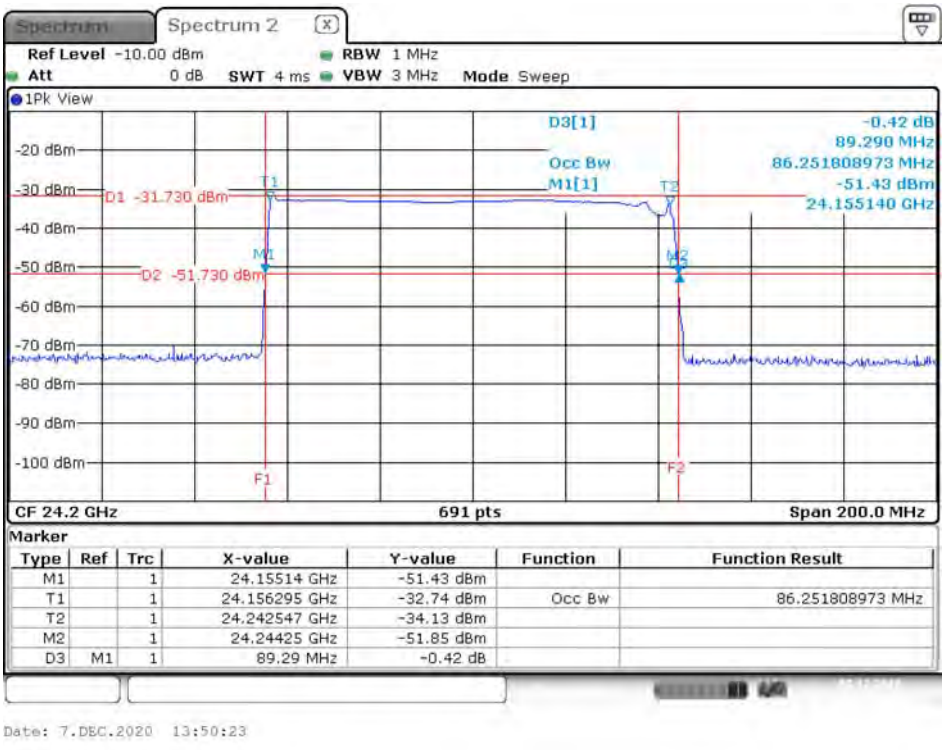
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	23.91696G	62.03	83.54	-21.51	6.48	1	Horizontal	25	1.51	-	55.55	38.95	16.26	48.73
AV	23.99232G	51.37	63.54	-12.17	6.60	1	Horizontal	25	1.51	-	44.77	39.00	16.30	48.70
PK	24.06188G	92.83	137.54	-44.71	6.57	1	Horizontal	25	1.51	-	86.26	38.96	16.30	48.69
AV	24.06188G	79.54	117.54	-38.00	6.57	1	Horizontal	25	1.51	-	72.97	38.96	16.30	48.69
PK	24.48855G	63.92	83.54	-19.62	6.43	1	Horizontal	25	1.51	-	57.49	38.71	16.32	48.60
AV	24.42826G	51.35	63.54	-12.19	6.45	1	Horizontal	25	1.51	-	44.90	38.74	16.32	48.61

Test Mode	Test Frequency (MHz)	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) f_L > 24000MHz	Frequency range (MHz) f_H < 24250MHz	Test Result
1	24100	88.280	85.383	24055.43	24143.81	**PASS**
2	24200	89.290	86.251	24155.14	24244.25	**PASS**
3	24125	88.280	85.383	24080.43	24168.70	**PASS**
4	24150	176.910	173.661	24061.00	24237.74	**PASS**
5	24150	183.860	180.607	24058.39	24242.08	**PASS**

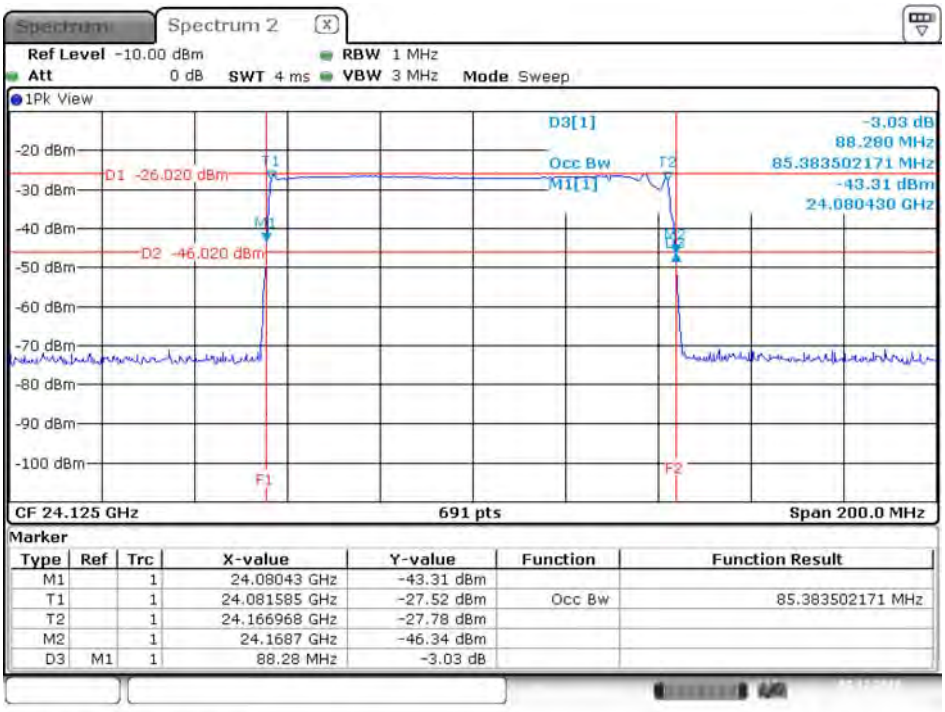
Test Mode: Mode 1 / 20 dB Bandwidth and 99% Bandwidth Plot on 24100 MHz



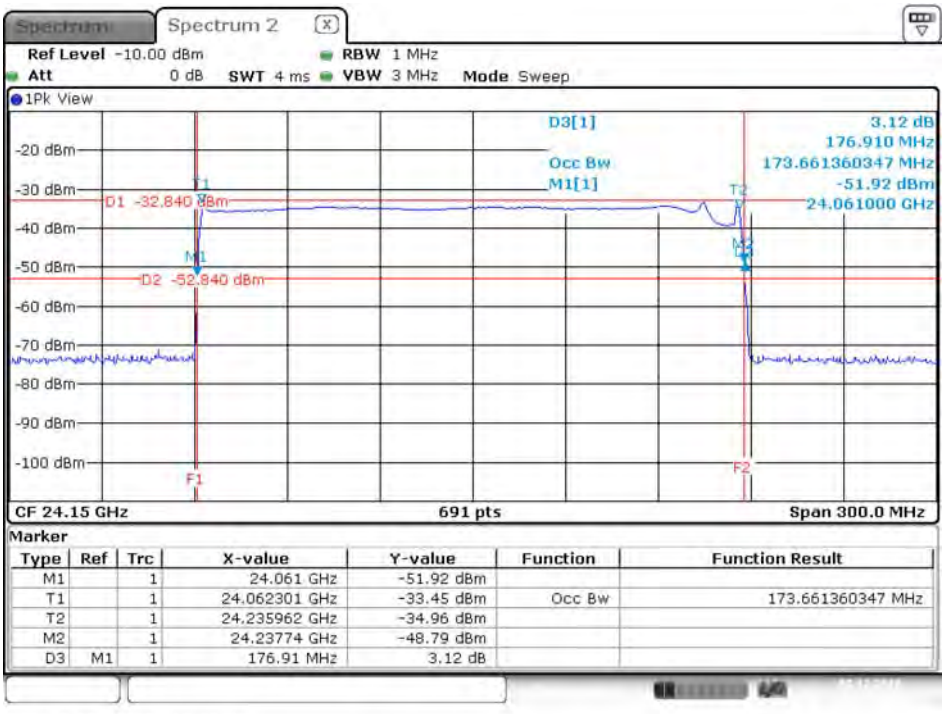
Test Mode: Mode 2 / 20 dB Bandwidth and 99% Bandwidth Plot on 24200 MHz



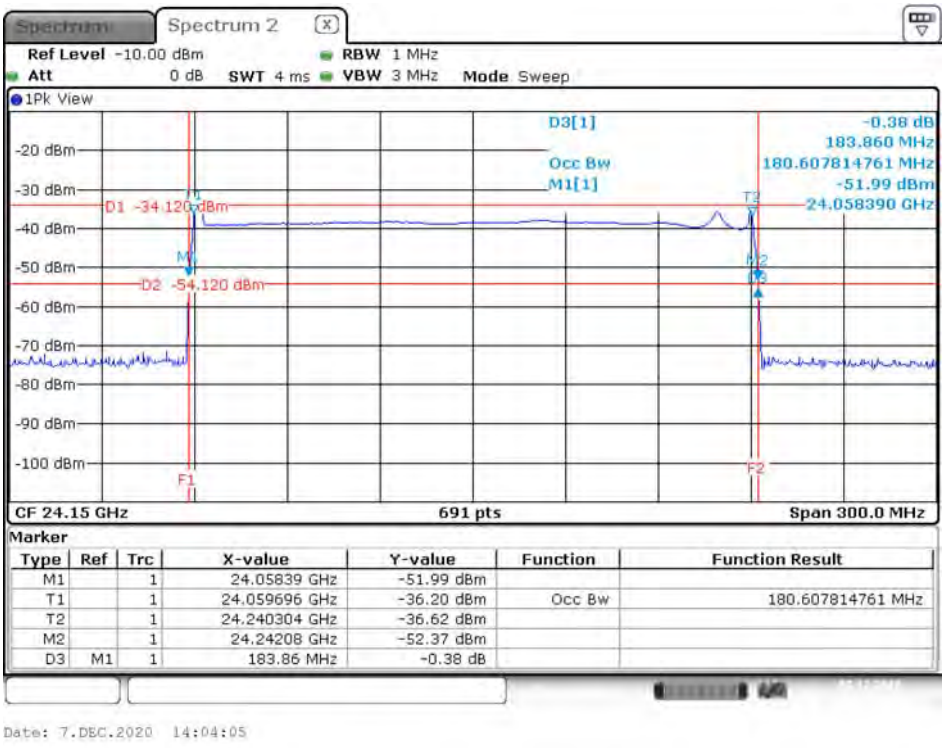
Test Mode: Mode 3 / 20 dB Bandwidth and 99% Bandwidth Plot on 24125 MHz



Test Mode: Mode 4 / 20 dB Bandwidth and 99% Bandwidth Plot on 24150 MHz



Test Mode: Mode 5 / 20 dB Bandwidth and 99% Bandwidth Plot on 24150 MHz

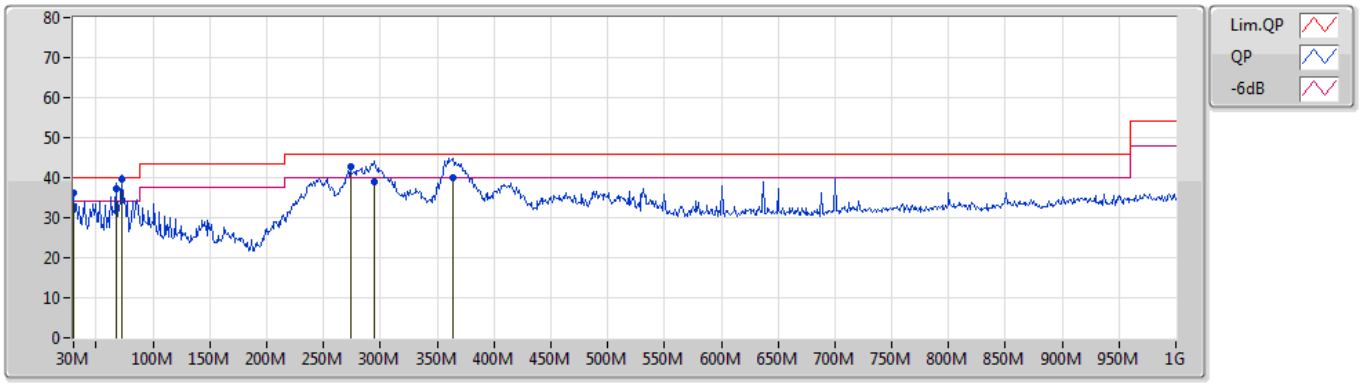


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	72.68M	39.51	40.00	-0.49	Vertical

Mode 1

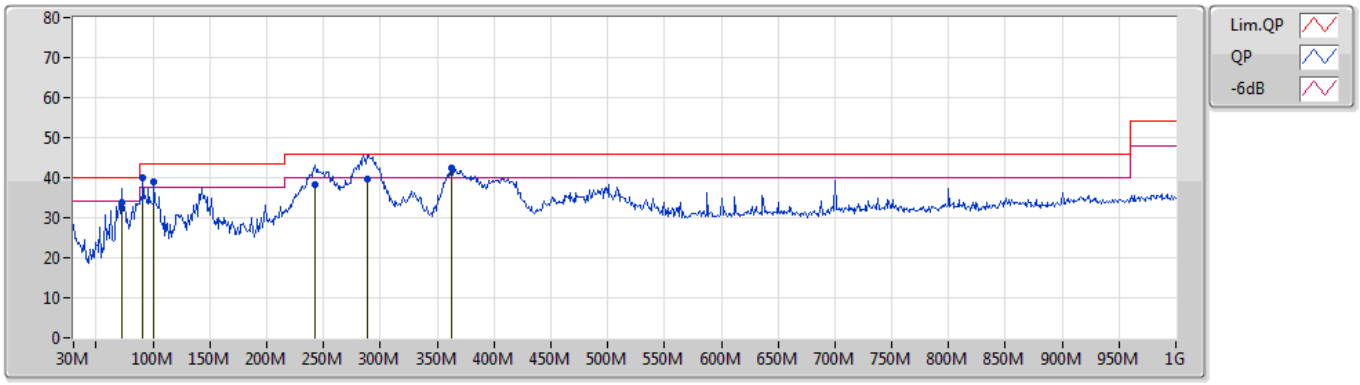
10/12/2020



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/m)	(dB/m)	(dB)	(dB)
PK	30M	36.19	40.00	-3.81	-7.58	3	Vertical	5	1.00	-	43.77	23.79	1.00	32.37
QP	67.83M	37.41	40.00	-2.59	-18.59	3	Vertical	61	1.25	-	56.00	12.31	1.46	32.36
QP	72.68M	39.51	40.00	-0.49	-18.69	3	Vertical	0	2.00	"Worst"	58.20	12.16	1.50	32.35
PK	273.47M	42.85	46.00	-3.15	-10.62	3	Vertical	200	1.50	-	53.47	18.59	2.99	32.20
QP	294.81M	38.83	46.00	-7.17	-10.07	3	Vertical	24	2.00	-	48.90	19.04	3.08	32.19
QP	363.68M	39.97	46.00	-6.03	-7.93	3	Vertical	217	1.50	-	47.90	20.60	3.58	32.11

Mode 1

10/12/2020



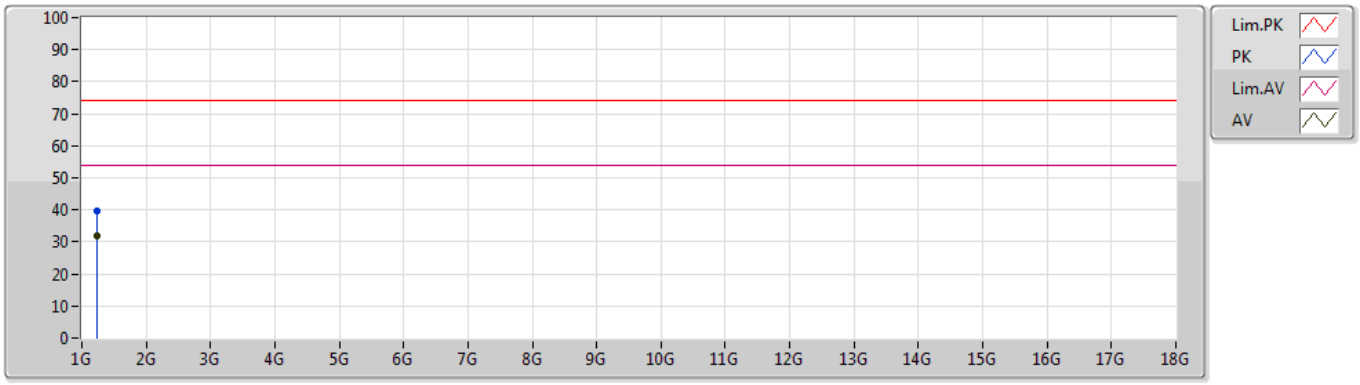
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
QP	72.68M	33.70	40.00	-6.30	-18.69	3	Horizontal	107	2.00	-	52.39	12.16	1.50	32.35
PK	91.11M	39.91	43.50	-3.59	-15.55	3	Horizontal	115	2.00	"Worst"	55.46	15.08	1.70	32.33
PK	100.81M	38.93	43.50	-4.57	-13.44	3	Horizontal	157	2.00	-	52.37	17.06	1.81	32.31
QP	242.43M	38.38	46.00	-7.62	-11.91	3	Horizontal	156	1.00	-	50.29	17.44	2.85	32.20
QP	288.99M	39.57	46.00	-6.43	-10.23	3	Horizontal	16	1.00	-	49.80	18.90	3.06	32.19
PK	362.71M	42.35	46.00	-3.65	-7.95	3	Horizontal	255	1.00	-	50.30	20.58	3.58	32.11

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	1.23597G	31.98	54.00	-22.02	Vertical
Mode 2	Pass	AV	1.23604G	28.97	54.00	-25.03	Vertical
Mode 3	Pass	AV	1.23588G	24.70	54.00	-29.30	Vertical
Mode 4	Pass	AV	1.236G	28.98	54.00	-25.02	Vertical
Mode 5	Pass	AV	1.23597G	28.93	54.00	-25.07	Vertical

Mode 1

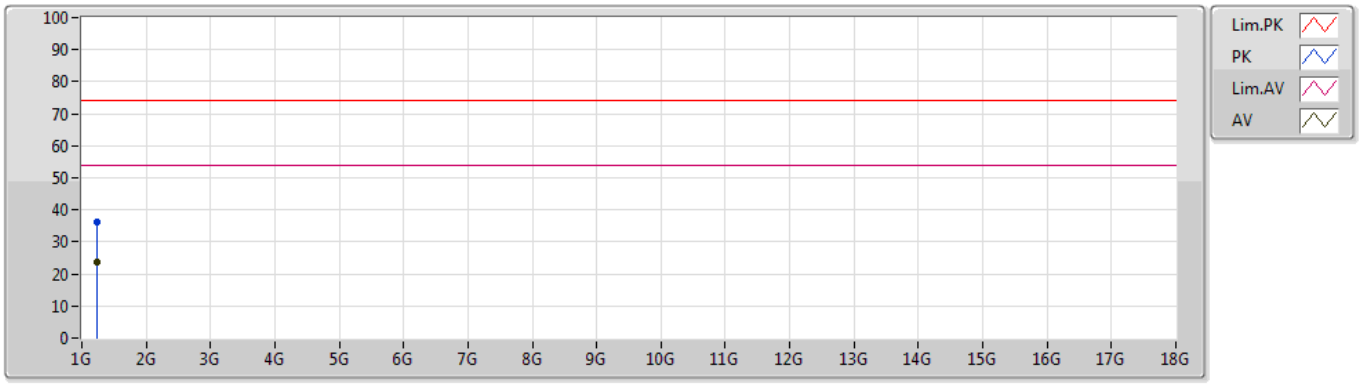
10/12/2020



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	1.23584G	39.84	74.00	-34.16	-8.14	3	Vertical	147	1.60	-	47.98	25.14	2.32	35.60
AV	1.23597G	31.98	54.00	-22.02	-8.14	3	Vertical	147	1.60	"Worst"	40.12	25.14	2.32	35.60

Mode 1

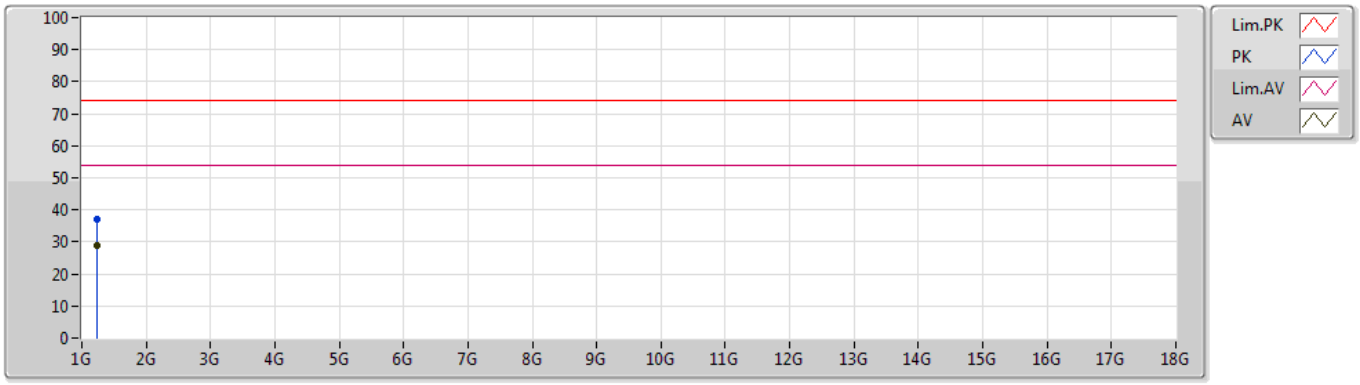
10/12/2020



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	1.23606G	36.06	74.00	-37.94	-8.14	3	Horizontal	115	1.51	-	44.20	25.14	2.32	35.60
AV	1.23708G	23.80	54.00	-30.20	-8.13	3	Horizontal	115	1.51	"Worst"	31.93	25.15	2.32	35.60

Mode 2

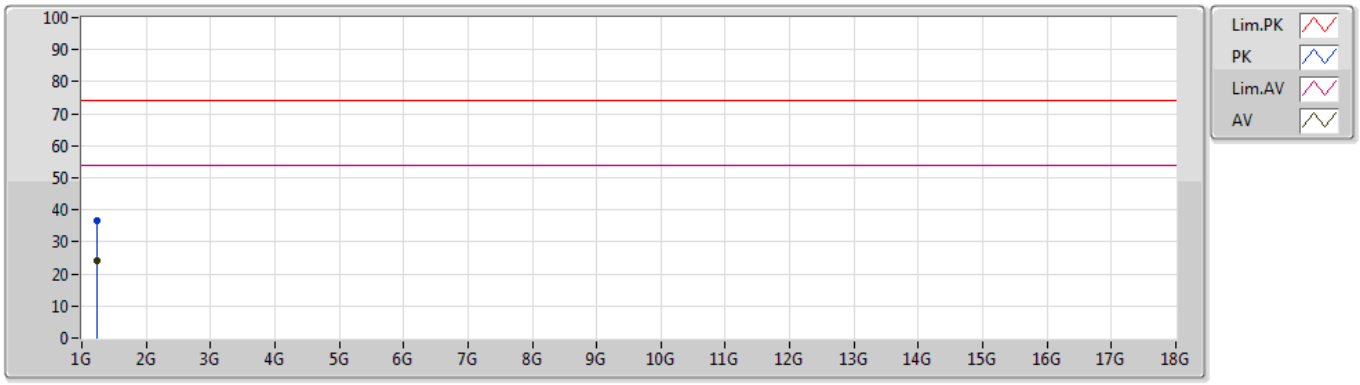
10/12/2020



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	1.23586G	36.93	74.00	-37.07	-8.14	3	Vertical	261	1.62	-	45.07	25.14	2.32	35.60
AV	1.23604G	28.97	54.00	-25.03	-8.14	3	Vertical	261	1.62	"Worst"	37.11	25.14	2.32	35.60

Mode 2

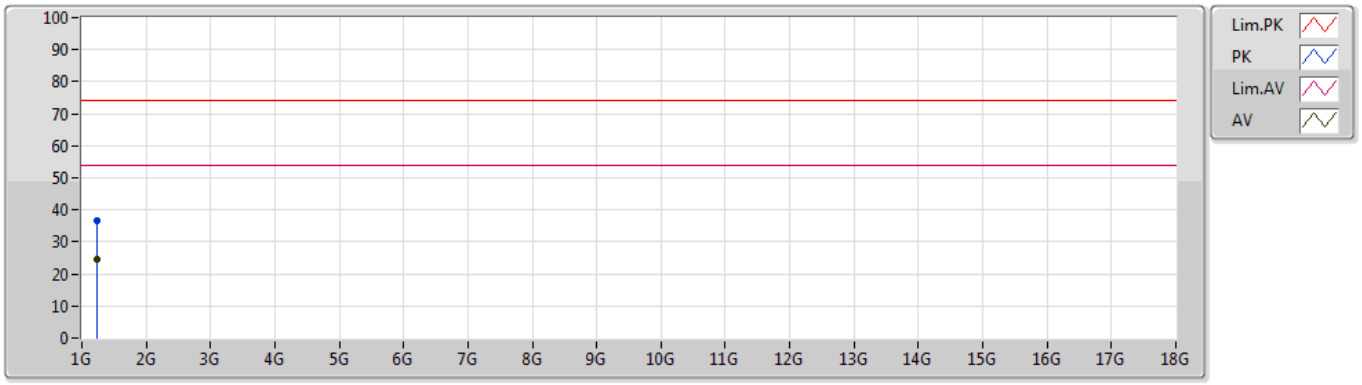
10/12/2020



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	1.22896G	36.46	74.00	-37.54	-8.20	3	Horizontal	122	1.70	-	44.66	25.12	2.31	35.63
AV	1.236G	23.99	54.00	-30.01	-8.14	3	Horizontal	122	1.70	"Worst"	32.13	25.14	2.32	35.60

Mode 3

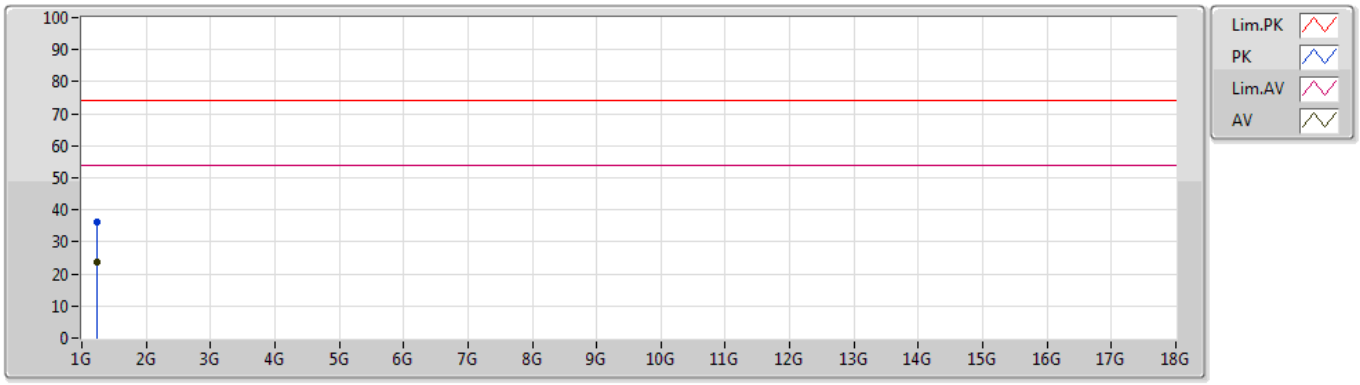
10/12/2020



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	1.23594G	36.67	74.00	-37.33	-8.14	3	Vertical	290	1.58	-	44.81	25.14	2.32	35.60
AV	1.23588G	24.70	54.00	-29.30	-8.14	3	Vertical	290	1.58	"Worst"	32.84	25.14	2.32	35.60

Mode 3

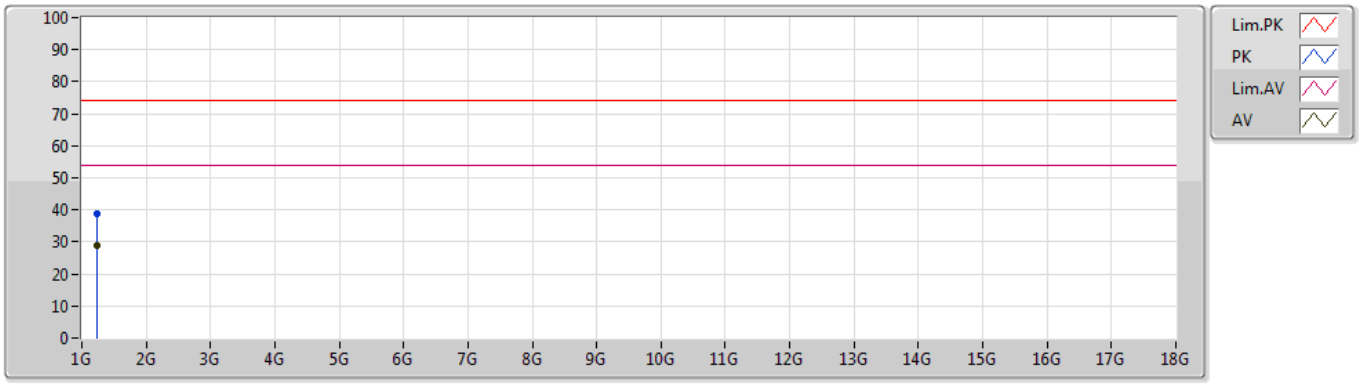
10/12/2020



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	1.236G	36.34	74.00	-37.66	-8.14	3	Horizontal	113	1.65	-	44.48	25.14	2.32	35.60
AV	1.2361G	23.75	54.00	-30.25	-8.14	3	Horizontal	113	1.65	"Worst"	31.89	25.14	2.32	35.60

Mode 4

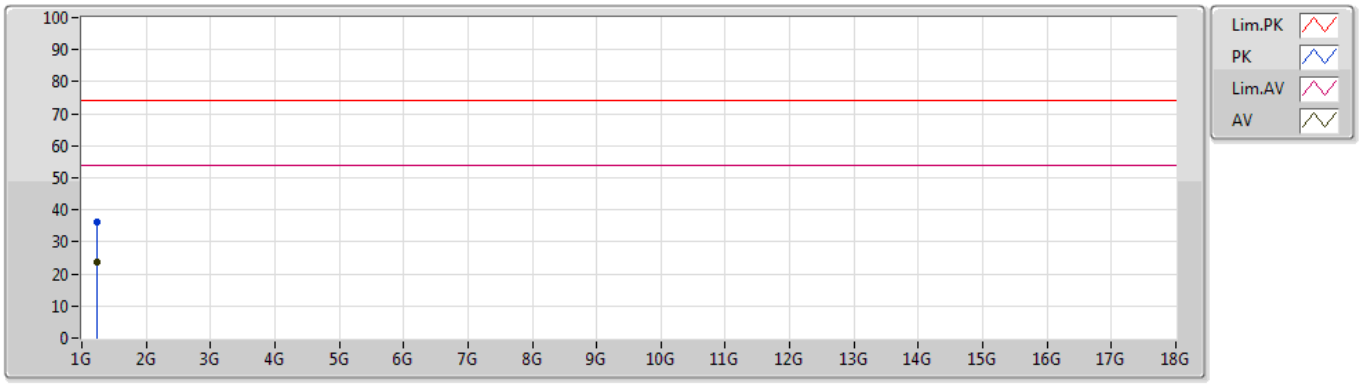
10/12/2020



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	1.23596G	38.85	74.00	-35.15	-8.14	3	Vertical	295	1.68	-	46.99	25.14	2.32	35.60
AV	1.236G	28.98	54.00	-25.02	-8.14	3	Vertical	295	1.68	"Worst"	37.12	25.14	2.32	35.60

Mode 4

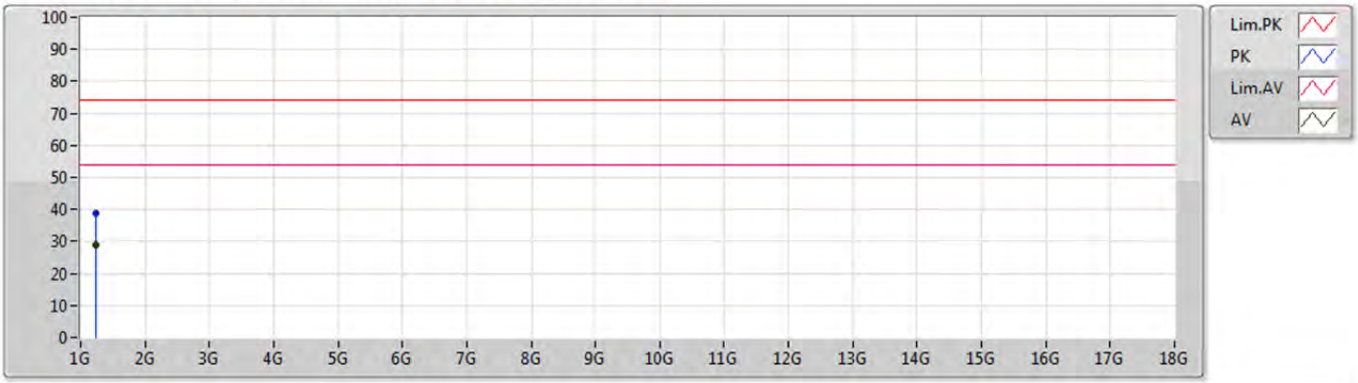
10/12/2020



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	1.22898G	36.24	74.00	-37.76	-8.20	3	Horizontal	106	1.62	-	44.44	25.12	2.31	35.63
AV	1.23764G	23.82	54.00	-30.18	-8.13	3	Horizontal	106	1.62	"Worst"	31.95	25.15	2.32	35.60

Radiated Emissions above 1GHz_Mode 5

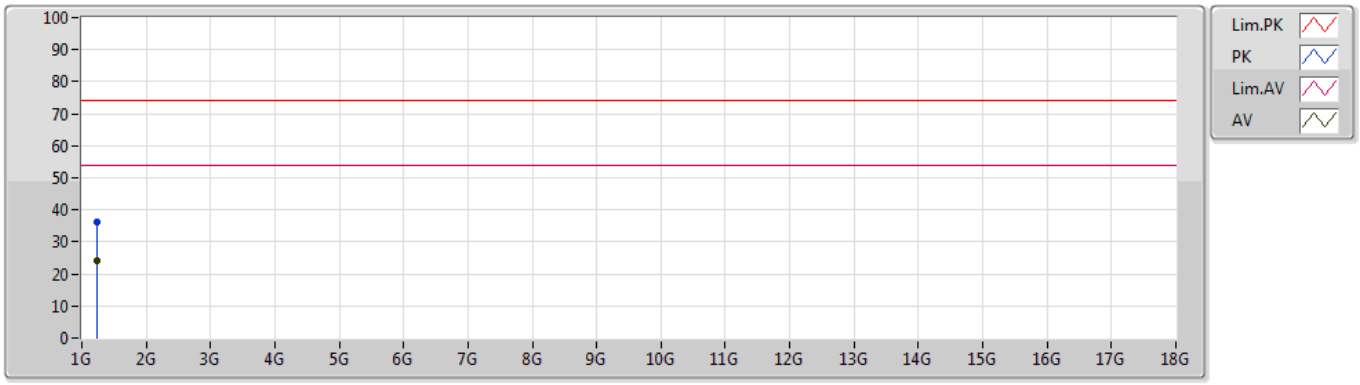
10/12/2020



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	1.23598G	38.71	74.00	-35.29	-8.14	3	Vertical	297	1.71	-	46.85	25.14	2.32	35.60
AV	1.23597G	28.93	54.00	-25.07	-8.14	3	Vertical	297	1.71	"Worst"	37.07	25.14	2.32	35.60

Mode 5

10/12/2020



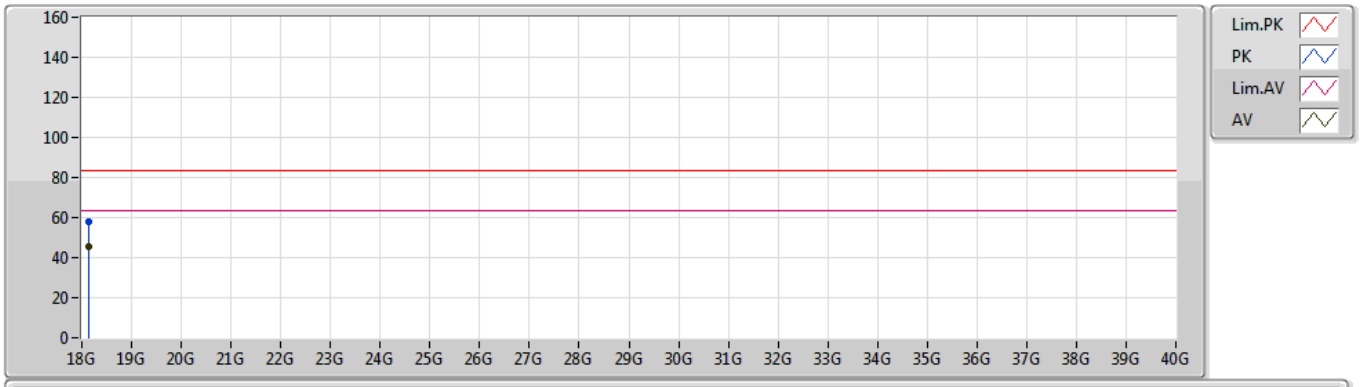
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	1.23924G	36.39	74.00	-37.61	-8.11	3	Horizontal	110	1.72	-	44.50	25.16	2.32	35.59
AV	1.23584G	24.06	54.00	-29.94	-8.14	3	Horizontal	110	1.72	"Worst"	32.20	25.14	2.32	35.60

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	18.14217G	45.36	63.54	-18.18	Vertical
Mode 2	Pass	AV	18.13708G	45.74	63.54	-17.80	Vertical
Mode 3	Pass	AV	18.13807G	45.13	63.54	-18.41	Vertical
Mode 4	Pass	AV	18.14132G	45.21	63.54	-18.33	Horizontal
Mode 5	Pass	AV	18.13644G	45.09	63.54	-18.45	Vertical

Mode 1

24/12/2020

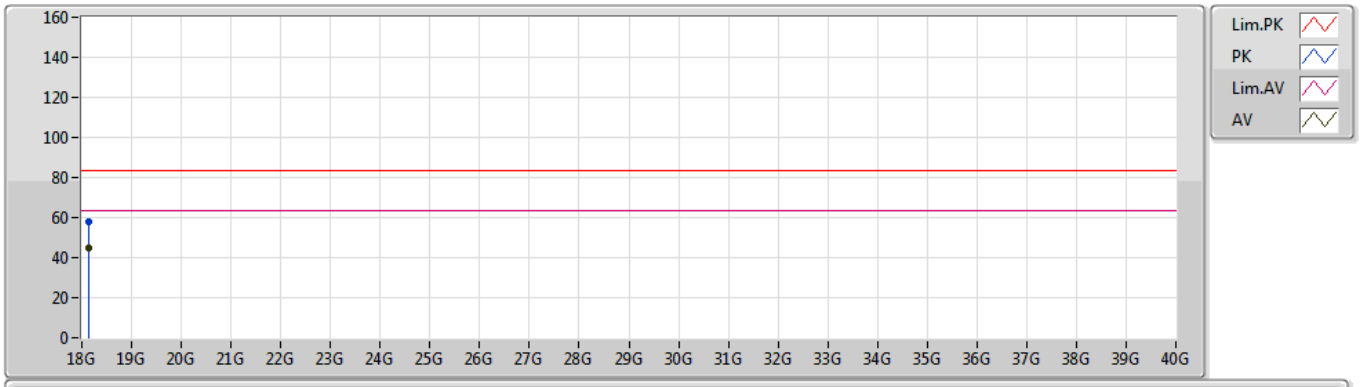


EUT Y
CTX Index5 24.1GHz
Power 0 Low Power
04-E-C-5

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	18.13777G	58.07	83.54	-25.47	1.39	1	Vertical	3	1.83	-	56.68	37.41	14.21	50.23
AV	18.14217G	45.36	63.54	-18.18	1.39	1	Vertical	3	1.83	-	43.97	37.41	14.21	50.23

Mode 1

24/12/2020

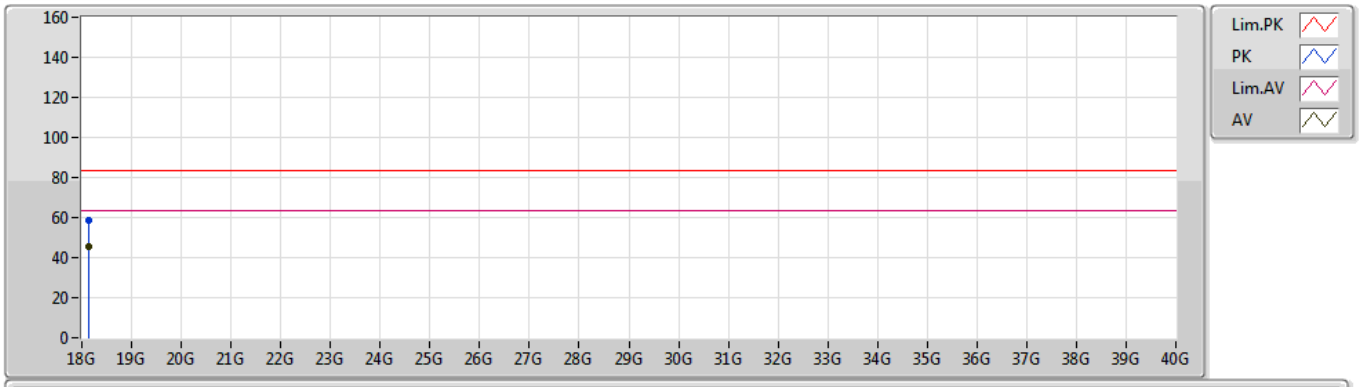


EUT Y
CTX Index5 24.1GHz
Power 0 Low Power
04-E-C-5

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	18.14102G	58.10	83.54	-25.44	1.39	1	Horizontal	197	2.07	-	56.71	37.41	14.21	50.23
AV	18.13745G	44.78	63.54	-18.76	1.39	1	Horizontal	197	2.07	-	43.39	37.41	14.21	50.23

Mode 2

24/12/2020

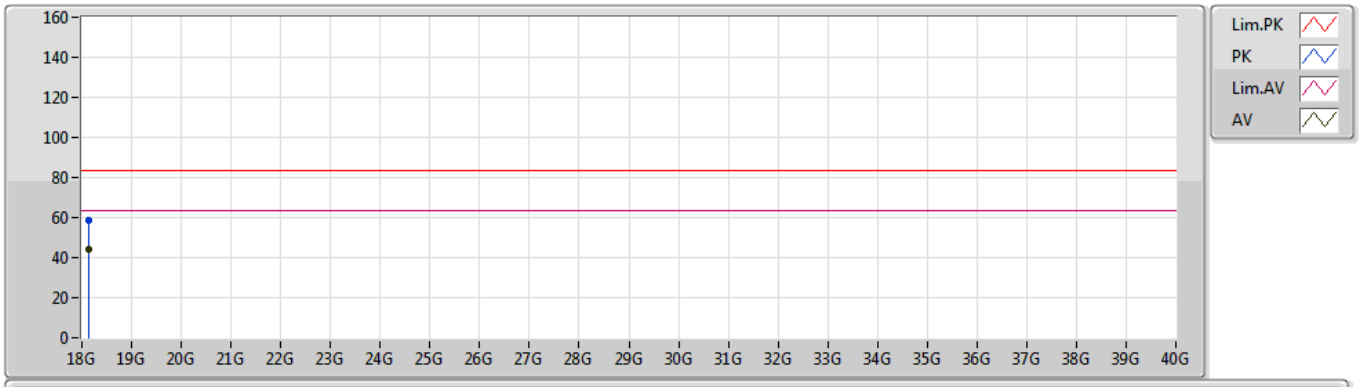


EUT Y
CTX Index6 24.2GHz
Power 0 Low Power
04-E-C-5

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	18.13749G	58.78	83.54	-24.76	1.39	1	Vertical	65	1.13	-	57.39	37.41	14.21	50.23
AV	18.13708G	45.74	63.54	-17.80	1.39	1	Vertical	65	1.13	-	44.35	37.41	14.21	50.23

Mode 2

24/12/2020

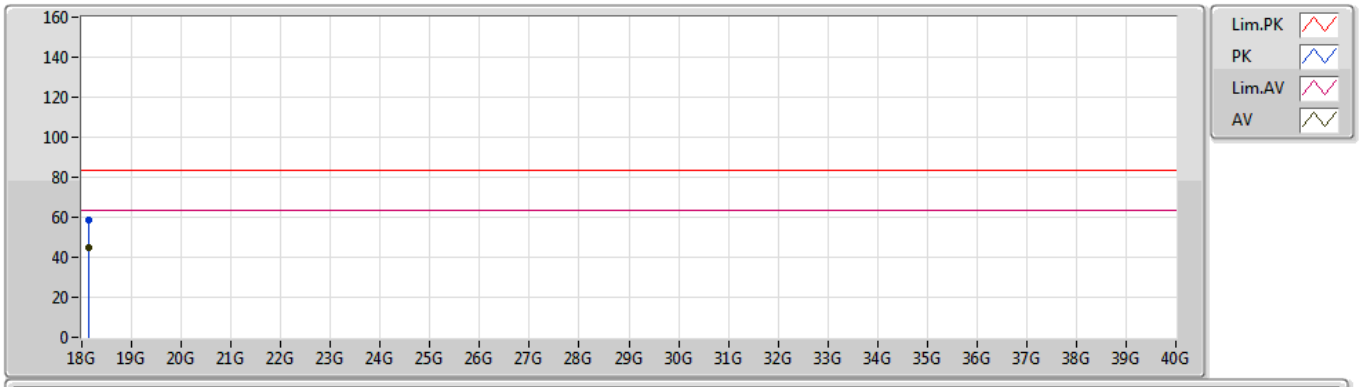


EUT Y
CTX Index6 24.2GHz
Power 0 Low Power
04-E-C-5

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)
AV	18.1375G	44.14	63.54	-19.40	1.39	1	Horizontal	135	1.29	-	42.75	37.41	14.21	50.23
PK	18.14605G	58.29	83.54	-25.25	1.40	1	Horizontal	135	1.29	-	56.89	37.42	14.21	50.23

Mode 3

24/12/2020

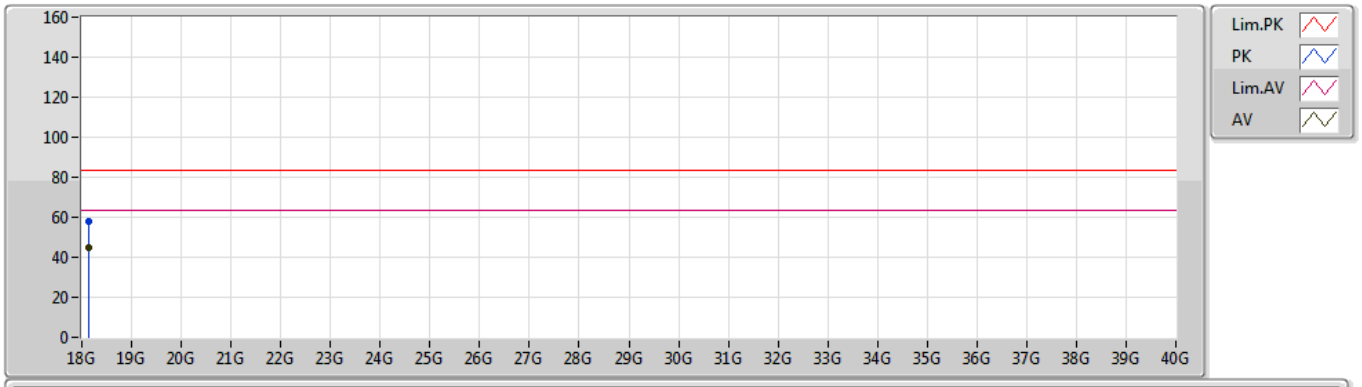


EUT Y
CTX Index7 24.125GHz
Power 0 Low Power
04-E-C-5

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	18.1385G	58.75	83.54	-24.79	1.39	1	Vertical	84	2.14	-	57.36	37.41	14.21	50.23
AV	18.13807G	45.13	63.54	-18.41	1.39	1	Vertical	84	2.14	-	43.74	37.41	14.21	50.23

Mode 3

24/12/2020

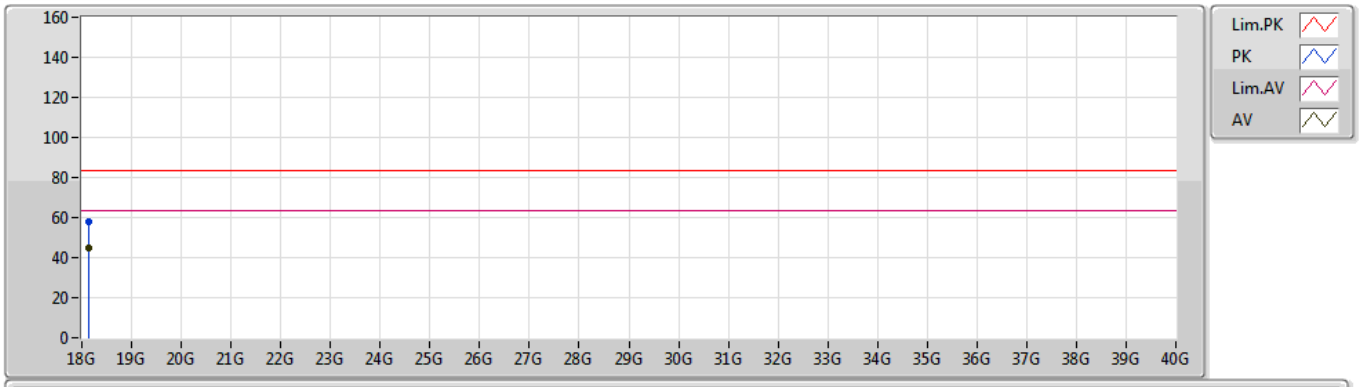


EUT Y
CTX Index7 24.125GHz
Power 0 Low Power
04-E-C-5

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	18.13841G	58.25	83.54	-25.29	1.39	1	Horizontal	124	2.08	-	56.86	37.41	14.21	50.23
AV	18.14001G	45.01	63.54	-18.53	1.39	1	Horizontal	124	2.08	-	43.62	37.41	14.21	50.23

Mode 4

24/12/2020

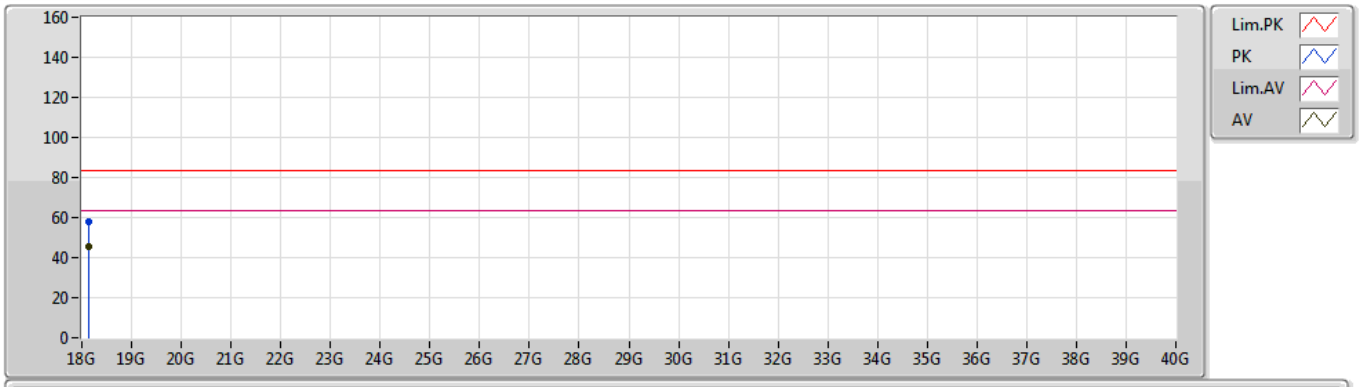


EUT Y
CTX Index8 24.15GHz
Power 0 Low Power
04-E-C-5

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)
AV	18.14113G	45.15	63.54	-18.39	1.39	1	Vertical	174	1.17	-	43.76	37.41	14.21	50.23
PK	18.14547G	58.02	83.54	-25.52	1.40	1	Vertical	174	1.17	-	56.62	37.42	14.21	50.23

Mode 4

24/12/2020

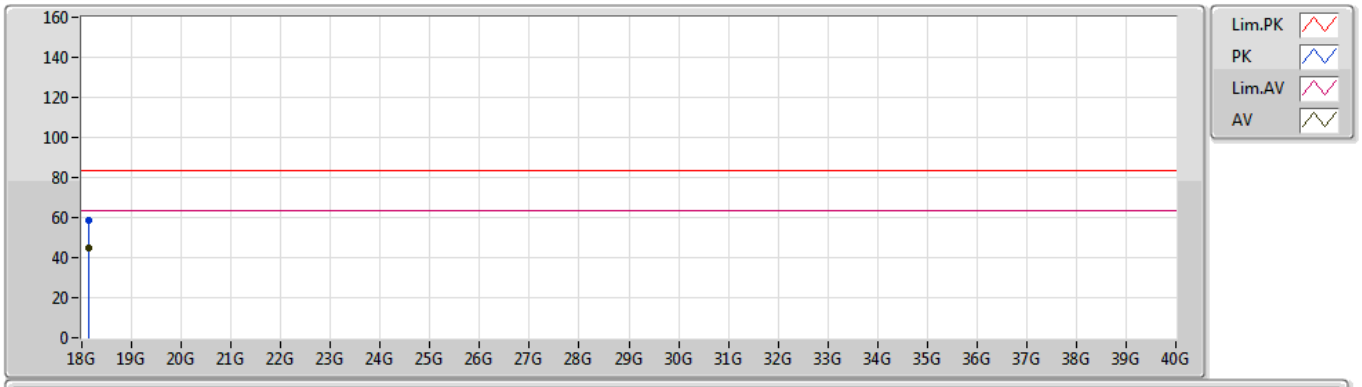


EUT Y
CTX Index8 24.15GHz
Power 0 Low Power
04-E-C-5

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)
AV	18.14132G	45.21	63.54	-18.33	1.39	1	Horizontal	142	1.03	-	43.82	37.41	14.21	50.23
PK	18.14486G	58.20	83.54	-25.34	1.40	1	Horizontal	142	1.03	-	56.80	37.42	14.21	50.23

Mode 5

24/12/2020

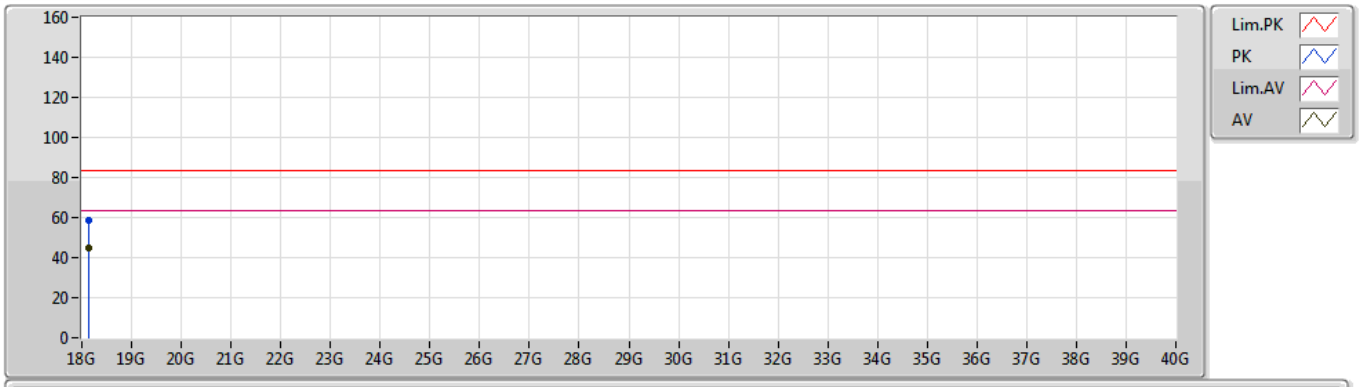


EUT Y
CTX Index9 24.15GHz
Power 0 Low Power
04-E-C-5

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	18.14357G	58.44	83.54	-25.10	1.39	1	Vertical	188	2.38	-	57.05	37.41	14.21	50.23
AV	18.13644G	45.09	63.54	-18.45	1.39	1	Vertical	188	2.38	-	43.70	37.41	14.21	50.23

Mode 5

24/12/2020



EUT Y
CTX Index9 24.15GHz
Power 0 Low Power
04-E-C-5

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	18.14468G	58.55	83.54	-24.99	1.40	1	Horizontal	122	1.75	-	57.15	37.42	14.21	50.23
AV	18.13704G	44.88	63.54	-18.66	1.39	1	Horizontal	122	1.75	-	43.49	37.41	14.21	50.23

Test Mode: Mode 1

Frequency (GHz)	Measurement Distance (m)	Measurement Peak (dBm)	Rx Antenna Gain (dBi)	Measurement EIRP (dBm)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.242	1	-81.59	24	-39.48	67.520	97.49	-29.970
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Average (dBm)**	**Rx Antenna Gain (dBi)**	**Measurement EIRP (dBm)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.213	1	-87.54	24	-45.43	61.565	77.49	-15.925

Test Mode: Mode 2

Frequency (GHz)	Measurement Distance (m)	Measurement Peak (dBm)	Rx Antenna Gain (dBi)	Measurement EIRP (dBm)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.432	1	-82.39	24	-40.25	66.754	97.49	-30.736
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Average (dBm)**	**Rx Antenna Gain (dBi)**	**Measurement EIRP (dBm)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.398	1	-87.55	24	-45.41	61.588	77.49	-15.902

Test Mode: Mode 3

Frequency (GHz)	Measurement Distance (m)	Measurement Peak (dBm)	Rx Antenna Gain (dBi)	Measurement EIRP (dBm)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.229	1	-82.09	24	-39.98	67.018	97.49	-30.472
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Average (dBm)**	**Rx Antenna Gain (dBi)**	**Measurement EIRP (dBm)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.254	1	-87.65	24	-45.54	61.462	77.49	-16.028

Test Mode: Mode 4

Frequency (GHz)	Measurement Distance (m)	Measurement Peak (dBm)	Rx Antenna Gain (dBi)	Measurement EIRP (dBm)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.276	1	-81.52	24	-39.40	67.596	97.49	-29.894
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Average (dBm)**	**Rx Antenna Gain (dBi)**	**Measurement EIRP (dBm)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.305	1	-86.04	24	-43.92	63.082	77.49	-14.408

Test Mode: Mode 5

Frequency (GHz)	Measurement Distance (m)	Measurement Peak (dBm)	Rx Antenna Gain (dBi)	Measurement EIRP (dBm)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.265	1	-82.73	24	-40.62	66.384	97.49	-31.106
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Average (dBm)**	**Rx Antenna Gain (dBi)**	**Measurement EIRP (dBm)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.330	1	-88.11	24	-45.98	61.016	77.49	-16.474

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].
EIRP = PT * GT = (PR / GR) * (4 * Pi * D / λ)^2