Microtest
微测检测

Test Report

FCC ID: 2ASJR-CM2-1112120

Date of issue: June 15, 2019

Report Number:	MTi190614E098
Sample Description:	GT-Sense SMA Connectors
Model(s):	CM2-1112120, CM2-1102120
Applicant:	Globetracker, ApS
Address:	Strandgade 91, 4th Floor, DK-1401 Copenhagen K, DK
Date of Test:	Feb. 25, 2019 to June 15, 2019

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Test Result Certification

Applicant's name:	Globetracker, ApS
Address:	Strandgade 91, 4th Floor, DK-1401 Copenhagen K, DK
Manufacture's Name:	Danchell
Address:	Lyngvej 8-DK-4450 4450 Jyderup Denmark
Product name:	GT-Sense SMA Connectors
Trademark:	GT-Sense
Model name:	CM2-1112120, CM2-1102120
Standards:	FCC Part 15.249
Test Procedure:	ANSI C63.10-2013

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

Tested by:	Demi Mu	June 15, 2019
Reviewed by:	Blue Zheng	June 15, 2019
Approved by:	Smith Chen	June 15, 2019

1 General description

1.1 Feature of equipment under test (EUT)

Equipment:	GT-Sense SMA Connectors
Trade Name:	GT-Sense
Model Name:	CM2-1112120
Serial Model:	CM2-1102120
Model Difference:	All the model are the same circuit and RF module, except the CM2-110210 has some temperature, humidity and pressure sensors removed.
Operation Frequency:	907-923MHz
Modulation Type:	GFSK
Antenna Type:	Chip antenna
Antenna Gain:	-0.5dBi
Power Source:	DC 36V from adapter
Battery:	DC 3.7V from battery or DC 36V from adapter
Hardware Version:	3
Software Version:	60_3

1.2 Operation channel list

Channel	Frequency(MHz)
1	907
2	913
3	923

1.3 Test Frequency Channel

Channel	Frequency(MHz)
Low	907
Middle	913
High	923

1.4 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement.

1.5 Ancillary equipment list

Equipment	Model	S/N	Manufacturer
Adapter	/	/	/

2 Summary of Test Result

Test procedures according to the technical standards:

Item	FCC Part No.	Description of Test	Result
1	FCC Part15.203	Antenna Requirement	Pass
2	FCC Part15.207	AC power line conducted emission	Pass
3	FCC Part15.249(d)	Radiated spurious emission	Pass
4	FCC Part 15.215	20dB and 99% Bandwidth	Pass

3 Test Facilities and Accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.	448573

3.2 Environmental conditions

Temperature:	15ºC~35ºC
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

The reported uncertainty of measurement y ± 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 %

RF frequency	1 x 10-7
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Farad	LZ-RF	Lz_Rf 3A3

4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E001	Spectrum Analyzer	Agilent	E4407B	MY41441082	2018/09/18	2019/09/17
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI	1000314	2018/09/18	2019/09/17
MTI-E006	Broadband antenna	schwarabeck	VULB9163	872	2018/09/18	2019/09/17
MTI-E007	Horn antenna	schwarabeck	BBHA9120D	1201	2018/09/18	2019/09/17
MTI-E014	amplifier	America	8447D	3113A06150	2018/09/18	2019/09/17
MTI-E015	Conduction Immunity Signal Generator	Schloder	CDG6000	126A1343/2015	2018/09/18	2019/09/17
MTI-E016	Coupled decoupling network	Schloder	CND M2/M3	A2210332/2015	2018/09/18	2019/09/17
MTI-E034	amplifier	Agilent	8449B	3008A02400	2018/08/22	2019/08/21
MTI-E040	Spectrum analyzer	Agilent	N9020A	MY49100060	2018/09/05	2019/09/04
MTI-E041	Signal generator	Agilent	N5182A	MY49060455	2018/09/23	2019/09/22
MTI-E042	Analog signal generator	Agilent	E4421B	GB40051240	2018/09/23	2019/09/22
MTI-E043	Power probe	Dare Instruments	RPR3006W	16I00054SNO16	2018/09/29	2019/09/28
MTI-E047	10dB attenuator	Mini-Circuits	UNAT-10+	15542	2018/09/24	2019/09/23
MTI-E049	spectrum analyzer	Rohde&schwarz	FSP-38	100019	2018/09/18	2019/09/17
MTI-E050	PSG Signal generator	Agilent	E8257D	MY46520873	2018/09/24	2019/09/23
MTI-E061	Active Loop Antenna 9kHz - 30MHz	Schwarzbeek	FMZB 1519 B	00044	2018/09/26	2019/09/25
MTI-E052	18-40GHz amplifier	Chengdu step Micro Technology	ZLNA-18-40G-21	1608001	2018/09/18	2019/09/17
MTI-E053	15-40G Antenna	Schwarzbeek	BBHA9170	BBHA9170582	2018/09/18	2019/09/17
Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).						

5 Test Result

5.1 Antenna requirement

5.1.1 Standard requirement

FCC PART 15.203 and 15.247(b);

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.1.2 EUT Antenna

The antenna is an Chip antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is -0.5dBi.

5.2 Conducted emission

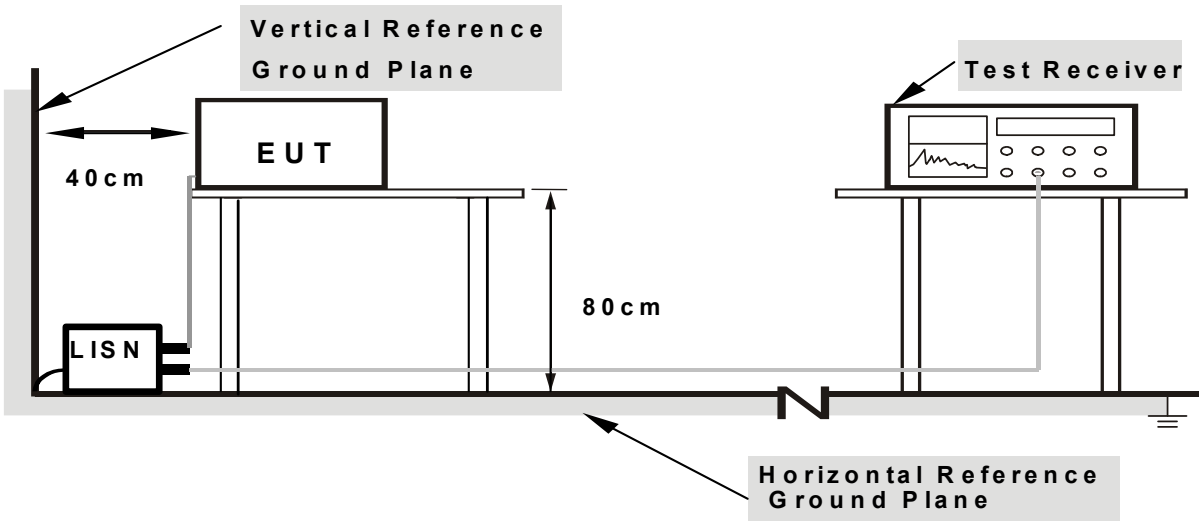
5.2.1 Limits

FCC §15.207;

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 note2	56 - 46 note2
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00
Note1: The tighter limit applies at the band edges. *Note2: The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.*		

5.2.2 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 from other units and other metal planes

5.2.3 Test procedure

a. 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.

b. 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

c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d. 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.

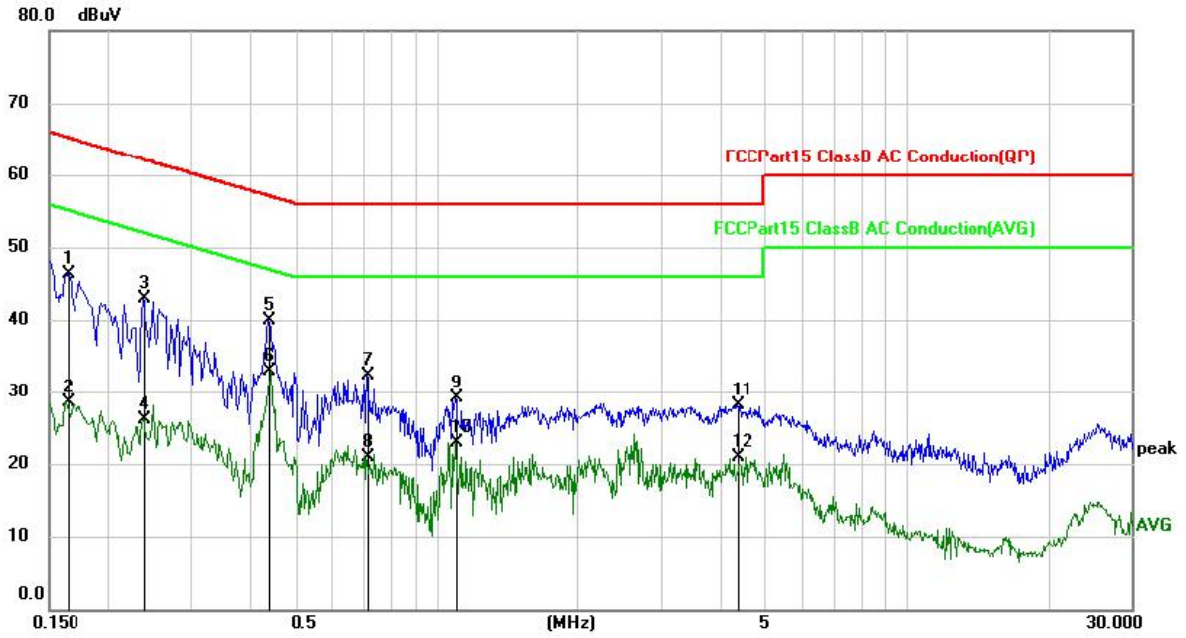
e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

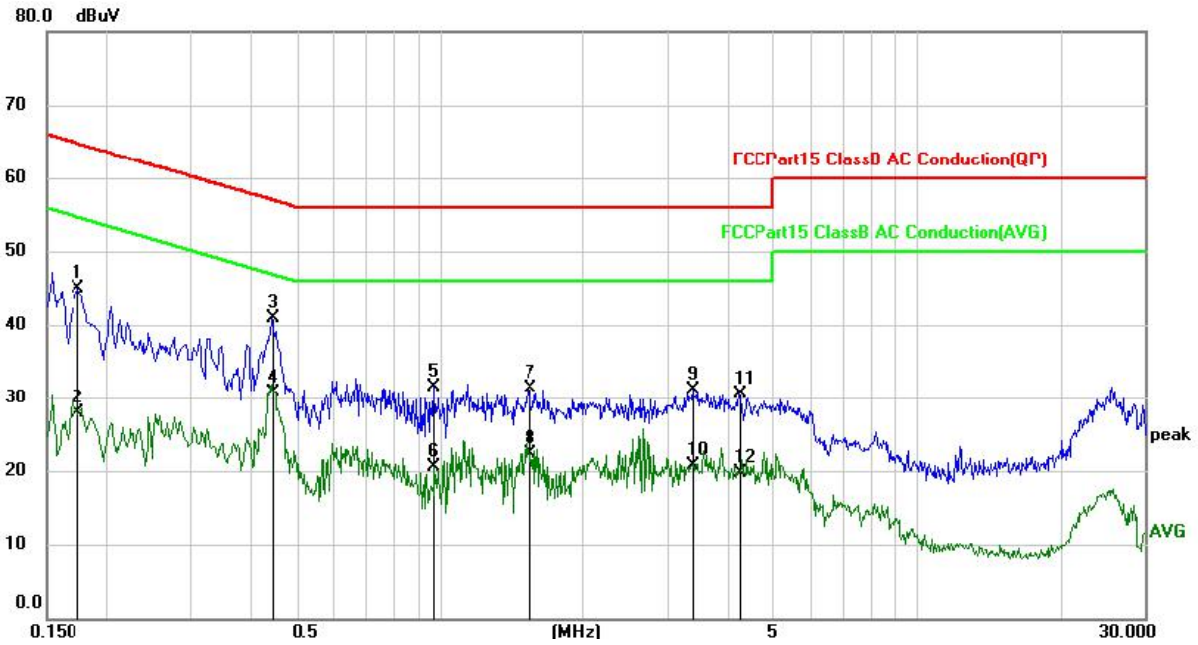
5.2.4 Test results

EUT：	GT-Sense SMA Connectors	Model Name. ：	CM2-1112120
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase ：	L
Test Voltage ：	36V from adapter AC 120V/60Hz	Test Mode：	Charging+TX



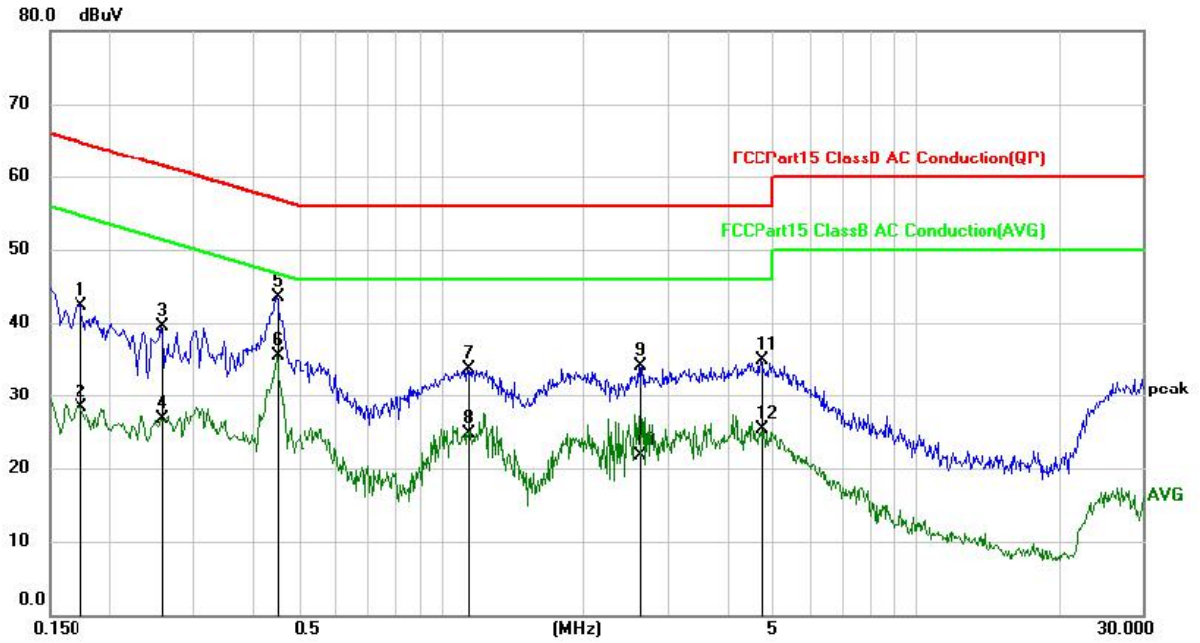
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1650	35.81	10.51	46.32	65.21	-18.89	QP	
2		0.1650	18.09	10.51	28.60	55.21	-26.61	AVG	
3		0.2379	32.38	10.48	42.86	62.17	-19.31	QP	
4		0.2379	15.63	10.48	26.11	52.17	-26.06	AVG	
5		0.4380	29.57	10.42	39.99	57.10	-17.11	QP	
6	*	0.4380	22.55	10.42	32.97	47.10	-14.13	AVG	
7		0.7137	21.94	10.38	32.32	56.00	-23.68	QP	
8		0.7137	10.51	10.38	20.89	46.00	-25.11	AVG	
9		1.0940	18.72	10.36	29.08	56.00	-26.92	QP	
10		1.0940	12.59	10.36	22.95	46.00	-23.05	AVG	
11		4.3578	17.87	10.26	28.13	56.00	-27.87	QP	
12		4.3578	10.70	10.26	20.96	46.00	-25.04	AVG	

EUT：	GT-Sense SMA Connectors	Model Name. ：	CM2-1112120
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase :	N
Test Voltage ：	36V from adapter AC 120V/60Hz	Test Mode：	Charging+TX



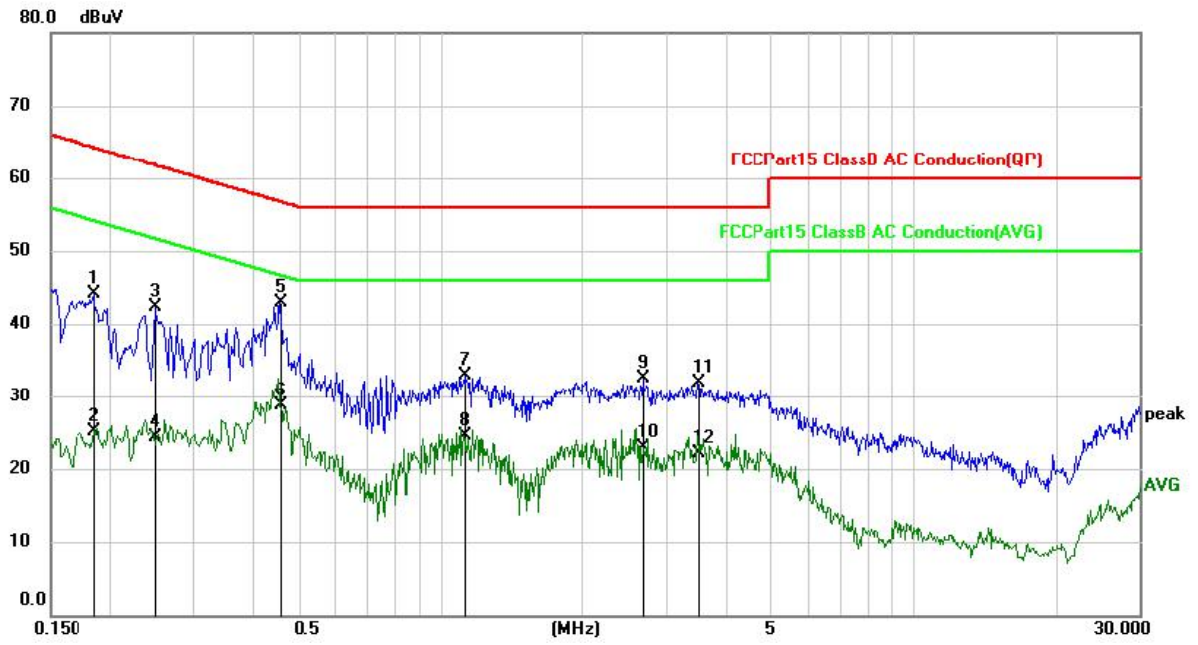
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1737	34.40	10.51	44.91	64.78	-19.87	QP	
2		0.1737	17.44	10.51	27.95	54.78	-26.83	AVG	
3	*	0.4460	30.51	10.42	40.93	56.95	-16.02	QP	
4		0.4460	20.32	10.42	30.74	46.95	-16.21	AVG	
5		0.9700	21.11	10.37	31.48	56.00	-24.52	QP	
6		0.9700	10.12	10.37	20.49	46.00	-25.51	AVG	
7		1.5420	21.03	10.34	31.37	56.00	-24.63	QP	
8		1.5420	12.05	10.34	22.39	46.00	-23.61	AVG	
9		3.3900	20.90	10.20	31.10	56.00	-24.90	QP	
10		3.3900	10.53	10.20	20.73	46.00	-25.27	AVG	
11		4.2339	20.25	10.25	30.50	56.00	-25.50	QP	
12		4.2339	9.44	10.25	19.69	46.00	-26.31	AVG	

EUT：	GT-Sense SMA Connectors	Model Name. ：	CM2-1112120
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase :	N
Test Voltage ：	36V from adapter AC 240V/60Hz	Test Mode：	Charging+TX



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1737	31.83	10.51	42.34	64.78	-22.44	QP	
2		0.1737	17.76	10.51	28.27	54.78	-26.51	AVG	
3		0.2580	29.06	10.47	39.53	61.50	-21.97	QP	
4		0.2580	16.17	10.47	26.64	51.50	-24.86	AVG	
5		0.4500	33.13	10.43	43.56	56.88	-13.32	QP	
6	*	0.4500	24.99	10.43	35.42	46.88	-11.46	AVG	
7		1.1377	23.26	10.36	33.62	56.00	-22.38	QP	
8		1.1377	14.41	10.36	24.77	46.00	-21.23	AVG	
9		2.6218	23.73	10.28	34.01	56.00	-21.99	QP	
10		2.6218	11.36	10.28	21.64	46.00	-24.36	AVG	
11		4.7378	24.64	10.30	34.94	56.00	-21.06	QP	
12		4.7378	14.93	10.30	25.23	46.00	-20.77	AVG	

EUT：	GT-Sense SMA Connectors	Model Name. ：	CM2-1112120
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase :	L
Test Voltage ：	36V from adapter AC 240V/60Hz	Test Mode：	Charging+TX



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1859	33.65	10.50	44.15	64.22	-20.07	QP	
2		0.1859	14.61	10.50	25.11	54.22	-29.11	AVG	
3		0.2500	31.79	10.47	42.26	61.76	-19.50	QP	
4		0.2500	13.93	10.47	24.40	51.76	-27.36	AVG	
5	*	0.4580	32.56	10.43	42.99	56.73	-13.74	QP	
6		0.4580	18.27	10.43	28.70	46.73	-18.03	AVG	
7		1.1257	22.55	10.36	32.91	56.00	-23.09	QP	
8		1.1257	14.18	10.36	24.54	46.00	-21.46	AVG	
9		2.6819	22.32	10.27	32.59	56.00	-23.41	QP	
10		2.6819	12.66	10.27	22.93	46.00	-23.07	AVG	
11		3.4940	21.71	10.20	31.91	56.00	-24.09	QP	
12		3.4940	11.95	10.20	22.15	46.00	-23.85	AVG	

5.3 Radiated spurious emission

5.3.1 Limit

FCC PART 15.249(a);

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

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

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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

5.3.2 Test method

a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

c) Use the following spectrum analyzer settings:

1) Span = wide enough to fully capture the emission being measured

2) RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz

3) VBW ≥ RBW, Sweep = auto

4) Detector function = peak

5) Trace = max hold

d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

5.3.3 Test Result

Note: If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

Below 30MHz

EUT：	GT-Sense SMA Connectors	Model Name. ：	CM2-1112120
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage：	36V from adapter AC 240V/60Hz
Test Mode：	Charging+TX	Polarization :	--

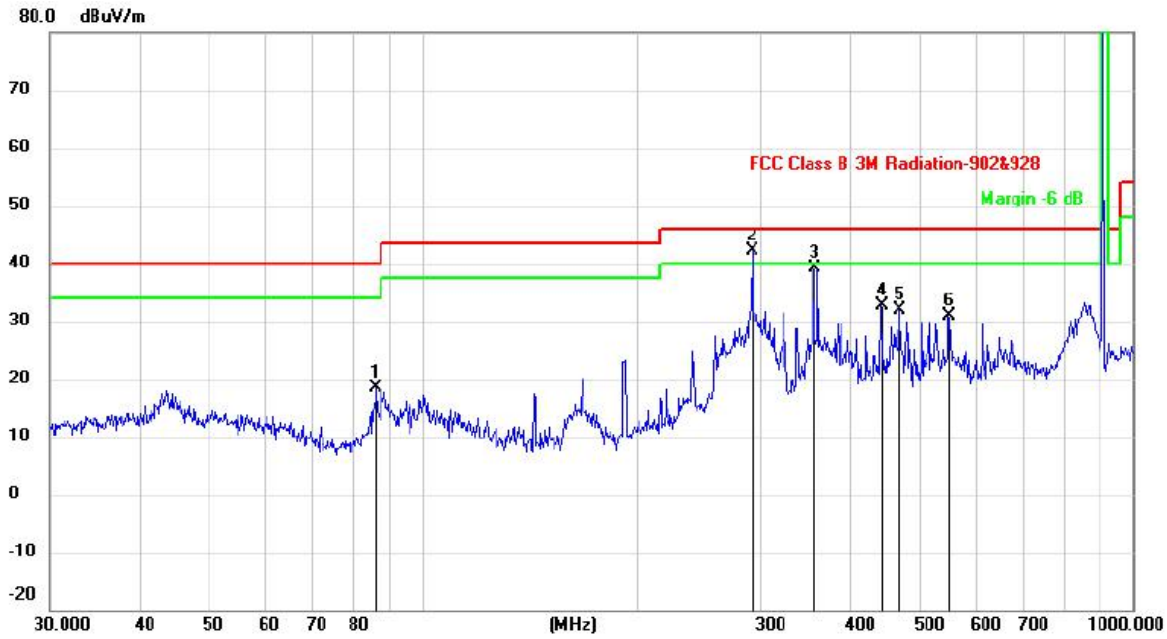
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

5.3.4 Test Result

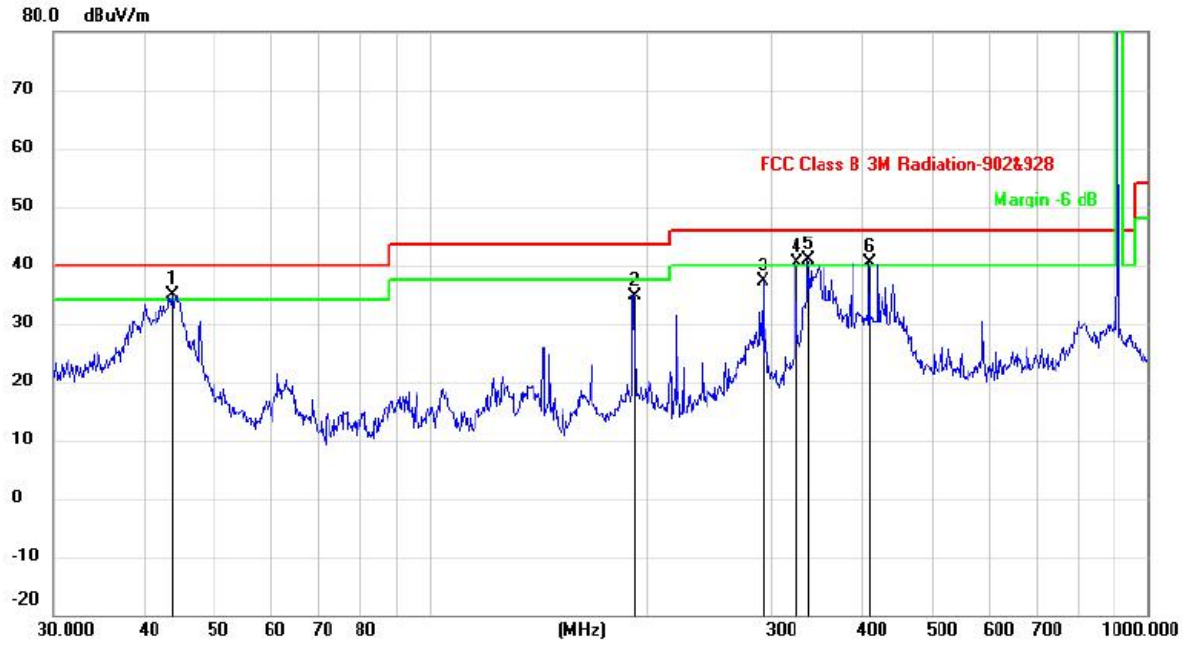
30MHz-1GHz

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



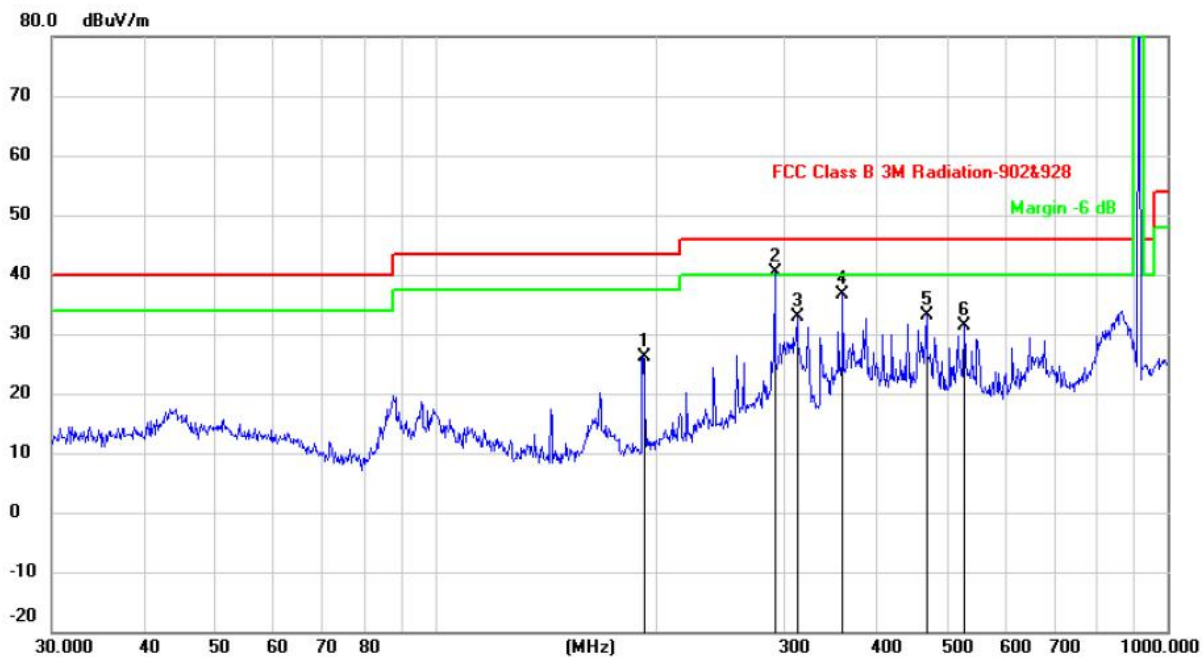
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		86.2001	32.50	-14.02	18.48	40.00	-21.52	QP
2	*	291.0360	51.09	-8.88	42.21	46.00	-3.79	QP
3		355.4273	46.71	-7.48	39.23	46.00	-6.77	QP
4		441.7426	38.45	-5.94	32.51	46.00	-13.49	QP
5		468.8762	37.43	-5.54	31.89	46.00	-14.11	QP
6		549.0195	36.11	-5.21	30.90	46.00	-15.10	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



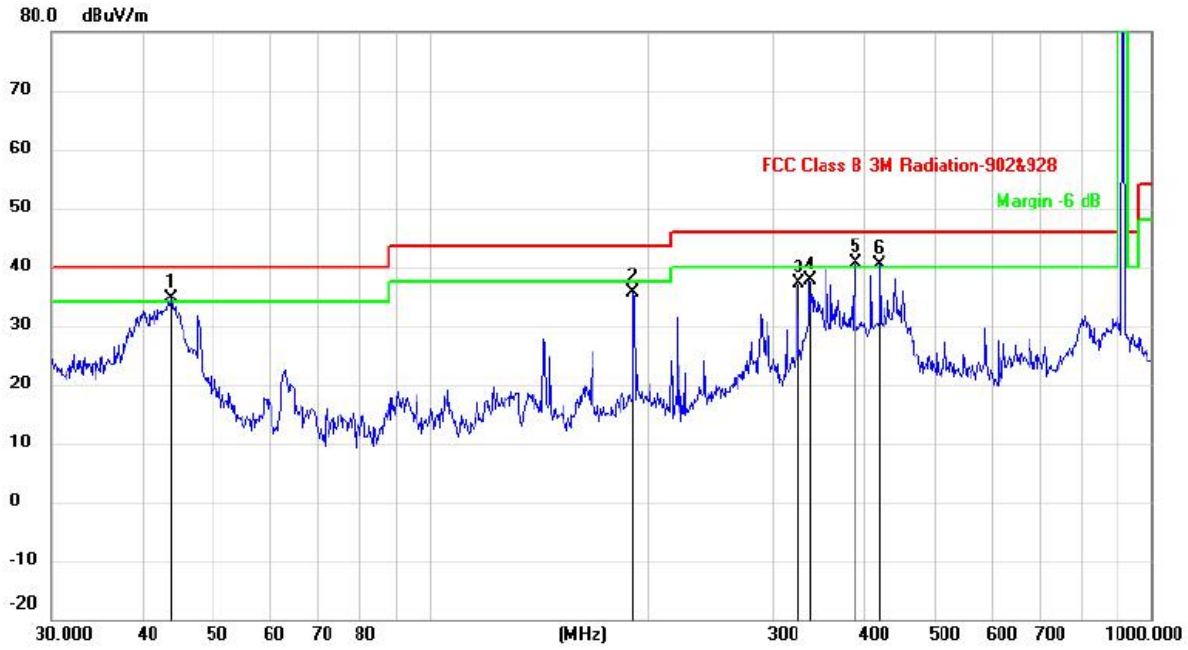
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1	!	43.8119	44.76	-9.92	34.84	40.00	-5.16	QP
2		192.4186	45.11	-10.51	34.60	43.50	-8.90	QP
3		291.0360	45.03	-7.88	37.15	46.00	-8.85	QP
4	!	323.3204	48.54	-8.14	40.40	46.00	-5.60	QP
5	*	336.0352	48.82	-7.87	40.95	46.00	-5.05	QP
6	!	408.9460	46.88	-6.42	40.46	46.00	-5.54	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		192.4186	39.04	-12.89	26.15	43.50	-17.35	QP
2	*	291.0360	49.17	-8.88	40.29	46.00	-5.71	QP
3		312.1794	41.15	-8.36	32.79	46.00	-13.21	QP
4		360.4476	43.96	-7.37	36.59	46.00	-9.41	QP
5		468.8762	38.75	-5.54	33.21	46.00	-12.79	QP
6		528.2458	36.60	-5.15	31.45	46.00	-14.55	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz

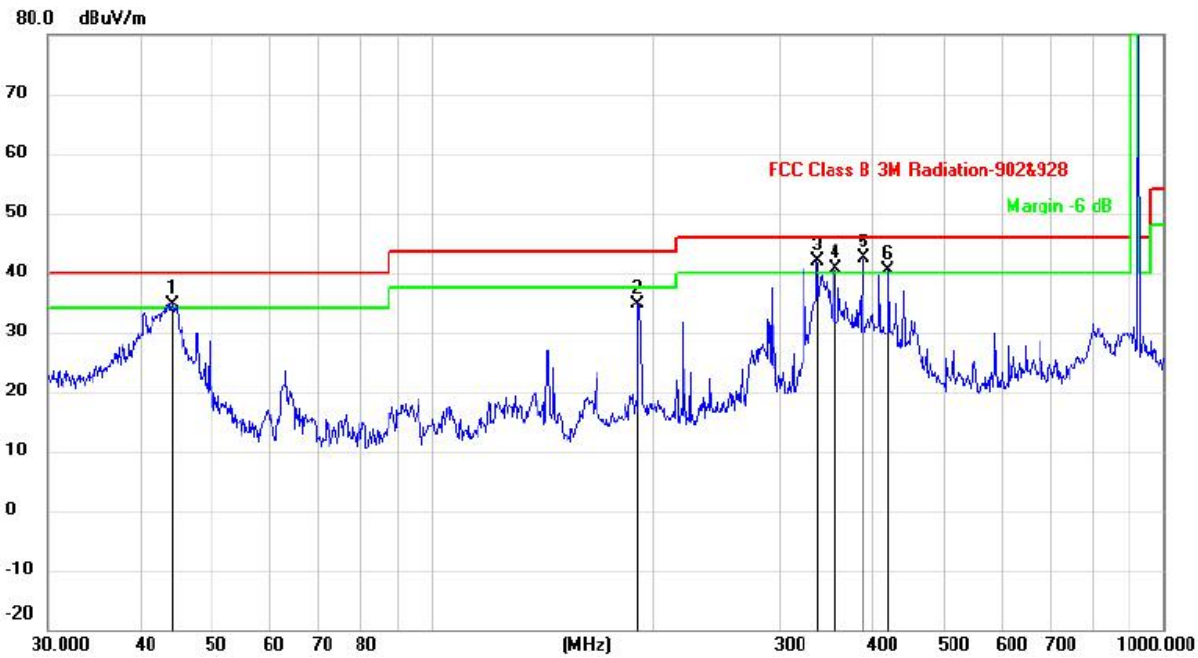


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1	!	43.9658	44.41	-9.90	34.51	40.00	-5.49	QP
2		191.7450	46.30	-10.57	35.73	43.50	-7.77	QP
3		323.3204	45.24	-8.14	37.10	46.00	-8.90	QP
4		336.0352	45.42	-7.87	37.55	46.00	-8.45	QP
5	*	387.9920	47.39	-6.79	40.60	46.00	-5.40	QP
6	!	420.5803	46.55	-6.24	40.31	46.00	-5.69	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		95.7622	29.16	-12.14	17.02	43.50	-26.48	QP
2		192.4186	38.93	-12.89	26.04	43.50	-17.46	QP
3	*	291.0360	50.85	-8.88	41.97	46.00	-4.03	QP
4		360.4476	44.11	-7.37	36.74	46.00	-9.26	QP
5		441.7426	40.63	-5.94	34.69	46.00	-11.31	QP
6		549.0195	36.35	-5.21	31.14	46.00	-14.86	QP

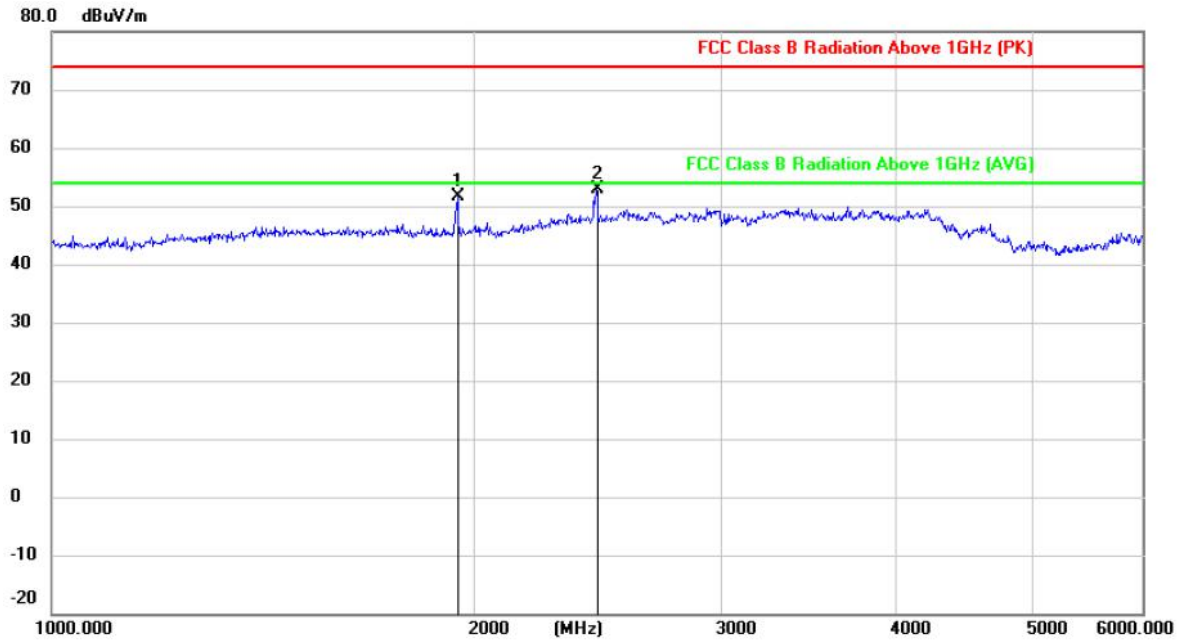
Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1	!	44.2752	44.49	-9.84	34.65	40.00	-5.35	QP
2		191.7450	45.28	-10.57	34.71	43.50	-8.79	QP
3	!	336.0352	49.83	-7.87	41.96	46.00	-4.04	QP
4	!	355.4273	48.21	-7.48	40.73	46.00	-5.27	QP
5	*	387.9920	49.24	-6.79	42.45	46.00	-3.55	QP
6	!	420.5803	46.72	-6.24	40.48	46.00	-5.52	QP

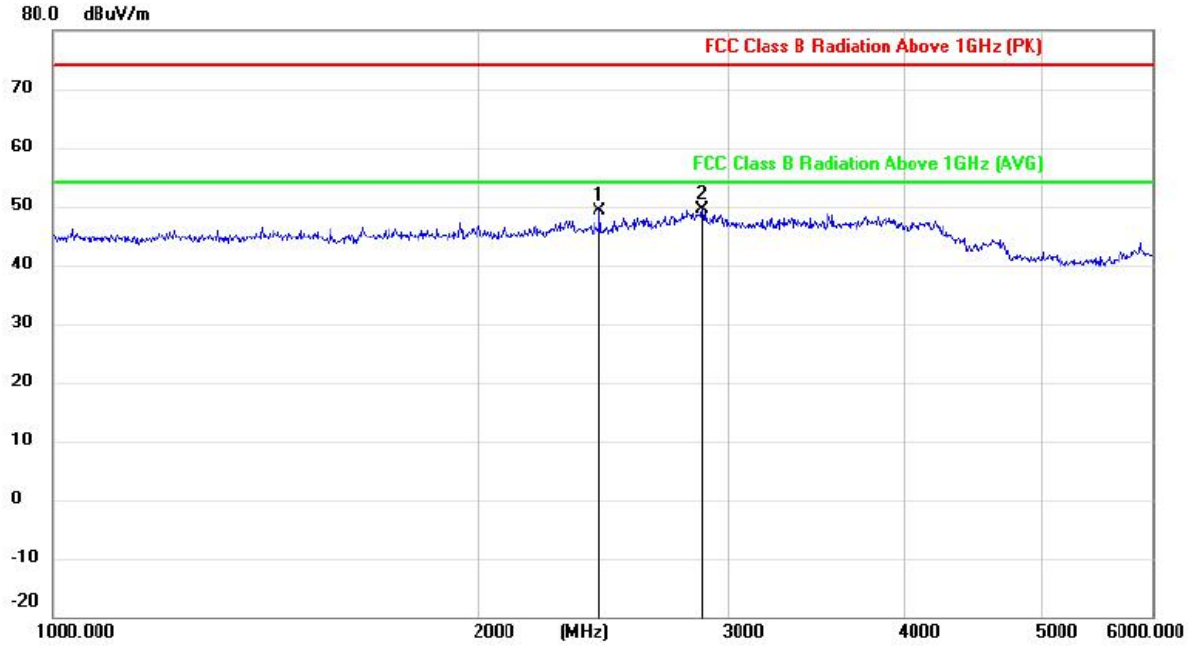
1G-6G:

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



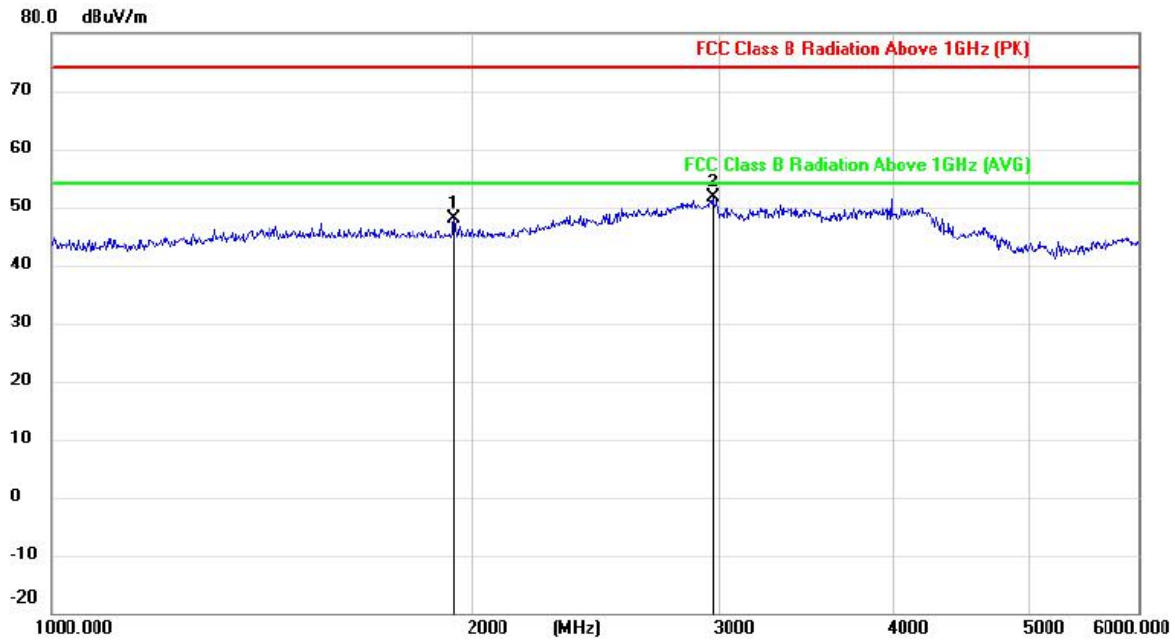
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		1947.476	65.00	-13.36	51.64	74.00	-22.36	peak
2	*	2445.105	61.87	-9.02	52.85	74.00	-21.15	peak

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



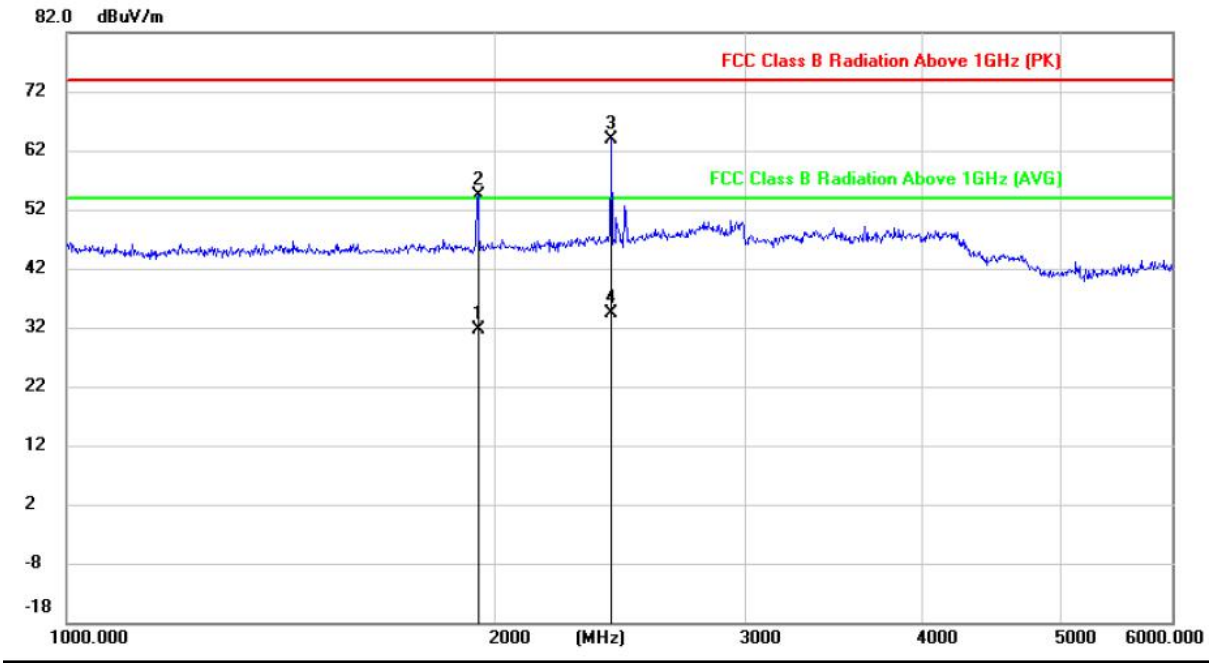
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		2436.358	59.19	-10.06	49.13	74.00	-24.87	peak
2	*	2878.122	56.69	-7.42	49.27	74.00	-24.73	peak

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz



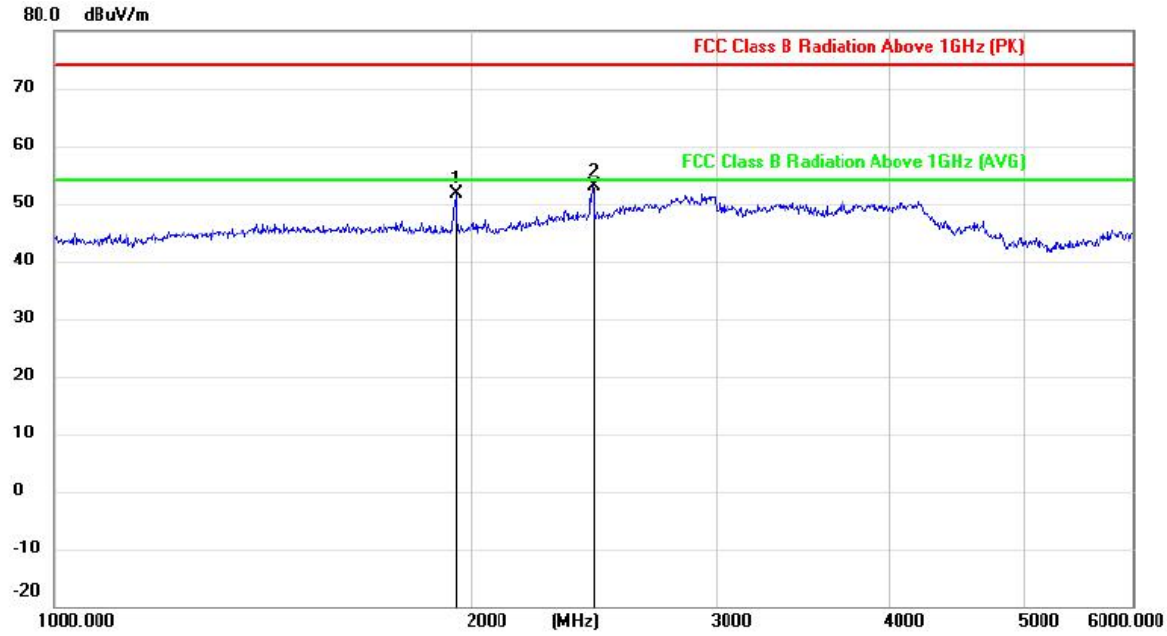
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		1940.510	61.37	-13.40	47.97	74.00	-26.03	peak
2	*	2972.460	56.67	-5.02	51.65	74.00	-22.35	peak

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz



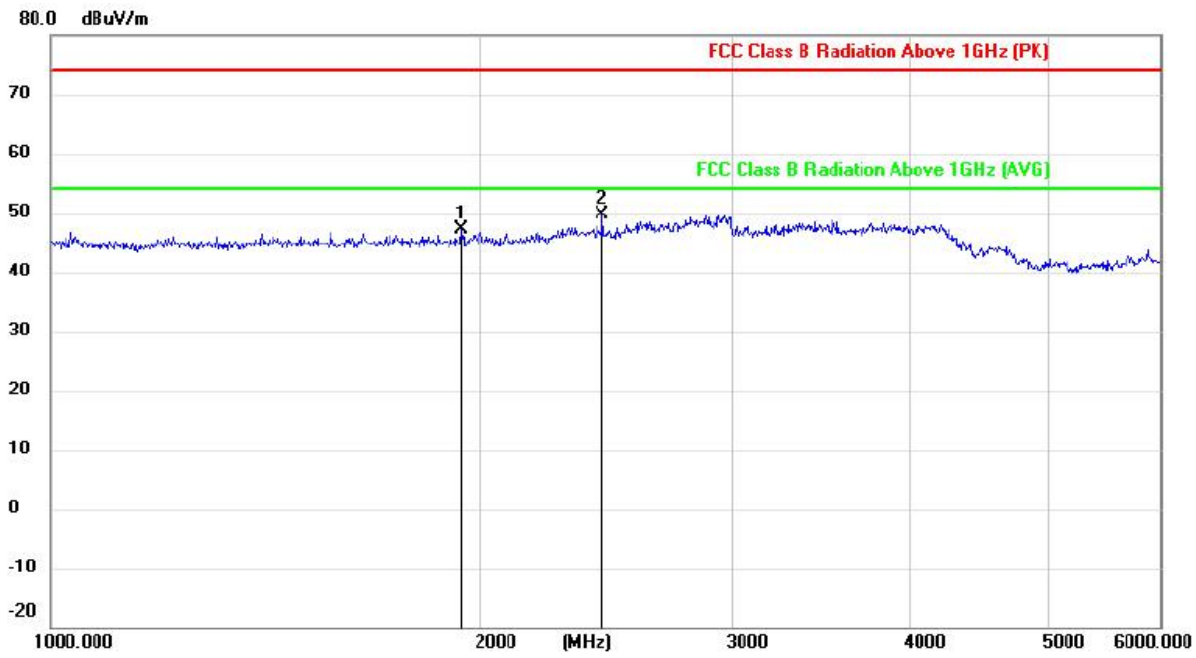
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		1947.477	67.90	-13.55	54.35	54.00	-19.65	Peak
2		1947.477	45.21	-13.55	31.66	54.00	-22.34	AVG
3	*	2418.959	73.98	-10.18	63.80	74.00	-10.20	peak
4		2418.959	44.52	-10.18	34.34	54.00	-19.66	AVG

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		1947.477	65.00	-13.36	51.64	74.00	-22.36	peak
2	*	2445.105	61.87	-9.02	52.85	74.00	-21.15	peak

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz



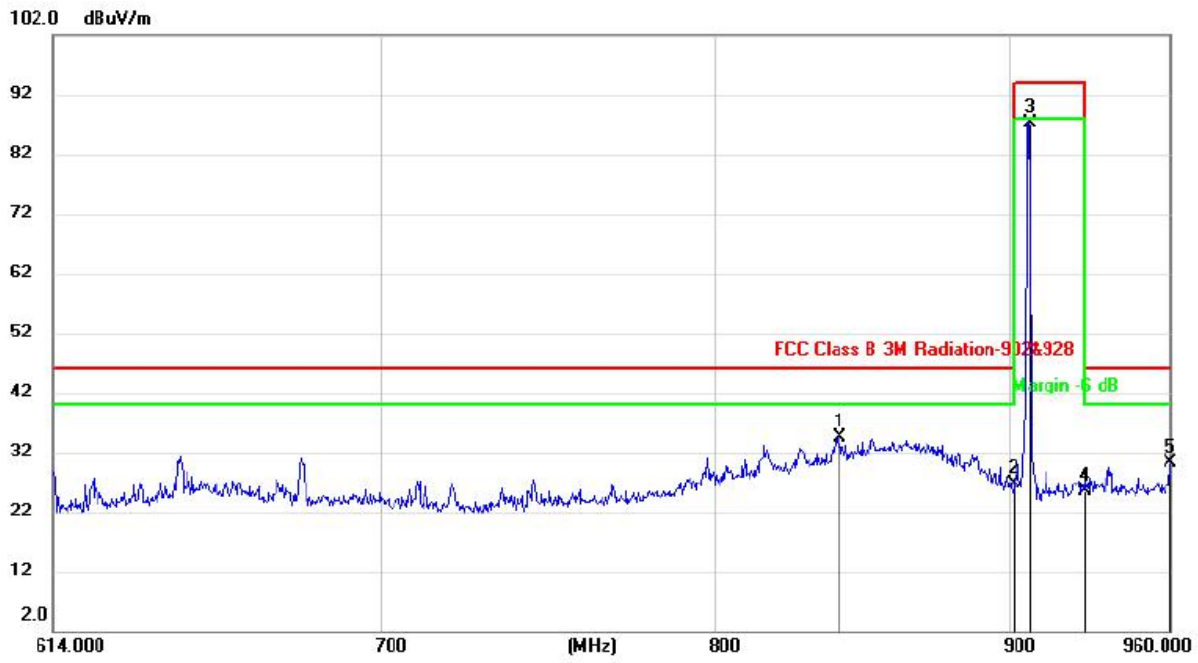
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		1940.510	60.69	-13.61	47.08	74.00	-26.92	peak
2	*	2436.358	59.69	-10.06	49.63	74.00	-24.37	peak

5.3.5 Band edge-radiated

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2)Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
(3) All other emissions more than 20dB below the limit.

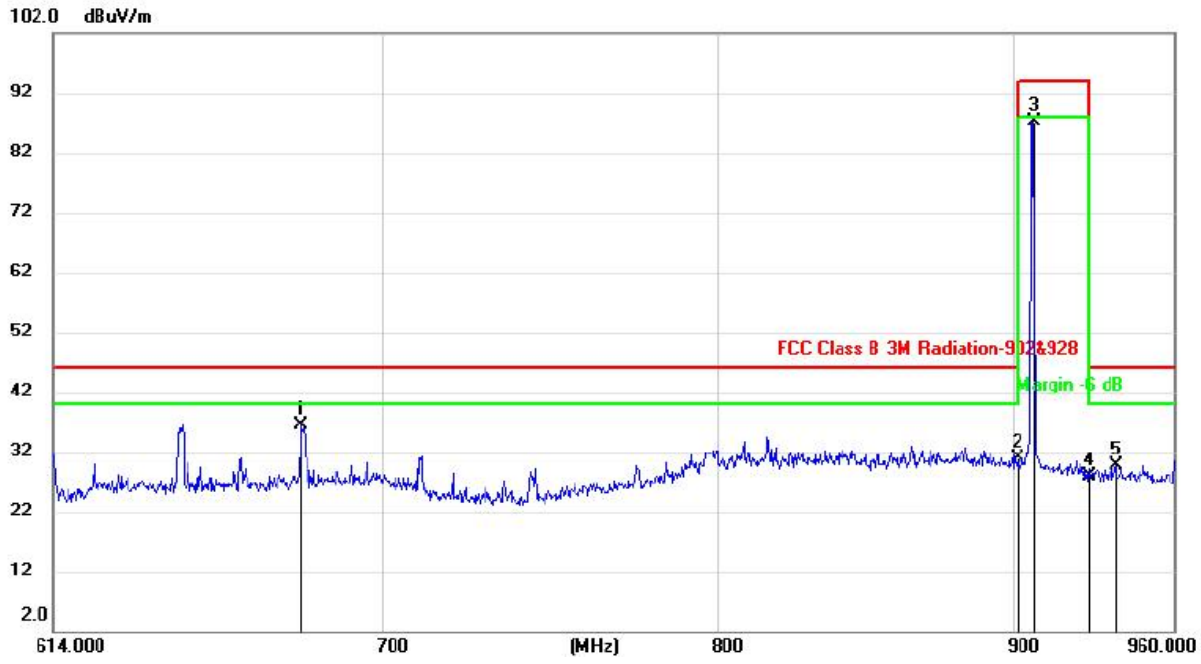
All the modulation modes have been tested, and the worst result was report as below:

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



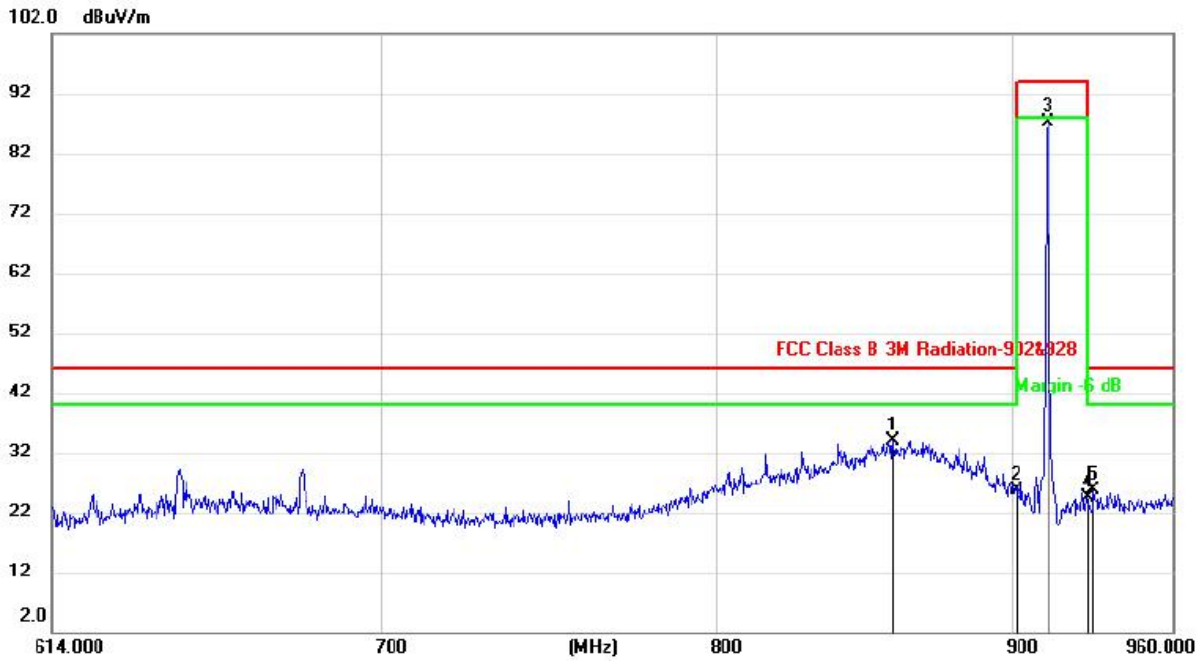
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		841.4162	36.47	-2.17	34.30	46.00	-11.70	QP
2		902.0000	27.93	-1.26	26.67	46.00	-19.33	QP
3	*	907.4324	88.47	-1.22	87.25	94.00	-6.75	QP
4		928.0000	26.32	-1.02	25.30	46.00	-20.70	QP
5		960.0000	30.78	-0.73	30.05	46.00	-15.95	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-907MHz



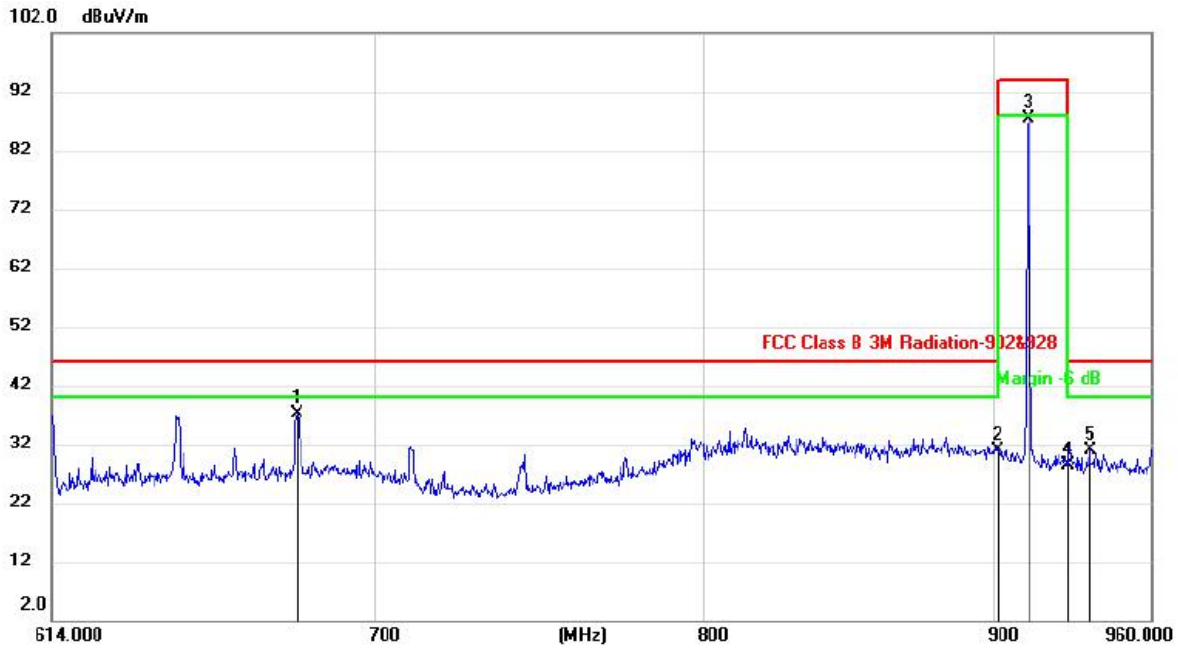
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		677.7431	40.85	-4.47	36.38	46.00	-9.62	QP
2		902.0000	32.14	-1.26	30.88	46.00	-15.12	QP
3	*	907.4324	88.38	-1.22	87.16	94.00	-6.84	QP
4		928.0000	28.93	-1.02	27.91	46.00	-18.09	QP
5		937.9461	30.66	-0.93	29.73	46.00	-16.27	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz



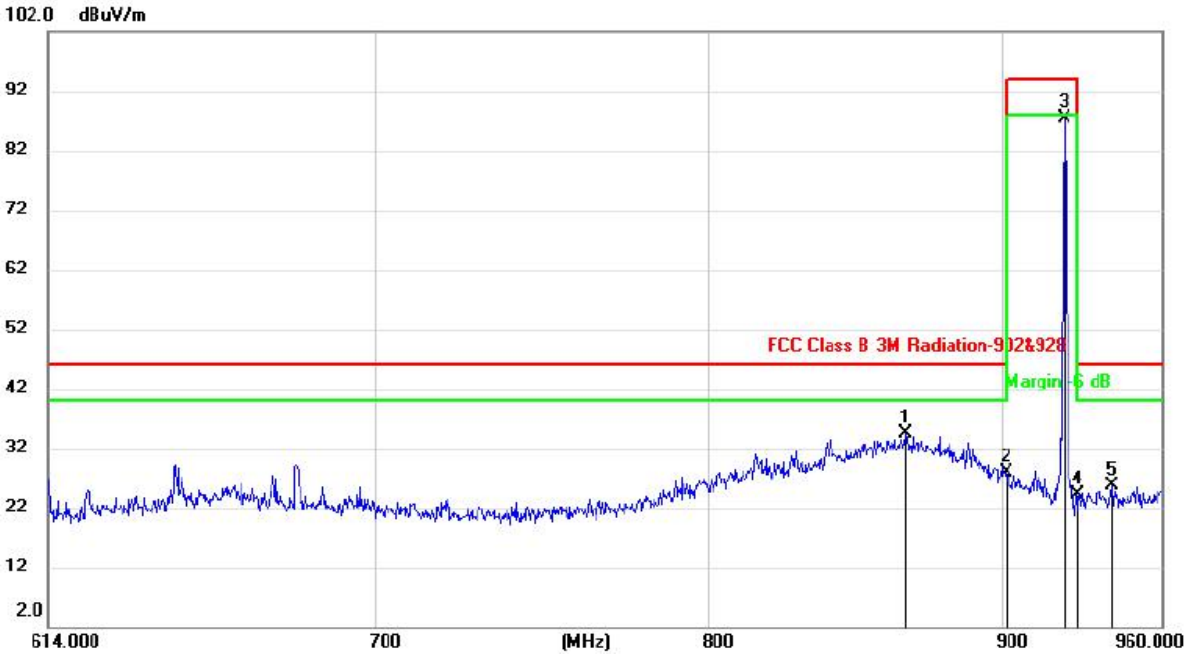
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		858.5103	35.80	-1.91	33.89	46.00	-12.11	QP
2		902.0000	26.95	-1.26	25.69	46.00	-20.31	QP
3	*	913.1281	88.26	-1.15	87.11	94.00	-6.89	QP
4		928.0000	25.48	-1.02	24.46	46.00	-21.54	QP
5		930.0149	26.66	-1.00	25.66	46.00	-20.34	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-913MHz



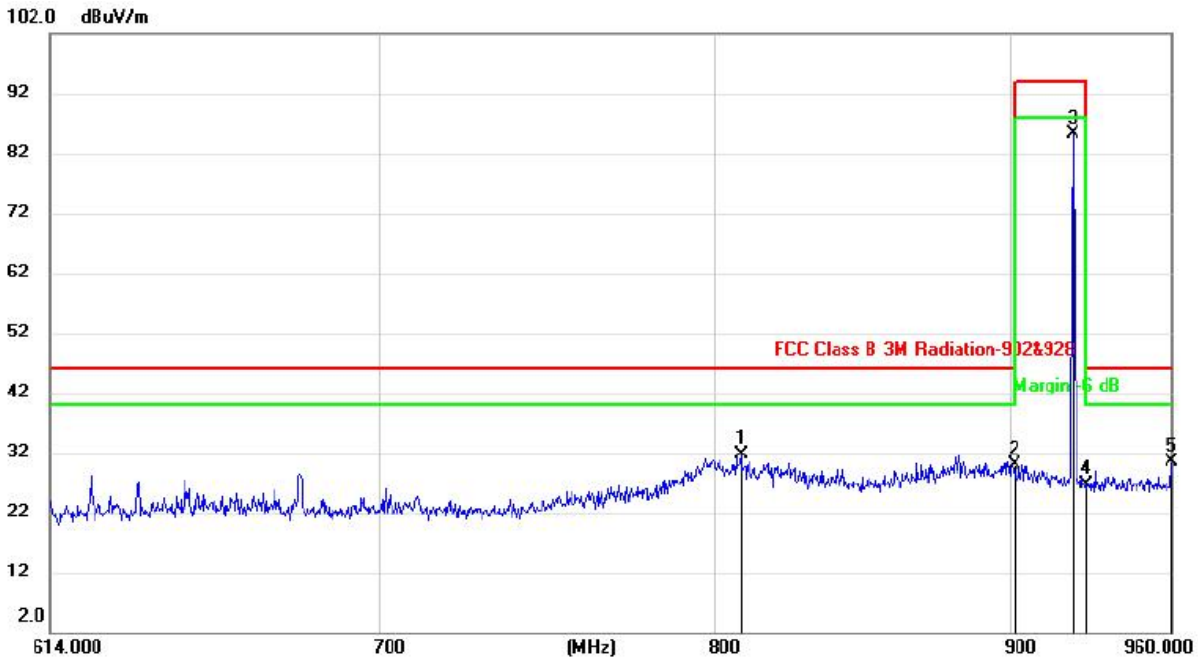
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		678.3491	41.63	-4.46	37.17	46.00	-8.83	QP
2		902.0000	32.16	-1.26	30.90	46.00	-15.10	QP
3	*	913.1281	88.58	-1.15	87.43	94.00	-6.57	QP
4		928.0000	29.51	-1.02	28.49	46.00	-17.51	QP
5		936.2708	31.70	-0.94	30.76	46.00	-15.24	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Horizontal
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		866.2187	36.17	-1.80	34.37	46.00	-11.63	QP
2		902.0000	29.06	-1.26	27.80	46.00	-18.20	QP
3	*	923.3881	88.40	-1.07	87.33	94.00	-6.67	QP
4		928.0000	25.17	-1.02	24.15	46.00	-21.85	QP
5		940.8849	26.41	-0.90	25.51	46.00	-20.49	QP

Temperature:	25℃	Relative Humidity:	44%
Pressure:	101kPa	Polarization:	Vertical
Test voltage:	36V from adapter AC 120V/60Hz	Test Mode ：	TX-923MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	Detector
1		808.6037	34.30	-2.68	31.62	46.00	-14.38	QP
2		902.0000	31.19	-1.26	29.93	46.00	-16.07	QP
3	*	922.9755	86.14	-1.07	85.07	94.00	-8.93	QP
4		928.0000	27.73	-1.02	26.71	46.00	-19.29	QP
5		960.0000	31.11	-0.73	30.38	46.00	-15.62	QP

5.4 20dB and 99% bandwidth

5.4.1 Limits

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.

5.4.2 Test method

Use the following spectrum analyzer settings:

For 20 dB bandwidth

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥1% of the 20 dB bandwidth
VBW ≥RBW
Sweep = auto
Detector function = peak
Trace = max hold

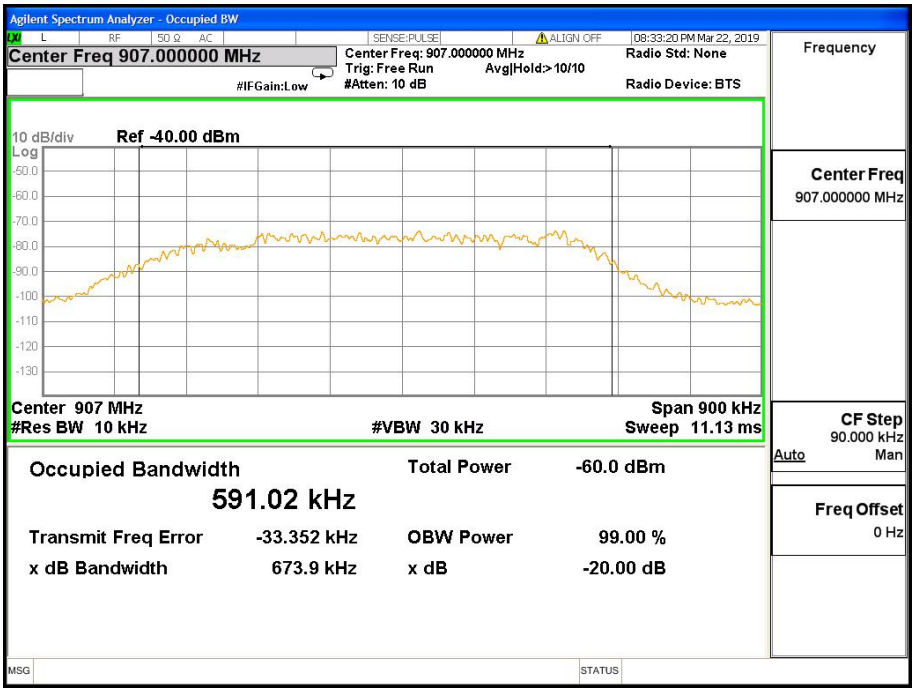
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission

5.4.3 Test result

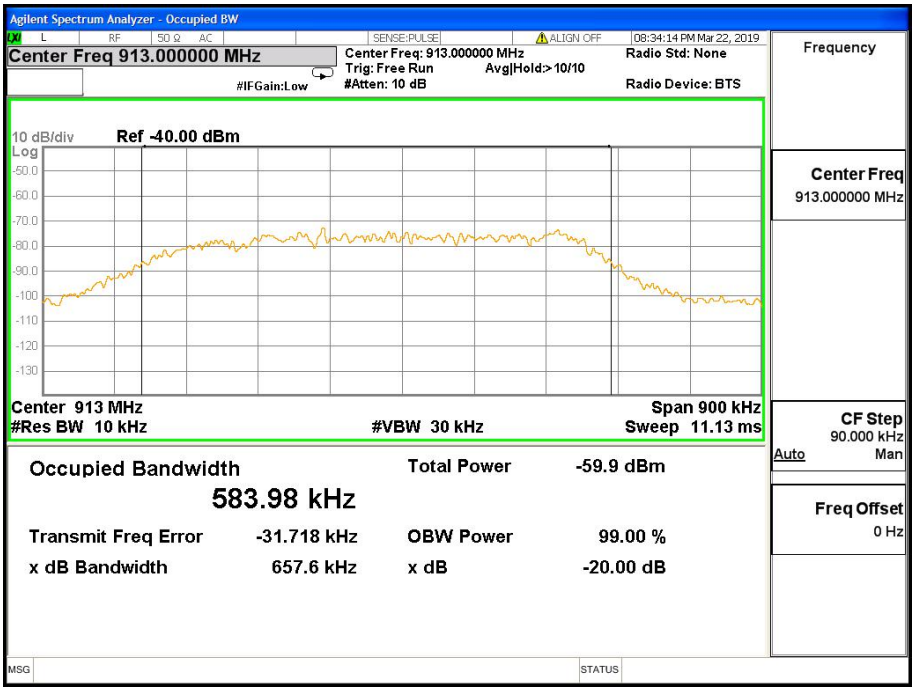
Channel	Frequency(MHz)	20dB bandwidth (MHz)
Low	907	0.6739
Middle	913	0.6576
High	923	0.6664

Test plots

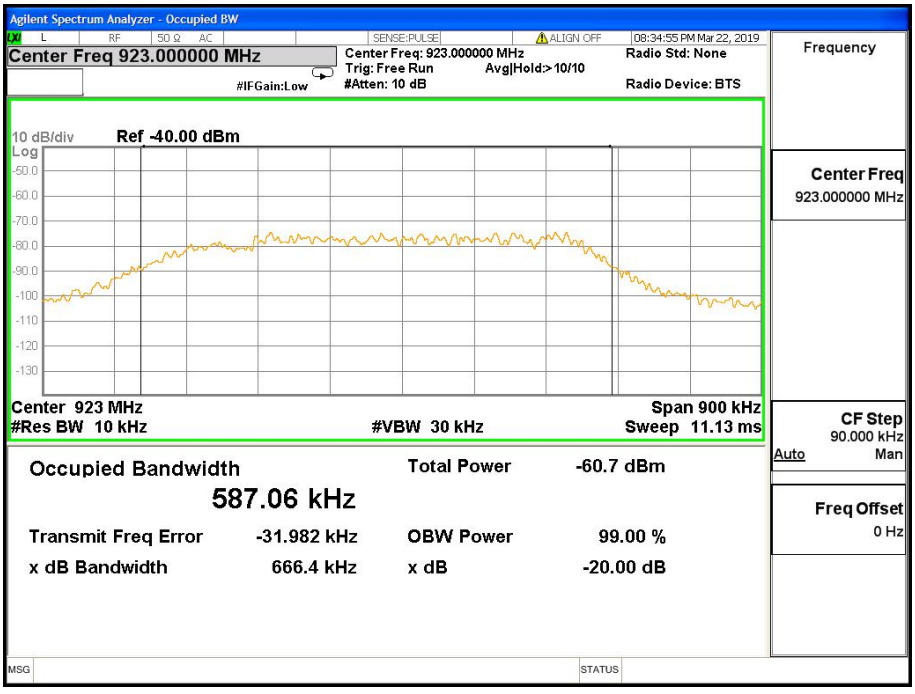
907MHz



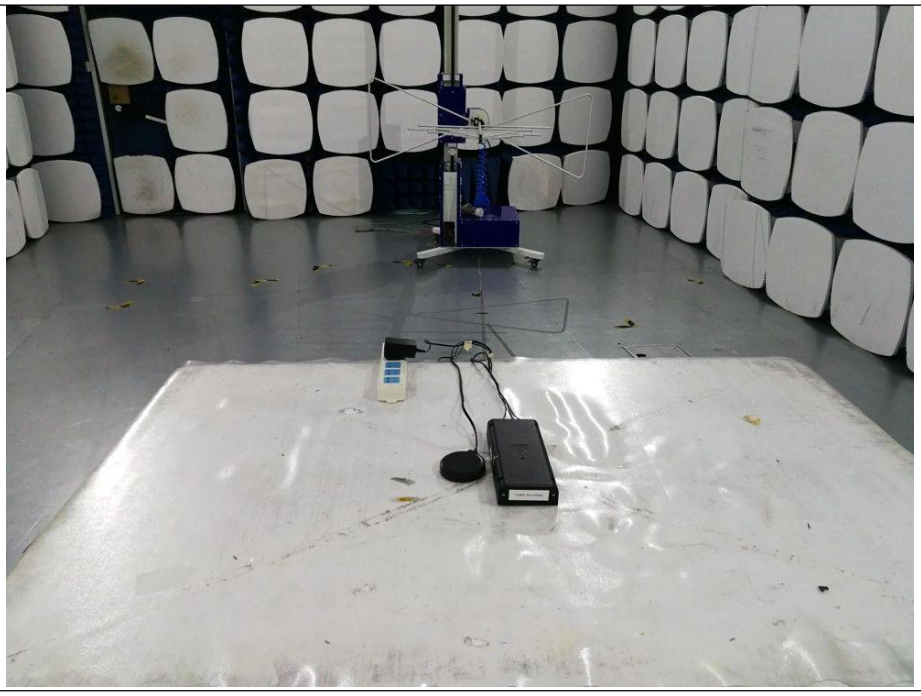
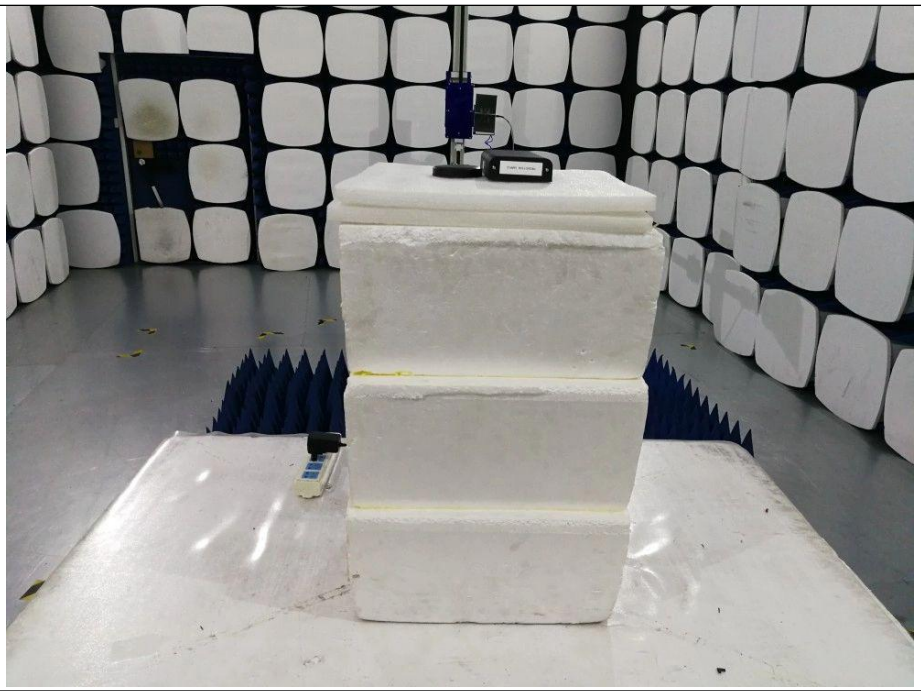
913MHz



923MHz



Photographs of the Test Setup

Radiated emission – below 1GHz

Radiated emission – above 1GHz


Conducted emission


Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi190614E097-1.

----END OF REPORT----