Certificate # 2861.01

TEST REPORT

Verified Code: 396706

Report No.:	E202012115394-3	**Application No.:**	E202012115394
Client:	SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD		
Address:	705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China		
Sample Description:	LoRaWAN Gateway		
Model:	G200-HA923		
Test Specification:	CFR 47, FCC Part 15 Subpart C RADIO FREQUENCY DEVICES: Subpart C—Intentional Radiators		
Receipt Date:	2021-01-11		
Test Date:	2021-01-16 to 2021-03-11		
Issue Date:	2021-04-15		
Test Result:	Pass		

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

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.**

TABLE OF CONTENTS

1. TEST RESULT SUMMARY

CFR 47, FCC Part 15 Subpart C ANSI C63.10:2013		
Standard	Test Item	Result
15.207	Conducted emission AC power port	Pass
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Field strength of emissions and Restricted bands	Pass
§15.215(c)	20dB bandwidth	Pass
§15.249(d)	Out of band emissions	Pass
§15.249(d)	Duty Cycle	Pass,see the section §6 Restricted band
§15.203	Antenna Requirement	Pass, Note [1]

Note [1]: The max gain of antenna is 2.15dBi which accordance 15.203.is considered sufficient to comply with the provisions of this section.

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name:	SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address:	705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

2.2 MANUFACTURER

Name:	SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address:	705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

2.3 FACTORY

Name:	SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address:	705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	LoRaWAN Gateway
Model No.:	G200-HA923
Adding Model	/
FCC ID:	2AYYO-G200AS
Trade Name:	Easylinkin
Power Supply:	DC12V power supplied by adapter
Adapter Specification:	Model: PS120W1000U Input: 100-240V~50/60Hz 0.5A Max Output: 12.0V ⎓ 1.0A 12.0W
Frequency Range:	919.1MHz ~924.8MHz
Transmit Power:	Peak: 109.38dBuV/m (Max.) Average: 77.86dBuV/m (Max.)
Type of Modulation:	GFSK
Antenna Specification:	External antenna with 2.15dBi gain (Max.)
Temperature Range:	0 ℃ ~ +60 ℃
Hardware Version:	PCB-GW200M-01D
Software Version:	g200_v2.0.0.2001201313

Sample No: E202012115394-0001

Note: The EUT have two different color appearances.

2.5 TEST OPERATION MODE

Mode No.	Description of the modes
1	Lora fixed frequency

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

2.7 TEST SOFTWARE:

Software version	Test level
SecureCRRT	Default

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

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

USA	A2LA(Certificate #:2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http://www.grgtest.com

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	2021-10-08
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	R&S	FSV30	1321.3008K30-104381-rH	2021-03-14
Bilog Antenna	Schwarzbeck	VULB 9163	01279	2021-03-14
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	02143	2021-12-27
Amplifier	EMEC	EM330	/	2021-04-01
Amplifier	Tonscend	TAP9E6343	AP20E806065	2021-06-28
Amplifier	Tonscend	TAP01018048	AP20E8060075	2021-06-28
Test S/W	Tonscend	JS32-RE/2.5.2.4		
20 dB Bandwidth				
Spectrum Analyzer	R&S	FSV30	1321.3008K30-104381-rH	2021-03-14

5. CONDUCTED EMISSIONS

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

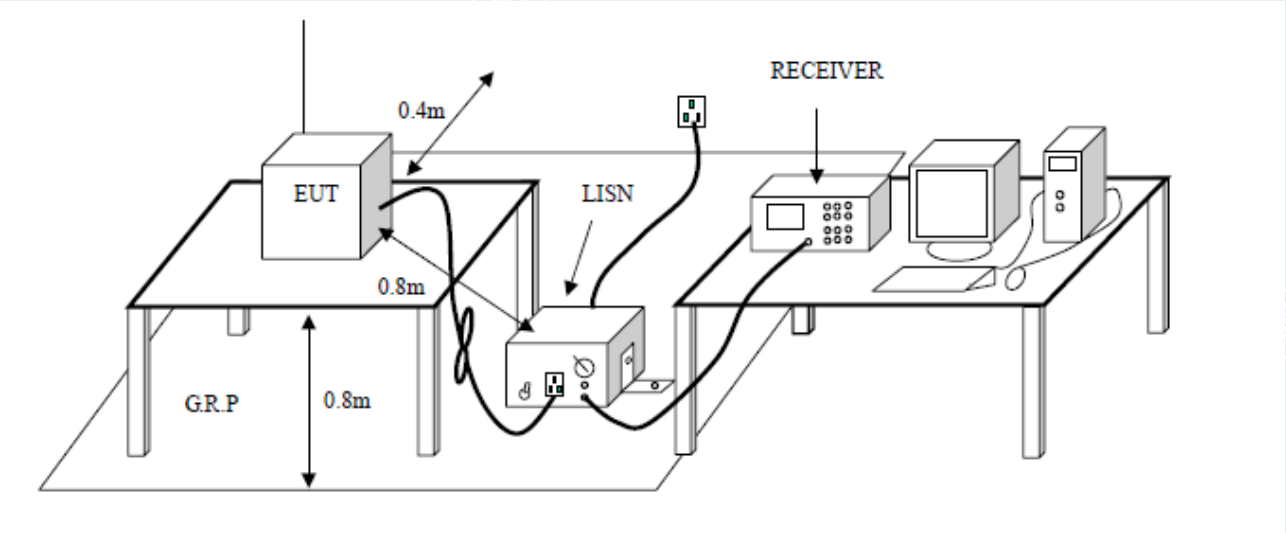
Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2013.
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 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

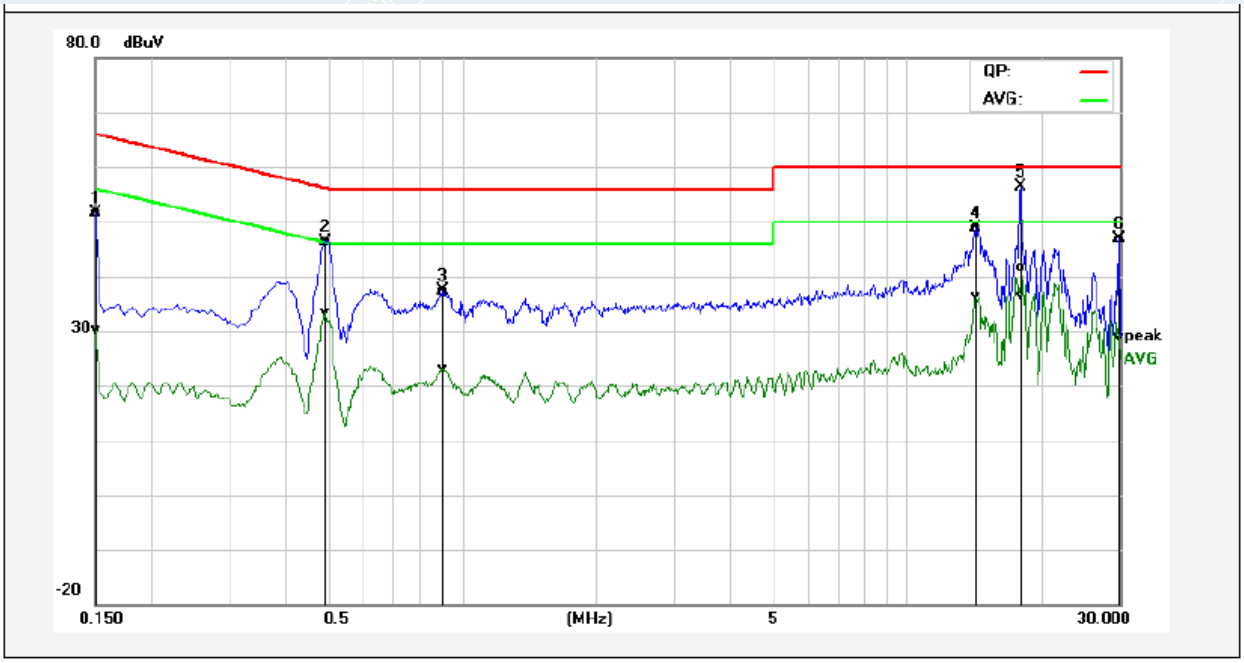
Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62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

EUT Name	LoRaWAN Gateway	Model	G200-HA923
Environmental Conditions	24.8℃/45%RH/101kPa	Test Mode	Mode 1
Power supply	AC120V/60Hz	Tested By	Chen Xiaocong
Test Date	2021-01-16	Sample No.	E202012112553-0005

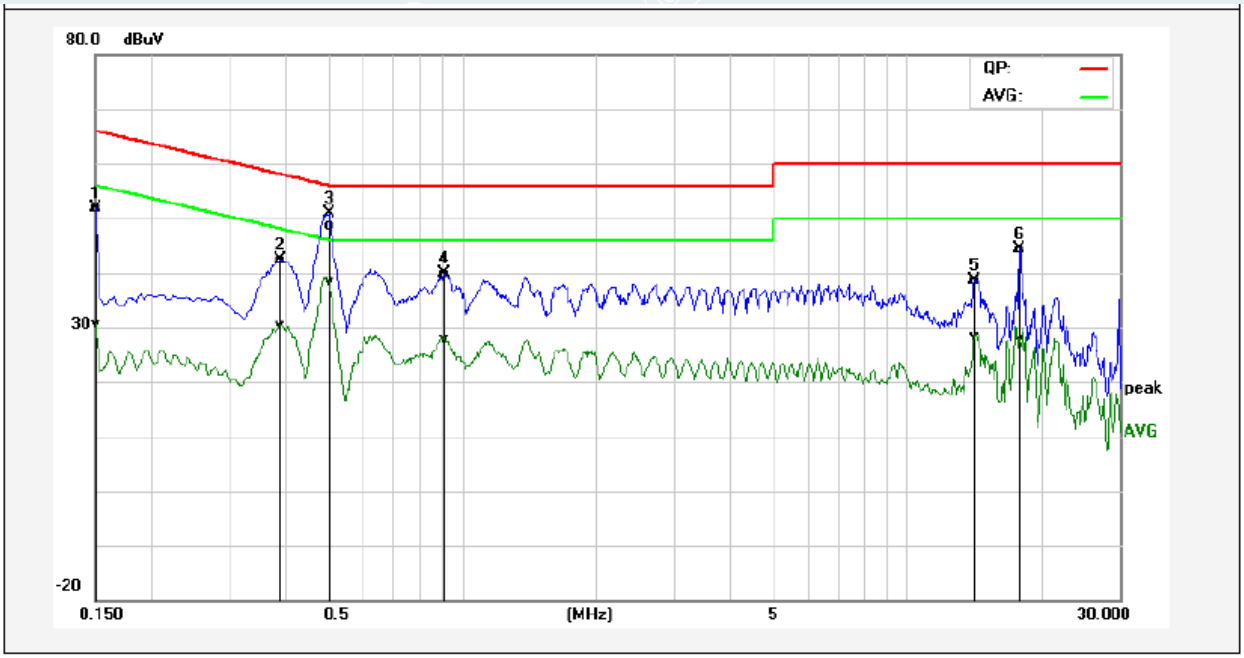
Line: **L1**



No.	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
1	0.1500	42.04	20.62	9.61	51.65	30.23	65.99	56.00	-14.34	-25.77	Pass
2*	0.4940	36.87	23.78	9.62	46.49	33.40	56.10	46.10	-9.61	-12.70	Pass
3	0.9060	27.74	13.53	9.62	37.36	23.15	56.00	46.00	-18.64	-22.85	Pass
4	14.2420	39.03	26.53	9.78	48.81	36.31	60.00	50.00	-11.19	-13.69	Pass
5	17.9619	31.90	26.45	9.83	41.73	36.28	60.00	50.00	-18.27	-13.72	Pass
6	29.8420	36.96	18.98	9.87	46.83	28.85	60.00	50.00	-13.17	-21.15	Pass

EUT Name	LoRaWAN Gateway	Model	G200-HA923
Environmental Conditions	24.8℃/45%RH/101kPa	Test Mode	Mode 1
Power supply	AC120V/60Hz	Tested By	Chen Xiaocong
Test Date	2021-01-16	Sample No.	E202012112553-0005

Line: **N**



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	42.31	21.13	9.61	51.92	30.74	65.99	56.00	-14.07	-25.26	Pass
2	0.3899	32.79	20.76	9.62	42.41	30.38	58.06	48.07	-15.65	-17.69	Pass
3*	0.5020	39.13	28.87	9.62	48.75	38.49	56.00	46.00	-7.25	-7.51	Pass
4	0.9100	30.29	18.34	9.62	39.91	27.96	56.00	46.00	-16.09	-18.04	Pass
5	14.1620	28.82	18.57	9.78	38.60	28.35	60.00	50.00	-21.40	-21.65	Pass
6	17.8819	34.44	18.01	9.83	44.27	27.84	60.00	50.00	-15.73	-22.16	Pass

6. RADIATED SPURIOUS EMISSIONS

6.1. LIMITS

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

Fundamental Frequency	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics (μV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500

Except where otherwise indicated in the applicable FCC, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5

Frequency (MHz)	Magnetic field strength (HField) (μA/m)	Measurement Distance (m)
0.009-0.490	6.37/F (F in kHz)	300
0.490-1.705	63.7/F (F in kHz)	30
1.705-30.0	0.08	30

Table 6

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Restricted band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	1435 - 1626.5	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	1645.5 - 1646.5	9.3 - 9.5
2.1735 - 2.1905	16.80425 - 16.80475	1660 - 1710	10.6 - 12.7
3.020 -3.026	25.5 - 25.67	1718.8 - 1722.2	13.25 - 13.4
4.125 - 4.128	37.5 - 38.25	2200 - 2300	14.47 - 14.5
4.17725 - 4.17775	73 - 74.6	2310 - 2390	15.35 - 16.2
4.20725 - 4.20775	74.8 - 75.2	2483.5 - 2500	17.7 - 21.4
5.677 - 5.683	108 - 138	2655 - 2900	22.01 - 23.12
6.215 - 6.218	149.9 - 150.05	3260 - 3267	23.6 - 24.0
6.26775 - 6.26825	156.52475 - 156.52525	3332 - 3339	31.2 - 31.8
6.31175 - 6.31225	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
8.291 - 8.294	162.0125 - 167.17	3500 - 4400	Above 38.6
8.362 - 8.366	167.72 - 173.2	4500 - 5150	
8.37625 - 8.38675	240 - 285	5350 – 5460	
8.41425 - 8.41475	322 - 335.4	7250 -7750	
12.29 - 12.293	399.9 – 410	8025 -8500	
12.51975 - 12.52025	608 – 614	--	
12.57675 - 12.57725	960 - 1427		
13.36 - 13.41			

6.2. TEST PROCEDURES

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

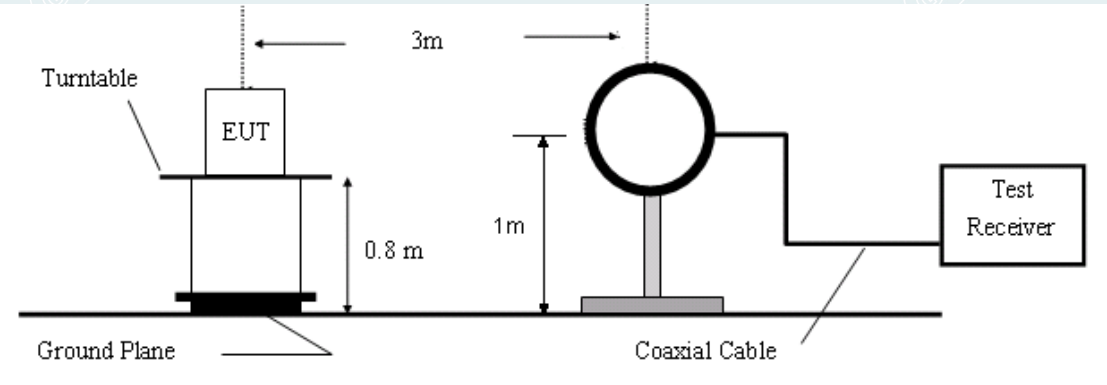


Figure 1. 9 KHz to 30MHz radiated emissions test configuration

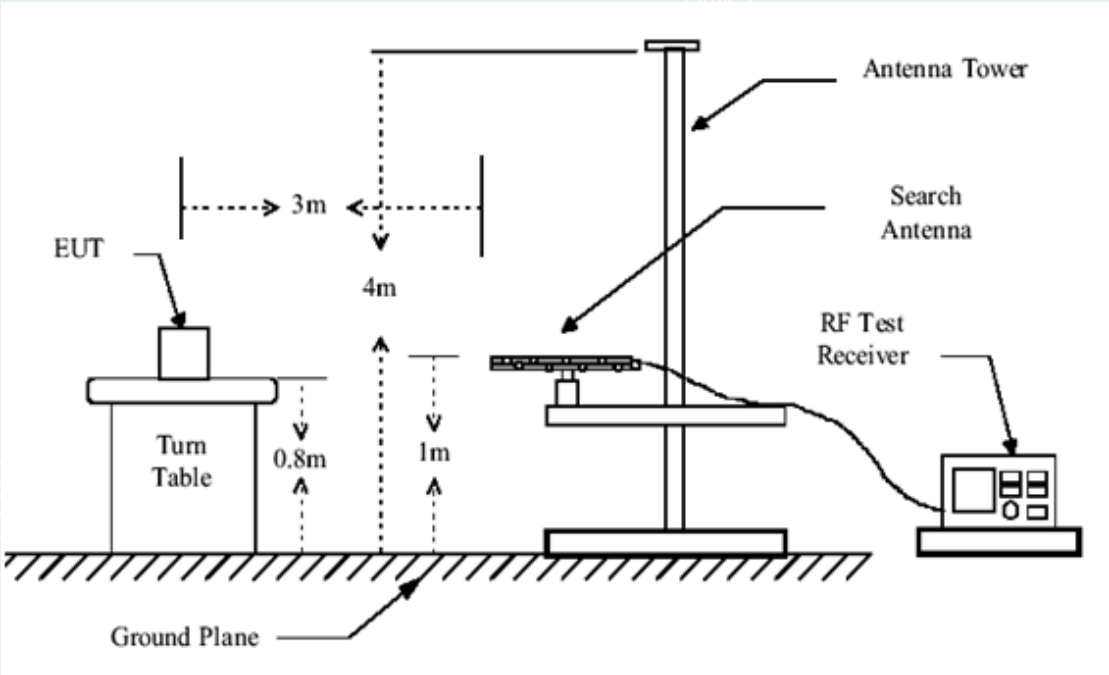


Figure 2. 30MHz to 1GHz radiated emissions test configuration

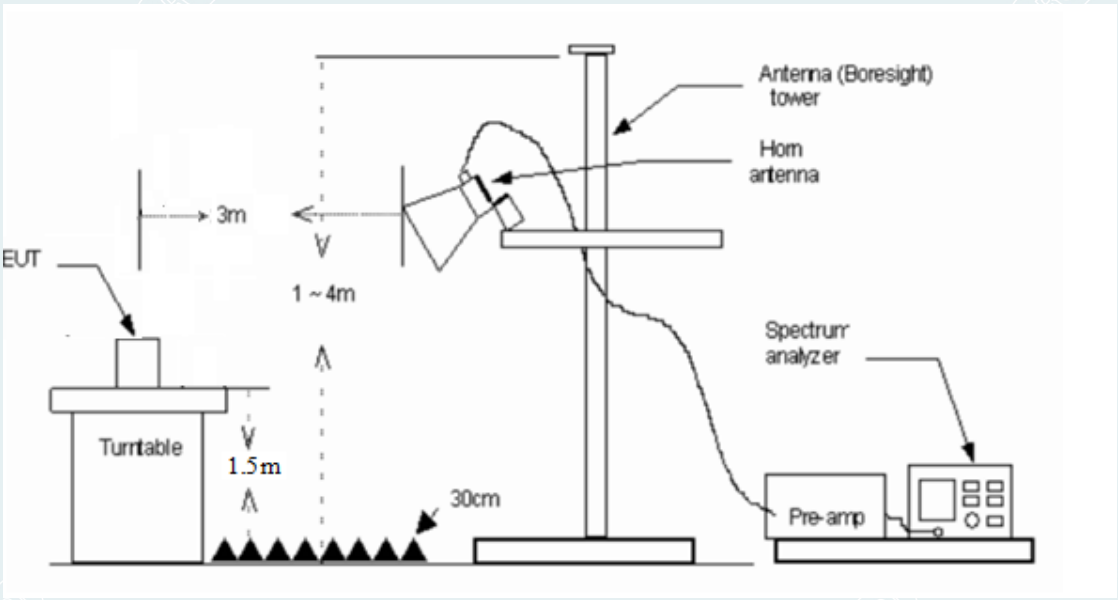


Figure 3. Above 1GHz radiated emissions test configuration

6.4. TEST RESULT

The field strength of fundamental

TX / 919.1MHz

Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
919.0786	91.06	76.93	-14.13	94.00	17.07	100	228	Horizontal	QP
919.0749	91.12	77.63	-13.49	94.00	16.37	100	252	Vertical	QP

TX / 921.9MHz

Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
921.8540	91.13	77.05	-14.08	94.00	16.95	100	236	Horizontal	QP
921.8615	91.09	77.65	-13.44	94.00	16.35	100	246	Vertical	QP

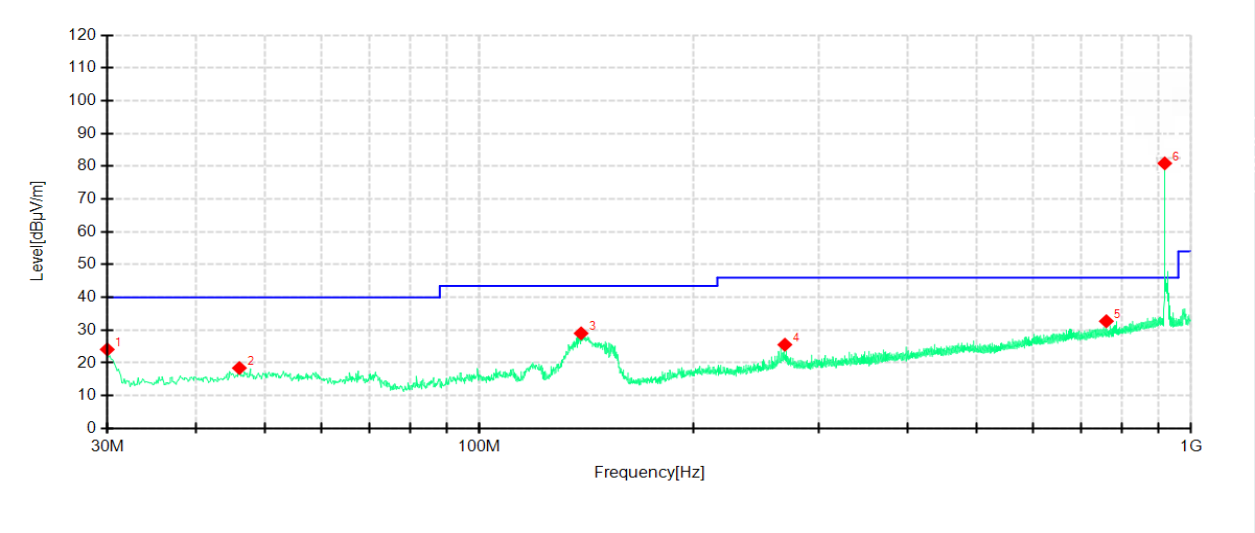
TX / 924.8MHz

Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
924.7756	91	77.00	-14.00	94.00	17.00	100	231	Horizontal	QP
924.7756	91.21	77.86	-13.35	94.00	16.14	100	249	Vertical	QP

Radiated Spurious Emission

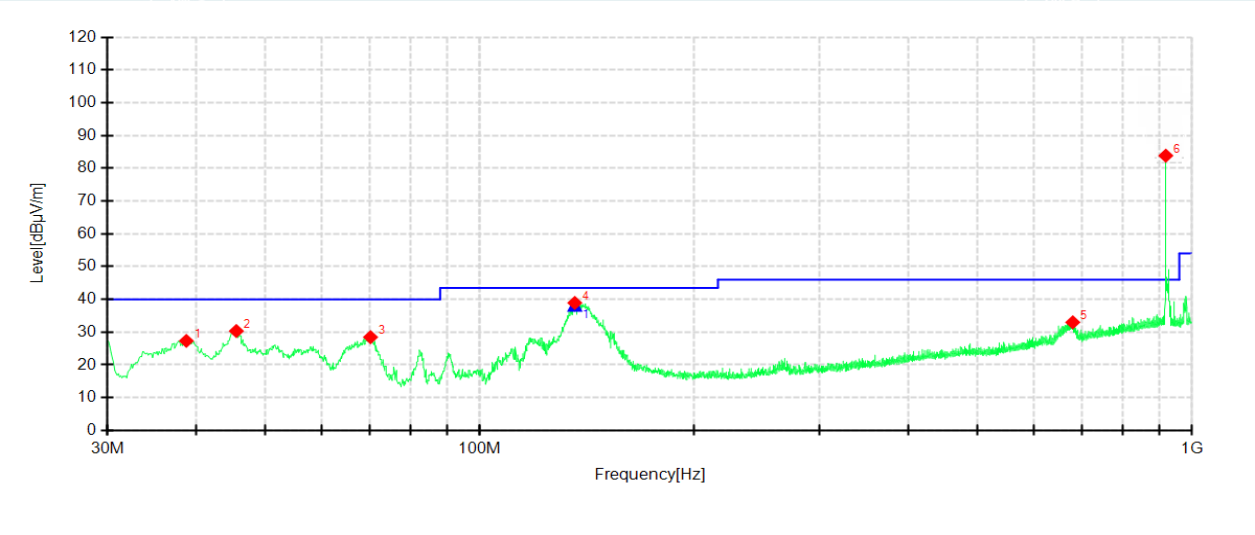
Test Frequency 30MHz – 1GHz

Lowest channel (919.1MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	30.0000	55.72	24.11	-31.61	40.00	15.89	PK	200	148	Horizontal
2	46.0070	47.51	18.44	-29.07	40.00	21.56	PK	200	317	Horizontal
3	139.0174	61.72	29.02	-32.70	43.50	14.48	PK	200	23	Horizontal
4	268.7711	52.37	25.56	-26.81	46.00	20.44	PK	100	110	Horizontal
5	760.5013	49.78	32.71	-17.07	46.00	13.29	PK	200	156	Horizontal
6	919.1161	91.62	78.11	-13.51	46.00	-32.11	PK	100	228	Horizontal

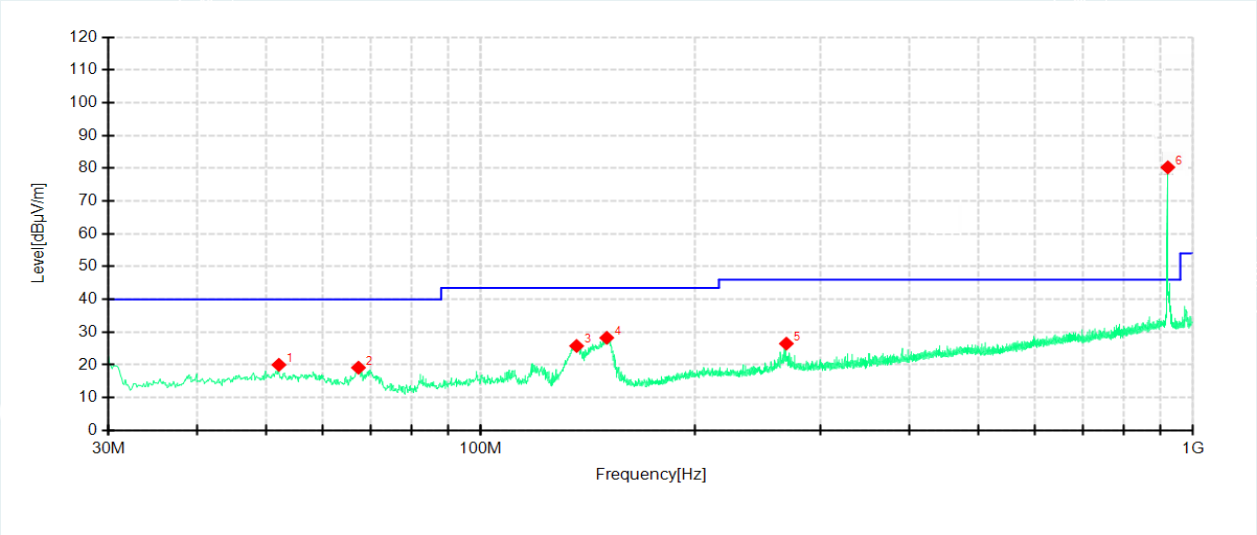
Lowest channel (919.1MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	38.7311	57.01	27.32	-29.69	40.00	12.68	PK	100	169	Vertical
2	45.5219	60.19	30.34	-29.85	40.00	9.66	PK	100	198	Vertical
3	70.2600	60.01	28.46	-31.55	40.00	11.54	PK	200	221	Vertical
4	135.9857	66.88	38.92	-27.96	43.50	4.58	PK	100	4	Vertical
5	680.3450	50.61	32.99	-17.62	46.00	13.01	PK	100	293	Vertical
6	919.1161	93.11	80.24	-12.87	46.00	-34.24	PK	100	264	Vertical

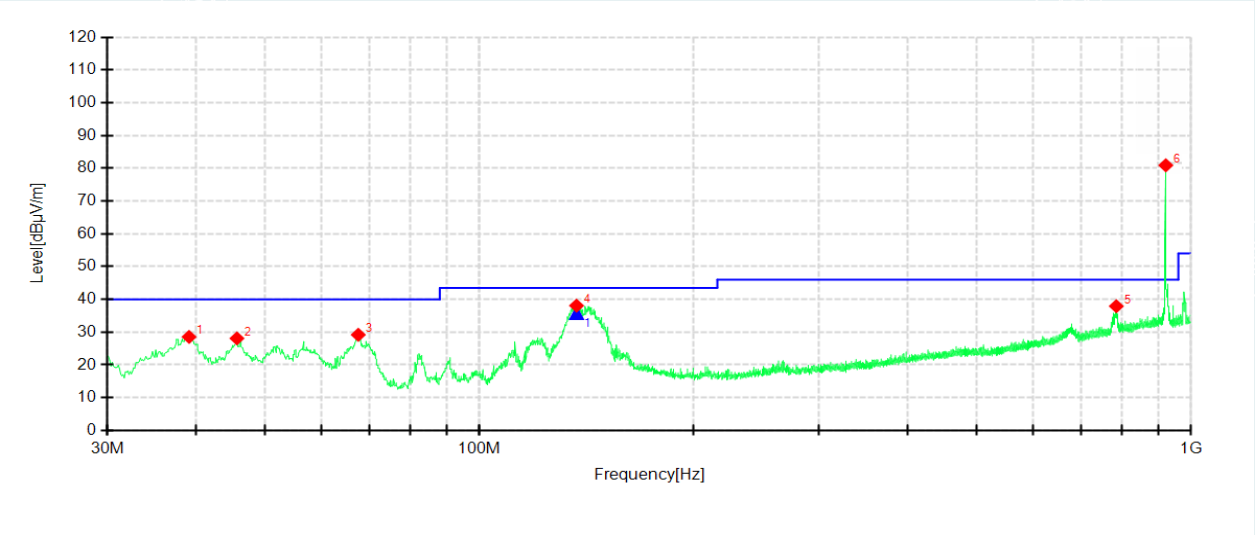
Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	135.9857	-27.96	66.24	38.28	43.50	5.22	100	4	Vertical

Middle channel (921.9MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	52.0703	48.88	20.02	-28.86	40.00	19.98	PK	100	316	Horizontal
2	67.3497	50.70	19.15	-31.55	40.00	20.85	PK	200	256	Horizontal
3	136.3495	58.44	25.78	-32.66	43.50	17.72	PK	200	323	Horizontal
4	150.2950	60.51	28.26	-32.25	43.50	15.24	PK	200	356	Horizontal
5	268.6498	53.30	26.49	-26.81	46.00	19.51	PK	100	351	Horizontal
6	921.9052	91.91	78.47	-13.44	46.00	-32.47	PK	100	221	Horizontal

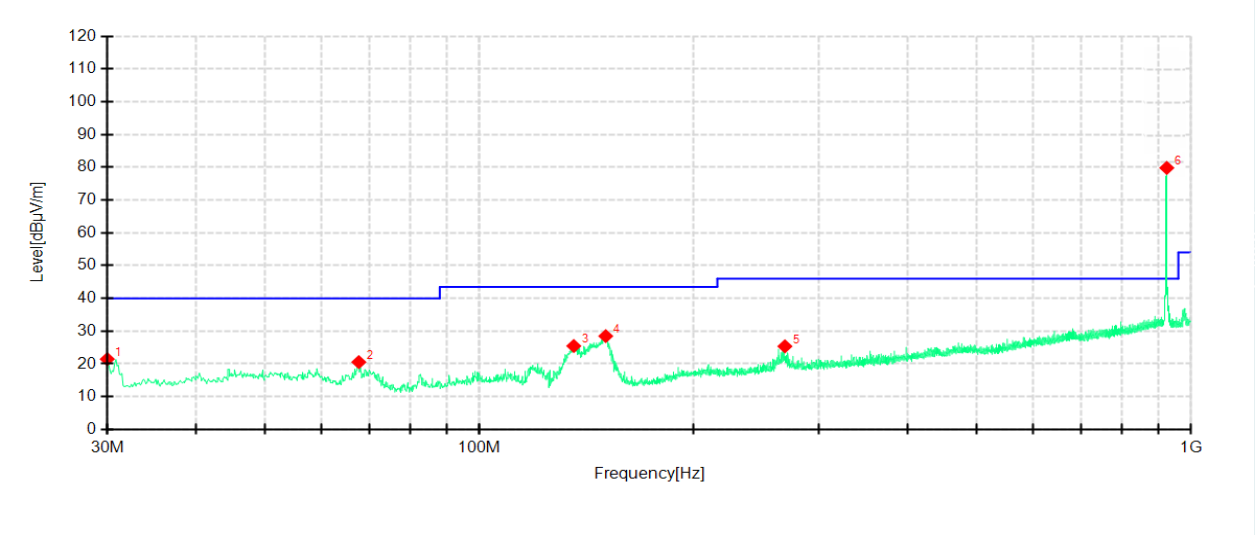
Middle channel (921.9MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	39.0949	58.21	28.54	-29.67	40.00	11.46	PK	100	87	Vertical
2	45.6432	57.95	28.09	-29.86	40.00	11.91	PK	200	162	Vertical
3	67.5922	60.49	29.18	-31.31	40.00	10.82	PK	200	242	Vertical
4	136.9559	65.85	38.07	-27.78	43.50	5.43	PK	100	138	Vertical
5	785.4819	53.75	37.91	-15.84	46.00	8.09	PK	100	308	Vertical
6	921.9052	92.19	79.39	-12.80	46.00	-33.39	PK	100	242	Vertical

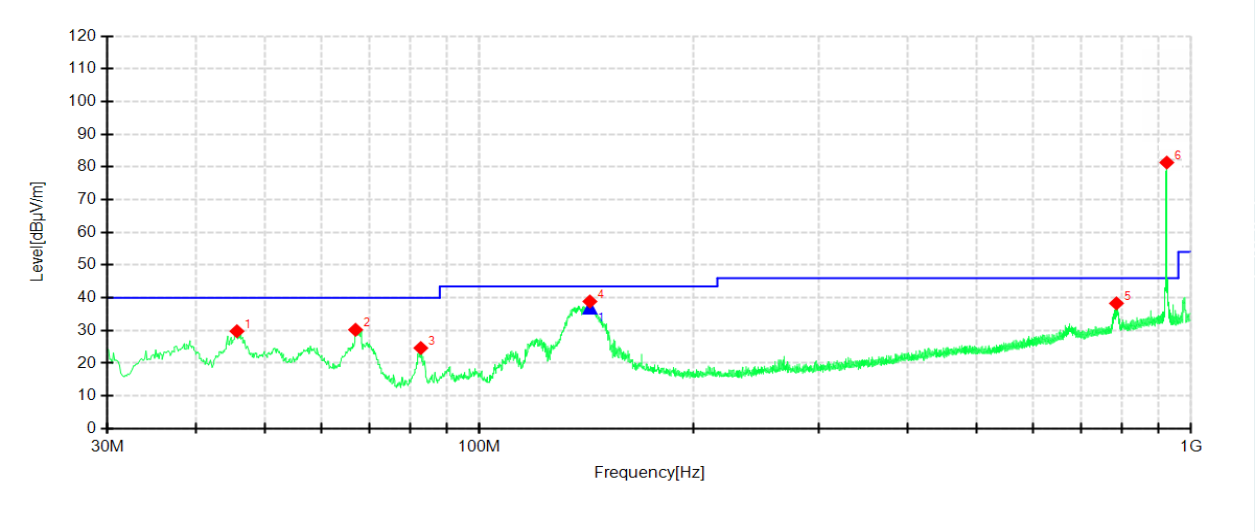
Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	136.9559	-27.78	63.558	35.78	43.50	7.72	100	142	Vertical

Highest channel (924.8MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	30.0000	53.07	21.46	-31.61	40.00	18.54	PK	200	1	Horizontal
2	67.7135	52.19	20.55	-31.64	40.00	19.45	PK	200	317	Horizontal
3	135.7432	58.11	25.46	-32.65	43.50	18.04	PK	200	346	Horizontal
4	150.5376	60.72	28.48	-32.24	43.50	15.02	PK	200	357	Horizontal
5	268.7711	52.17	25.36	-26.81	46.00	20.64	PK	100	338	Horizontal
6	924.8156	92.22	78.29	-13.93	46.00	-32.29	PK	100	228	Horizontal

Highest channel (924.8MHz) Date: 2021-03-11



Suspected Data List										
NO.	Freq. [MHz]	Reading[dB µV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	45.6432	59.64	29.78	-29.86	40.00	10.22	PK	200	131	Vertical
2	66.9859	61.47	30.22	-31.25	40.00	9.78	PK	200	168	Vertical
3	82.7503	57.13	24.65	-32.48	40.00	15.35	PK	200	322	Vertical
4	143.0191	65.84	38.88	-26.96	43.50	4.62	PK	100	86	Vertical
5	785.8457	54.13	38.30	-15.83	46.00	7.70	PK	100	28	Vertical
6	924.8156	92.51	79.23	-13.28	46.00	-33.23	PK	100	248	Vertical

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	143.0191	-26.96	63.934	36.97	43.50	6.53	100	86	Vertical

Note:

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

2 *Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.*

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

4 *Below 1GHz: factor = Antenna Factor + Cable Loss.*

Above 1 GHz

Lowest channel (919.1MHz) Date: 2021-03-09

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1173.7174	62.40	37.78	-24.62	74.00	36.22	150	0	Horizontal
2	1837.9838	67.27	45.87	-21.40	74.00	28.13	150	61	Horizontal
3	2792.9793	58.50	39.66	-18.84	74.00	34.34	150	256	Horizontal
4	3676.8677	63.60	48.26	-15.34	74.00	25.74	150	256	Horizontal
5	6811.8812	51.30	45.65	-5.65	74.00	28.35	150	241	Horizontal
6	9933.3933	47.77	50.14	2.37	74.00	23.86	150	203	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1175.5176	63.62	39.01	-24.61	74.00	34.99	150	105	Vertical
2	1837.9838	68.88	47.48	-21.40	74.00	26.52	150	277	Vertical
3	2792.9793	61.26	42.42	-18.84	74.00	31.58	150	105	Vertical
4	3675.9676	67.02	51.68	-15.34	74.00	22.32	150	105	Vertical
5	6810.0810	50.54	44.88	-5.66	74.00	29.12	150	164	Vertical
6	9937.8938	47.68	50.06	2.38	74.00	23.94	150	105	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	3676.4455	-15.34	199	322	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	3676.4455	-15.34	59.85	44.51	54.00	9.49	199	322	Vertical

Middle channel (921.9MHz) Date: 2021-03-09

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1177.3177	62.25	37.65	-24.60	74.00	36.35	150	9	Horizontal
2	1844.2844	67.00	45.59	-21.41	74.00	28.41	150	210	Horizontal
3	2792.9793	57.11	38.27	-18.84	74.00	35.73	150	255	Horizontal
4	3687.6688	63.65	48.28	-15.37	74.00	25.72	150	255	Horizontal
5	6807.3807	50.44	44.77	-5.67	74.00	29.23	150	196	Horizontal
6	9902.7903	47.73	50.04	2.31	74.00	23.96	150	181	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1171.9172	61.79	37.17	-24.62	74.00	36.83	150	105	Vertical
2	1843.3843	68.85	47.44	-21.41	74.00	26.56	150	239	Vertical
3	2765.9766	61.52	42.80	-18.72	74.00	31.20	150	299	Vertical
4	3687.6688	66.80	51.43	-15.37	74.00	22.57	150	105	Vertical
5	6800.1800	50.92	45.21	-5.71	74.00	28.79	150	105	Vertical
6	9837.9838	47.96	50.19	2.23	74.00	23.81	150	105	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	3687.6504	-15.37	199	323	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	3687.6504	-15.37	61.16	45.79	54.00	8.21	199	323	Vertical

Highest channel (924.8MHz) Date: 2021-03-09

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1175.5176	62.51	37.90	-24.61	74.00	36.10	150	3	Horizontal
2	1849.6850	66.79	45.37	-21.42	74.00	28.63	150	210	Horizontal
3	3158.4158	56.13	38.93	-17.20	74.00	35.07	150	256	Horizontal
4	3699.3699	63.96	48.56	-15.40	74.00	25.44	150	256	Horizontal
5	6488.7489	51.45	44.80	-6.65	74.00	29.20	150	256	Horizontal
6	9657.9658	48.13	50.34	2.21	74.00	23.66	150	256	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1180.9181	62.01	37.42	-24.59	74.00	36.58	150	105	Vertical
2	1849.6850	67.59	46.17	-21.42	74.00	27.83	150	241	Vertical
3	2792.9793	61.01	42.17	-18.84	74.00	31.83	150	113	Vertical
4	3699.3699	67.40	52.00	-15.40	74.00	22.00	150	105	Vertical
5	6587.7588	51.45	44.74	-6.71	74.00	29.26	150	105	Vertical
6	9963.0963	47.84	50.27	2.43	74.00	23.73	150	280	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	3699.2589	-15.40	199	314	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	3699.2589	-15.40	62.90	47.50	54.00	6.50	199	314	Vertical

Note:

1 *Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.*

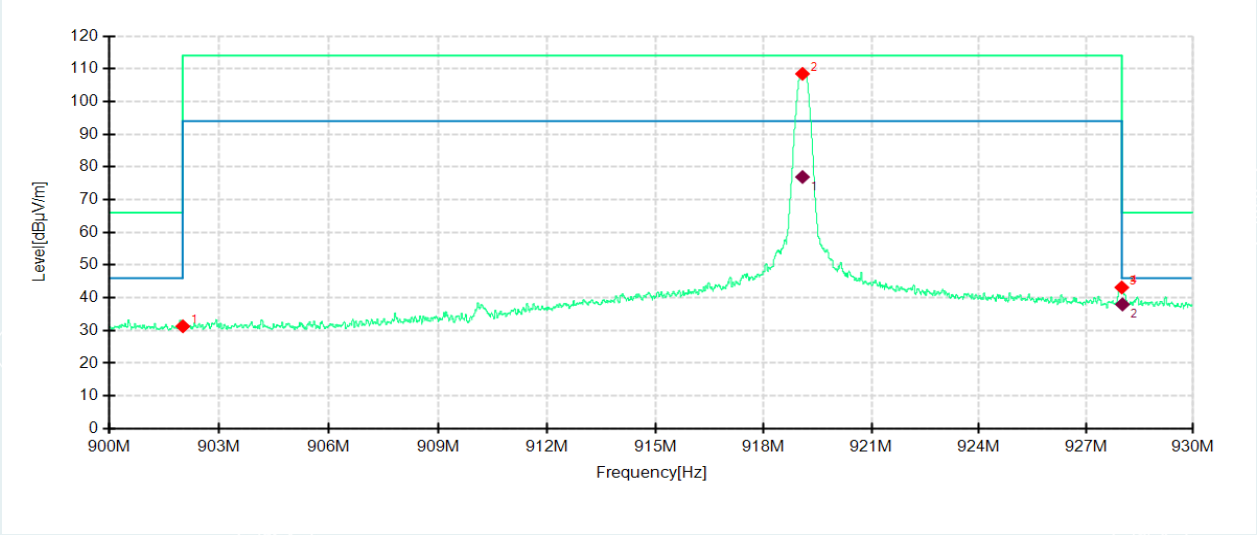
2 *According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's* unnecessary to perform an average measurement.

3 *The IF bandwidth of Receiver between above was 1MHz*

4 *Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.*

BANDEDGE

Lowest channel (919.1MHz) Date: 2021-03-11

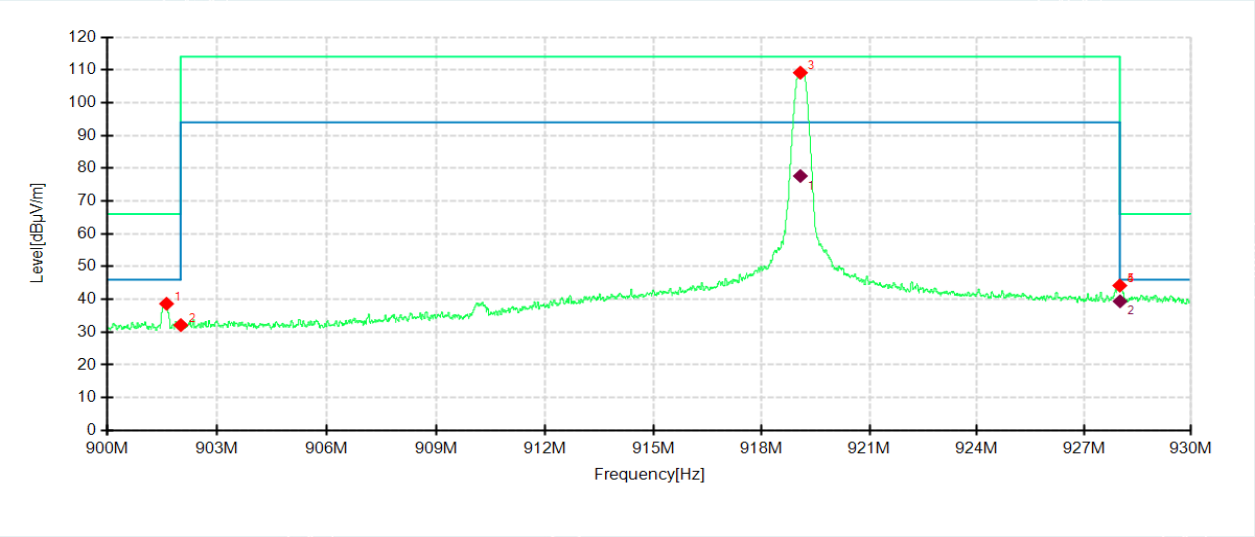


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	902.0065	45.61	31.29	-14.32	114.00	82.71	100	357	Horizontal
2	919.0786	122.58	108.45	-14.13	114.00	5.55	100	228	Horizontal
3	928.0000	57.07	43.16	-13.91	66.00	22.84	100	147	Horizontal
4	928.0198	57.20	43.29	-13.91	66.00	22.71	100	309	Horizontal

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	919.0786	-14.13	100	228	Horizontal
2	928.0198	-13.91	100	309	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	919.0786	-14.13	91.06	76.93	94.00	17.07	100	228	Horizontal
2	928.0198	-13.91	51.893	37.98	46.00	8.02	100	309	Horizontal

Lowest channel (919.1MHz) Date: 2021-03-11

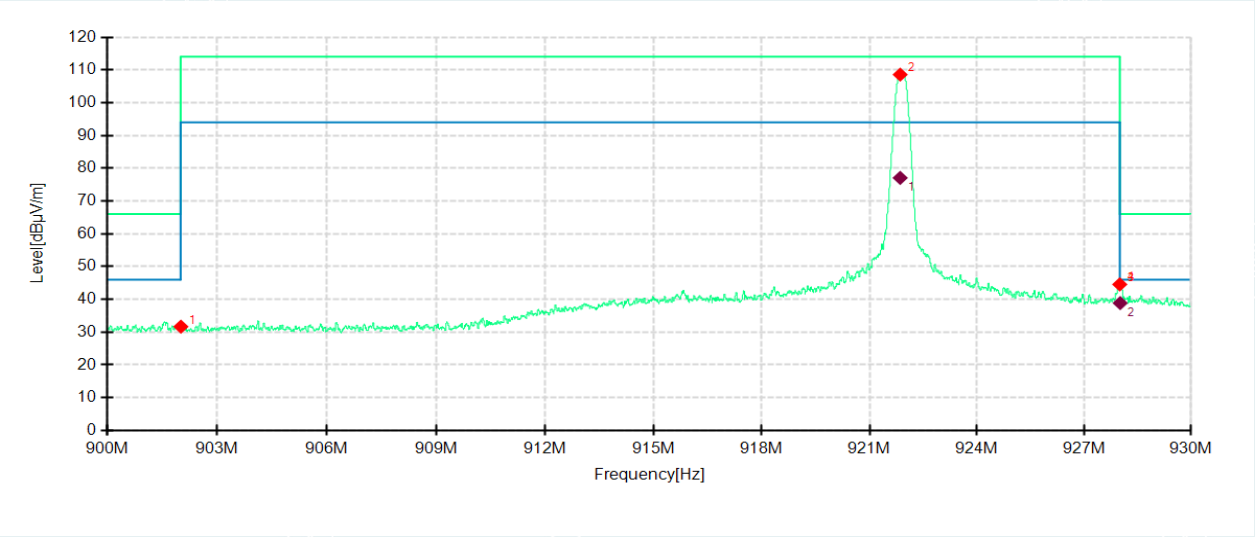


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	901.6165	52.37	38.65	-13.72	66.00	27.35	100	101	Vertical
2	902.0065	45.84	32.13	-13.71	114.00	81.87	100	35	Vertical
3	919.0749	122.64	109.15	-13.49	114.00	4.85	100	252	Vertical
4	928.0000	57.46	44.20	-13.26	66.00	21.80	100	252	Vertical
5	928.0085	57.47	44.21	-13.26	66.00	21.79	100	252	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	919.0749	-13.49	100	252	Vertical
2	928.0085	-13.26	100	260	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	919.0749	-13.49	91.12	77.63	94.00	16.37	100	252	Vertical
2	928.0085	-13.26	52.674	39.41	46.00	6.59	100	260	Vertical

Middle channel (921.9MHz) Date: 2021-03-11

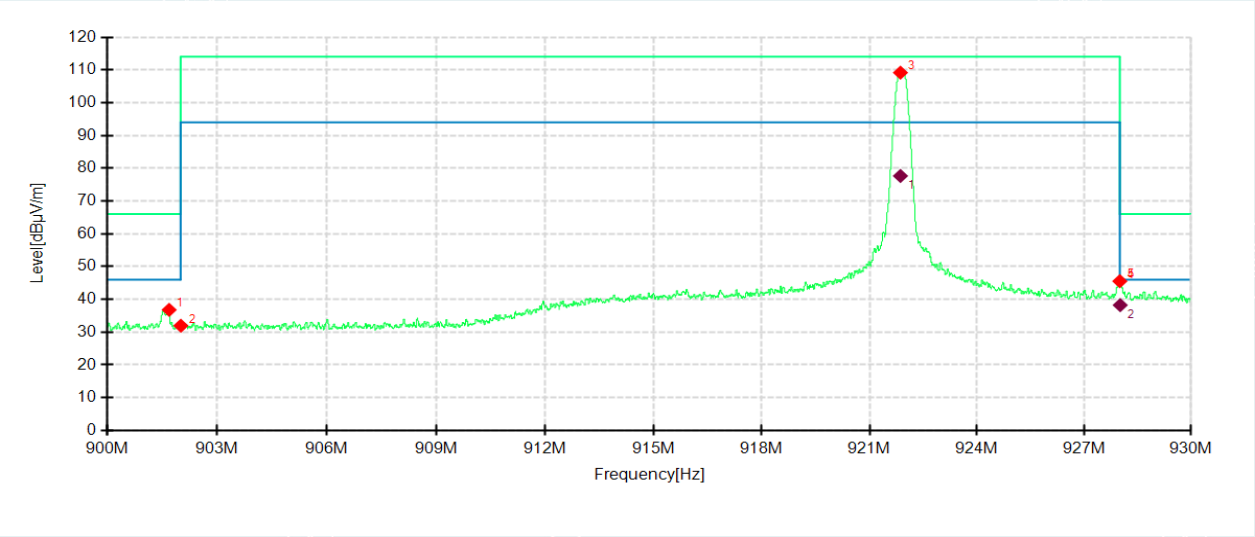


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	902.0065	45.99	31.67	-14.32	114.00	82.33	100	89	Horizontal
2	921.8540	122.65	108.57	-14.08	114.00	5.43	100	236	Horizontal
3	928.0000	58.47	44.56	-13.91	66.00	21.44	100	140	Horizontal
4	928.0123	58.71	44.80	-13.91	66.00	21.20	100	140	Horizontal

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	921.8540	-14.08	100	236	Horizontal
2	928.0123	-13.91	100	145	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	921.8540	-14.08	91.13	77.05	94.00	16.95	100	236	Horizontal
2	928.0123	-13.91	52.775	38.87	46.00	7.13	100	145	Horizontal

Middle channel (921.9MHz) Date: 2021-03-11

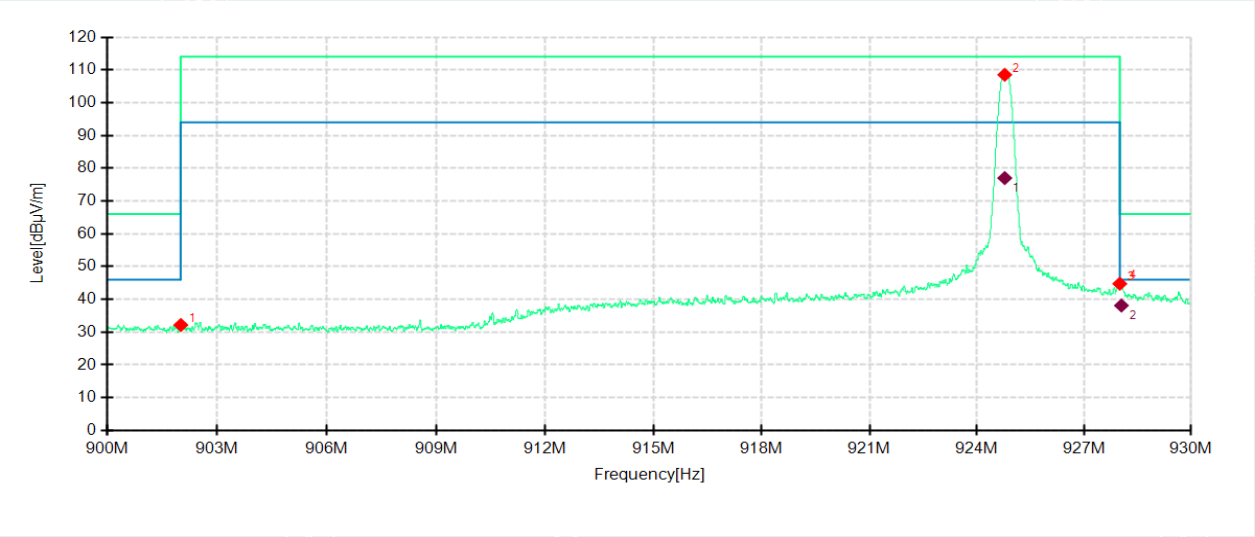


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	901.6877	50.51	36.79	-13.72	66.00	29.21	100	89	Vertical
2	902.0065	45.67	31.96	-13.71	114.00	82.04	100	246	Vertical
3	921.8615	122.61	109.17	-13.44	114.00	4.83	100	246	Vertical
4	928.0000	58.80	45.54	-13.26	66.00	20.46	100	208	Vertical
5	928.0123	58.97	45.71	-13.26	66.00	20.29	100	208	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	921.8615	-13.44	100	246	Vertical
2	928.0123	-13.26	100	208	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	921.8615	-13.44	91.09	77.65	94.00	16.35	100	246	Vertical
2	928.0123	-13.26	51.485	38.23	46.00	7.77	100	208	Vertical

Highest channel (924.8MHz) Date: 2021-03-11

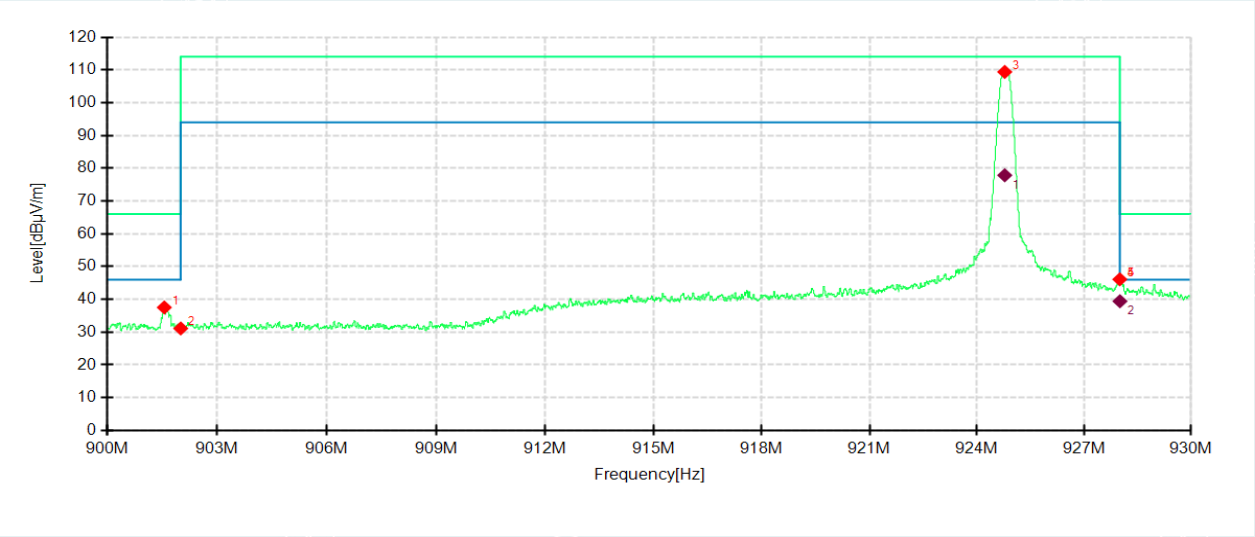


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	902.0065	46.49	32.17	-14.32	114.00	81.83	100	299	Horizontal
2	924.7756	122.52	108.52	-14.00	114.00	5.48	100	231	Horizontal
3	928.0000	58.66	44.75	-13.91	66.00	21.25	100	277	Horizontal
4	928.0460	59.31	45.40	-13.91	66.00	20.60	100	202	Horizontal

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	924.7756	-14.00	100	231	Horizontal
2	928.0460	-13.91	100	202	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	924.7756	-14.00	91	77.00	94.00	17.00	100	231	Horizontal
2	928.0460	-13.91	52.029	38.12	46.00	7.88	100	202	Horizontal

Highest channel (924.8MHz) Date: 2021-03-11



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	901.5564	51.25	37.53	-13.72	66.00	28.47	100	125	Vertical
2	902.0028	44.83	31.12	-13.71	114.00	82.88	100	316	Vertical
3	924.7756	122.73	109.38	-13.35	114.00	4.62	100	249	Vertical
4	928.0000	59.37	46.11	-13.26	66.00	19.89	100	198	Vertical
5	928.0048	59.25	45.99	-13.26	66.00	20.01	100	198	Vertical

PK Final Data List					
NO.	Freq. [MHz]	Factor [dB]	Height [cm]	Angle [°]	Polarity
1	924.7756	-13.35	100	249	Vertical
2	928.0048	-13.26	100	208	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	924.7756	-13.35	91.21	77.86	94.00	16.14	100	249	Vertical
2	928.0048	-13.26	52.678	39.42	46.00	6.58	100	208	Vertical

Note:

1 AVG reading=Peak reading -20log(Δ); Where, Δ=Duty cycle= $T_{on}/T_{(on+off)}$=30/1030=0.0291

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

3 Factor = Antenna Factor + Cable Loss.

7. 20DB BANDWIDTH

7.1. LIMITS

The test of the item was performed in accordance with the standards §15.215(c).

7.2. TEST PROCEDURES

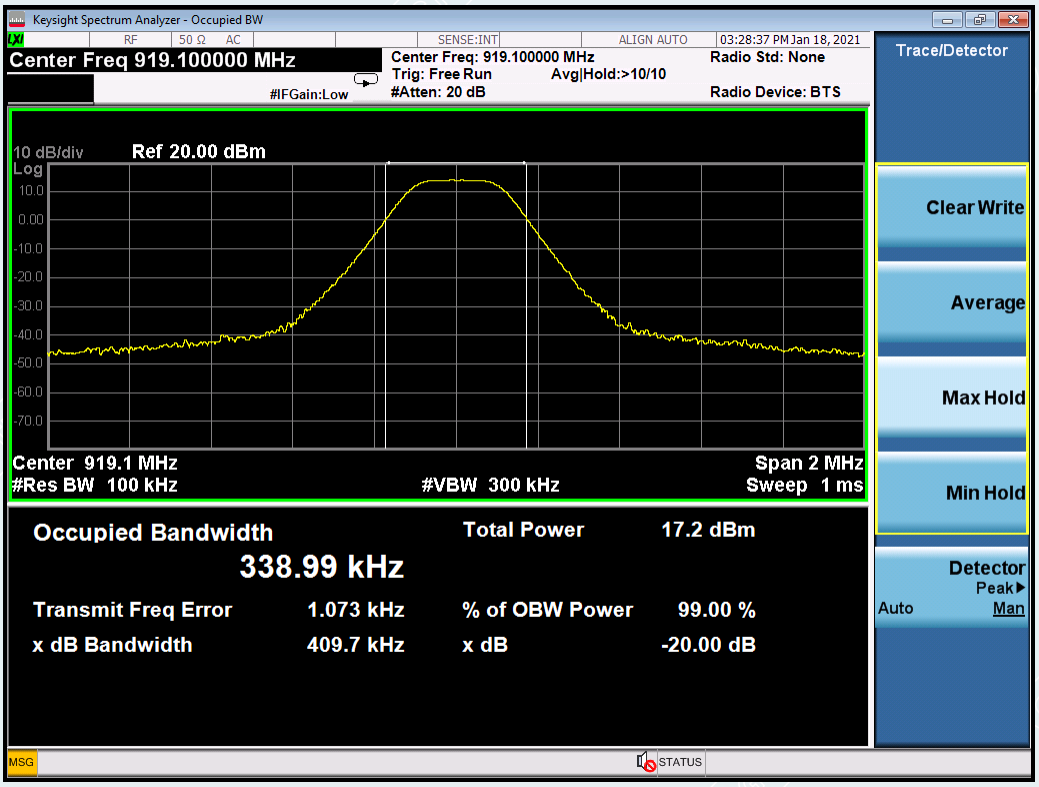
1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer**.**
2) Set the spectrum analyzer as RBW=1%to 3% OBW, VBW=3RBW, Span>Declare bandwidth, Sweep = auto.
3) Record 20dB of the bandwidth value.
4) Repeat above procedures until all frequencies measured were complete.

7.3. TEST SETUP

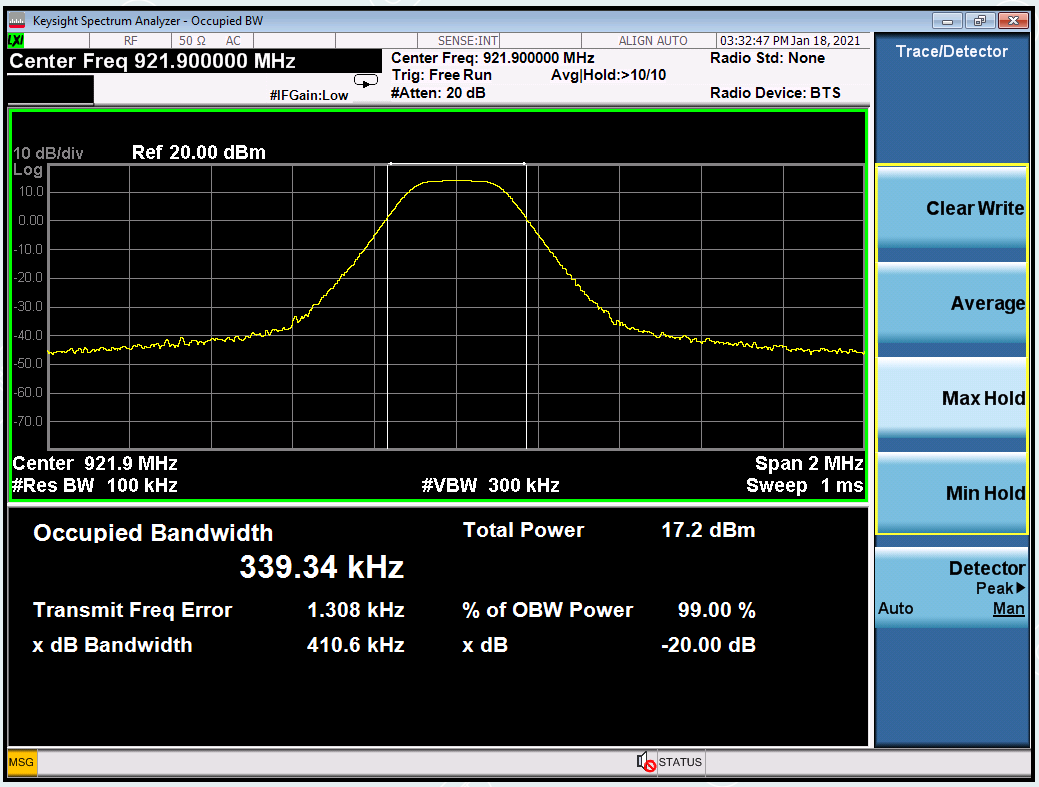
7.4. TEST RESULTS

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	Test Result
Low	919.1	409.7	PASS
Mid	921.9	410.6	PASS
High	924.8	410.2	PASS

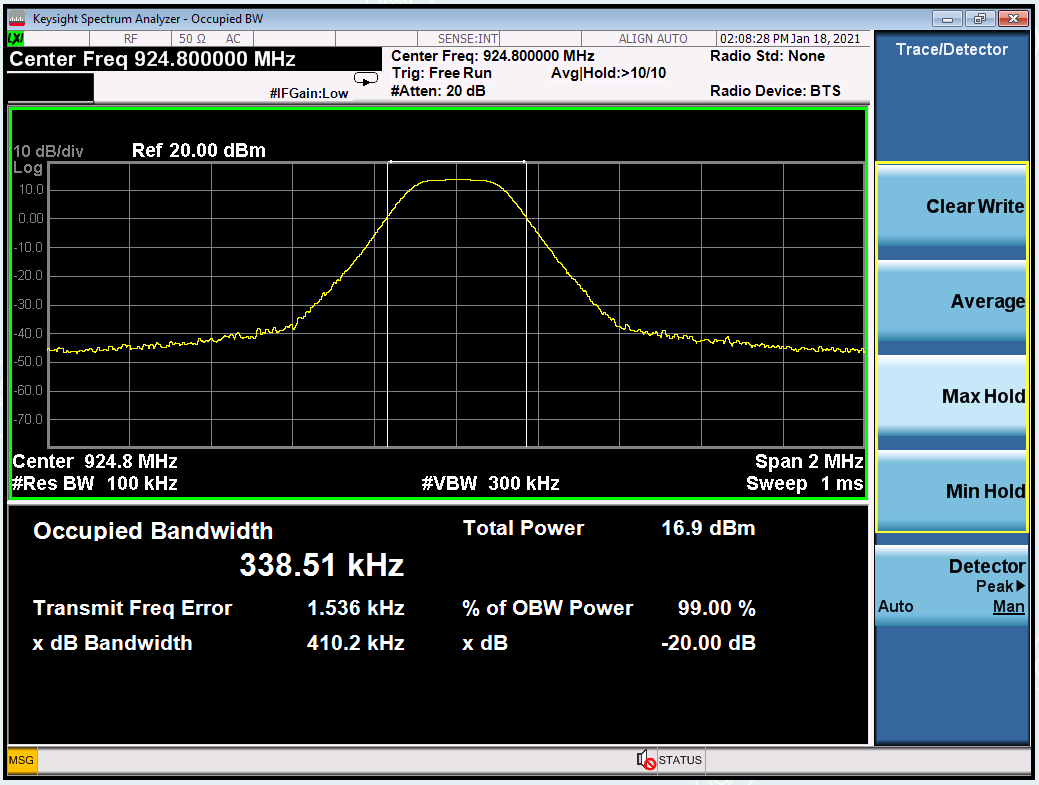
Channel 919.1MHz



Channel 921.9MHz



Channel 924.8MHz



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