



Radio Test Report

Report No.: STS2603136W01

Issued for

Hebei Huachuang M&C Technology Co., Ltd
Building #1, South of Puhui Street, West of Guangsheng East
Road, High-tech Park, Fengnan Economic Development
Zone, Tangshan, Hebei, China

Product Name: 80G Radar Level Transmitter

Brand Name: N/A

Model Name: HCDAR-80

Series Model(s) HCDAR-80, HCDAR-81, HCDAR-80S,
HCDAR-81S, HCDAR-82

FCC ID: 2BFRQ-HCDAR8X

Test Standards: FCC Part 15.256

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

**TEST REPORT**

Applicant's Name..... : Hebei Huachuang M&C Technology Co., Ltd
Building #1, South of Puhui Street, West of Guangsheng East
Address..... : Road, High-tech Park, Fengnan Economic Development
Zone, Tangshan, Hebei, China
Manufacture's Name..... : Hebei Huachuang M&C Technology Co., Ltd
1F, South of Puhui Street, West of Guangsheng East Road,
Address..... : High-tech Park, Fengnan Economic Development Zone,
Tangshan, Hebei, China

Product Description

Product Name..... : 80G Radar Level Transmitter
Brand Name : N/A
Model Name..... : HCDAR-80
Series Model..... : HCDAR-80, HCDAR-81, HCDAR-80S, HCDAR-81S,
HCDAR-82

Test Standards..... : FCC Part 15.256

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date of receipt of test item..... : 19 Mar 2026

Date of performance of tests...: 19 Mar 2026~21 May. 2026

Date of Issue..... : 21 May. 2026

Test Result..... : **Pass**

Testing Engineer :

Rain Liu

(Rain Liu)

Technical Manager :

Skylar Li

(Skylar Li)

Authorized Signatory :

Bovey Yang

(Bovey Yang)





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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	21 May. 2026	STS2603136W01	ALL	Initial Issue



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.256		
FCC standard	Test Item	Results
15.256(h)	Spurious emissions	PASS
15.256(f)	Fundamental bandwidth	PASS
15.256(g)	Fundamental emissions limits (Maximum peak output power & Power spectral density)	PASS
15.256(i)	Antenna beamwidth	PASS
15.256(j)	Antenna side lobe gain	PASS
15.215(c)	Frequency stability	PASS
15.207	AC Conducted	N/A

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2020+Cor 1-2023



1.1 TEST FACILITY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power	$\pm 0.751\text{dB}$
2	Occupied bandwidth	$\pm 3.6\%$
3	All emissions, radiated below 1GHz	$\pm 2.52\text{dB}$
4	All emissions, radiated 1GHz-18GHz	$\pm 3.48\text{dB}$
5	All emissions, radiated >18G	$\pm 4.18\text{dB}$
6	Duty Cycle	$\pm 3.2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	80G Radar Level Transmitter
Brand Name	N/A
Model Name	HCDAR-80
Series Model(s)	HCDAR-80, HCDAR-81, HCDAR-80S, HCDAR-81S, HCDAR-82
Model Difference	The dimensions of the connecting threads are different
Operation Frequency	76-81GHz
Modulation Type	FMCW
Antenna Type	PCB
Antenna Gain	31.3dBi
Power Rating	Input: 12-28V DC
Battery	N/A
Hardware version	N/A
Software version	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Lingdu Electronic Technology (Gu'an)Co., Ltd.	N/A	PCB	N/A	31.3	Antenna

The EUT antenna is External Antenna. No antenna other than that furnished by the responsible party shall be used with the device.

3

Channel List	
Channel	Frequency (GHz)
01	76-81

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above listed frequency for testing.

4. The EUT is LRP device

2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level

RF Function	Type	Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
Radar	75-85GHz	FMCW	31.3	Default	The EUT has signal transmission when it is powered on

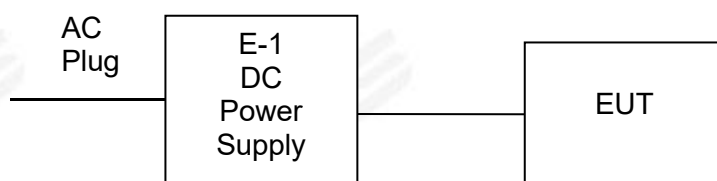
2.4 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Description
Mode1	TX mode

2.5 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



2.6 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	DC power supply	HONGSHENG FENG	DPS-305AF	N/A	E-1

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.7 TEST EQUIPMENT

RF Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
966 chamber	CHENYU	966 Room	966	2025.08.13	2028.08.12
Temperature & Humidity	TORIE	TP502V4-P	6700000124280	2025.10.13	2026.10.12
Pre-Amplifier (0.1M-3GHz)	EM	EM330	60665	2025.02.22	2026.02.21
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2025.09.25	2026.09.24
Pre-Amplifier (18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2026.02.04	2027.02.03
Active loop Antenna (9KHz-30MHz)	ZHINAN	ZN30900C	16035	2025.02.25	2027.02.24
Bilog Antenna (30-1000MHz)	TESEQ	CBL6111D	34678	2025.09.27	2027.09.26
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA 9120D	2014	2025.09.27	2027.09.26
HornAntenna (18G-40GHz)	A-INFOMW	LB-180400-KF	J211020657	2025.09.27	2027.09.26
Horn Antenna (40G-60GHz)	A-INFO	LB-19-25-A	2020039000053	2024.12.25	2027.12.24
Horn Antenna (50G-75GHz)	A-INFO	LB-15-25-A	2020028000183	2024.12.25	2027.12.24
Horn Antenna (75G-110GHz)	A-INFO	LB-10-25-A	2020017000101	2024.12.25	2027.12.24
Mixer(40-60GHz)	AT-Microwave	AT-SAX8-4060	U4NO01	2024.12.25	2027.12.24
Mixer(50-75GHz)	AT-Microwave	AT-SAXB-5075	V4NO01	2024.12.25	2027.12.24
Mixer(75-110GHz)	AT-Microwave	AT-SAX8-75110	S5JA01	2024.12.25	2027.12.24
Mixer(110-170GHz)	AT-Microwave	AT-SAX24-110170	D4NO01	2024.12.25	2027.12.24
Mixer(170-260GHz)	AT-Microwave	AT-SAX32-170260	H4NO01	2024.12.25	2027.12.24
RF Coaxial Cable	LEITAI M-WAVE	CA360	DC-18G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA360	DC-18G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA3507	DC-40G	2025.09.26	2026.09.25
RF Coaxial Cable	LEITAI M-WAVE	CA3507	DC-40G	2025.09.26	2026.09.25
Signal Analyzer	Keysight	N9020A	MY52440124	2026.02.04	2027.02.03
Positioning Controller	MF	MF-7802	MF-780208587	2025.09.26	2026.09.25
signal generator	Keysight	E8257D	MY58040082	2026.02.04	2027.02.03
Signal Analyzer	R&S	FSV 40-N	101823	2025.09.26	2026.09.25
Filter Box	BALUN Technology	SU319E	BL-SZ1530051	2025.09.26	2026.09.25
Switch Control Box	SKET	SU319E	51409043	2025.09.26	2026.09.25
Antenna Mast	MF	MFA-440H	1308023	N/A	N/A
Turn Table	MF	SC100_1	60531	N/A	N/A
Temperature& Humidity test chamber	Safety test	AG80L	171200018	2026.02.04	2027.02.03
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
DC power supply	HONGSHENG FENG	DPS-305AF	17064939	2025.09.22	2026.09.21
Test SW	EZ-MMW	Ver.STSLAB-MMW1.0			

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

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 the limits in the following table.

FREQUENCY (MHz)	Conducted Emission limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “ * ” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

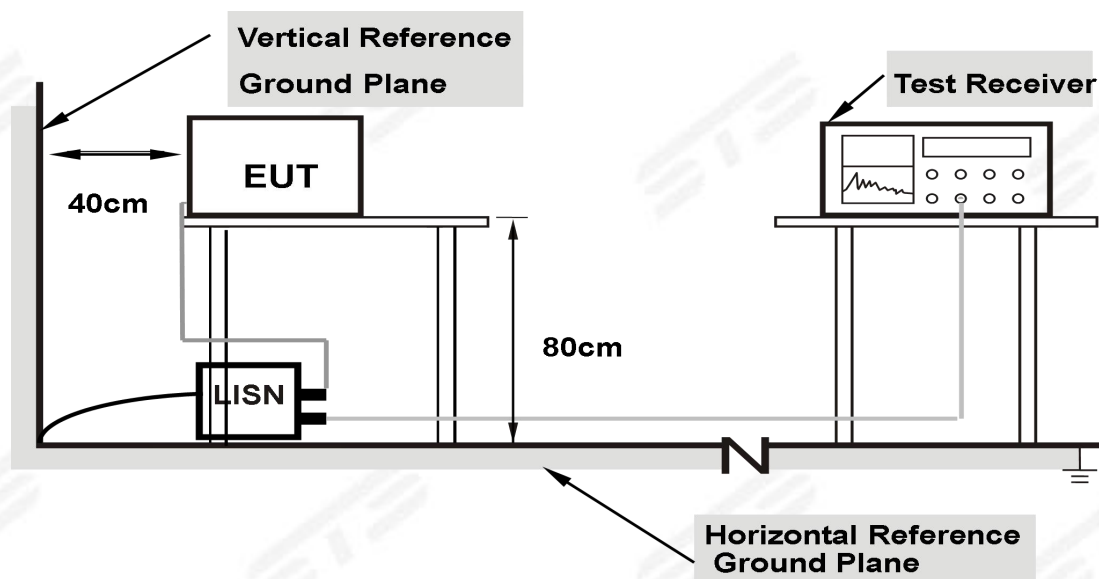
The following table is the setting of the receiver

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

3.2 TEST PROCEDURE

- The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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 to 40 cm long.
- I/O cables that are not connected to a peripheral 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.
- LISN is at least 80 cm from the nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.5 TEST RESULT

Note: The EUT operates powered by DC so it is not applicable.

4. FUNDAMENTAL EMISSIONS

4.1 LIMIT

(1) All emission limits provided in this section are expressed in terms of Equivalent Isotropic Radiated Power (EIRP).

(2) The EIRP level is to be determined from the maximum measured power within a specified bandwidth.

(i) The EIRP in 1 MHz is computed from the maximum power level measured within any 1-MHz bandwidth using a power averaging detector;

(ii) The EIRP in 50 MHz is computed from the maximum power level measured with a peak detector in a 50-MHz bandwidth centered on the frequency

at which the maximum average power level is realized and this 50 MHz bandwidth must be contained within the authorized operating bandwidth. For a RBW less than 50 MHz, the peak EIRP limit (in dBm) is reduced by $20 \log(\text{RBW}/50)$ dB where RBW is the resolution bandwidth in megahertz. The RBW shall not be lower than 1 MHz or greater than 50 MHz. The video bandwidth of the measurement instrument shall not be less than the RBW. If the RBW is greater than 3 MHz, the application for certification filed shall contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

(3) The EIRP limits for LPR operations in the bands authorized by this rule section are provided in Table below. The emission limits in Table below are based on boresight measurements (i.e., measurements performed within the main beam of an LPR antenna).

TABLE 1—LPR EIRP EMISSION LIMITS

Frequency band of operation (GHz)	Average emission limit (EIRP in dBm measured in 1 MHz)	Peak emission limit (EIRP in dBm measured in 50 MHz)
5.925-7.250	-33	7
24.05-29.00	-14	26
75-85	-3	34

4.2 TEST PROCEDURE

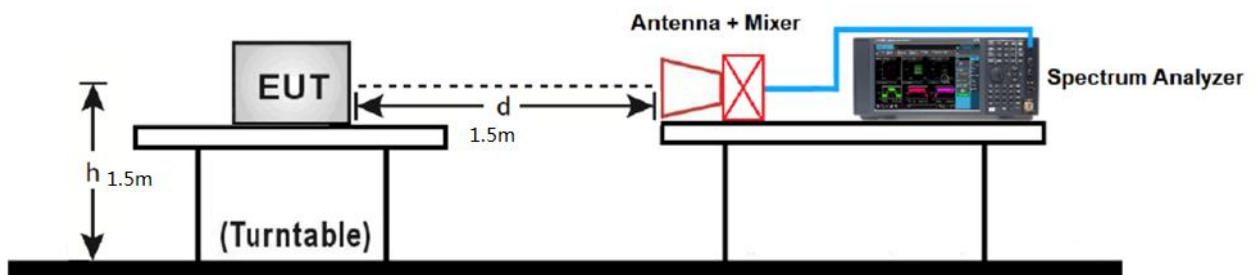
Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
- If the EUT is a tabletop system, 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 1.5m
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0 degree to 360 degree.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1m to 4m.
- Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
- At each turntable position the analyzer sweeps with position-peak detector to find the maximum of all emissions.

4.3 TEST SETUP





4.4 TEST RESULTS

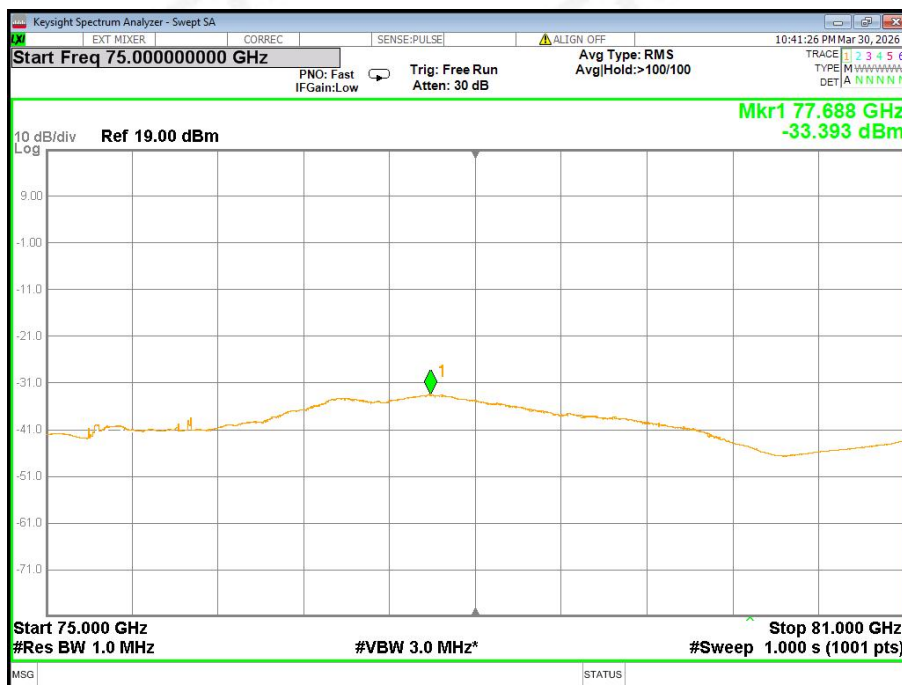
Frequency(GHz)	RBW/1MHz (dbm)	RBW/50MHz (dbm)	Limit/50MHz (dbm)	Result
76-81	-7.863	26.116	34.000	PASS



Note: calculation formula
Please refer to Section 4.1 (ii) in this report.
 $RBW/50MHz = 20 * \log(1/50)$



Frequency (GHz)	AVG Power (dbm)	Limit (dbm)	Result
76-81	-33.393	-3	PASS



5. UNWANTED EMISSIONS

5.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2020+Cor 1-2023 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

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

LIMITS OF RADIATED EMISSION MEASUREMENT (1000MHz-25GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 360 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Restricted band

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz Upper Band Edge: 2475 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

Receiver Parameter	Setting
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.2 TEST PROCEDURE

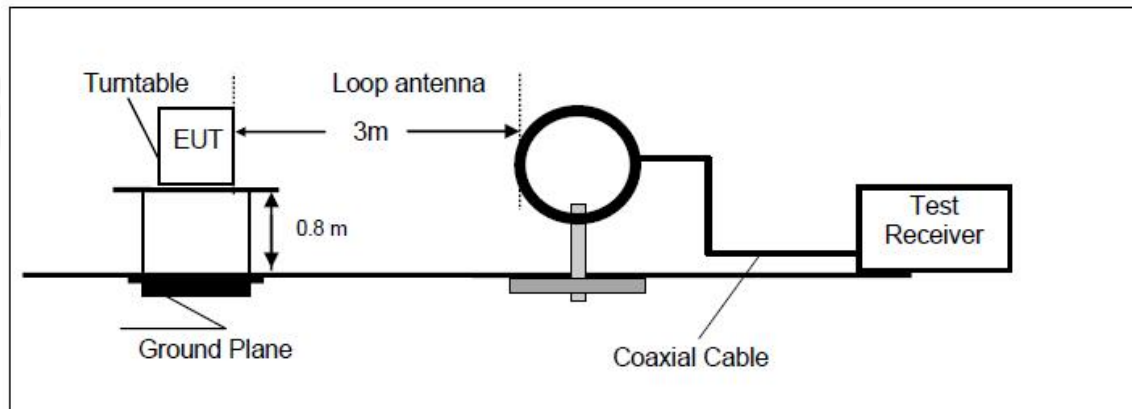
- The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.
- If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

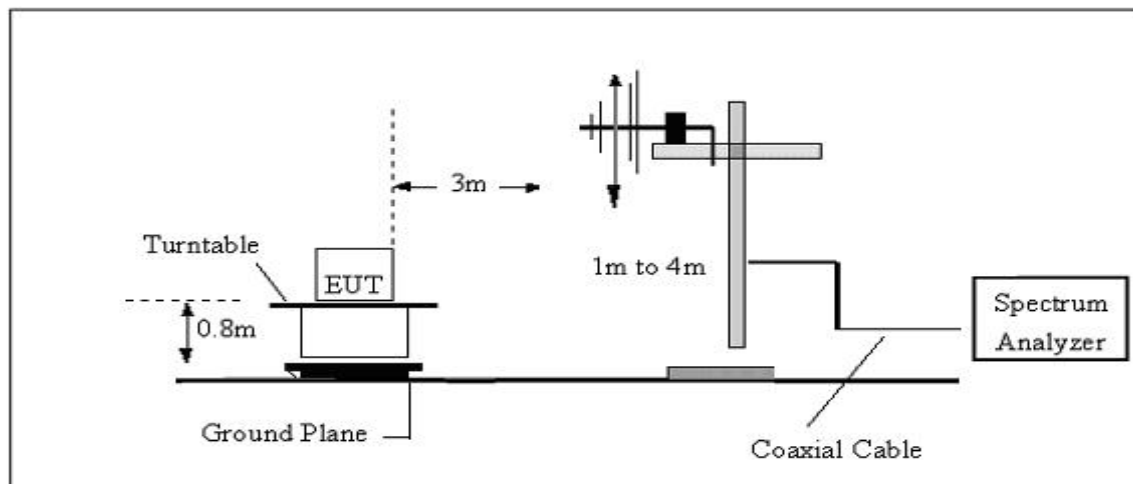
Both horizontal and vertical antenna polarities were tested with a band-stop filter and performed pretest to three orthogonal axis. The worst-case emissions were reported.

5.3 TEST SETUP

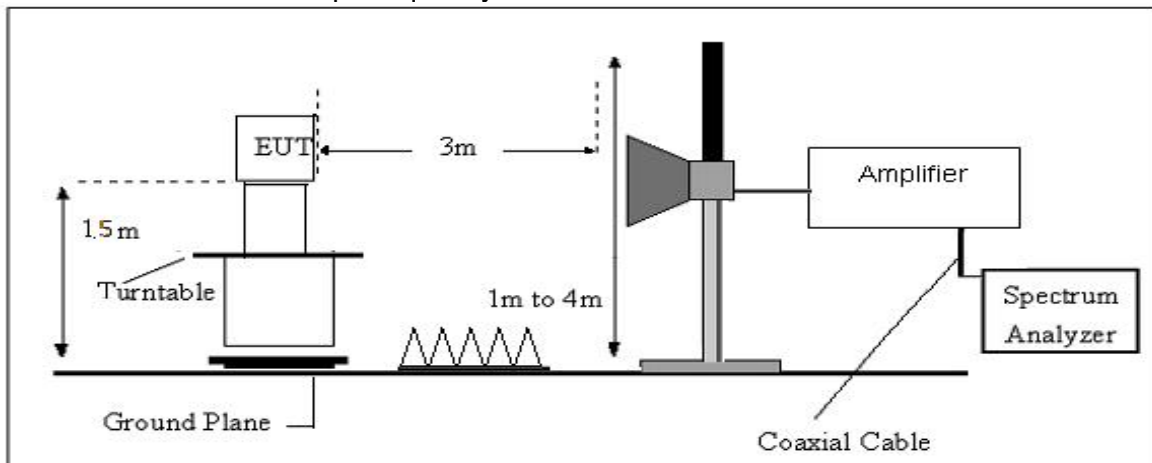
(A) Radiated Emission Test-Up Frequency 9 KHz – 30MHz



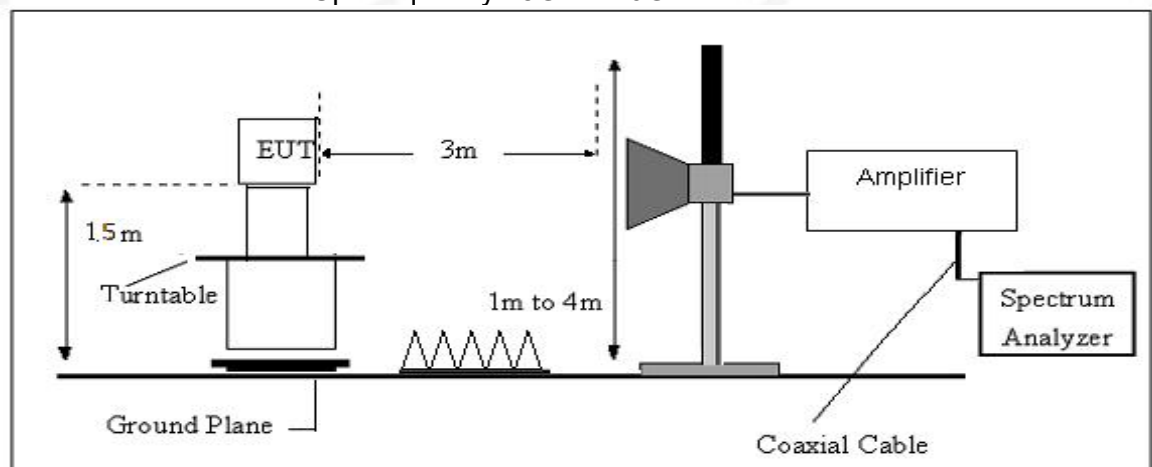
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



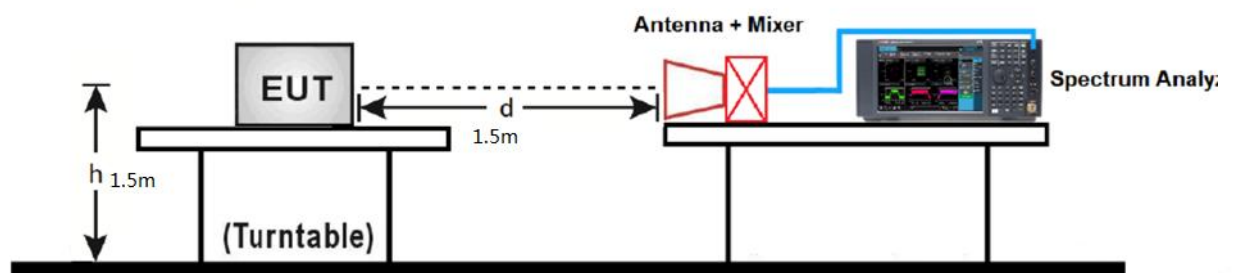
(C) Radiated Emission Test-Up Frequency 1GHz~18GHz



(D) Radiated Emission Test-Up Frequency 18GHz~40GHz



(E) Radiated Emission Test-Up Frequency Above 40GHz



5.4 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

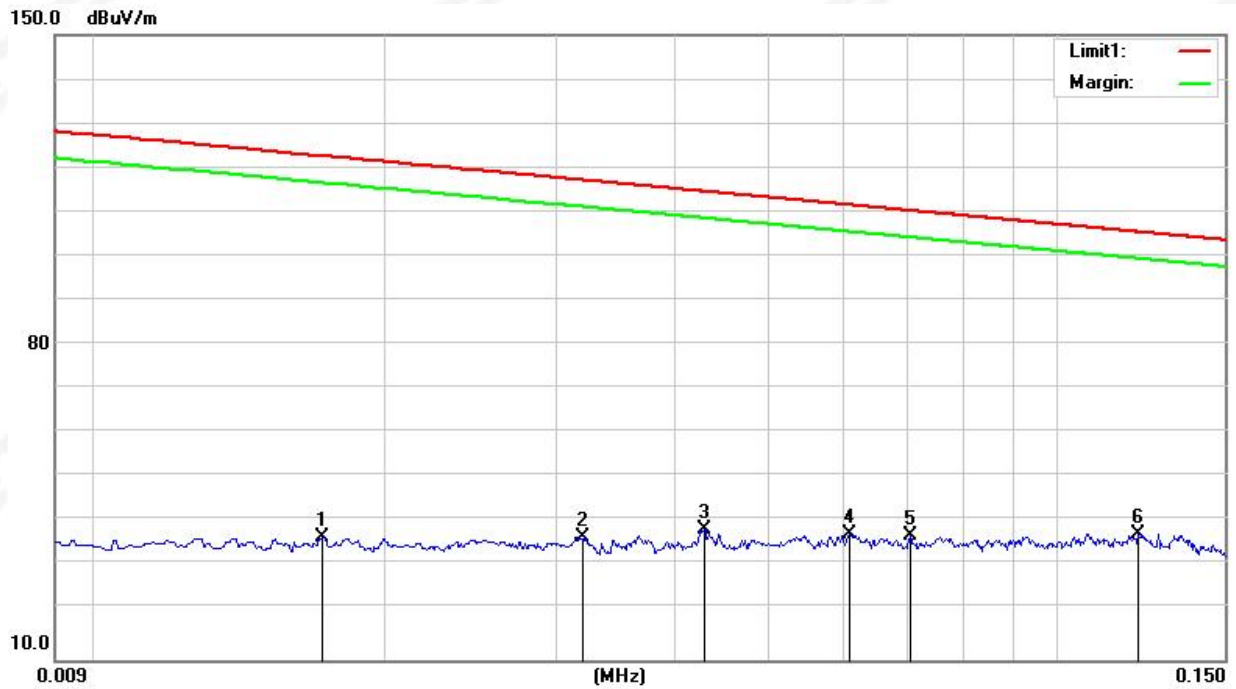
For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = AF + CL - AG$$

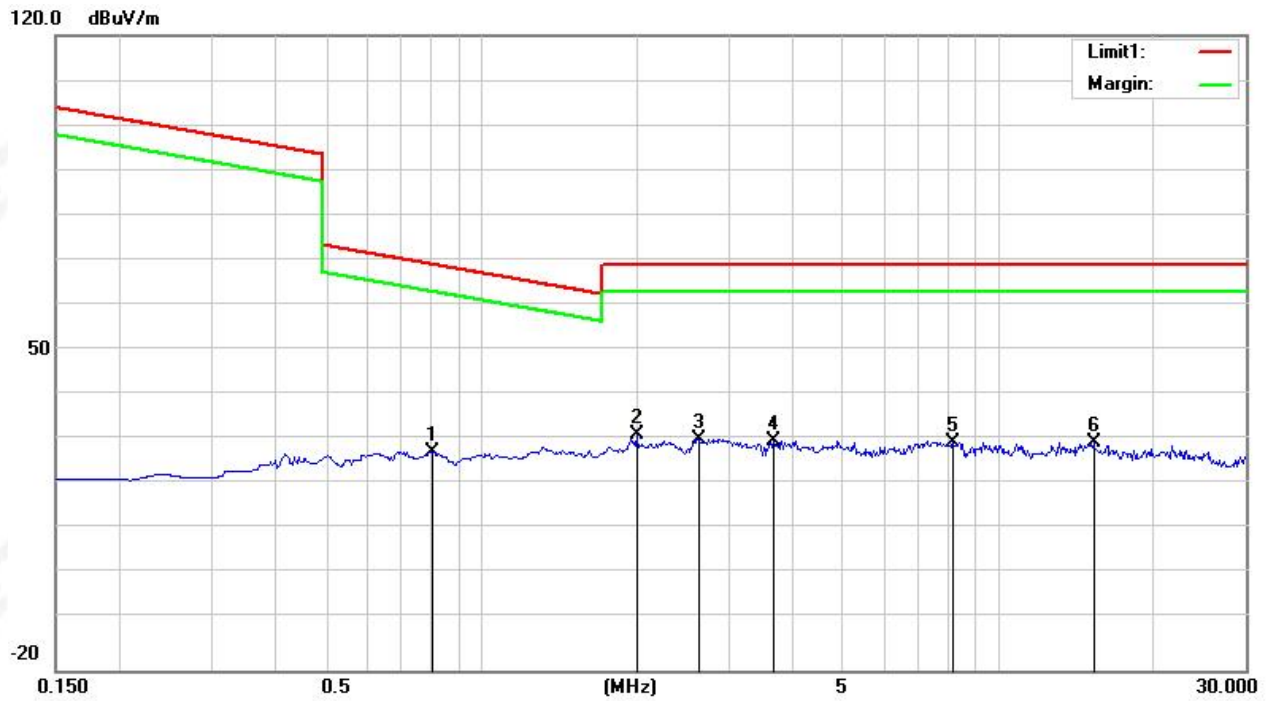
5.5 TEST RESULTS

Coxial RSE-9KHz-150KHz



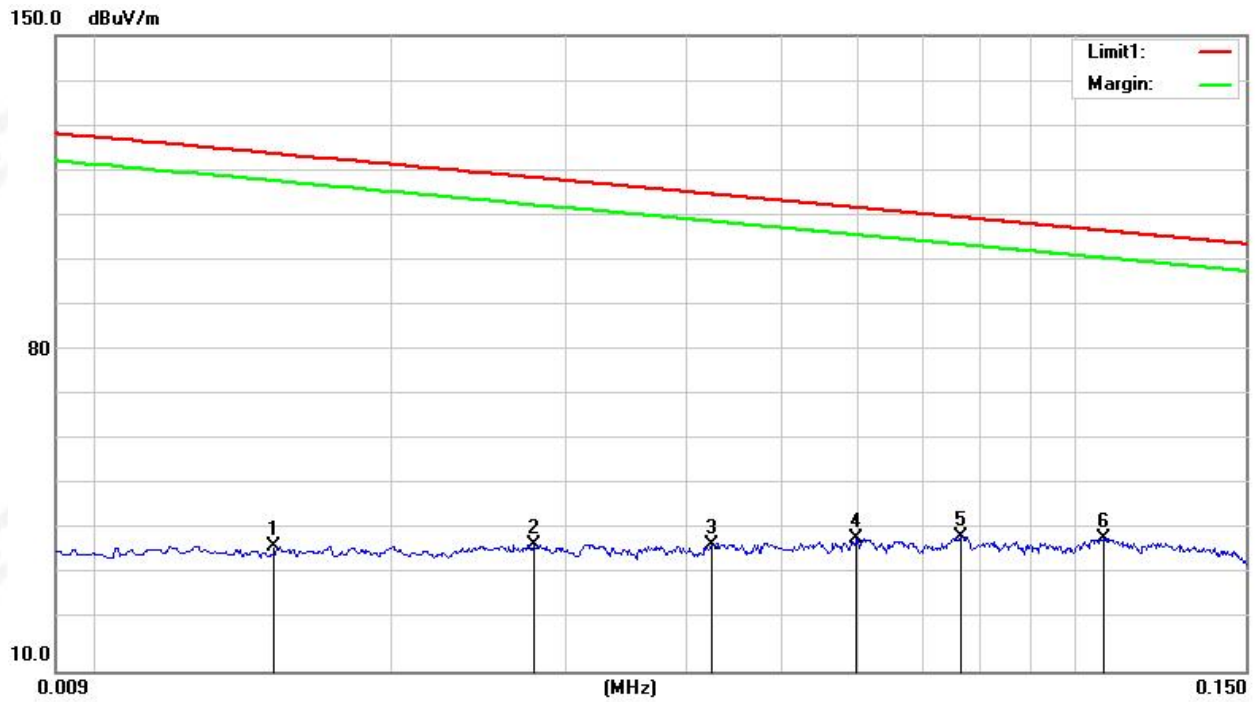
No.	Frequency (KHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0171	17.51	19.89	37.40	122.94	-85.54	peak
2	0.0320	17.68	19.86	37.54	117.50	-79.96	peak
3	0.0430	19.42	19.64	39.06	114.94	-75.88	peak
4	0.0610	18.94	19.19	38.13	111.90	-73.77	peak
5	0.0704	18.98	18.93	37.91	110.65	-72.74	peak
6	0.1218	20.78	17.56	38.34	105.89	-67.55	peak

RSE-150KHz-30MHz



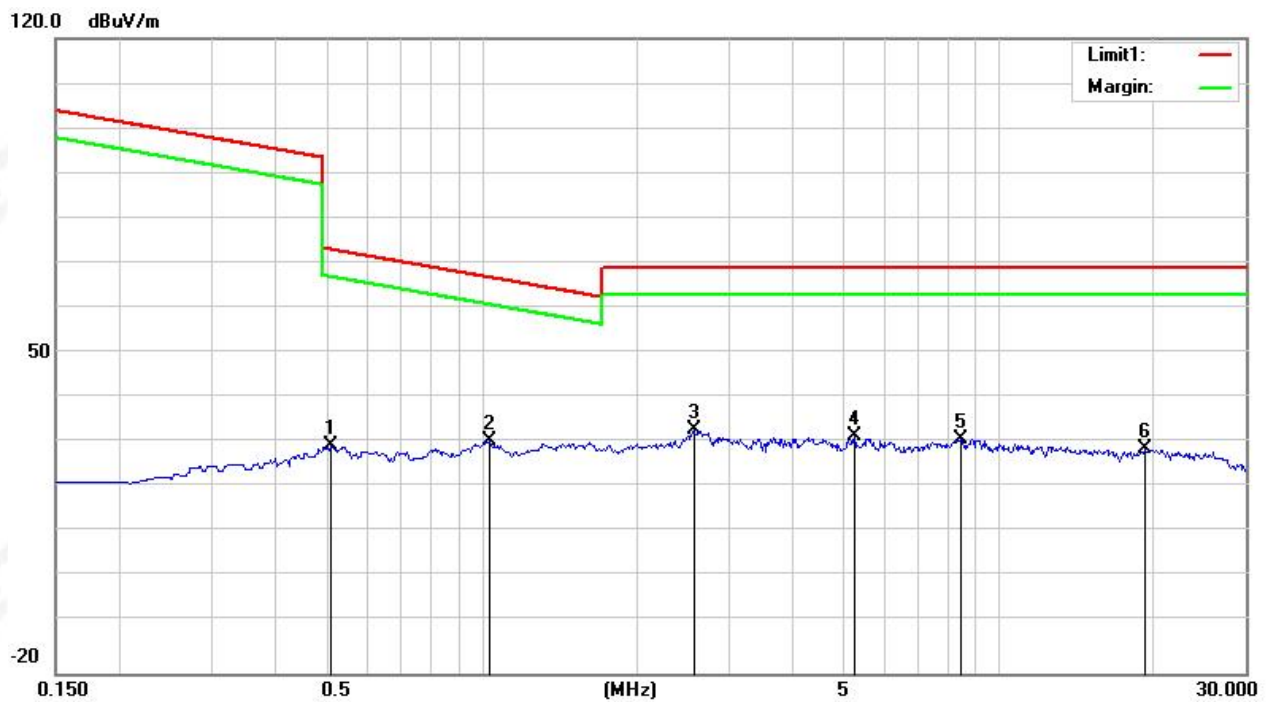
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.8064	7.95	20.28	28.23	69.47	-41.24	peak
2	2.0007	11.47	20.40	31.87	69.50	-37.63	peak
3	2.6274	10.73	20.21	30.94	69.50	-38.56	peak
4	3.6722	10.27	20.30	30.57	69.50	-38.93	peak
5	8.1797	10.03	20.31	30.34	69.50	-39.16	peak
6	15.2540	8.71	21.36	30.07	69.50	-39.43	peak

Coplanar
RSE-9KHz-150KHz



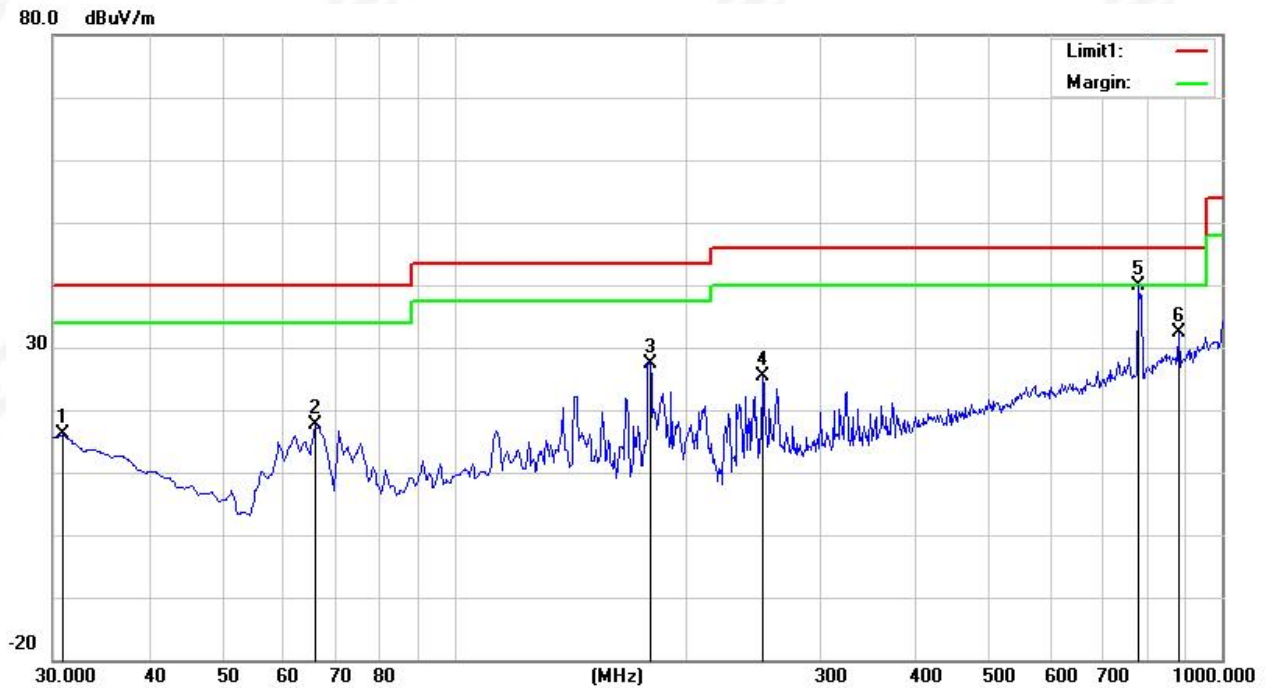
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0151	17.87	19.74	37.61	124.03	-86.42	peak
2	0.0280	18.02	19.94	37.96	118.66	-80.70	peak
3	0.0424	18.34	19.65	37.99	115.06	-77.07	peak
4	0.0597	19.94	19.23	39.17	112.08	-72.91	peak
5	0.0767	20.97	18.72	39.69	109.91	-70.22	peak
6	0.1073	21.61	17.59	39.20	106.99	-67.79	peak

RSE-150KHz-30MHz



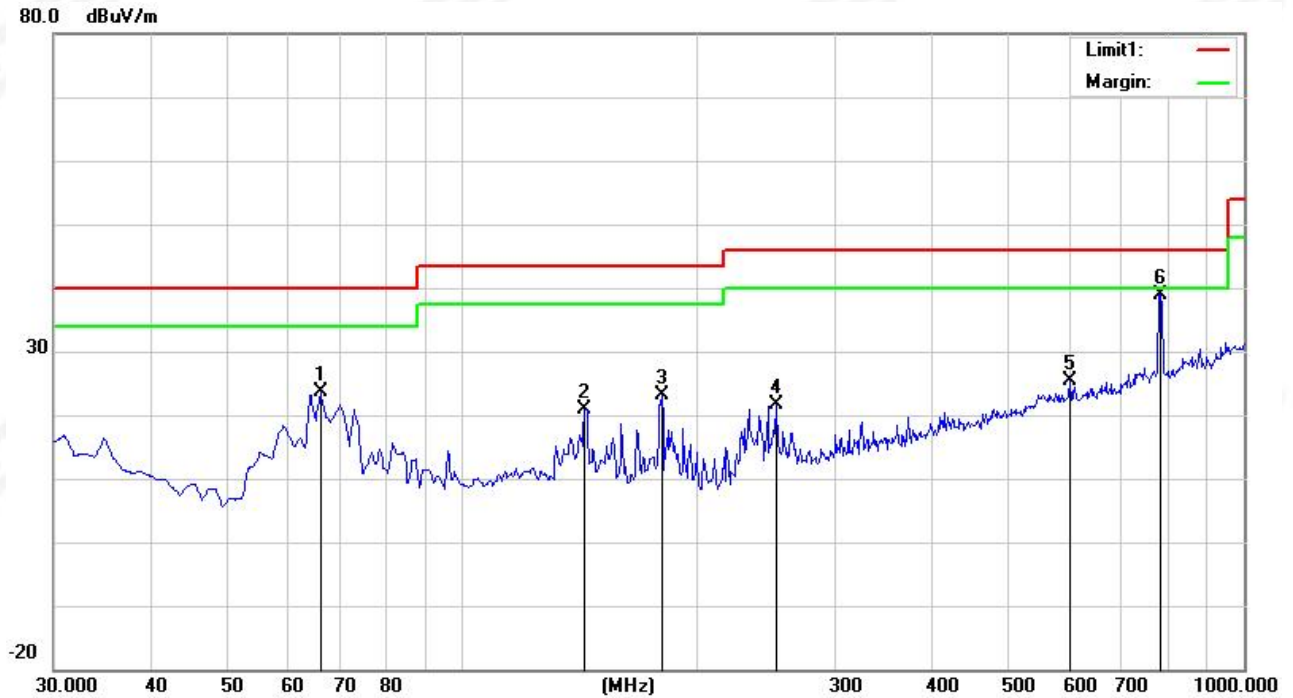
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.5100	9.86	20.20	30.06	73.45	-43.39	peak
2	1.0320	11.16	20.21	31.37	67.33	-35.96	peak
3	2.5678	13.34	20.23	33.57	69.50	-35.93	peak
4	5.2541	11.86	20.48	32.34	69.50	-37.16	peak
5	8.4184	11.50	20.29	31.79	69.50	-37.71	peak
6	19.1341	7.09	22.29	29.38	69.50	-40.12	peak

30MHz – 1000MHz Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	29.43	-13.35	16.08	40.00	-23.92	peak
2	65.8900	43.11	-25.60	17.51	40.00	-22.49	peak
3	180.3500	47.40	-20.04	27.36	43.50	-16.14	peak
4	252.1300	41.20	-15.80	25.40	46.00	-20.60	peak
5	779.8100	42.00	-2.22	39.78	46.00	-6.22	peak
6	880.6900	33.16	-0.66	32.50	46.00	-13.50	peak

Vertical



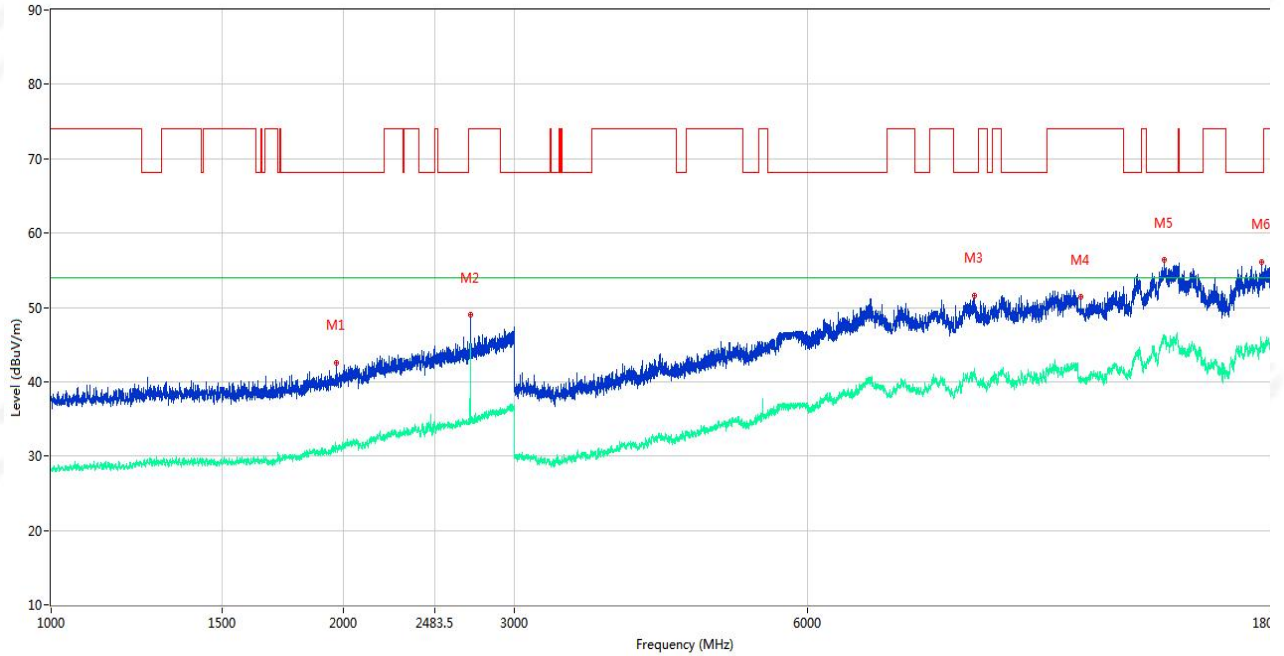
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	65.8900	49.22	-25.60	23.62	40.00	-16.38	peak
2	143.4900	39.11	-18.23	20.88	43.50	-22.62	peak
3	180.3500	43.25	-20.04	23.21	43.50	-20.29	peak
4	252.1300	37.50	-15.80	21.70	46.00	-24.30	peak
5	600.3600	31.15	-5.84	25.31	46.00	-20.69	peak
6	782.7200	40.97	-2.14	38.83	46.00	-7.17	peak



Above 1G Radiation Spurious

1GHz - 18GHz
Horizontal

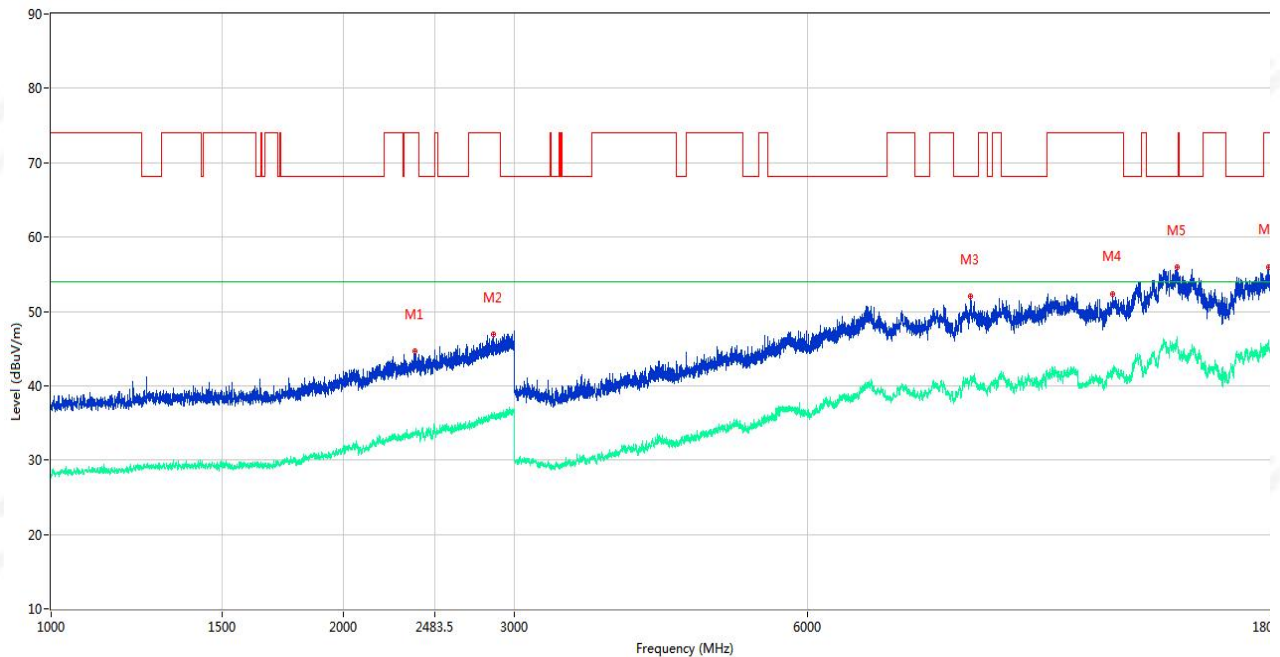
RE_FCC Test Case_FCC 15C 1GHz-18GHz - 5G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	1966.500	42.59	0.12	68.2	-25.61	Peak	0.00	Horizontal	Pass
1**	1966.500	30.94	0.12	54.0	-23.06	AV	0.00	Horizontal	Pass
2	2700.000	48.98	3.99	74.0	-25.02	Peak	340.70	Horizontal	Pass
2**	2700.000	45.13	3.99	54.0	-8.87	AV	340.70	Horizontal	Pass
3	8911.250	51.65	1.45	68.2	-16.55	Peak	137.50	Horizontal	Pass
3**	8911.250	41.58	1.45	54.0	-12.42	AV	137.50	Horizontal	Pass
4	11488.000	61.36	1.97	74.0	-12.64	Peak	76.90	Horizontal	Pass
4**	11488.000	49.60	1.97	54.0	-4.40	AV	76.90	Horizontal	Pass
5	13985.000	56.34	8.26	68.2	-11.86	Peak	29.40	Horizontal	Pass
5**	13985.000	45.88	8.26	54.0	-8.12	AV	29.40	Horizontal	Pass
6	17612.249	56.16	6.53	68.2	-12.04	Peak	353.20	Horizontal	Pass
6**	17612.249	45.23	6.53	54.0	-8.77	AV	353.20	Horizontal	Pass

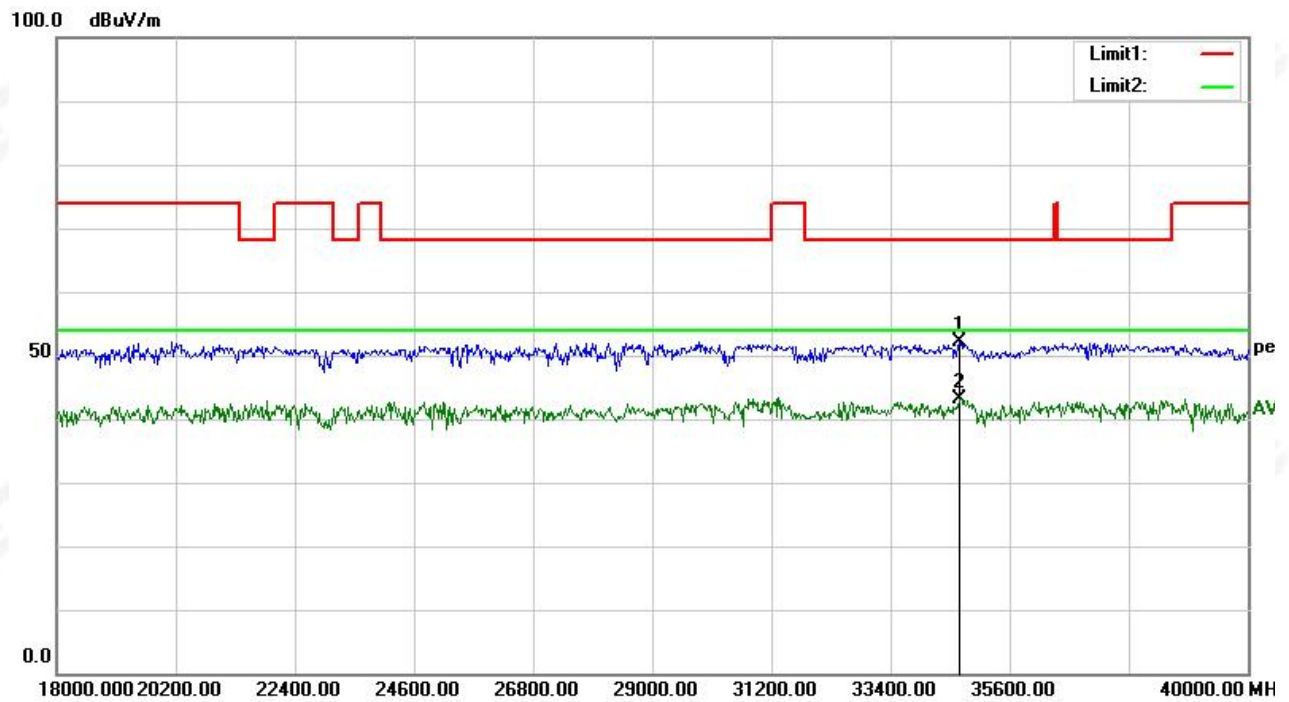
Vertical

RE_FCC Test Case_FCC 15C 1GHz-18GHz - 5G



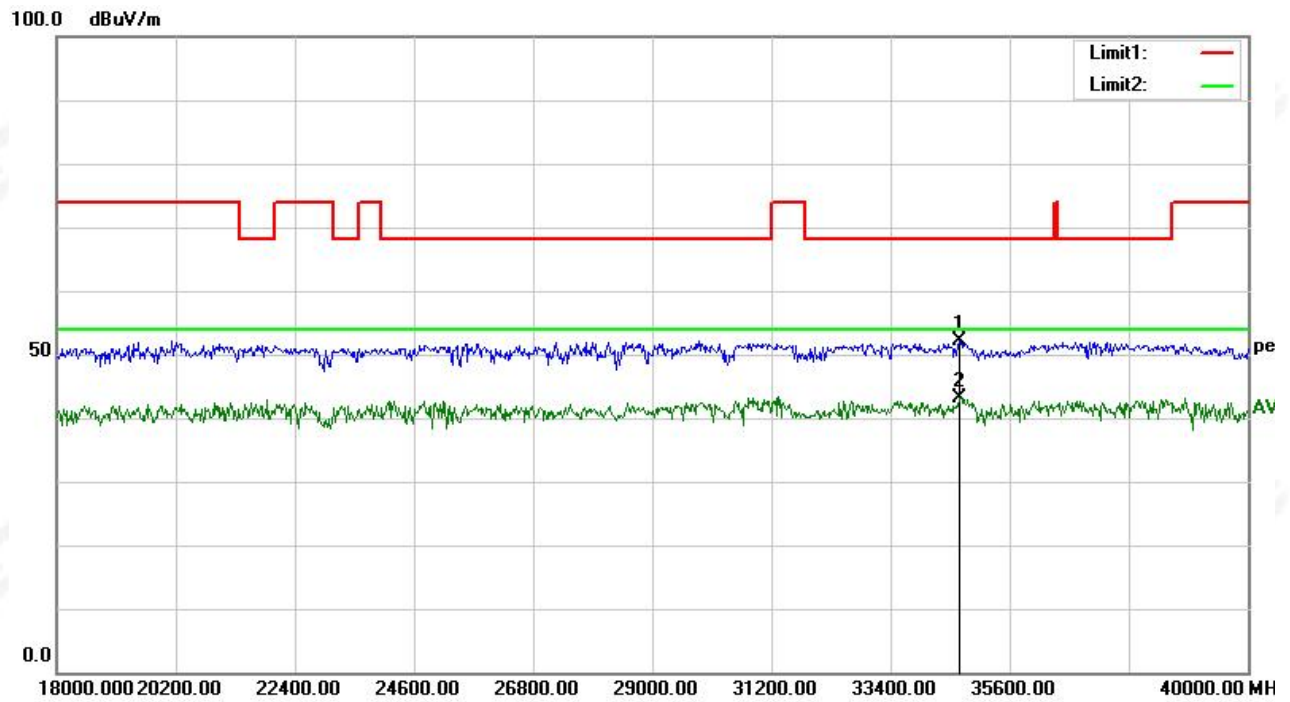
No	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Antenna	Verdict
1	2366.500	44.62	2.87	74.0	-29.38	Peak	256.50	Vertical	Pass
1**	2366.500	33.46	2.87	54.0	-20.54	AV	256.50	Vertical	Pass
2	2854.000	46.89	4.99	74.0	-27.11	Peak	150.90	Vertical	Pass
2**	2854.000	36.12	4.99	54.0	-17.88	AV	150.90	Vertical	Pass
3	8837.000	51.99	0.69	68.2	-16.21	Peak	341.00	Vertical	Pass
3**	8837.000	40.92	0.69	54.0	-13.08	AV	341.00	Vertical	Pass
4	12368.000	52.41	3.12	74.0	-21.59	Peak	30.00	Vertical	Pass
4**	12368.000	41.83	3.12	54.0	-12.17	AV	30.00	Vertical	Pass
5	14411.250	55.92	6.91	68.2	-12.28	Peak	322.40	Vertical	Pass
5**	14411.250	46.09	6.91	54.0	-7.91	AV	322.40	Vertical	Pass
6	17898.250	56.00	7.22	74.0	-18.00	Peak	211.60	Vertical	Pass
6**	17898.250	45.52	7.22	54.0	-8.48	AV	211.60	Vertical	Pass

18 GHz - 40GHz
Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	34676.000	42.54	9.61	52.15	68.20	-16.05	peak
2	34676.000	33.53	9.61	43.14	54.00	-10.86	AVG

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	34676.000	42.54	9.61	52.15	68.20	-16.05	peak
2	34676.000	33.53	9.61	43.14	54.00	-10.86	AVG

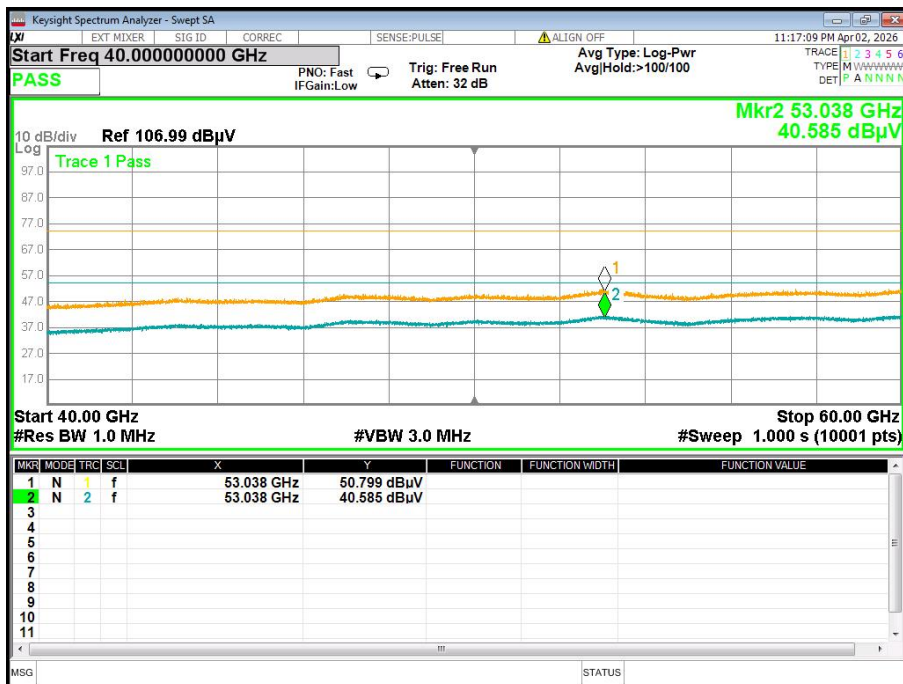
Above 40GHz

Frequency	Result	Limit	Margin	Remark	Pol.
(GHz)	(dBuV/m)	(dBuV/m)	(dB)		
53.0380	50.80	74.00	-23.20	PEAK	Horizontal
53.0380	40.59	54.00	-13.42	AVG	Horizontal
53.0880	50.41	74.00	-23.59	PEAK	Vertical
53.0880	40.22	54.00	-13.78	AVG	Vertical
73.0230	51.91	74.00	-22.09	PEAK	Horizontal
73.0230	42.09	54.00	-11.91	AVG	Horizontal
73.0695	51.98	74.00	-22.02	PEAK	Vertical
73.0695	42.29	54.00	-11.71	AVG	Vertical
88.0325	52.18	74.00	-21.82	PEAK	Horizontal
88.0325	42.02	54.00	-11.98	AVG	Horizontal
87.9919	51.77	74.00	-22.23	PEAK	Vertical
87.9919	42.28	54.00	-11.72	AVG	Vertical
117.0380	52.52	74.00	-21.48	PEAK	Horizontal
117.0380	42.42	54.00	-11.58	AVG	Horizontal
116.8880	52.47	74.00	-21.53	PEAK	Vertical
116.8880	42.26	54.00	-11.74	AVG	Vertical
189.1640	52.11	74.00	-21.89	PEAK	Horizontal
189.1640	42.29	54.00	-11.71	AVG	Horizontal
189.1070	52.10	74.00	-21.90	PEAK	Vertical
189.1070	42.15	54.00	-11.85	AVG	Vertical

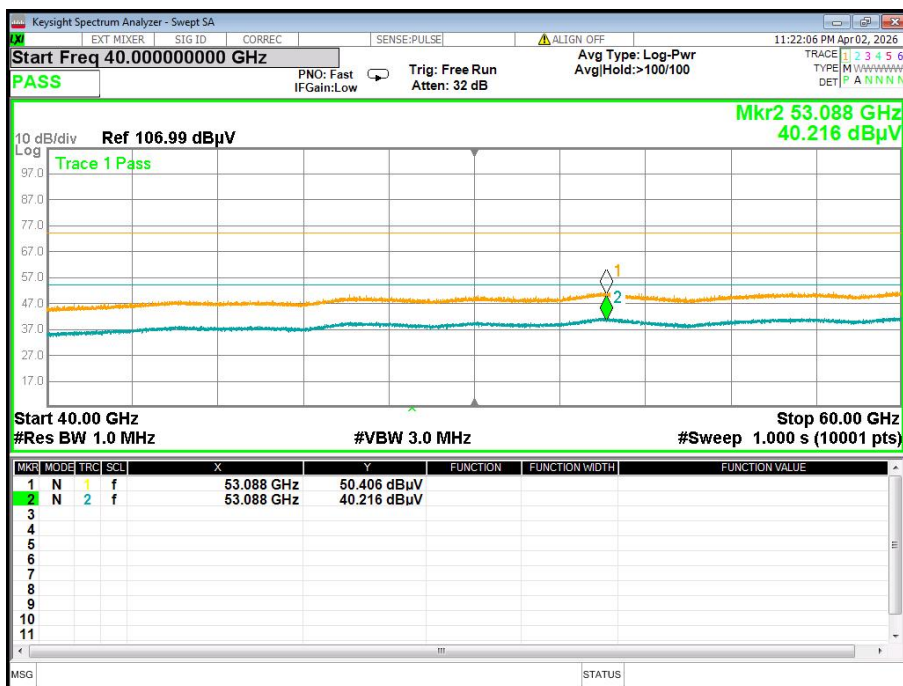


40GHz - 60GHz

Horizontal

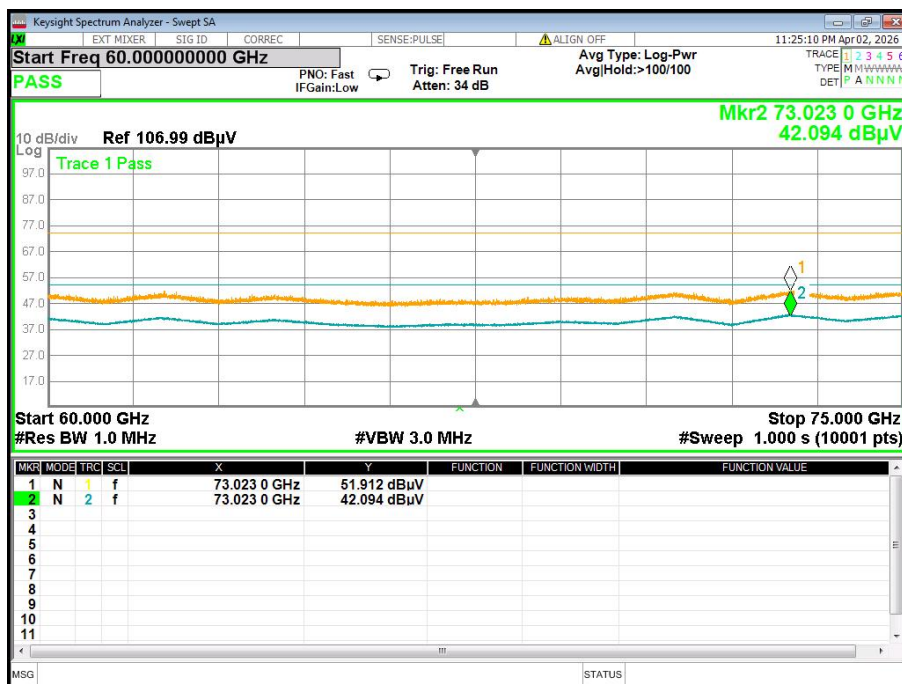


Vertical

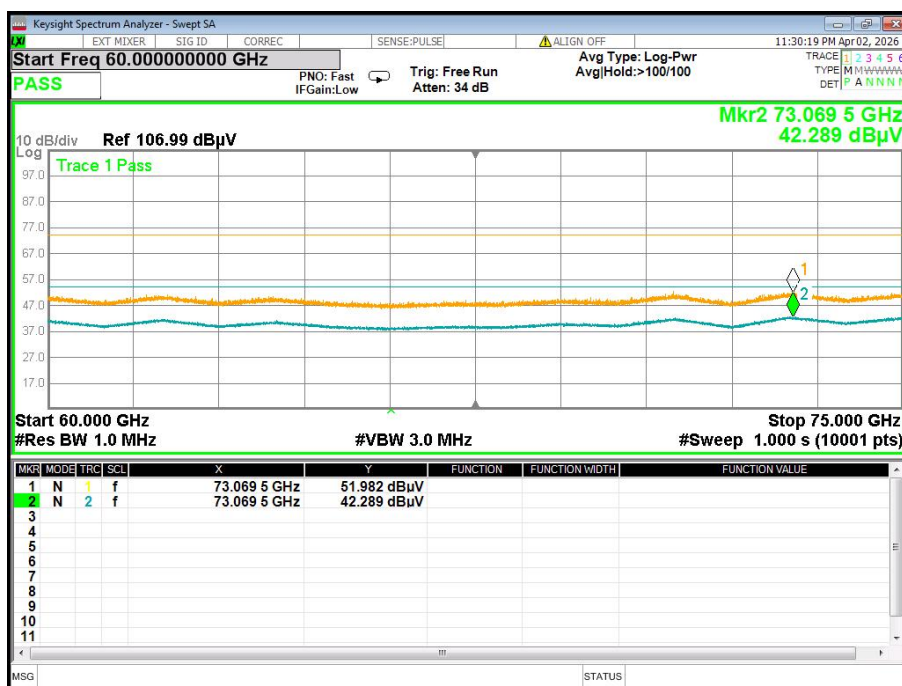


60GHz - 75GHz

Horizontal

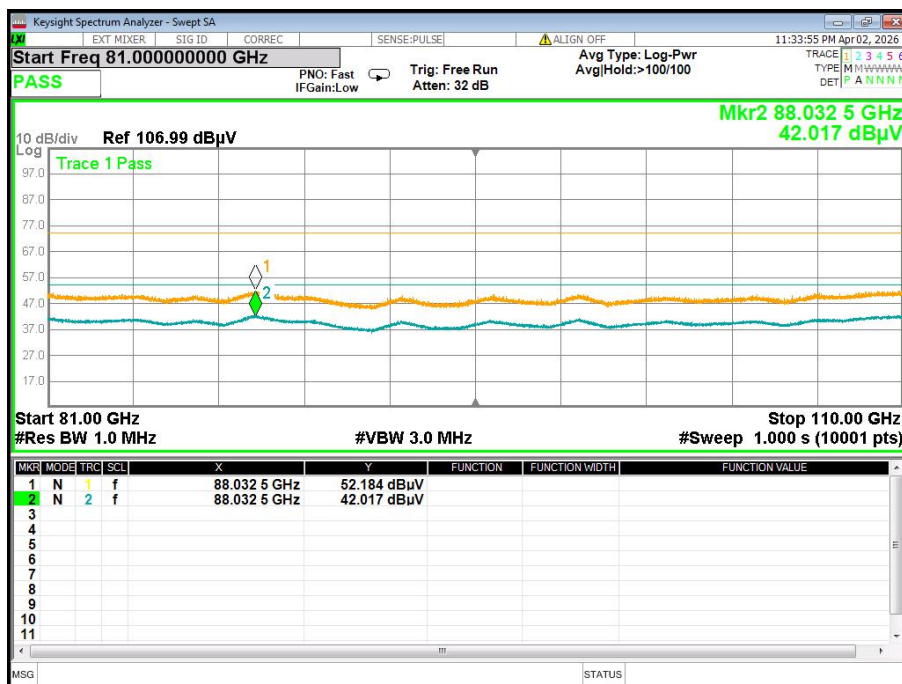


Vertical

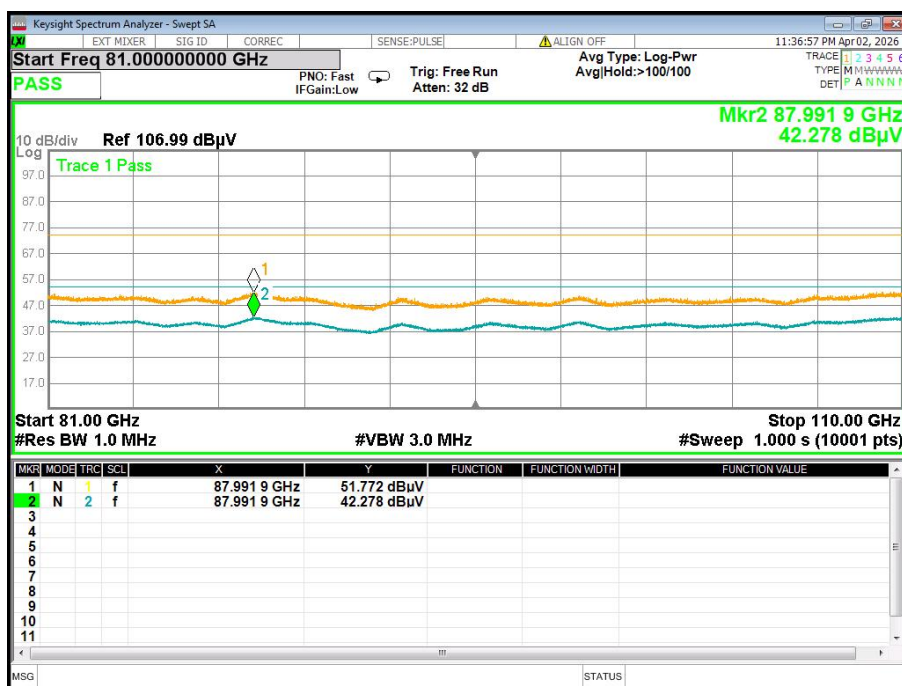


75GHz - 110GHz

Horizontal

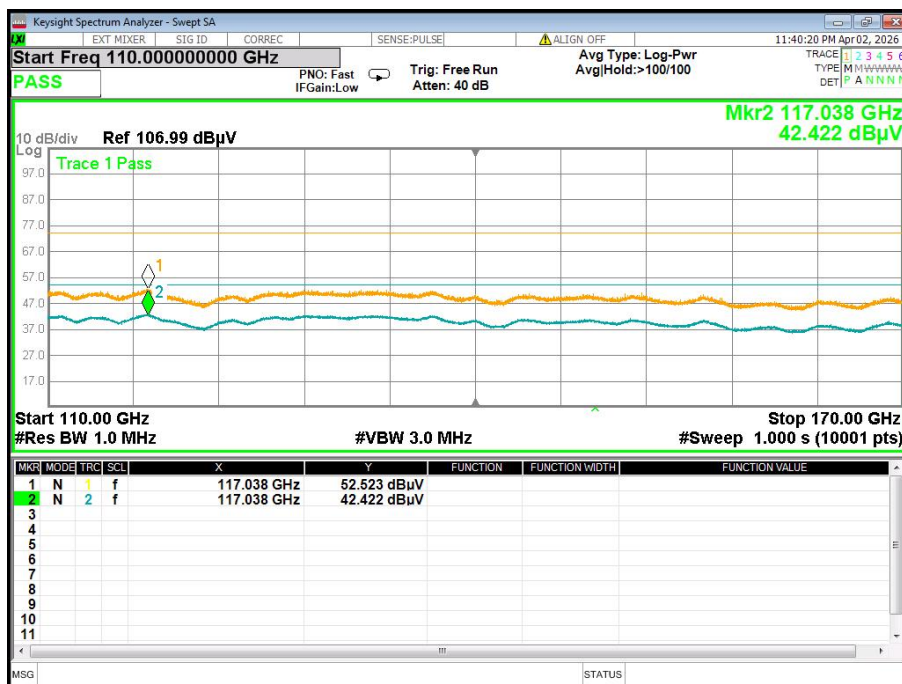


Vertical

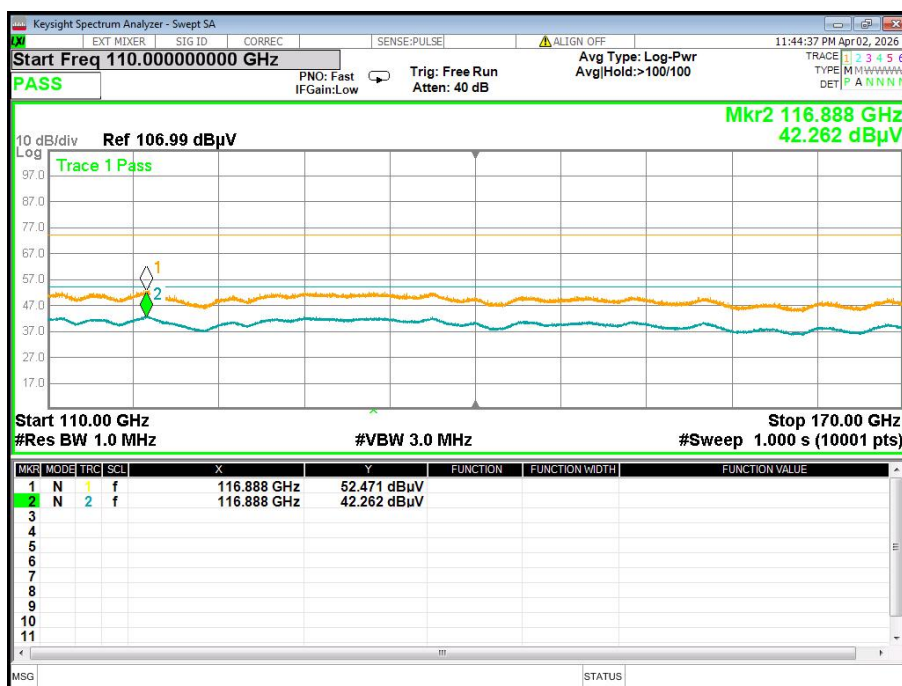


110GHz - 170GHz

Horizontal

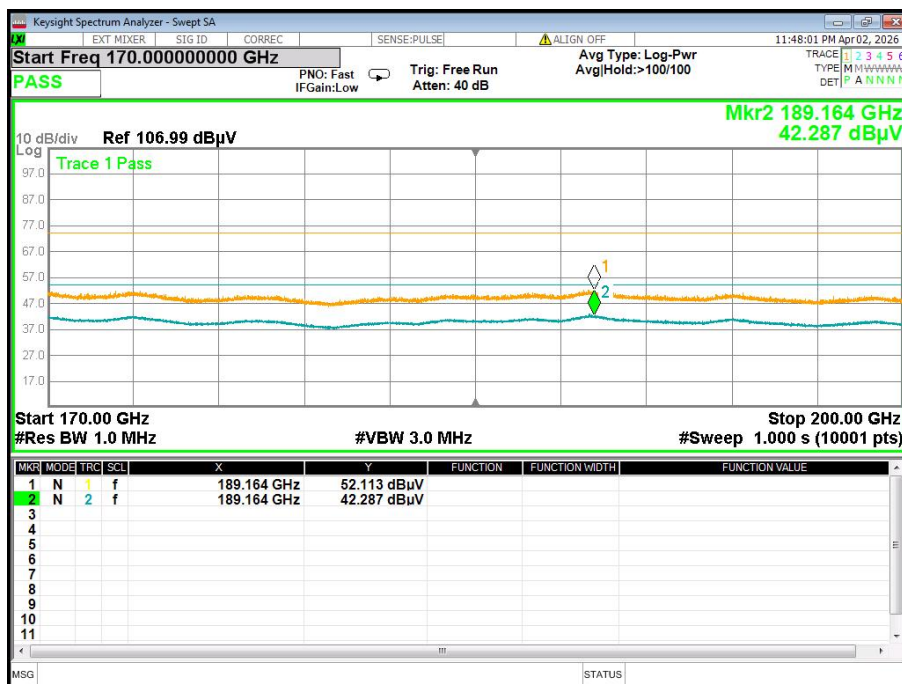


Vertical

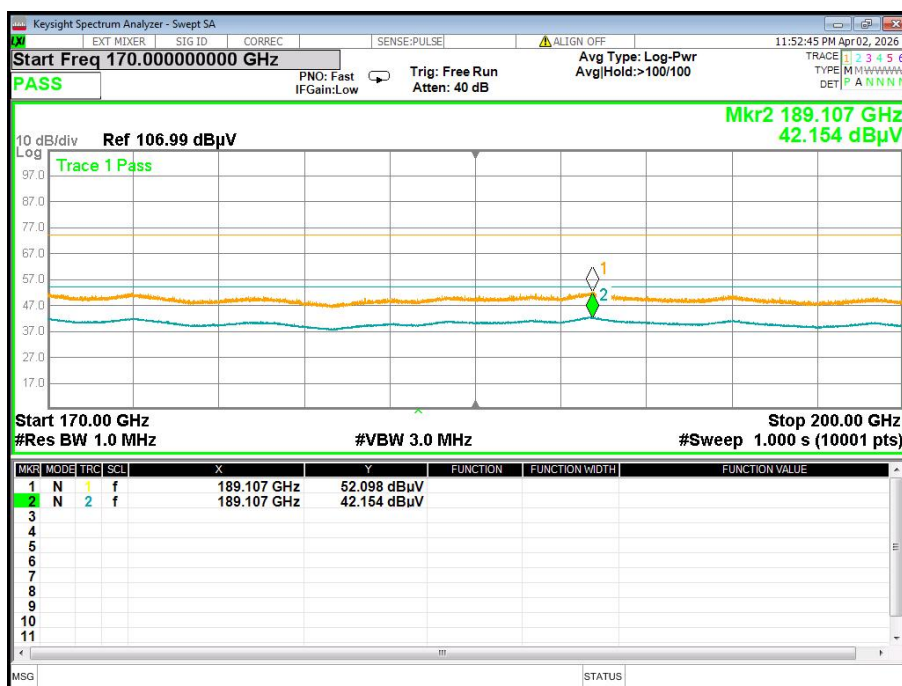


170GHz - 200GHz

Horizontal



Vertical



6. FUNDAMENTAL BANDWIDTH

6.1 LIMIT

FCC §15.256:

(f) Click to open paragraph tools The fundamental bandwidth of an LPR emission is defined as the width of the signal between two points, one below and one above the center frequency, outside of which all emissions are attenuated by at least 10 dB relative to the maximum transmitter output power when measured in an equivalent resolution bandwidth.

(1) The minimum fundamental emission bandwidth shall be 50 MHz for LPR operation under the provisions of this section.

(2) LPR devices operating under this section must confine their fundamental emission bandwidth within the 5.925-7.250 GHz, 24.05-29.00 GHz, and 75-85 GHz bands under all conditions of operation

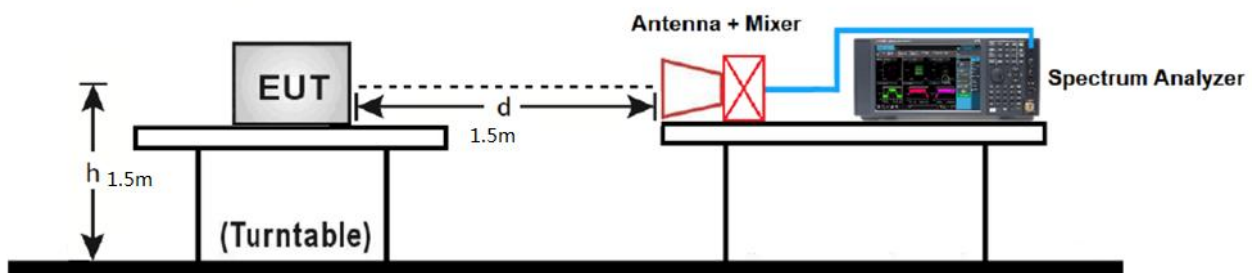
FCC §15.215:

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.2 TEST PROCEDURE

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
- If the EUT is a tabletop system, 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turntable.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 1.5m
- EUT is set into operation.
- The turntable rotates from 0 degree to 360 degree.
- The antenna with external mixer is polarized vertical and horizontal.
- The antenna height changes from 1m to 4m.
- The fundamental emission bandwidth measurement shall be made using a peak detector with a resolution bandwidth of 1 MHz and a video bandwidth of at least 3 MHz.

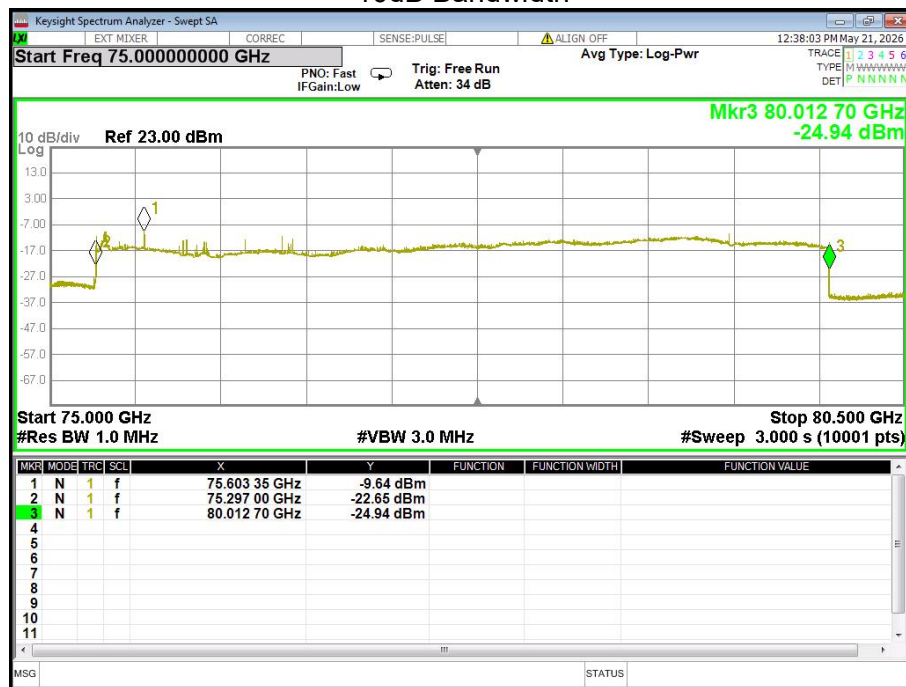
6.3 TEST SETUP



6.4 TEST RESULT

Lowest Frequency(GHz)	Highest Frequency(GHz)	10dB Bandwidth (MHz)	Limit (MHz)	Result
75.297	80.012	4715	>50	Pass

10dB Bandwidth



7. ANTENNA BEAMWIDTH AND ANTENNA SIDE LOBE GAIN

7.1 LIMIT

§ 15.256(i) Antenna beamwidth

(A) LPR devices operating under the provisions of this section within the 5.925-7.250 GHz and 24.05-29.00 GHz bands must use an antenna with a -3 dB beamwidth no greater than 12 degrees.

(B) LPR devices operating under the provisions of this section within the 75-85 GHz band must use an antenna with a -3 dB beamwidth no greater than 8 degrees.

(j) Antenna side lobe gain. LPR devices operating under the provisions of this section must limit the side lobe antenna gain relative to the main beam gain for off-axis angles from the main beam of greater than 60 degrees to the levels provided in Table below.

FCC 15.256		
Frequency range (GHz)	Antenna beamwidth in degree (°)	Antenna side lobe gain limit relative to main beam gain (dB)
5.925 to 7.250 12 -	12	-22
24.05 to 29.00	12	-27
75.00 to 85.00	8	-38

7.2 TEST RESULT

Frequency(GHz)	Main lobe max gain, dBi	Main lobe 3 dBc beamwidth, deg	Main lobe beamwidth Limit, deg	Result
75-85	31.3	7.55	8.00	PASS

Frequency (GHz)	Antenna side lobe suppression for off-axis angles > 60° , dB	Antenna side lobe suppression minimum limit, dB	Result
75-85	-38.67	-38.00	PASS

8. FREQUENCY STABILITY

8.1 LIMIT

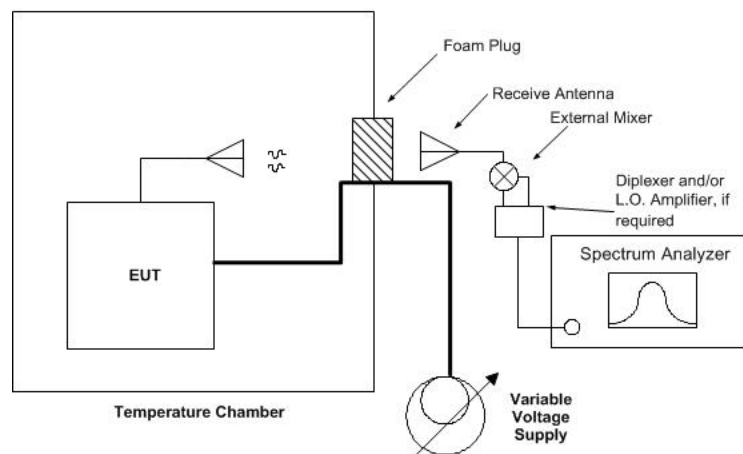
As specified in Section 15.215(c), the bandwidth of the fundamental emission must be contained within the frequency band over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage. Frequency stability is to be measured according to Section 2.1055 at the highest and lowest frequency of operation and with the modulation that produces the widest emission bandwidth.

8.2 DESCRIPTION

15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of outof-band operation.

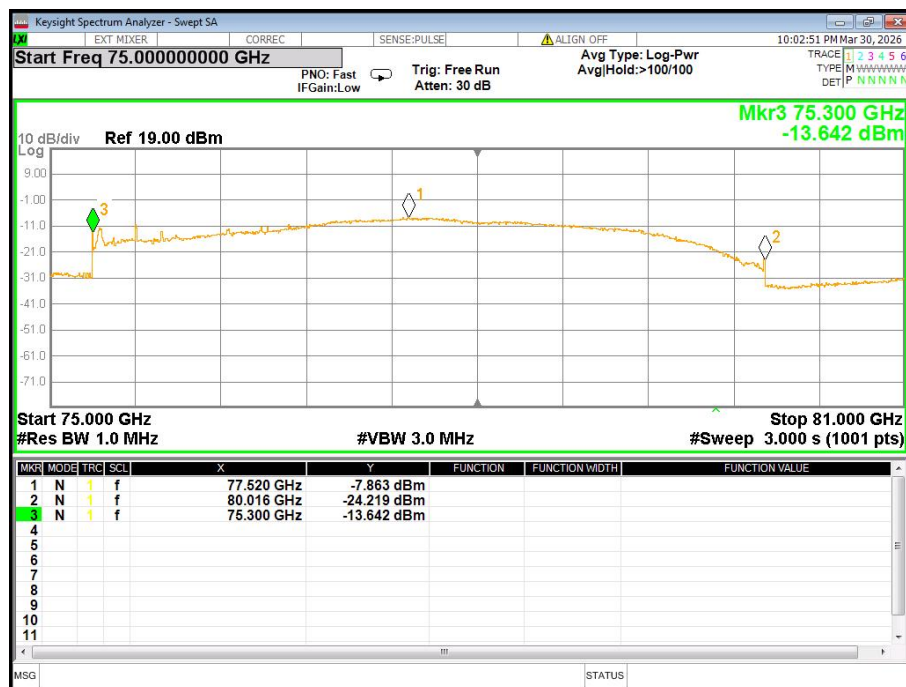
8.3 TEST SETUP

EUT uses a horn antenna connected to a spectrum analyzer for measurement. The EUT was placed in an environmental chamber using foam plugs to maintain temperature conditions inside. The horn antenna measures the frequency of the fundamental signal.



8.4 TEST RESULT

Voltage (%)	Power (VDC)	Temp (°C)	FL (GHz)	FH (GHz)	Limit (GHz)	Result
100%	24V	-30	75.3002	80.0157	75-85GHz	Pass
		-20	75.3001	80.0157	75-85GHz	Pass
		-10	75.3001	80.0156	75-85GHz	Pass
		0	75.3003	80.0158	75-85GHz	Pass
		10	75.3001	80.0157	75-85GHz	Pass
		20	75.3000	80.0160	75-85GHz	Pass
		30	75.3005	80.0156	75-85GHz	Pass
		40	75.3004	80.0158	75-85GHz	Pass
		50	75.3003	80.0156	75-85GHz	Pass
		60	75.3006	80.0158	75-85GHz	Pass
115%	27.6V	20	75.3002	80.0158	75-85GHz	Pass
85%	20.4V	20	75.3001	80.0159	75-85GHz	Pass



9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

9.2 EUT ANTENNA

The EUT antenna is PCB Antenna. It comply with the standard requirement.



10. PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

*****END OF THE REPORT*****