Certificate # 2861.01

TEST REPORT

Verified Code: 492791

Report No.:	E20201010106801-2	**Application No.:**	E20201010106801
Client:	Shen Zhen MTC Co., LTD		
Address:	MTC Industry Park, 1st Lilang Road, Xialilang community, Nanwan street, Longgang district, Shenzhen, China		
Sample Description:	Google Android TV BOX		
Model:	UI-7060A		
Test Specification:	FCC 47 CFR Part 15 Subpart C 15.247 KDB 558074 D01 15.247 measurement guidance v05r02 ANSI C63.10:2013		
Receipt Date:	2020-10-16		
Test Date:	2020-10-20 to 2020-11-08		
Issue Date:	2020-12-08		
Test Result:	Pass		

Prepared By:	**Reviewed By:**	**Approved By:**
Test Engineer	Technical Manager	Manager
Xie Fang	Wu Haoting	Wu Chengrong

GUANGZHOU GRG METROLOGY & TEST CO.,LTD. APPROVED(03)

Other Aspects:

Note: Note

Abbreviations: *ok / P = passed; fail / F = failed; n.a. / N = not applicable;*

DIRECTIONS OF TEST

1. **This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**

2. **The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.**

3. **If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

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1. TEST RESULT SUMMARY

Technical Requirements		
FCC 47 CFR Part 15 Subpart C 15.247 KDB 558074 D01 15.247 measurement guidance v05r02		
Limit / Severity	**Item**	**Result**
§15.207	Conducted emission AC power port	Pass
§15.247(b)(1)	Conducted output power for FHSS	N/A
§15.247(b)(3)	Conducted output power for DTS	Pass
§15.247(e)	Power spectral density	Pass
§15.247(a)(2)	6dB bandwidth	Pass
§15.247(a)(1)	20dB Occupied bandwidth	N/A
--	99% Occupied Bandwidth	N/A
§15.247(a)(1)	Carrier frequency separation	N/A
§15.247(a)(1)(iii)	Number of hopping frequencies	N/A
§15.247(a)(1)(iii)	Dwell Time	N/A
§15.247(d)	Spurious RF conducted emissions	Pass
§15.247(d)	Band edge	Pass
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Pass
§15.203	Antenna requirement	Pass

The EUT has one antenna. The antenna is internal antenna.
The max gain of antenna is 2.64dBi.which accordance 15.203.is considered sufficient to comply with the provisions of this section.

2. GENERAL DESCRIPTION OF EUT

2.1. APPLICANT

Name:	Shen Zhen MTC Co., LTD
Address:	MTC Industry Park, 1st Lilang Road, Xialilang community, Nanwan street, Longgang district, Shenzhen, China

2.2. MANUFACTURER

Name:	DIGITAL MULTIMEDIA TECHNOLOGY CO., LTD
Address:	14th Floor, 726, Eonju-ro, Gangnam-gu, Seoul, Republic of Korea

2.3. FACTORY

Name :	PT. PAMPAS ELECTRIC
Address :	JL. KRUING 2 BLOK L9 NO.9 KAWASAN INDUSTRI DELTA SILICON, LIPPO CIKARANG, KEL SUKARESMI, KEC. CIKARANG SELATAN KAB. BEKASI JAWA BARAT 17530

2.4. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Google Android TV BOX
Model No.:	UI-7060A
Adding Model:	UI-7060
Model Differences:	UI-7060,UI-7060A board, schematic, hardware version, software version, structure are same, the difference as below:

model name	EMMC	DDR	S/PDIF	Remote Control
UI-7060	4G EMMC	1GB DDR3-2133, 16bits(4Gb*2)	/	Infrared Remote Control
UI-7060A	8G EMMC	2GB DDR3-2133, 16bits(4Gb*4)	1	Bluetooth Control

Trade Name:	DMT,TIVO,EVOLUTION DIGITAL,NELSON CABLE, LINGVO TV, SFN, ODK, ODV, Homecast, Mid air Connect
FCC ID:	2AHVH-UI7060
Power Supply:	DC12V power supplied by adapter
Adapter Specification:	CHENZHOU FRECOM ELECTRONICS CO., LTD Model: F12L46-120100SPAU Input: 100-240V~50/60Hz 0.3A Output: 12.0V ⎓ 1.0A 12.0W
Frequency Range:	2402 ~ 2480MHz
Transmit Power:	0.42dBm
Modulation type:	GFSK for 1Mbps

Channel space:	2MHz
Antenna Specification:	Internal antenna 2.64dBi gain (Max.)
Temperature Range:	-10℃~40℃
Hardware Version:	IP1510-ZC01-01
Software Version:	20201027-135554
Sample No:	0001, 0008
Note:	/

2.5. TEST OPERATION MODE

Test Item	Mode No.	Description of the modes
Conducted Emission	1	Bluetooth BLE Transmitting
Radiated Emission	1	Bluetooth BLE Transmitting

2.6. LOCAL SUPPORTIVE

Name of Equipment	Manufacturer	Model	Serial Number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	/
Adapter (Notebook)	LENOVO	ADLX65NCC3A	N/A	/
Cable				
AC cable	/	/	/	Unshielded, 1.00m
DC cable	/	/	/	Shielded, 1.80m

Test software:

Software version	Test level
Bluetooth RF Test Tool (Version:5.2.2.22)	6

3. LABORATORY AND ACCREDITATIONS

3.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co,. Ltd.

Add : Address: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China

P.C. : 518000

Tel : 0755-61180008

Fax : 0755-61180008

3.2. ACCREDITATIONS

A2LA	Certificate Number 2861.01

3.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz～1000MHz	4.3dB
		1GHz～18GHz	5.6dB
	Vertical	30MHz～1000MHz	4.3dB
		1GHz～18GHz	5.6dB
Conduction Emission		9 kHz ~ 150 kHz	2.8 dB
		150 kHz ~ 10 MHz	2.8 dB
		10 MHz ~ 30 MHz	2.2 dB

This uncertainty represents an expanded uncertainty factor of *k*=2.

4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Conducted Emissions				
EMI TEST RECEIVER	R&S	ESCI	100783	2020/11/27
LISN(EUT)	R&S	ENV216	101543	2021/03/24
EZ-EMC	EZ	CCS-3A1-CE	/	/
Radiated Spurious Emission& Restricted bands of operation				
TEST RECEIVER	R&S	ESU26	EMC26-G260	2021/09/22
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021/05/16
Bilog Antenna	Schwarzbeck	VULB 9163	01279	2021/03/14
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	02143	2020/12/28
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-497	2020/11/30
Amplifier	Tonscend	TAP9E6343	AP20E806065	2021/06/28
Amplifier	Tonscend	TAP01018048	AP20E8060075	2021/06/28
Amplifier	Tonscend	TAP037030	AP20E8060081	2021/06/28
Amplifier	Tonscend	TAP184050	AP20E806071	2021/06/15
Test S/W	Tonscend	JS32-RE/2.5.2.4		
6 dB Bandwidth				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021/05/16
Maximum Peak Output Power				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021/05/16
Conducted band edges and Spurious Emission				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021/05/16
Peak Output Spectral Density Measurement				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021/05/16

5. CONDUCTED EMISSION MEASUREMENT

5.1. LIMITS

Frequency range	Limits (dBμV)	
	Quasi-peak	Average
150kHz ～ 0.5MHz	66～56	56～46
0.5 MHz ～ 5 MHz	56	46
5 MHz ～ 30 MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

5.2. TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.4:2014.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

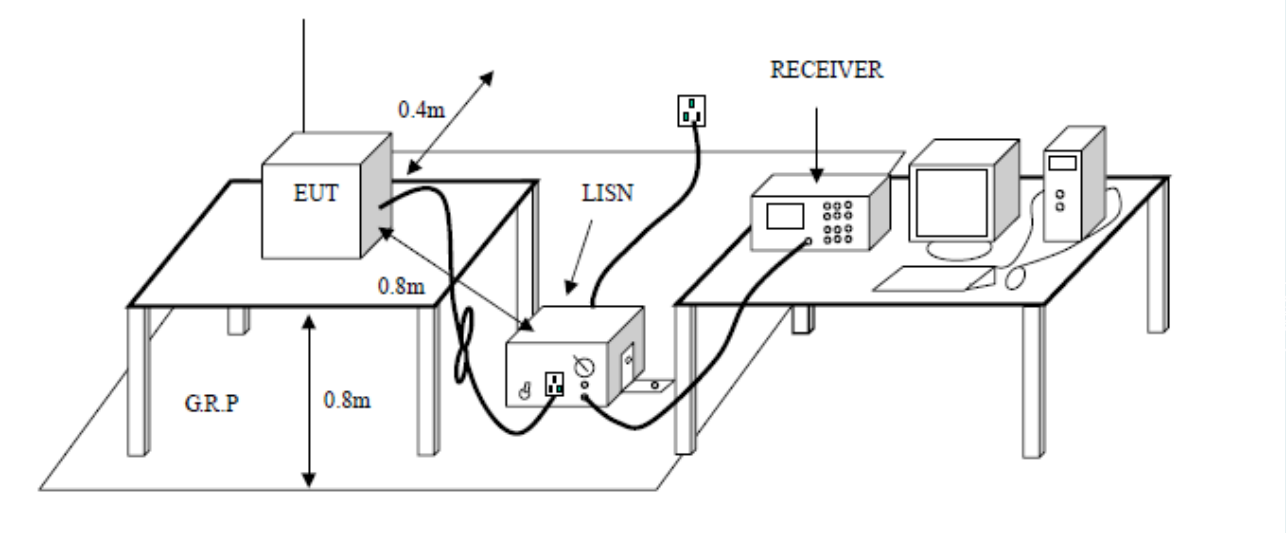
– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

5.3. TEST SETUP



5.4. DATA SAMPLE

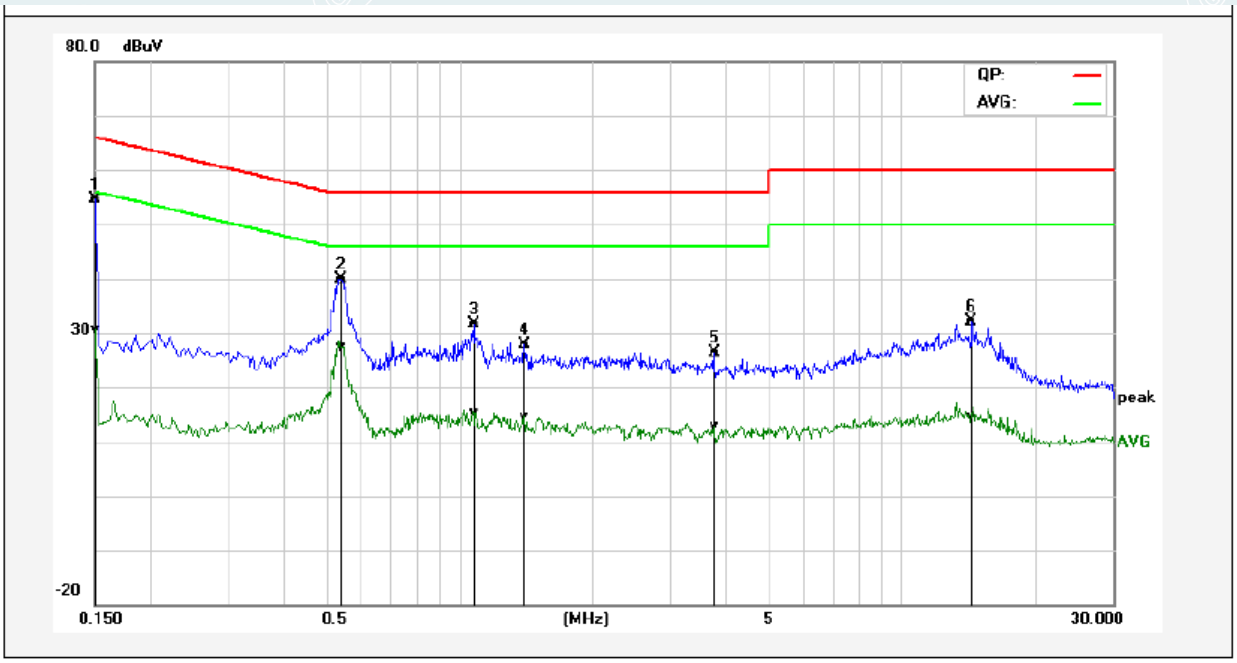
Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit =Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)

5.5. TEST RESULTS

Model No.	UI-7060A	**RBW,VBW**	9 kHz
Environmental Conditions	22℃/43%RH	**Test Mode**	Mode 1
Tested By	Luo Ping	**Line**	L
Tested Date	2020/10/28	**Test Voltage**	AC120V/60Hz

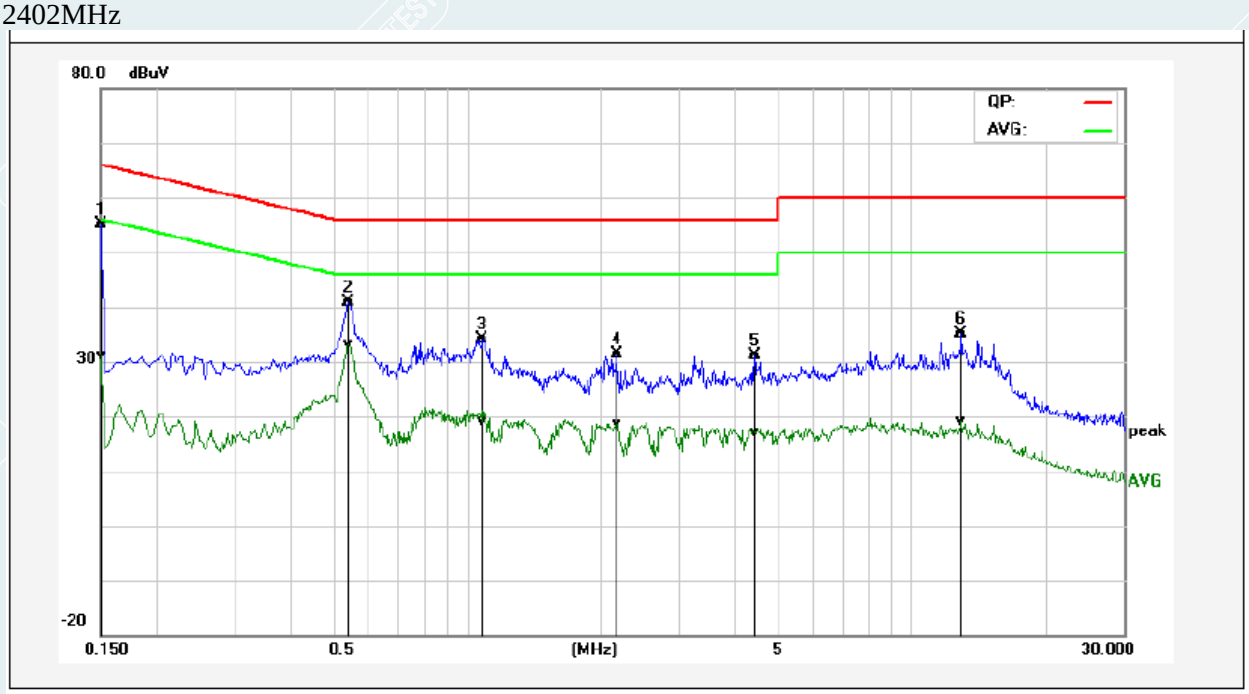
2402MHz



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1500	45.08	20.85	9.67	54.75	30.52	65.99	56.00	-11.24	-25.48	Pass
2	0.5420	30.32	17.81	9.67	39.99	27.48	56.00	46.00	-16.01	-18.52	Pass
3	1.0820	21.90	5.69	9.71	31.61	15.40	56.00	46.00	-24.39	-30.60	Pass
4	1.4100	18.25	5.02	9.72	27.97	14.74	56.00	46.00	-28.03	-31.26	Pass
5	3.7740	16.70	3.01	9.77	26.47	12.78	56.00	46.00	-29.53	-33.22	Pass
6	14.4100	22.13	4.83	9.89	32.02	14.72	60.00	50.00	-27.98	-35.28	Pass

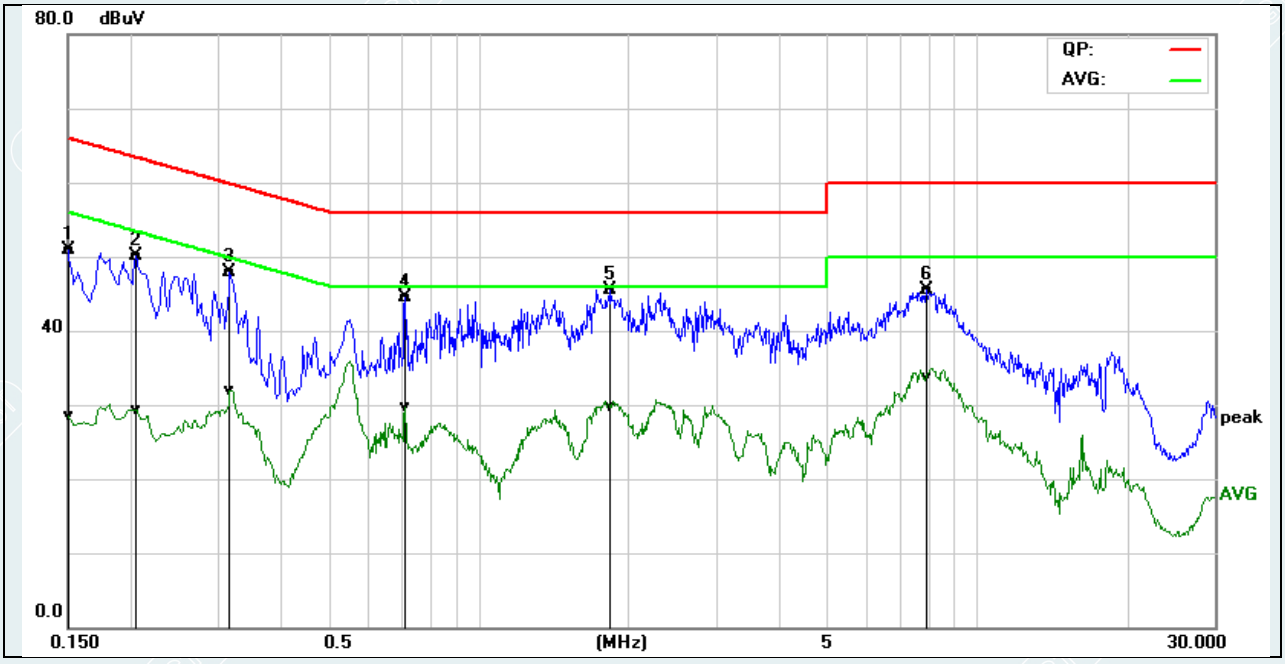
Model No.	UI-7060A	**RBW,VBW**	9 kHz
Environmental Conditions	22℃/43%RH	**Test Mode**	Mode 1
Tested By	Luo Ping	**Line**	N
Tested Date	2020/10/28	**Test Voltage**	AC120V/60Hz

2402MHz



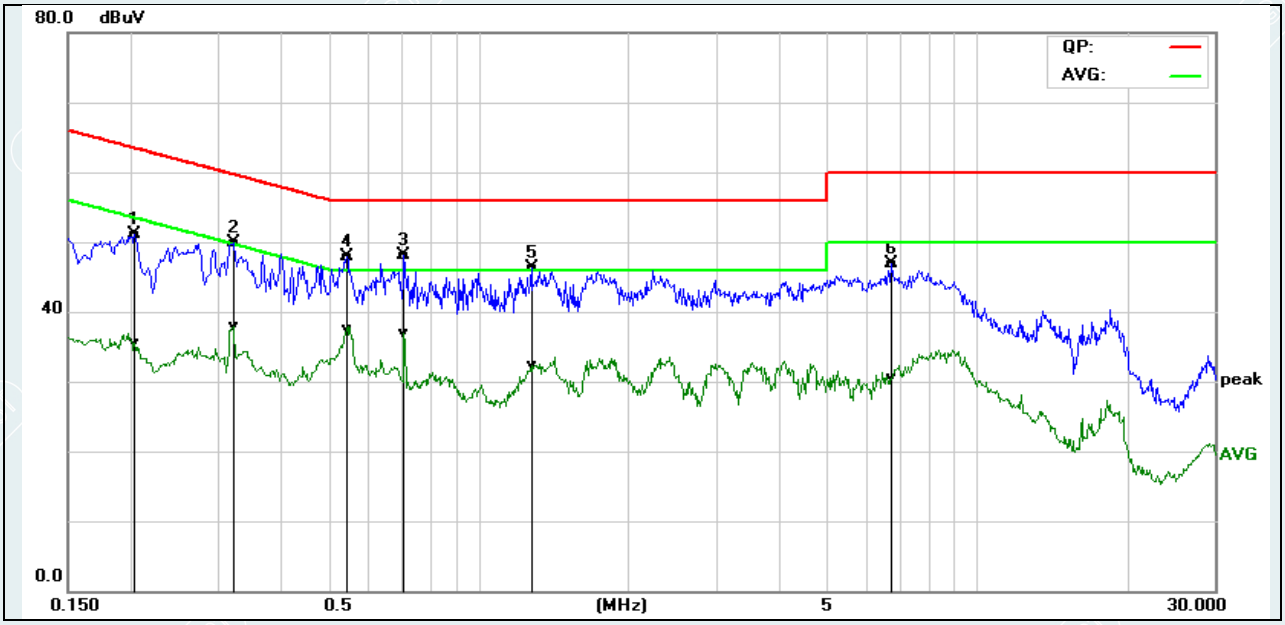
No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1500	45.34	21.36	9.67	55.01	31.03	65.99	56.00	-10.98	-24.97	Pass
2	0.5420	31.11	23.56	9.67	40.78	33.23	56.00	46.00	-15.22	-12.77	Pass
3	1.0859	24.52	9.43	9.71	34.23	19.14	56.00	46.00	-21.77	-26.86	Pass
4	2.1780	21.68	8.82	9.73	31.41	18.55	56.00	46.00	-24.59	-27.45	Pass
5	4.4540	21.31	7.46	9.79	31.10	17.25	56.00	46.00	-24.90	-28.75	Pass
6	12.9340	25.15	9.22	9.86	35.01	19.08	60.00	50.00	-24.99	-30.92	Pass

Model No.	UI-7060A	**RBW,VBW**	9 kHz
Environmental Conditions	24.5℃/43%RH	**Test Mode**	Mode 1
Tested By	Luo Ping	**Line**	L
Tested Date	2020/10/26	**Test Voltage**	AC230V/50Hz



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1500	41.29	18.99	9.61	50.90	28.60	65.99	56.00	-15.09	-27.40	Pass
2	0.2060	40.54	19.77	9.61	50.15	29.38	63.36	53.37	-13.21	-23.99	Pass
3	0.3180	38.25	22.29	9.61	47.86	31.90	59.76	49.76	-11.90	-17.86	Pass
4	0.7140	34.81	20.13	9.61	44.42	29.74	56.00	46.00	-11.58	-16.26	Pass
5*	1.8460	35.89	20.14	9.62	45.51	29.76	56.00	46.00	-10.49	-16.24	Pass
6	7.8980	35.75	23.96	9.71	45.46	33.67	60.00	50.00	-14.54	-16.33	Pass

Model No.	UI-7060A	**RBW,VBW**	9 kHz
Environmental Conditions	24.5℃/43%RH	**Test Mode**	Mode 1
Tested By	Luo Ping	**Line**	N
Tested Date	2020/10/26	**Test Voltage**	AC230V/50Hz



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.2040	41.58	25.86	9.61	51.19	35.47	63.44	53.45	-12.25	-17.98	Pass
2	0.3220	40.22	28.31	9.61	49.83	37.92	59.65	49.66	-9.82	-11.74	Pass
3*	0.7100	38.58	27.28	9.61	48.19	36.89	56.00	46.00	-7.81	-9.11	Pass
4	0.5460	38.27	27.85	9.62	47.89	37.47	56.00	46.00	-8.11	-8.53	Pass
5	1.2780	36.68	22.64	9.62	46.30	32.26	56.00	46.00	-9.70	-13.74	Pass
6	6.7460	37.16	20.86	9.69	46.85	30.55	60.00	50.00	-13.15	-19.45	Pass

6. RADIATED SPURIOUS EMISSIONS

6.1. LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	53.8~88.5
0.490-1.705	24000/F(kHz)	30	43~53.8
1.705-30.0	30	30	49.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE: (1) The lower limit shall apply at the transition frequencies.
NOTE: (2) Above 18G Limit=74+20log(3/1)=83.54 (dBμV/m).

6.2. TEST PROCEDURES (please refer to measurement standard)

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 315 °using 45 °steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0 °to 360 °) and by rotating the elevation axes (0 °to 360 °).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 315 °using 45 °steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (±45 °) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 315 °using 45 °steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (±45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz
Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).

6.3. TEST SETUP

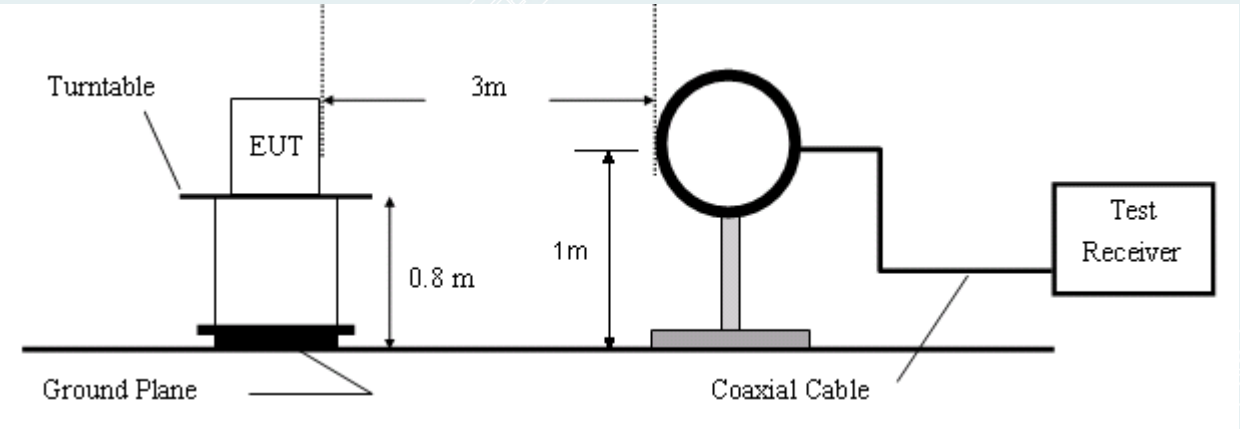


Figure 1. 9KHz to 30MHz radiated emissions test configuration

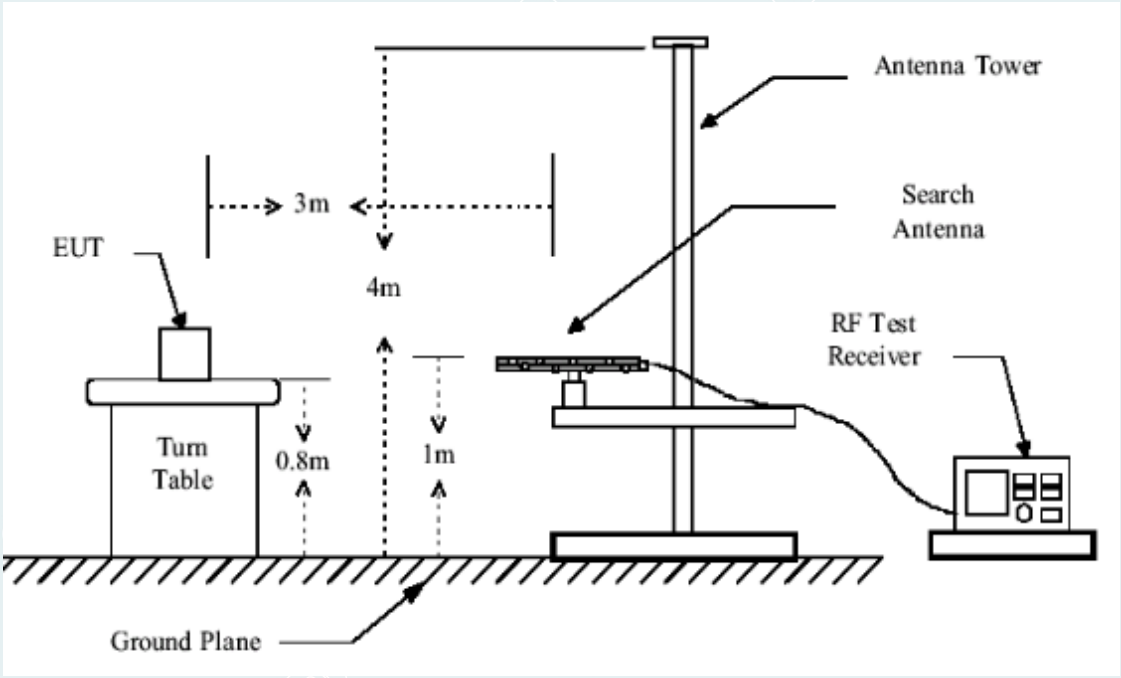


Figure 2. 30MHz to 1GHz radiated emissions test configuration

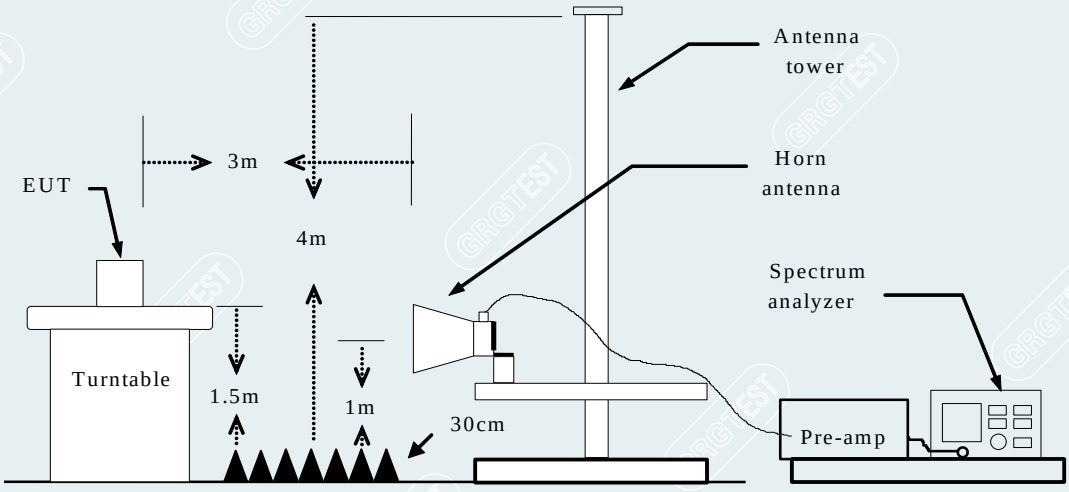


Figure 3. Above 1GHz radiated emissions test configuration

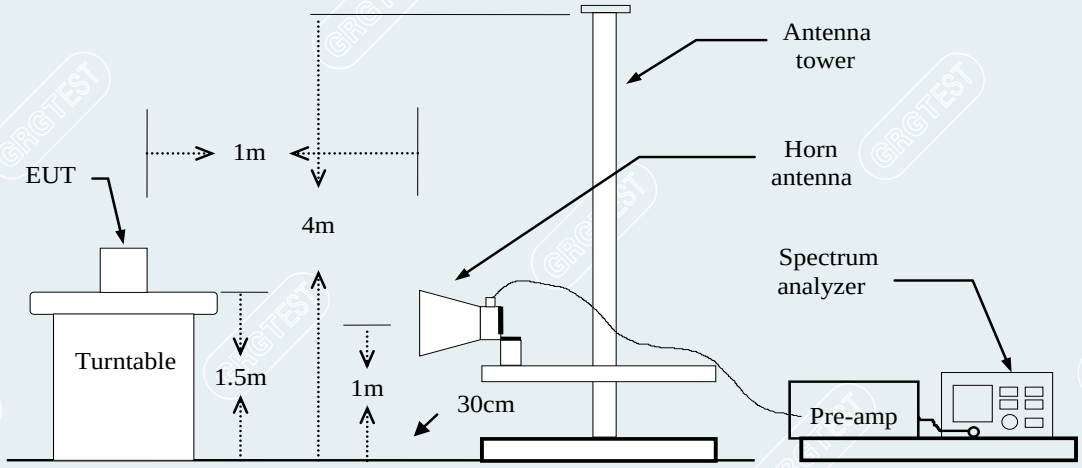


Figure 4. Above 18GHz radiated emissions test configuration

6.4. DATA SAMPLE

30MHz to 1GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	37.06	-15.48	21.58	40.00	-18.42	QP	Vertical

Above 1 GHz

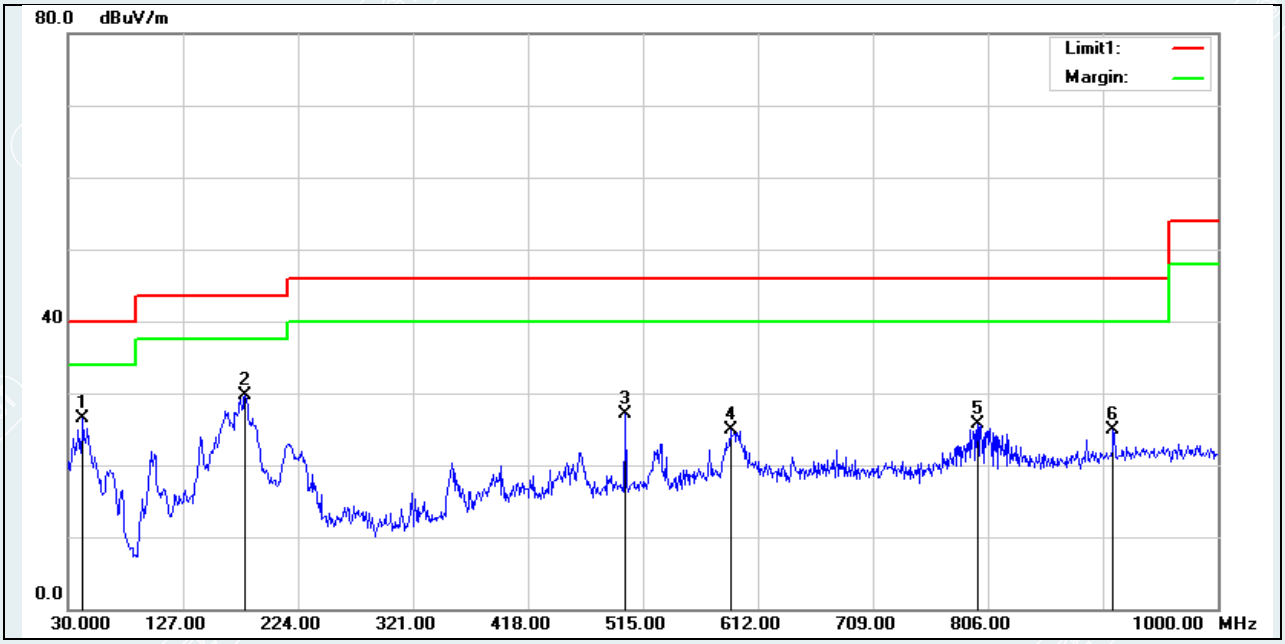
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	65.45	-11.12	54.33	74.00	-19.67	Peak	Vertical
xxx	xxx	63.00	-11.12	51.88	54.00	-2.12	AVG	Vertical

Frequency (MHz)	= Emission frequency in MHz
Ant.Pol. (H/V)	= Antenna polarization
Reading (dBuV)	= Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m)	= Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m)	= Reading (dBuV) + Correction Factor (dB/m)
Limit (dBuV/m)	= Limit stated in standard
Margin (dB)	= Remark Result (dBuV/m) – Limit (dBuV/m)
Peak	= Peak Reading
QP	= Quasi-peak Reading
AVG	= Average Reading

6.5. TEST RESULTS

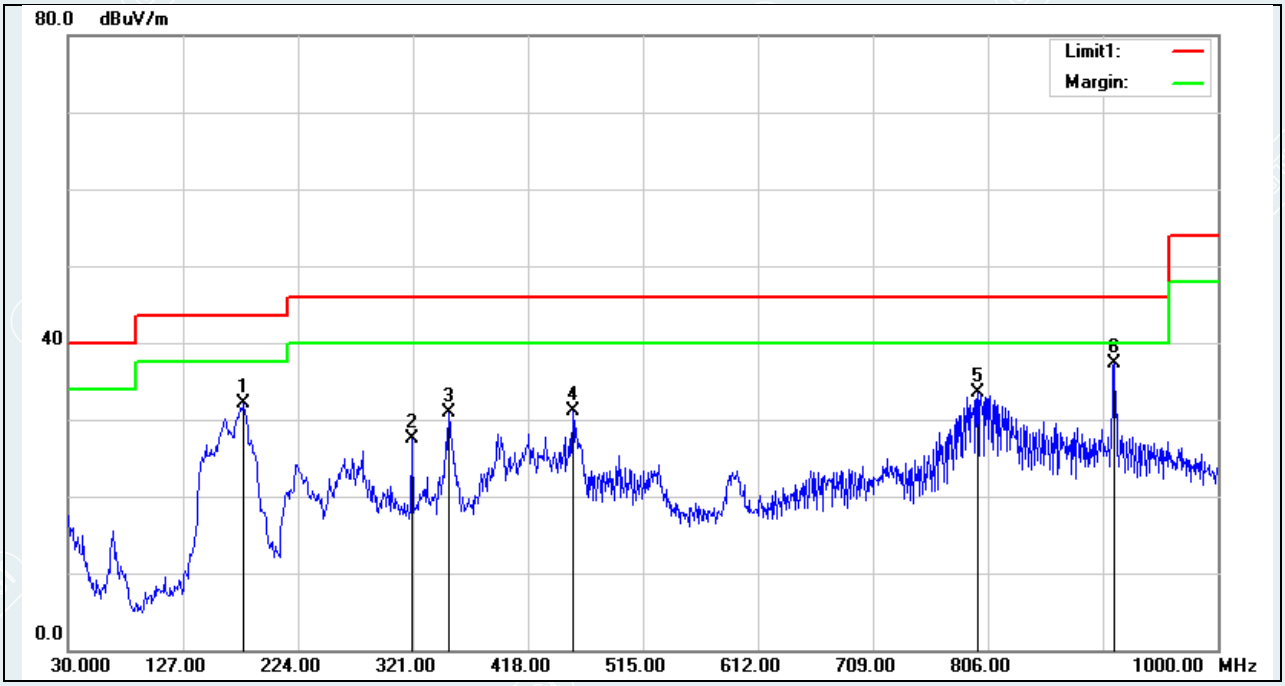
30MHz to 1GHz

Mode: TX
Lowest channel (2402MHz) Date: 2020/11/08
Polarity Vertical



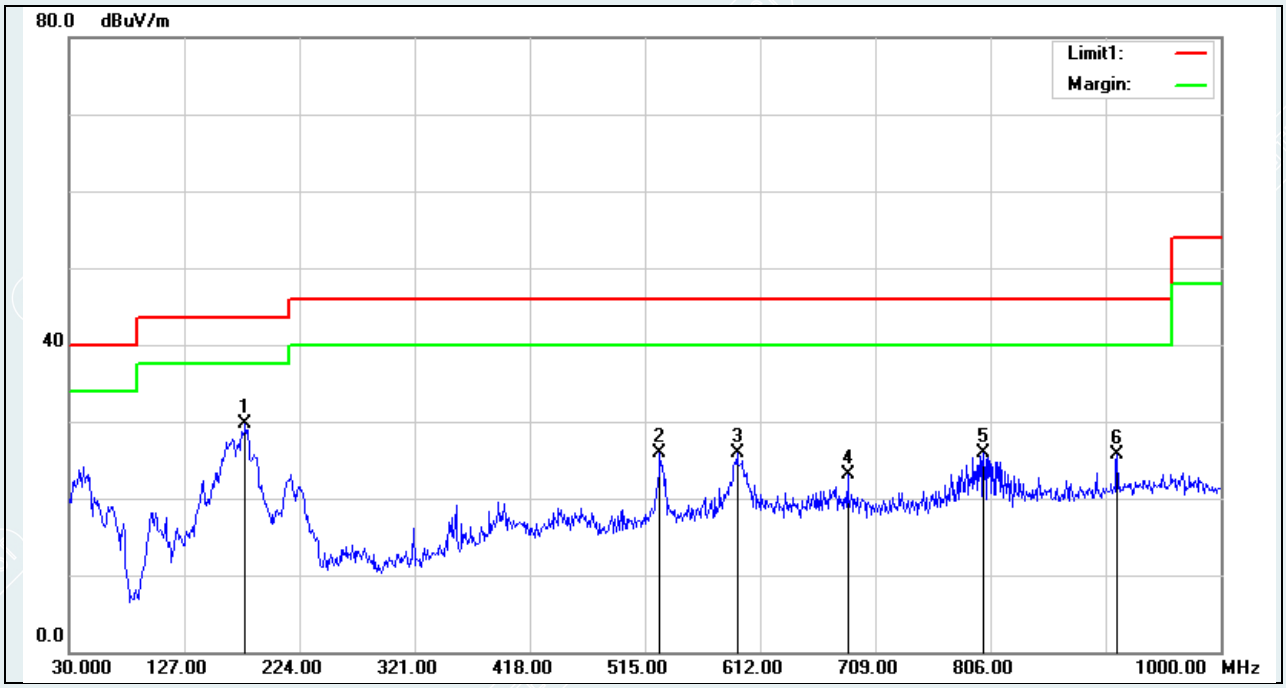
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1*	42.6100	49.68	-23.20	26.48	40.00	-13.52	100	13	QP
2	179.3800	57.65	-27.94	29.71	43.50	-13.79	100	225	QP
3	500.4500	46.43	-19.30	27.13	46.00	-18.87	100	311	QP
4	588.7200	42.70	-17.77	24.93	46.00	-21.07	100	111	QP
5	797.2700	41.20	-15.52	25.68	46.00	-20.32	100	100	QP
6	911.7300	39.62	-14.65	24.97	46.00	-21.03	100	157	QP

Mode: TX
Lowest channel (2402MHz) Date: 2020/11/08
Polarity Horizontal



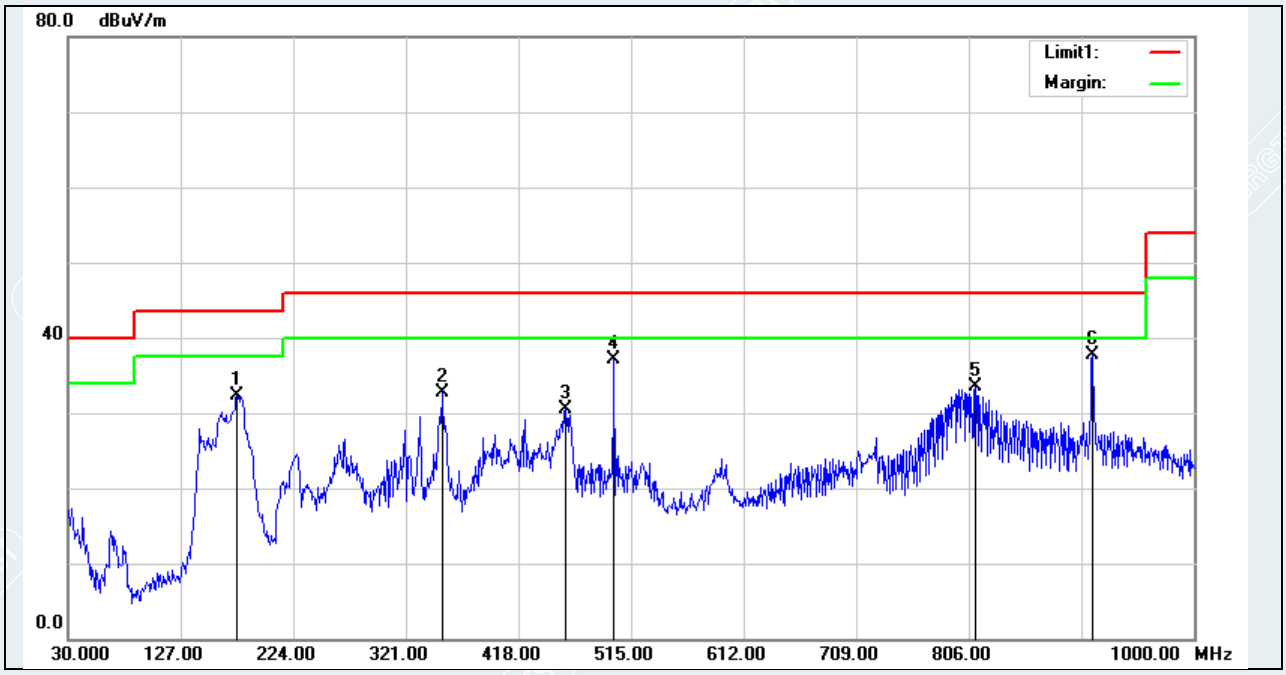
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	178.4100	60.00	-27.93	32.07	43.50	-11.43	100	63	QP
2	320.0300	51.01	-23.60	27.41	46.00	-18.59	100	304	QP
3	351.0700	53.47	-22.54	30.93	46.00	-15.07	100	282	QP
4	455.8300	51.06	-19.97	31.09	46.00	-14.91	100	149	QP
5	797.2700	48.93	-15.52	33.41	46.00	-12.59	100	145	QP
6*	912.7000	51.99	-14.63	37.36	46.00	-8.64	100	341	QP

Mode: TX
Highest channel (2480MHz) Date: 2020/11/08
Polarity Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1*	178.4100	57.69	-27.93	29.76	43.50	-13.74	100	242	QP
2	527.6100	44.66	-18.78	25.88	46.00	-20.12	100	245	QP
3	592.6000	43.57	-17.70	25.87	46.00	-20.13	100	145	QP
4	685.7200	40.01	-16.93	23.08	46.00	-22.92	100	191	QP
5	800.1800	41.41	-15.48	25.93	46.00	-20.07	100	104	QP
6	912.7000	40.39	-14.63	25.76	46.00	-20.24	100	154	QP

Mode: TX
Highest channel (2480MHz) Date: 2020/11/08
Polarity Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	175.5000	60.12	-27.89	32.23	43.50	-11.27	100	66	QP
2	352.0400	55.27	-22.51	32.76	46.00	-13.24	100	302	QP
3	458.7400	50.50	-19.93	30.57	46.00	-15.43	100	199	QP
4	500.4500	56.43	-19.30	37.13	46.00	-8.87	100	213	QP
5	811.8200	48.98	-15.38	33.60	46.00	-12.40	100	147	QP
6*	912.7000	52.24	-14.63	37.61	46.00	-8.39	100	345	QP

Remark:

1 No emission found between lowest internal used/generated frequency to 30MHz.

2 Data of measurement within this frequency range in the table above the reading of PK detector are more 6dB than QP limit, therefore it's unnecessary to performed QP scan.

3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120 kHz.

Above 1GHz:
According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Mode: TX/ 1Mbps
Lowest channel (2402MHz) Date: 2020/11/08

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3193.1250	57.29	41.71	-15.58	74.00	32.29	150	111	Vertical
2	3649.6875	55.22	40.85	-14.37	74.00	33.15	150	231	Vertical
3	4786.8750	48.64	38.09	-10.55	74.00	35.91	150	146	Vertical
4	5980.3125	51.01	42.81	-8.20	74.00	31.19	150	117	Vertical
5	11300.6250	41.35	48.66	7.31	74.00	25.34	150	25	Vertical
6	17934.3750	38.21	58.04	19.83	74.00	15.96	150	157	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17934.3750	19.83	27.46	47.29	54.00	6.71	150	157	Vertical

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3185.6250	54.76	39.10	-15.66	74.00	34.90	150	196	Horizontal
2	4803.7500	51.47	40.85	-10.62	74.00	33.15	150	185	Horizontal
3	6386.2500	47.92	41.18	-6.74	74.00	32.82	150	150	Horizontal
4	9182.8125	43.91	45.39	1.48	74.00	28.61	150	42	Horizontal
5	13986.5625	40.14	50.45	10.31	74.00	23.55	150	156	Horizontal
6	17990.6250	38.39	59.49	21.10	74.00	14.51	150	306	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17990.6250	21.10	26.52	47.62	54.00	6.38	150	306	Horizontal

Mode: TX/ 1Mbps
Middle channel (2440MHz) Date: 2020/11/08

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3187.5000	59.77	44.13	-15.64	74.00	29.87	150	186	Vertical
2	3645.0000	54.54	40.23	-14.31	74.00	33.77	150	254	Vertical
3	4350.0000	50.62	38.21	-12.41	74.00	35.79	150	254	Vertical
4	5973.7500	51.04	42.85	-8.19	74.00	31.15	150	151	Vertical
5	11299.6875	42.16	49.48	7.32	74.00	24.52	150	174	Vertical
6	17953.1250	36.67	56.92	20.25	74.00	17.08	150	134	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17953.1250	20.25	27.16	47.41	54.00	6.59	150	134	Vertical

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3646.8750	53.48	39.15	-14.33	74.00	34.85	150	145	Horizontal
2	4879.6875	48.13	38.78	-9.35	74.00	35.22	150	214	Horizontal
3	5397.1875	47.48	38.36	-9.12	74.00	35.64	150	93	Horizontal
4	11130.9375	41.74	48.04	6.30	74.00	25.96	150	277	Horizontal
5	13940.6250	39.88	49.82	9.94	74.00	24.18	150	116	Horizontal
6	17966.2500	37.83	58.38	20.55	74.00	15.62	150	87	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17966.2500	20.55	26.87	47.42	54.00	6.58	150	87	Horizontal

Mode: TX/ 1Mbps
Highest channel (2480MHz) Date: 2020/11/08

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3195.0000	60.70	45.14	-15.56	74.00	28.86	150	88	Vertical
2	3650.6250	55.73	41.35	-14.38	74.00	32.65	150	231	Vertical
3	5981.2500	50.88	42.68	-8.20	74.00	31.32	150	140	Vertical
4	7318.1250	47.74	44.18	-3.56	74.00	29.82	150	2	Vertical
5	14074.687	39.91	49.42	9.51	74.00	24.58	150	334	Vertical
6	17995.312	37.60	58.80	21.20	74.00	15.20	150	242	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17995.3125	21.20	25.98	47.18	54.00	6.82	150	242	Vertical

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3421.8750	54.67	38.51	-16.16	74.00	35.49	150	247	Horizontal
2	3833.4375	51.44	38.05	-13.39	74.00	35.95	150	270	Horizontal
3	4959.3750	48.11	39.31	-8.80	74.00	34.69	150	218	Horizontal
4	7656.5625	46.01	44.47	-1.54	74.00	29.53	150	4	Horizontal
5	14026.8750	40.37	50.46	10.09	74.00	23.54	150	224	Horizontal
6	17979.3750	37.69	58.53	20.84	74.00	15.47	150	259	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	17979.3750	20.84	26.64	47.48	54.00	6.52	150	259	Horizontal

Above 18GHz:

Recorded the worst case results in this report (IEEE 802.11n HT40)
Mode: TX/ 1Mbps
Highest channel (2480MHz) Date: 2020/11/02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18805.8000	58.41	46.99	-11.42	83.54	36.55	100	164	Vertical
2	20479.4500	57.06	46.78	-10.28	83.54	36.76	100	75	Vertical
3	21920.2000	56.71	46.81	-9.90	83.54	36.73	100	180	Vertical
4	23304.0000	56.19	47.60	-8.59	83.54	35.94	100	2	Vertical
5	24854.4000	55.57	47.69	-7.88	83.54	35.85	100	204	Vertical
6	26263.7000	55.68	49.15	-6.53	83.54	34.39	100	156	Vertical

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18342.5500	58.44	46.70	-11.74	83.54	36.84	100	68	Horizontal
2	19603.1000	57.38	46.37	-11.01	83.54	37.17	100	293	Horizontal
3	20686.8500	56.97	46.58	-10.39	83.54	36.96	100	164	Horizontal
4	22745.5500	56.20	47.13	-9.07	83.54	36.41	100	180	Horizontal
5	24871.4000	55.16	47.27	-7.89	83.54	36.27	100	164	Horizontal
6	25691.6500	56.25	48.66	-7.59	83.54	34.88	100	84	Horizontal

7. 6dB BANDWIDTH

7.1. LIMITS

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2. TEST PROCEDURES

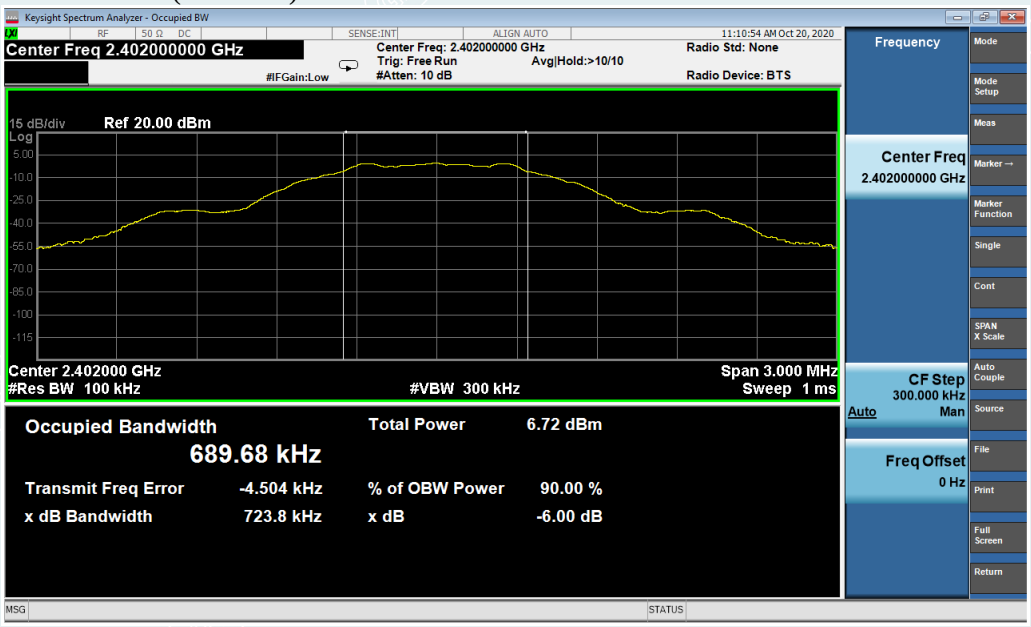
1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer**.**
2) Set resolution bandwidth (RBW) = 100kHz.Set the video bandwidth (VBW) ≥ 3 x RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize, record 6dB bandwidth value.
3) Repeat above procedures until all frequencies measured were complete.

7.3. TEST SETUP

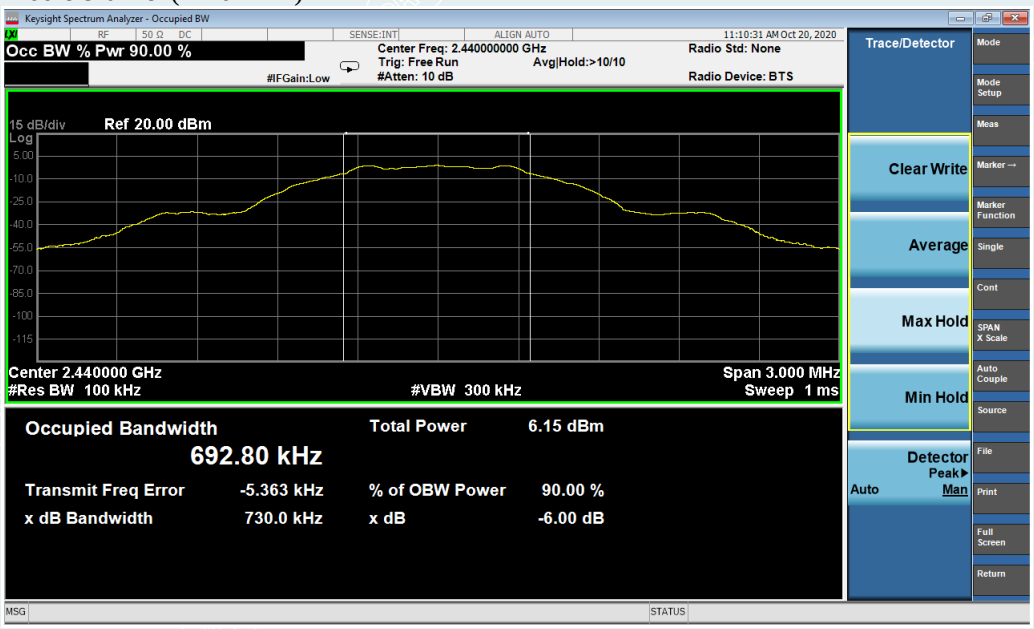
7.4. TEST RESULTS

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	723.8	>500	PASS
Middle	2440	730.0		PASS
Highest	2480	743.8		PASS

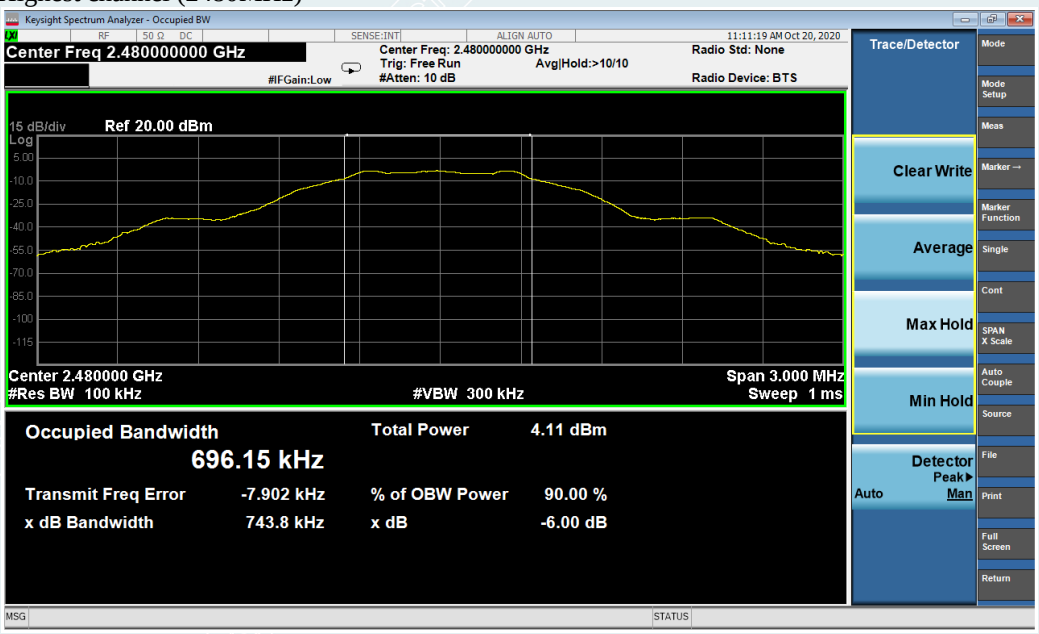
Lowest channel (2402MHz)



Middle channel (2440 MHz)



Highest channel (2480MHz)



8. MAXIMUM PEAK OUTPUT POWER

8.1.LIMITS

The maximum Peak output power measurement is 1W

8.2.TEST PROCEDURES

1) Place the EUT on a bench and set it in transmitting mode.
2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

8.3.TEST SETUP

8.4.TEST RESULTS

Channel	Frequency (MHz)	Measured Channel Power (dBm)	Limit	Peak/ Average	Result
Lowest	2402	0.42	1W (30dBm)	Peak	Pass
Middle	2440	-0.24			Pass
Highest	2480	-2.08			Pass

9. POWER SPECTRAL DENSITY

9.1. LIMITS

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

9.2. TEST PROCEDURES

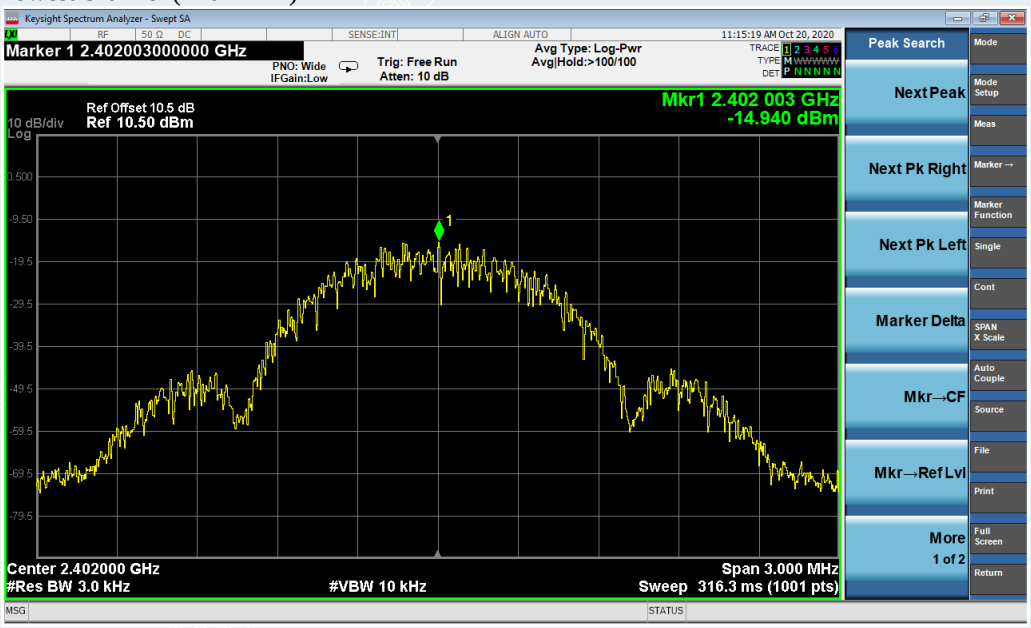
1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
2) Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3) Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW = 3 kHz. Set the VBW ≥3 RBW. Detector = peak. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4) Repeat above procedures until all frequencies measured were complete.

9.3. TEST SETUP

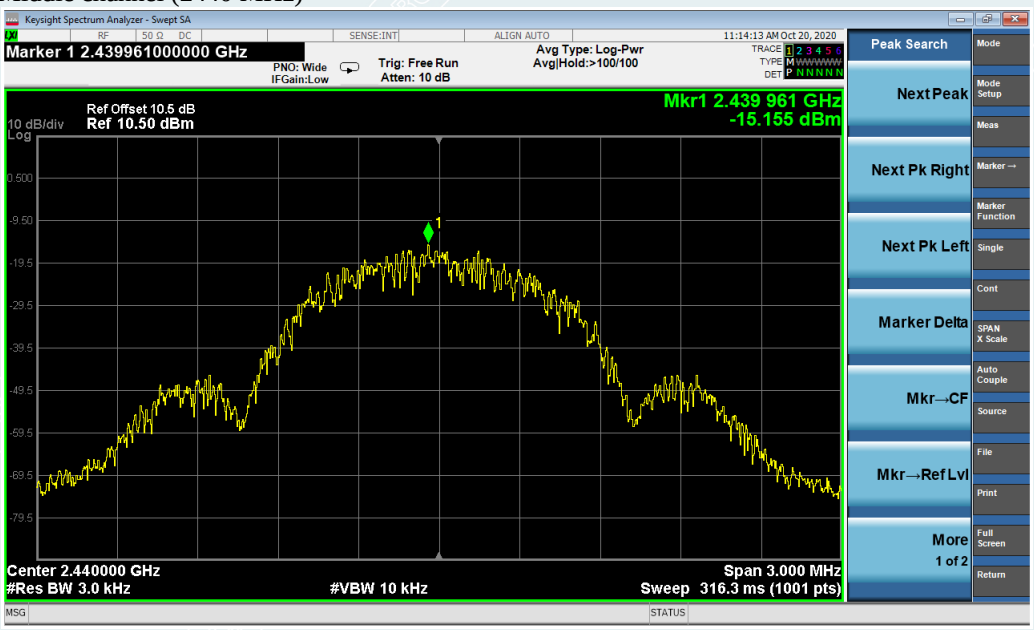
9.4. TEST RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-14.940	8	PASS
Middle	2440	-15.155		PASS
Highest	2480	-16.877		PASS

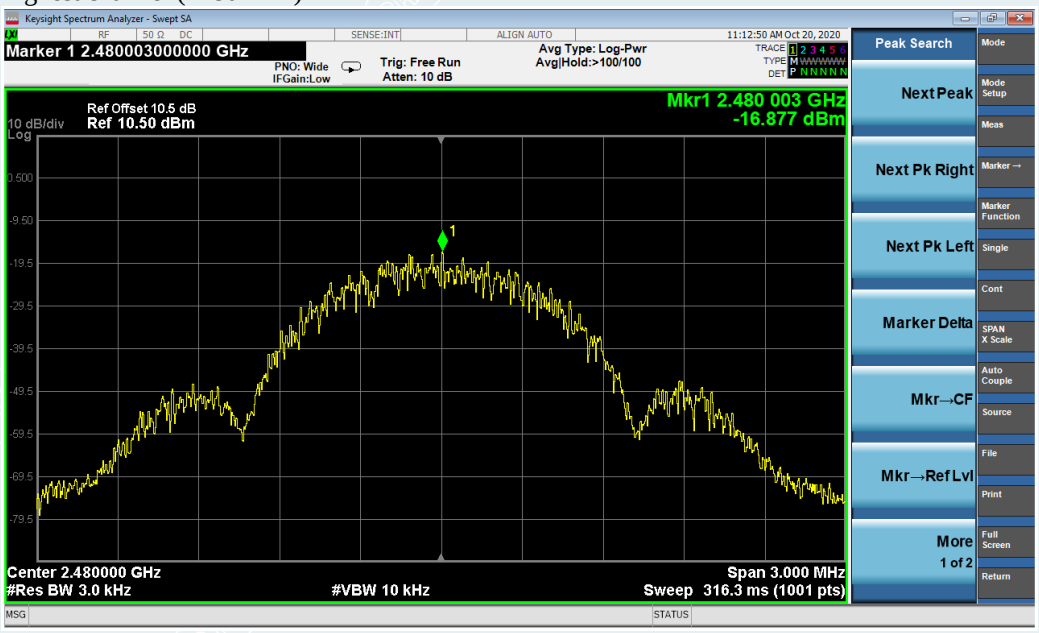
Lowest channel (2402MHz)



Middle channel (2440 MHz)



Highest channel (2480MHz)



10. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

10.1. LIMITS

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

10.2. TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v05r02.

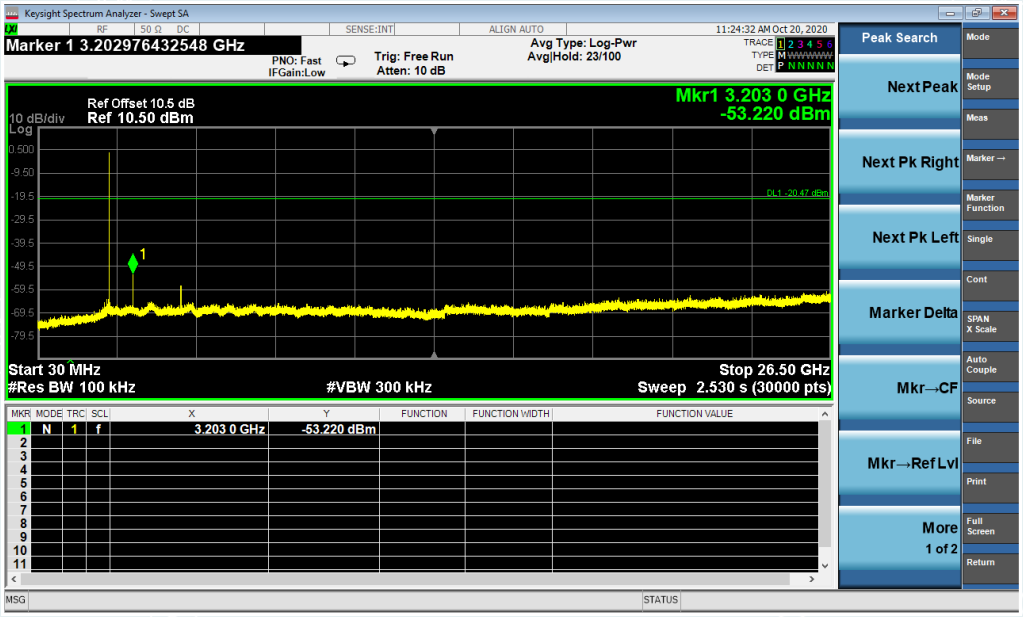
Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
2) Set the spectrum analyzer: RBW =100KHz; VBW =300KHz, Span = 10MHz to 26.5GHz; Sweep = auto; Detector Function = Peak. Trace = Max, hold.
3) Measure and record the results in the test report.
4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

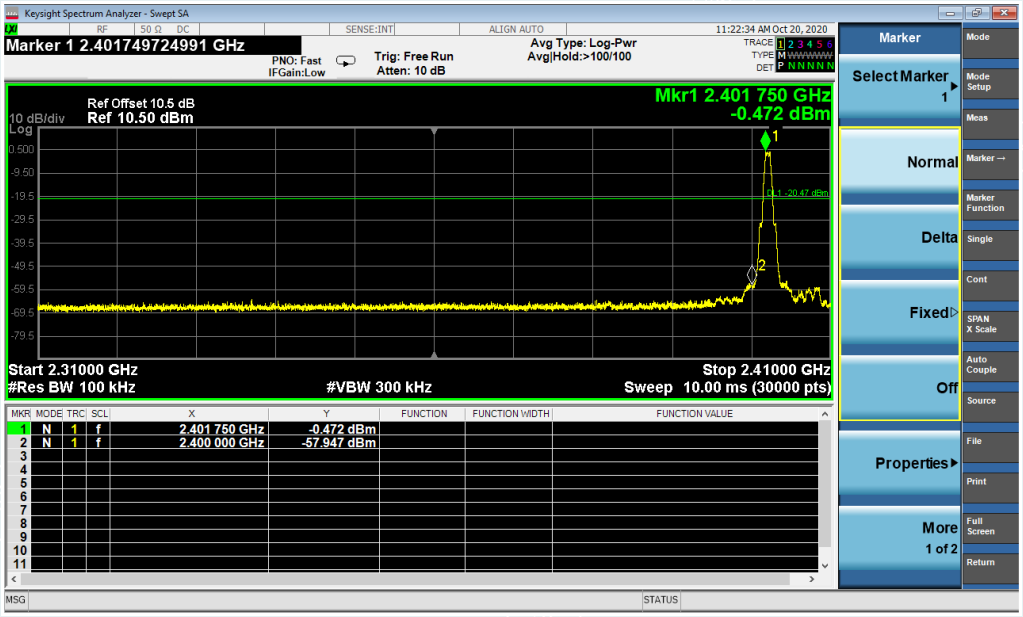
10.3. TEST SETUP

10.4. TEST RESULTS

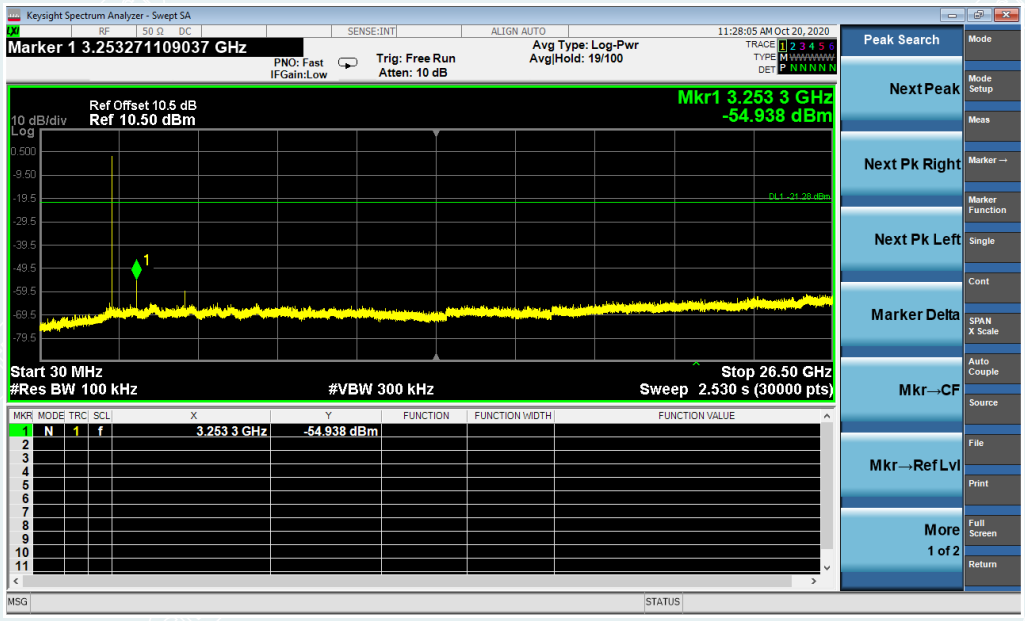
Lowest channel (2402MHz)
0.03GHz-26.5GHz

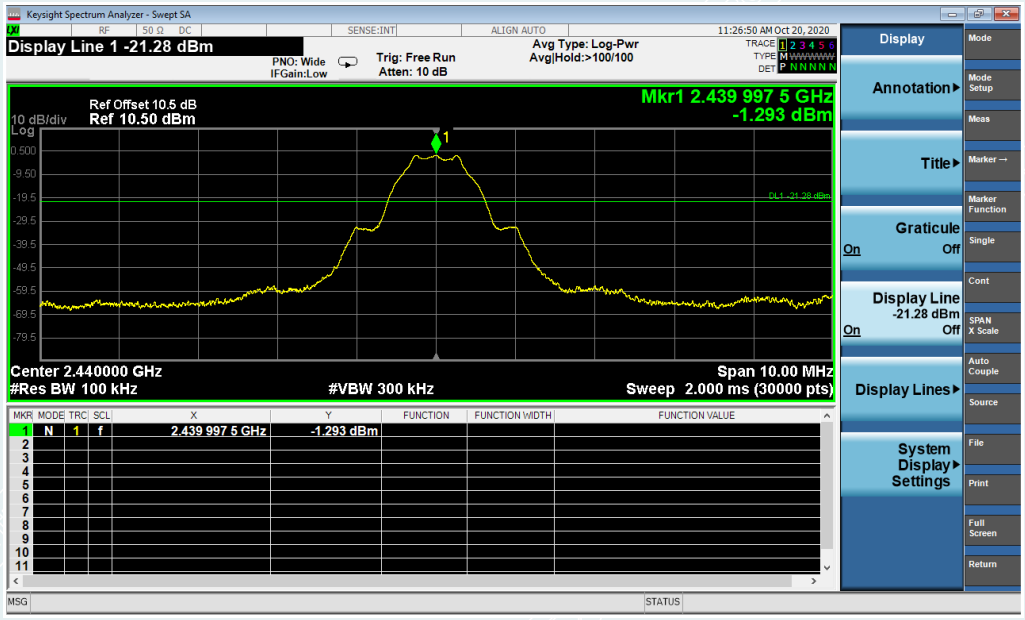


2.31GHz-2.41GHz

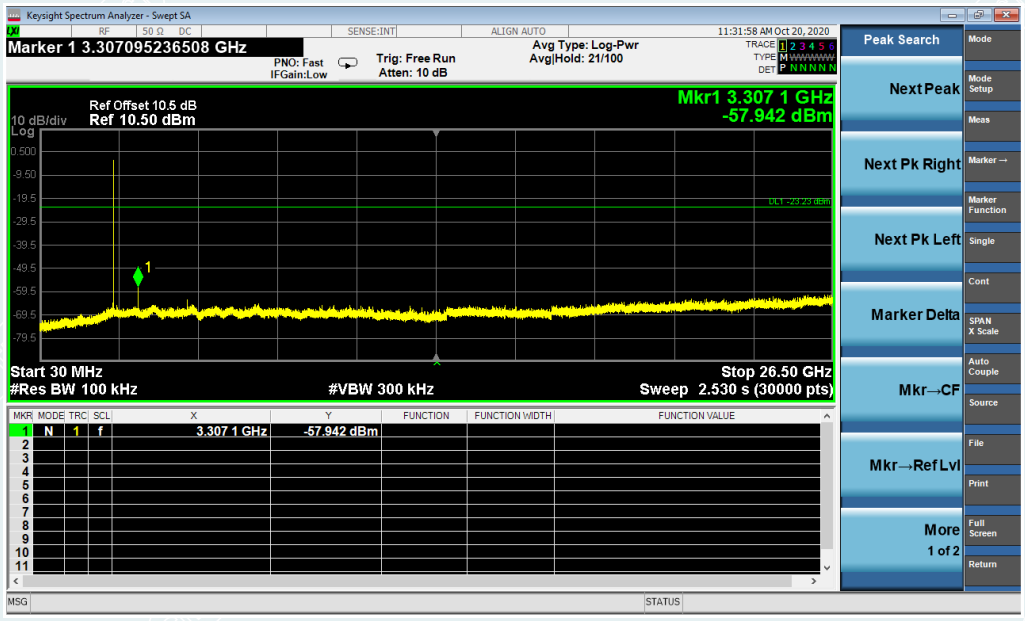


Middle channel (2440 MHz)
0.03GHz-26.5GHz

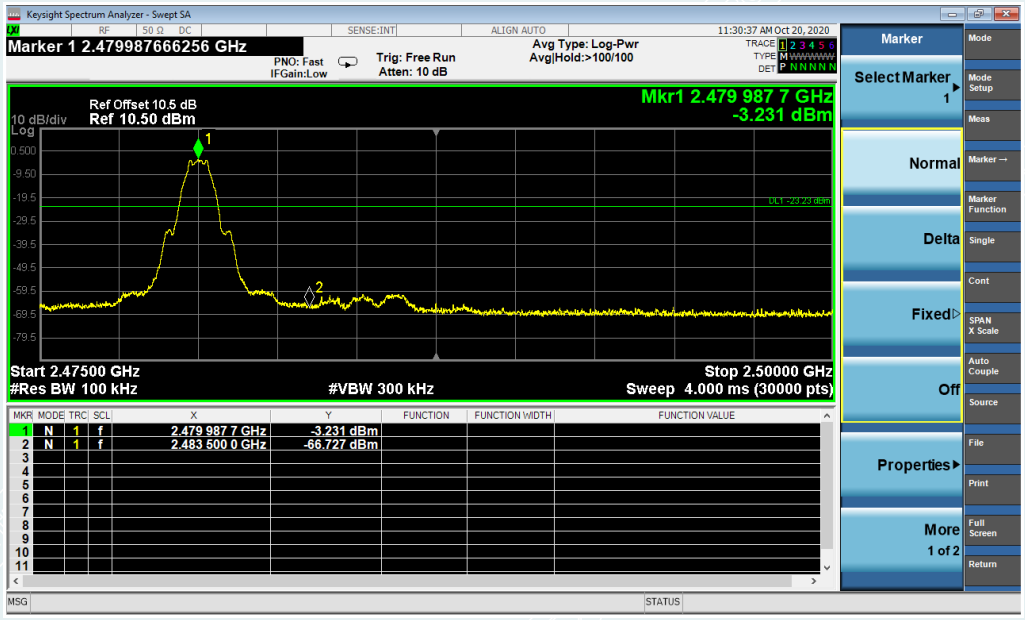




Highest channel (2480MHz)
0.03GHz-26.5GHz



2.475GHz-2.5GHz



11. RESTRICTED BANDS OF OPERATION

11.1. LIMITS

Section 15.247(d) In addition, Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

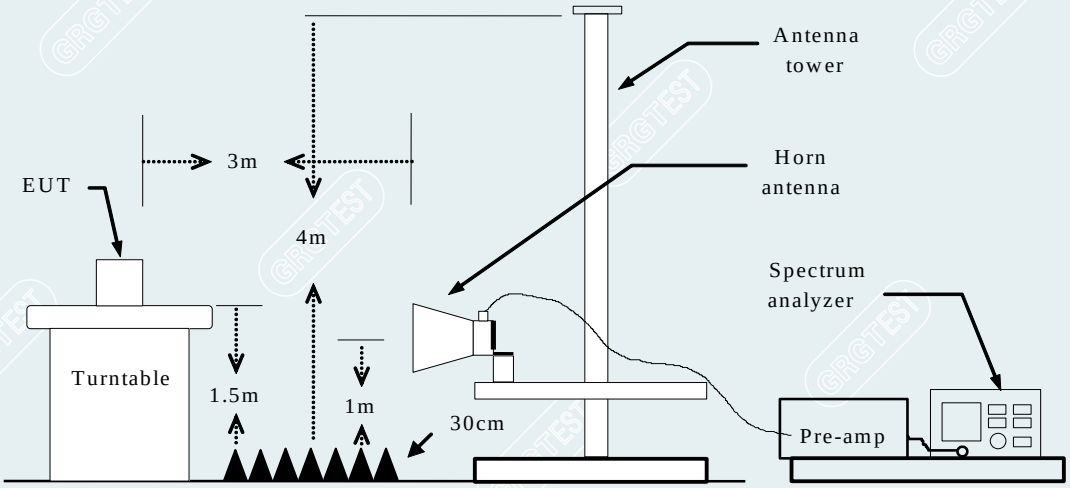
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 -	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.69525	960 - 1240	7.25 - 7.75
4.125 - 4.128	16.80425 -	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	16.80475	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	25.5 - 25.67	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	37.5 - 38.25	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	73 - 74.6	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	74.8 - 75.2	2200 - 2300	14.47 - 14.5
8.291 - 8.294	108 - 121.94	2310 - 2390	15.35 - 16.2
8.362 - 8.366	123 - 138	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	149.9 - 150.05	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.52475 -	3260 - 3267	23.6 - 24.0
12.29 - 12.293	156.52525	3332 - 3339	31.2 - 31.8
12.51975 -	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
12.52025	162.0125 - 167.17	3600 - 4400	
12.57675 -	167.72 - 173.2		
12.57725	240 - 285		
13.36 - 13.41	322 - 335.4		

11.2. TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Meas Guidance v03r01.

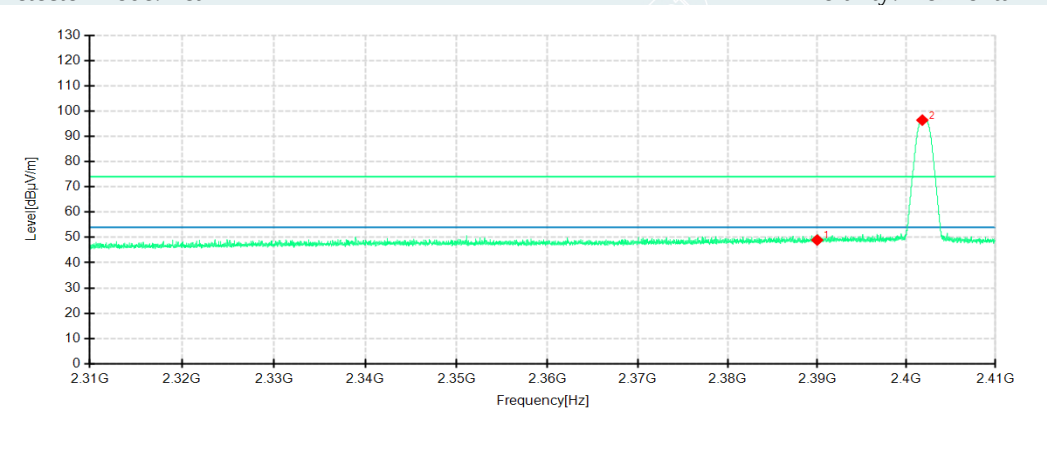
1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   a) PEAK: RBW=1MHz / VBW=1MHz / Sweep=AUTO
   b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO
5) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

11.3. TEST SETUP

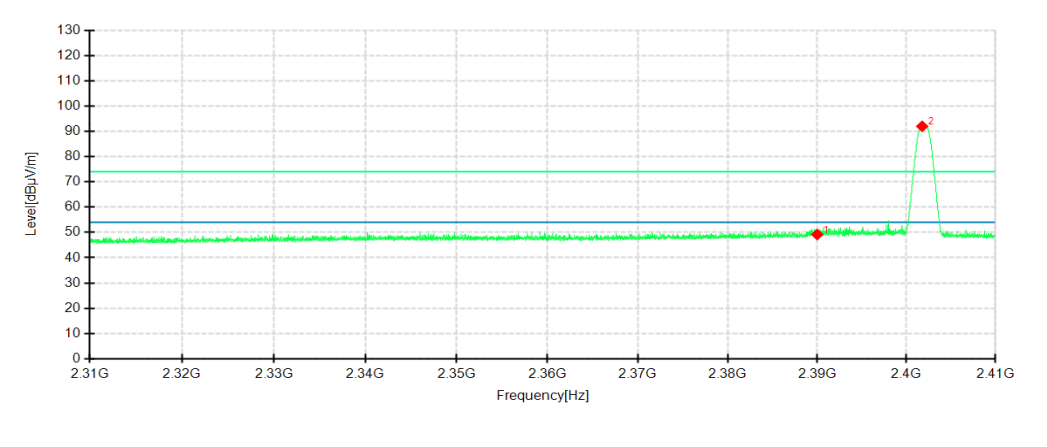


11.4. TEST RESULTS

Lowest Channel
Channel 2402MHz
Detector mode: Peak Polarity: Horizontal



Detector mode: Peak Polarity: Vertical

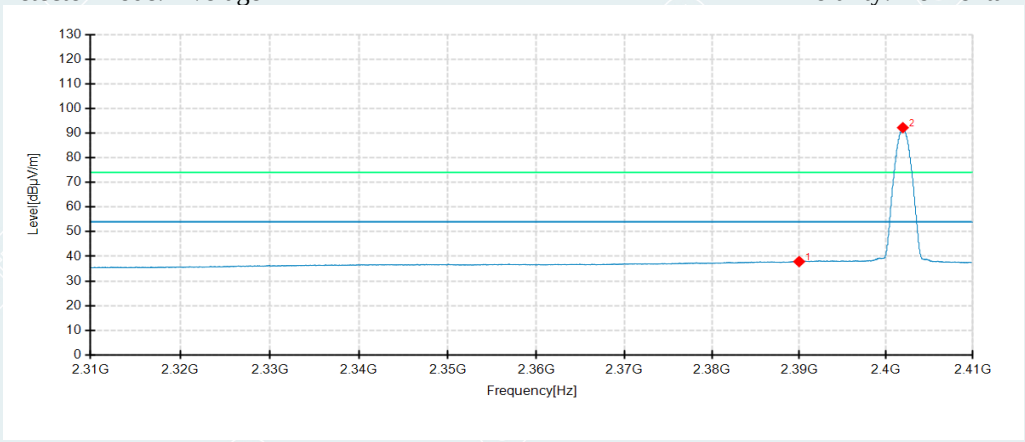


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole
1	2390.0000	42.10	48.95	6.85	74.00	25.05	150	357	Horizontal
2	2401.7833	89.38	96.41	7.03	74.00	-22.41	150	200	Horizontal
1	2390.0000	42.33	49.18	6.85	74.00	24.82	150	154	Vertical
2	2401.7667	84.95	91.98	7.03	74.00	-17.98	150	306	Vertical

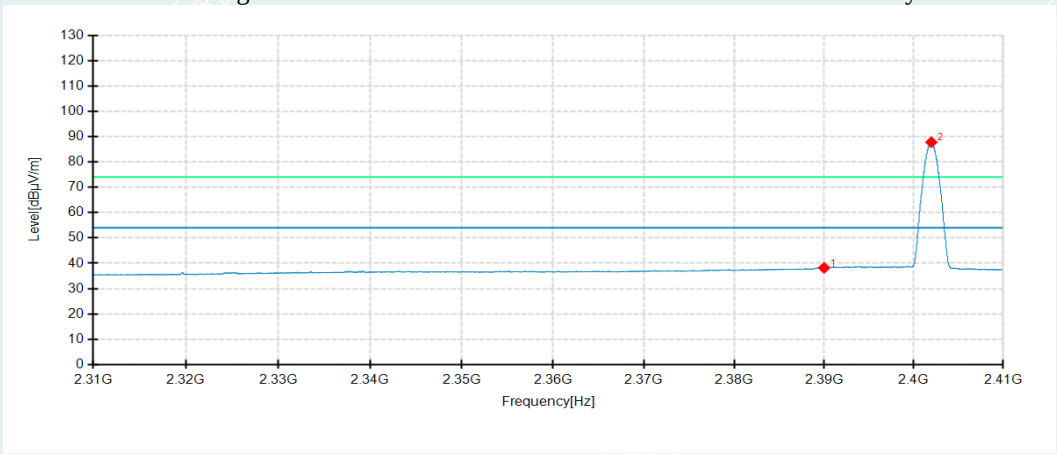
Lowest Channel

Channel 2402MHz

Detector mode: Average Polarity: Horizontal

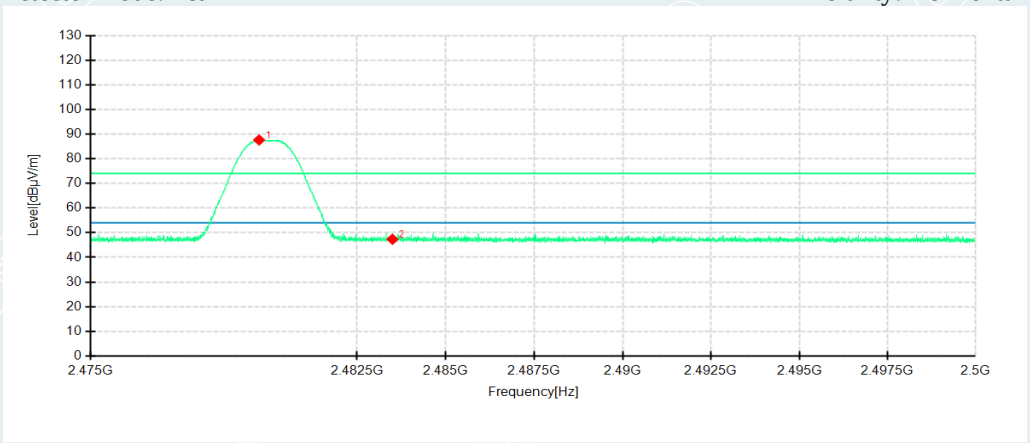


Detector mode: Average Polarity: Vertical

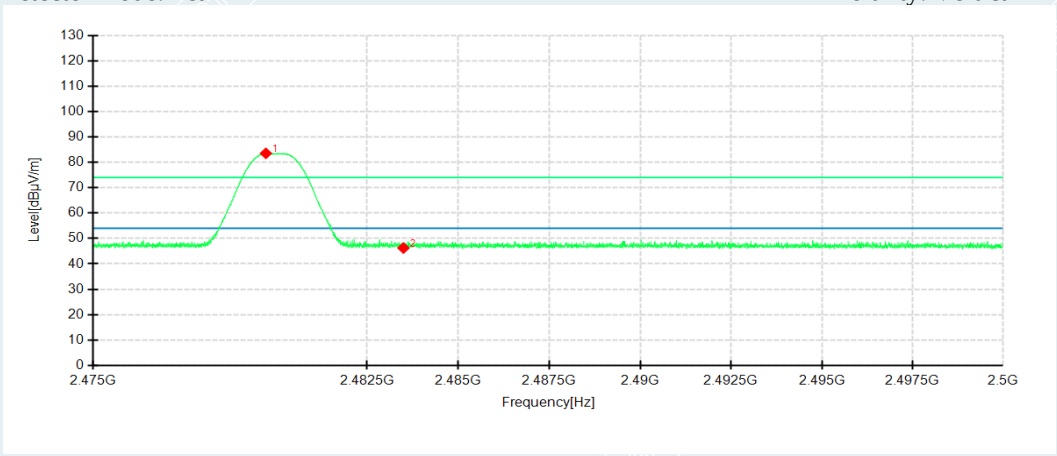


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole
1	2390.0000	31.04	37.89	6.85	54.00	16.11	150	209	Horizontal
2	2401.9333	85.17	92.20	7.03	54.00	-38.20	150	202	Horizontal
1	2390.0000	31.35	38.20	6.85	54.00	15.80	150	174	Vertical
2	2401.9667	80.77	87.79	7.02	54.00	-33.79	150	298	Vertical

Highest Channel
Channel 2480MHz
Detector mode: Peak Polarity: Horizontal



Detector mode: Peak Polarity: Vertical

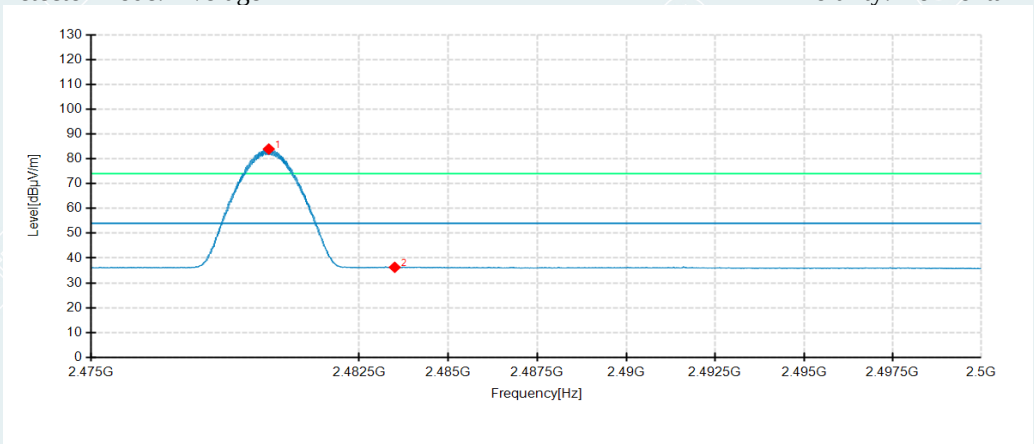


No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole
1	2479.7417	81.98	87.60	5.62	74.00	-13.60	150	189	Horizontal
2	2483.5000	41.78	47.34	5.56	74.00	26.66	150	3	Horizontal
1	2479.7292	77.90	83.52	5.62	74.00	-9.52	150	111	Vertical
2	2483.5000	40.68	46.24	5.56	74.00	27.76	150	73	Vertical

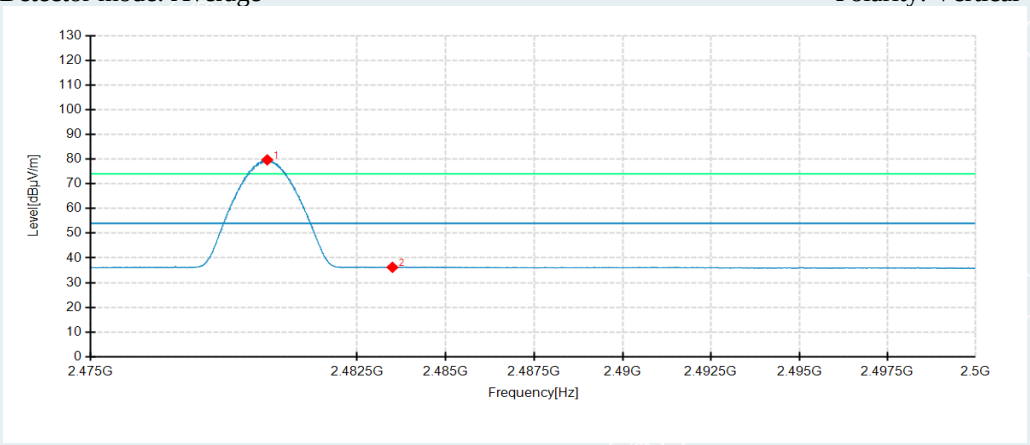
Highest Channel

Channel 2480MHz

Detector mode: Average Polarity: Horizontal



Detector mode: Average Polarity: Vertical



No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole
1	2479.9708	78.30	83.92	5.62	54.00	-29.92	150	187	Horizontal
2	2483.5000	30.73	36.29	5.56	54.00	17.71	150	125	Horizontal
1	2479.9708	74.05	79.67	5.62	54.00	-25.67	150	114	Vertical
2	2483.5000	30.64	36.20	5.56	54.00	17.80	150	3	Vertical

Remark: Max field strength in 3m distance. No any other emission which falls in restricted bands can be detected and be reported.

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