FCC RADIO TEST REPORT

Applicant	:	Ubiquiti Inc.
Address	:	685 Third Avenue, New York, New York 10017, USA
Equipment	:	SuperLink Gateway
Model No.	:	USL-Gateway
Trade Name	:	UBIQUITI
FCC ID	:	SWX-UPSL

I HEREBY CERTIFY THAT :

The sample was received on Apr. 28, 2025 and the testing was completed on Jun. 02, 2025 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

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History of this test report

Report No.	Issued Date	Description
24090195-TRFCC01	Dec. 02, 2024	Original
24090195-TRFCC01-A	Dec. 19, 2024	The supplied peripheral power supply is changed to peripheral.
25040656-TRFCC02	Jul. 31, 2025	1. Change Equipment Name. 2. Change Model No. 3. Add External Antenna. 4. Add DTS 500k.

1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	PASS
15.207	. AC Power Line Conducted Emission	PASS
15.209 15.205	. Radiated Spurious Emission	PASS
15.247(d)	. Conducted Spurious Emission	PASS
15.247(a)(1)	. 20dB Bandwidth	PASS
15.247(a)(1)	. Channel Carrier Frequencies Separation	PASS
15.247(a)(1)	. Dwell Time	PASS
15.247(b)	. Number of Hopping Channels	PASS
15.247(b)	. Peak Output Power Measurement Data	PASS

*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement, measurement uncertainty evaluation is not considered.
*After engineering evaluation, the following item need to retest:
1. AC Power Line Conducted Emission.
2. Radiated Spurious Emission

Refer to original report for other test categories. Test report number: 24090195-TRFCC01-A

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Operation Frequency Range	BLE: 2400MHz-2483.5MHz LoRa: 915MHz – 928MHz
Center Frequency Range	BLE: 2402MHz-2480MHz FHSS LoRa: 915.2MHz ~ 927.8MHz DTS LoRa: 915.6MHz ~ 927.6MHz
Modulation Type	BLE: GFSK LoRa: GFSK
Modulation Technology	BLE: DTS LoRa: FHSS, DTS
Data Rate	BLE: 1Mbps
Antenna Type	Monopole Antenna (for original)
	Dipole Antenna (for added)
Antenna Gain	BLE: 3.0 dBi LoRa: 1.0 dBi (for original)
	BLE: 4.0 dBi LoRa: 7.0 dBi (for added)

Note:
1. LoRa: FHSS only support SF5 ~ SF12 / 125kHz.
2. LoRa: DTS only support SF5 ~ SF12 / 500kHz.
3. LoRa worst case is SF5.
4. For more details, please refer to the User's manual of the EUT.

2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
***01**	**915.2**	26	920.2	51	925.2
02	915.4	27	920.4	52	925.4
03	915.6	28	920.6	53	925.6
04	915.8	29	920.8	54	925.8
05	916	30	921	55	926
06	916.2	31	921.2	56	926.2
07	916.4	32	921.4	57	926.4
08	916.6	***33**	**921.6**	58	926.6
09	916.8	34	921.8	59	926.8
10	917	35	922	60	927
11	917.2	36	922.2	61	927.2
12	917.4	37	922.4	62	927.4
13	917.6	38	922.6	63	927.6
14	917.8	39	922.8	***64**	**927.8**
15	918	40	923		
16	918.2	41	923.2		
17	918.4	42	923.4		
18	918.6	43	923.6		
19	918.8	44	923.8		
20	919	45	924		
21	919.2	46	924.2		
22	919.4	47	924.4		
23	919.6	48	924.6		
24	919.8	49	924.8		
25	920	50	925		

Note: Channels remarked * are selected to perform test.

2.3 Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.10.

b. An executive program, ”command Ver.: 10.0.19044.3086” under Windows 10 system was executed to transmit and receive data via LoRa.

c. The test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode 1	TX Mode, Power from Adapter (AC 120V/60Hz), ANT: 7.0 dBi
Test Mode 2	TX Mode, Power from PoE (AC 120V/60Hz), ANT: 7.0 dBi
Test Mode 3	TX Mode, Power from Adapter (AC 240V/60Hz), ANT: 7.0 dBi
caused “Test Mode 3” generated the worst case, it was reported as the final data.	
Radiated Emissions (30MHz ~ 1GHz)	
Test Mode 1	TX Mode, Power from PoE (AC 120V/60Hz), ANT: 7.0 dBi
Test Mode 2	TX Mode, Power from Adapter (AC 120V/60Hz), ANT: 7.0 dBi
Test Mode 3	TX Mode, Power from PoE (AC 240V/60Hz), ANT: 7.0 dBi
caused “Test Mode 3” generated the worst case, it was reported as the final data.	
Radiated Emissions (1GHz ~ 10GHz)	
Test Mode 1	TX Mode, Power from PoE (AC 120V/60Hz), ANT: 7.0 dBi

Modulation Type	TX CONFIGURATION
GFSK	1TX

2.4 Description of Test System

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	lenovo	S1GL2W	N/A	N/A
Type-C Adapter	UBIQUITI	GP-M015-QC	1.2m / NS	N/A
RJ45 Cable*2	TE CONNECTIVITY	CAT5E	1.2m / NS	N/A

Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	DELL	Latitude E5270	N/A	Adapter / 1.8m / NS
PoE	UBIQUITI	GP-H480-050G	N/A	0.6m / NS
Type-C Adapter	UBIQUITI	GP-M015-QC	1.2m / NS	N/A
RJ45 Cable*2	N/A	N/A	1.2m / NS	N/A

AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	DELL	Latitude E5270	N/A	Adapter / 1.8m / NS
PoE	UBIQUITI	GP-V480-032G	N/A	0.6m / NS
Type-C Adapter	UBIQUITI	GP-M015-QC	1.2m / NS	N/A
RJ45 Cable	N/A	N/A	1.2m / NS	N/A

2.5 General Information of Test

Organization	Cerpass Technology Corp.	
☒ Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel: +886-3-3226-888 Fax: +886-3-3226-881	
	FCC	TW1439, TW1079
	IC	4934E-1, 4934E-2
Frequency Range Investigated	Conducted: from 150kHz to 30 MHz Radiation: from 9 kHz to 10,000MHz	
Test Distance	The test distance of radiated emission from antenna to EUT is 3 M.	

Test Item	Test Site	Test period	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2025/05/29	24.1°C / 46%	Leon Huang
RF Conducted	RFCON01-NK	2025/06/02	25.1°C / 48%	Leon Huang
Radiated Emissions	3M02-NK	2025/05/15	22.1°C / 56%	Leon Huang
AC Power Line Conducted Emission	CON02-NK	2025/05/19	19.5°C / 58%	Leon Huang

2.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±3.2dB
Radiated Spurious Emission(9KHz~30MHz)	±3.405dB
Radiated Spurious Emission(30MHz~1GHz)	±5.326dB
Radiated Spurious Emission(1GHz~25GHz)	±5.918dB
Conducted Spurious Emission	±2.156dB
20dB Bandwidth	±4.40%
Peak Output Power(Conducted Power Meter)	±1.31dB
Dwell Time	±0.11%
Duty Cycle	±0.17%

3. Test Equipment and Ancillaries Used for Tests

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
Bilog Antenna	Schwarzbeck	VULB9168	369	2025/02/17	2026/02/16
Active Loop Antenna	Schwarzbeck	FMZB 1513	00414	2025/02/18	2026/02/17
Horn Antenna	EMCO	3115	31589	2025/02/20	2026/02/19
Horn Antenna	EMCO	3116	31970	2025/02/20	2026/02/19
EMI Receiver	R&S	ESCI	101423	2024/07/16	2025/07/15
Spectrum Analyzer	R&S	FSV 40-N	102151	2024/08/22	2025/08/21
Preamplifier	Agilent	8449B	3008A01954	2025/02/12	2026/02/11
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2024/10/15	2025/10/14
Preamplifier	EM Electronics corp.	EM330	60659	2024/12/16	2025/12/15
Cable-4m (9k-3G)	EMEC	RG-223	18274M	2024/08/08	2025/08/07
Cable-3in1 (30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2025/02/21	2026/02/20
Cable-0.5m (1G-40G)	HUBER SUHNER	SUCOFLEX 104	805443/4	2025/02/26	2026/02/25
Cable-3m (1G-40G)	HUBER SUHNER	SUCOFLEX 104	805796/4	2025/02/26	2026/02/25
Cable-8m (1G-26.5G)	WOKEN	WCBA-WCA203SM	CCE1374	2025/02/26	2026/02/25
Cable-3m (10M-40G)	HUBER SUHNER	SF102	804619/2	2024/10/14	2025/10/13
Cable-1m (10M-40G)	HUBER SUHNER	SF102	804398/2	2024/10/14	2025/10/13
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA
High Pass Filter	WOKEN	WFIL-H3000-18000F-03	WR377WC2B1	2024/10/15	2025/10/14
High Pass Filter	WOKEN	WFIL-H3000-18000F-03	WR377WC2B1	2024/10/15	2025/10/14
Notch Filter	Warison	WFIL-N5925-7125F-04	WRQ4BFWC4M1	2025/02/21	2026/02/20
Hipass Filter	Warison	WFIL-H7500-18000F	WRQ4BFWC2J1	2025/02/21	2026/02/20

Test Item	RF Conducted				
Test Site	RFCON01-NK				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
Spectrum Analyzer	R&S	FSP 40	100047	2025/03/03	2026/03/02
Attenuator	KEYSIGHT	8491B	MY39250703	2025/02/12	2026/02/11
Cable-0.5m (30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2024/10/24	2025/10/23
Power Meter	Anritsu	ML2495A	1224005	2025/02/12	2026/02/11
Power Sensor	Anritsu	MA2411B	1207295	2025/02/12	2026/02/11
Switch Box	Theda	1-4	TW5451159	NA	NA

Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	**Manufacturer**	**Model No**	**Serial No**	**Calibration Date**	**Valid Date**
EMI Receiver	R&S	ESCI	101423	2024/07/16	2025/07/15
Cable-4m (9k-3G)	EMEC	RG-223	18274M	2024/08/08	2025/08/07
LISN	Schwarzbeck	NSLK 8127	8127740	2024/08/27	2025/08/26
Two-Line V-Network	R&S	ENV216	102185	2024/08/27	2025/08/26

4. Antenna Requirements

4.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Antenna Construction and Directional Gain

Antenna Type	Monopole Antenna (for original)
	Dipole Antenna (for added)
Antenna Gain	LoRa: 1.0 dBi (for original)
	LoRa: 7.0 dBi (for added)

5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.10-2013. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

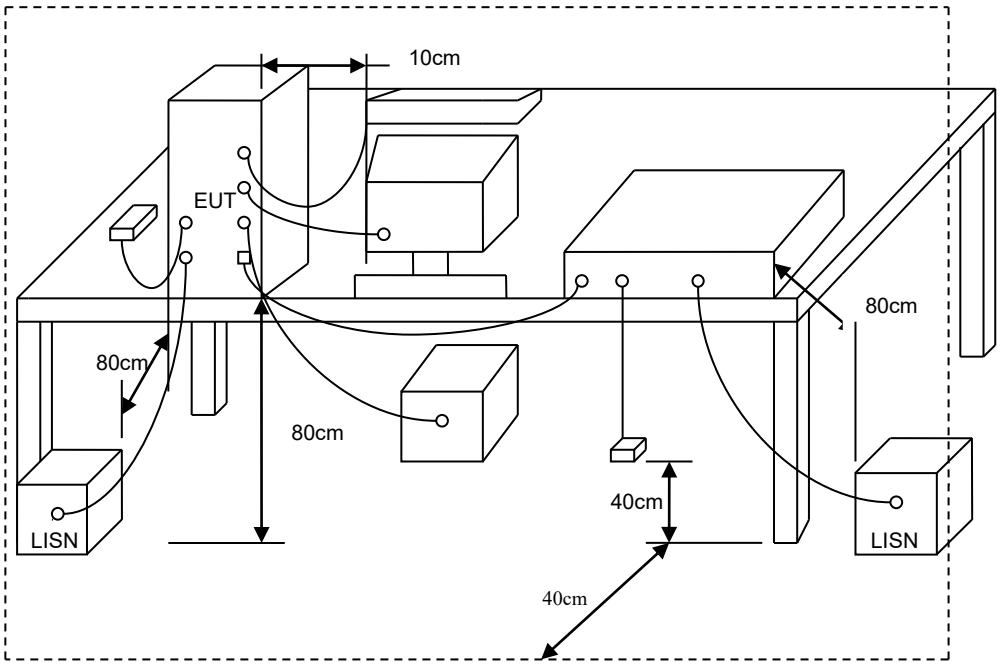
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

5.2 Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

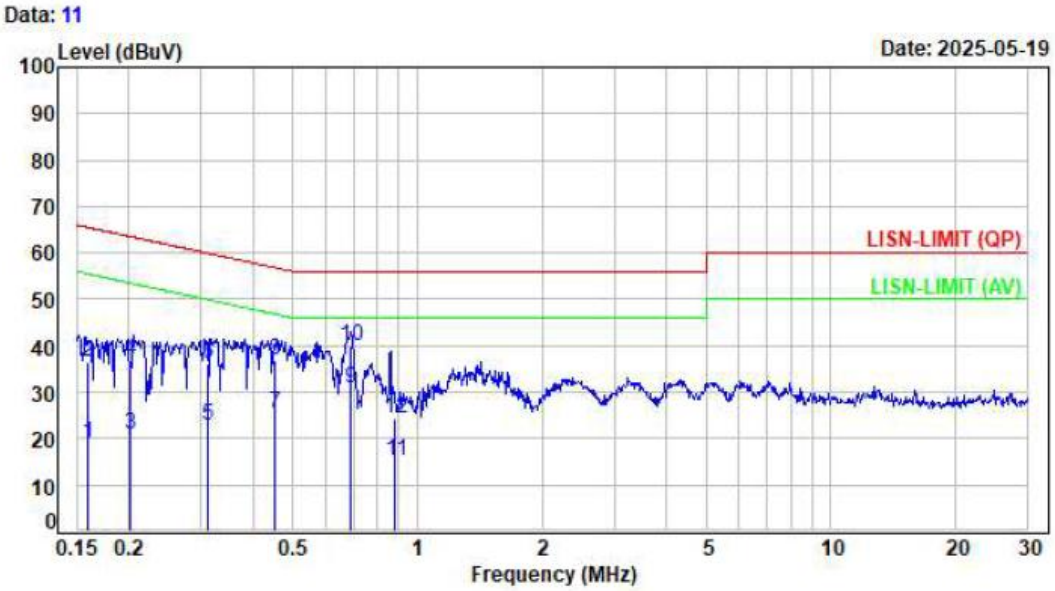
5.3 Typical Test Setup



5.4 Test Result and Data

Test Mode	Mode 3

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Line

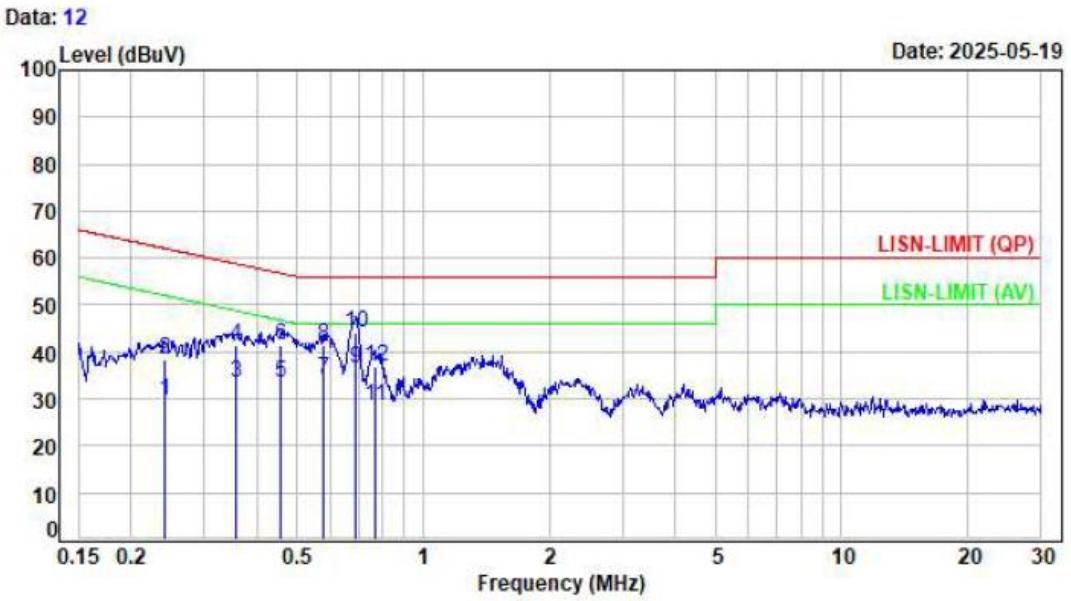


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1588	9.63	9.29	18.92	55.53	-36.61	Average	P
2	0.1588	9.63	27.03	36.66	65.53	-28.87	QP	P
3	0.2010	9.63	11.38	21.01	53.57	-32.56	Average	P
4	0.2010	9.63	27.29	36.92	63.57	-26.65	QP	P
5	0.3097	9.64	13.07	22.71	49.98	-27.27	Average	P
6	0.3097	9.64	26.30	35.94	59.98	-24.04	QP	P
7	0.4502	9.65	15.84	25.49	46.87	-21.38	Average	P
8	0.4502	9.65	27.13	36.78	56.87	-20.09	QP	P
9	0.6899	9.65	21.29	30.94	46.00	-15.06	Average	P
10	0.6899	9.65	30.19	39.84	56.00	-16.16	QP	P
11	0.8826	9.66	5.70	15.36	46.00	-30.64	Average	P
12	0.8826	9.66	14.49	24.15	56.00	-31.85	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

Test Mode	Mode 3

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Neutral

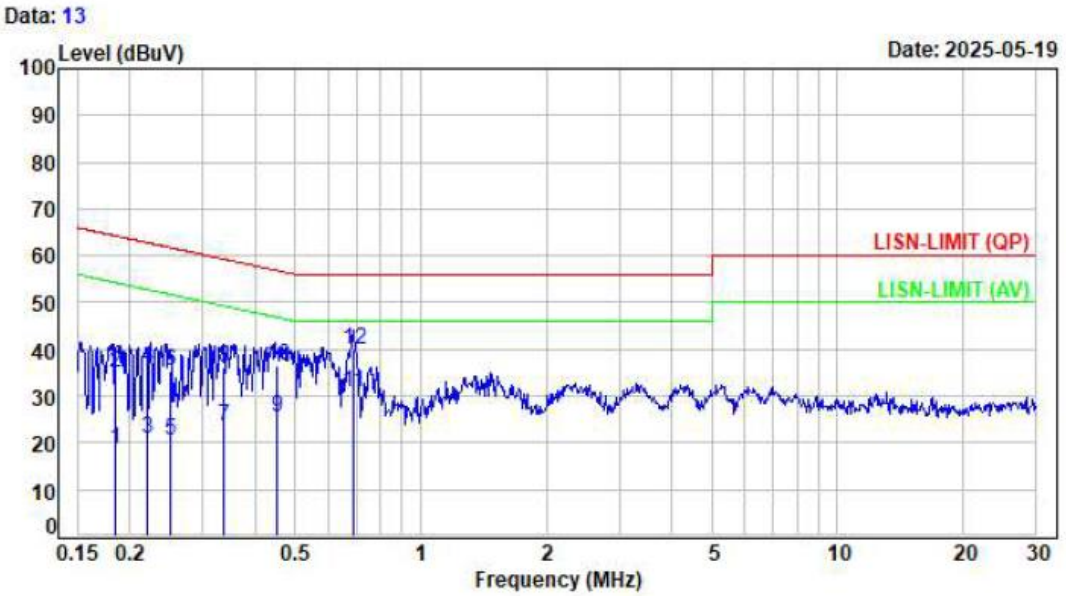


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2402	9.61	19.92	29.53	52.09	-22.56	Average	P
2	0.2402	9.61	28.66	38.27	62.09	-23.82	QP	P
3	0.3582	9.62	23.70	33.32	48.77	-15.45	Average	P
4	0.3582	9.62	31.68	41.30	58.77	-17.47	QP	P
5	0.4547	9.62	23.77	33.39	46.79	-13.40	Average	P
6	0.4547	9.62	31.94	41.56	56.79	-15.23	QP	P
7	0.5769	9.62	24.44	34.06	46.00	-11.94	Average	P
8	0.5769	9.62	31.83	41.45	56.00	-14.55	QP	P
9	0.6864	9.64	26.97	36.61	46.00	-9.39	Average	P
10	0.6864	9.64	34.29	43.93	56.00	-12.07	QP	P
11	0.7657	9.64	18.70	28.34	46.00	-17.66	Average	P
12	0.7657	9.64	27.21	36.85	56.00	-19.15	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

Test Mode	Mode 3

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Line



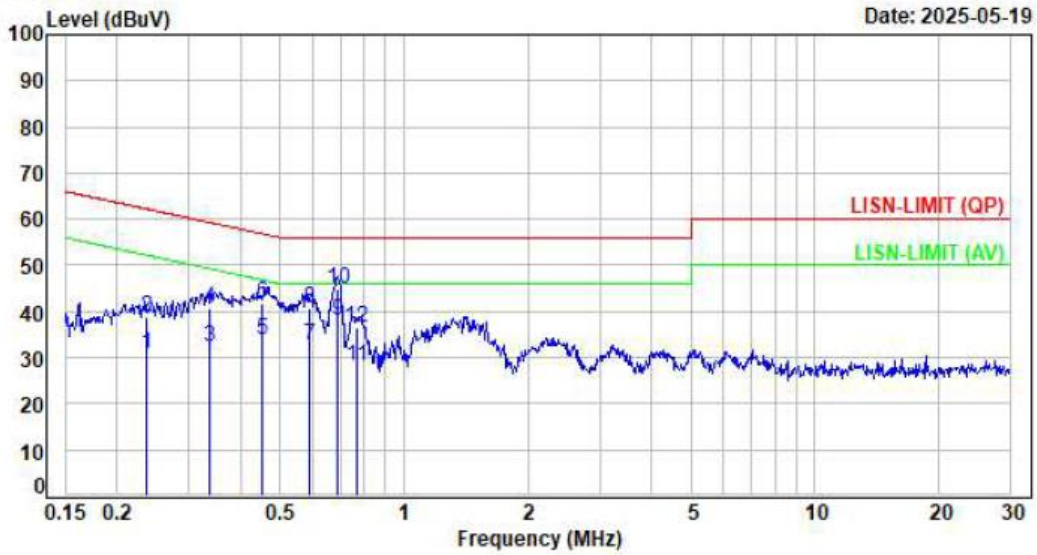
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1844	9.63	8.94	18.57	54.29	-35.72	Average	P
2	0.1844	9.63	25.38	35.01	64.29	-29.28	QP	P
3	0.2202	9.63	11.18	20.81	52.81	-32.00	Average	P
4	0.2202	9.63	26.35	35.98	62.81	-26.83	QP	P
5	0.2509	9.63	10.85	20.48	51.73	-31.25	Average	P
6	0.2509	9.63	25.73	35.36	61.73	-26.37	QP	P
7	0.3353	9.65	13.83	23.48	49.32	-25.84	Average	P
8	0.3353	9.65	26.36	36.01	59.32	-23.31	QP	P
9	0.4513	9.65	15.79	25.44	46.85	-21.41	Average	P
10	0.4513	9.65	26.85	36.50	56.85	-20.35	QP	P
11	0.6895	9.65	21.14	30.79	46.00	-15.21	Average	P
12	0.6895	9.65	30.24	39.89	56.00	-16.11	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

Test Mode	Mode 3

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Neutral

Data: 14

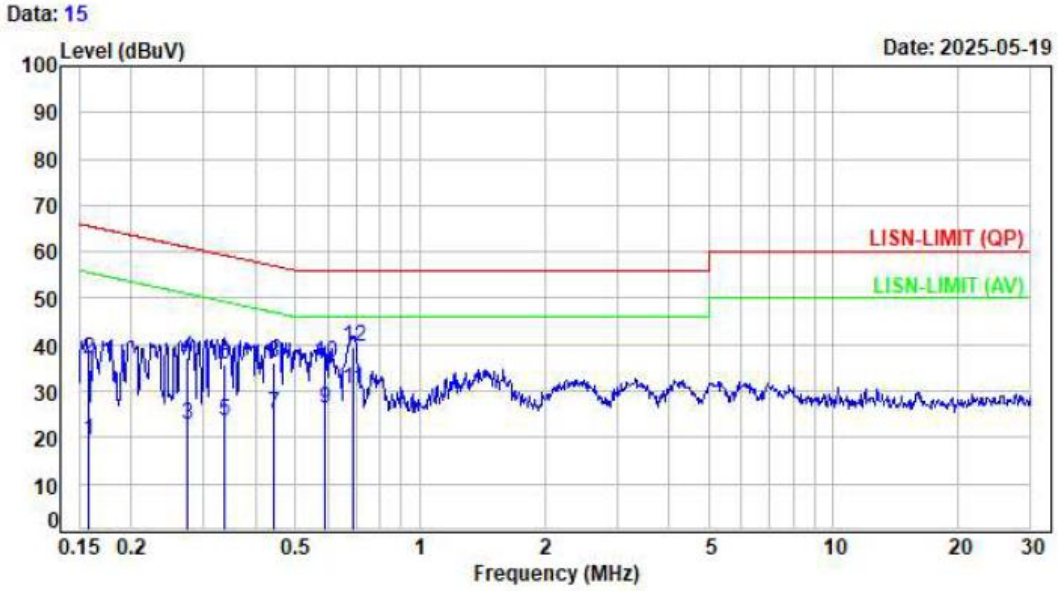


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2353	9.61	21.38	30.99	52.26	-21.27	Average	P
2	0.2353	9.61	29.32	38.93	62.26	-23.33	QP	P
3	0.3373	9.62	22.89	32.51	49.27	-16.76	Average	P
4	0.3373	9.62	31.17	40.79	59.27	-18.48	QP	P
5	0.4535	9.62	24.23	33.85	46.81	-12.96	Average	P
6	0.4535	9.62	32.07	41.69	56.81	-15.12	QP	P
7	0.5888	9.62	22.95	32.57	46.00	-13.43	Average	P
8	0.5888	9.62	30.90	40.52	56.00	-15.48	QP	P
9	0.6897	9.64	28.53	38.17	46.00	-7.83	Average	P
10	0.6897	9.64	35.40	45.04	56.00	-10.96	QP	P
11	0.7641	9.64	18.48	28.12	46.00	-17.88	Average	P
12	0.7641	9.64	26.88	36.52	56.00	-19.48	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

Test Mode	Mode 3

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Line

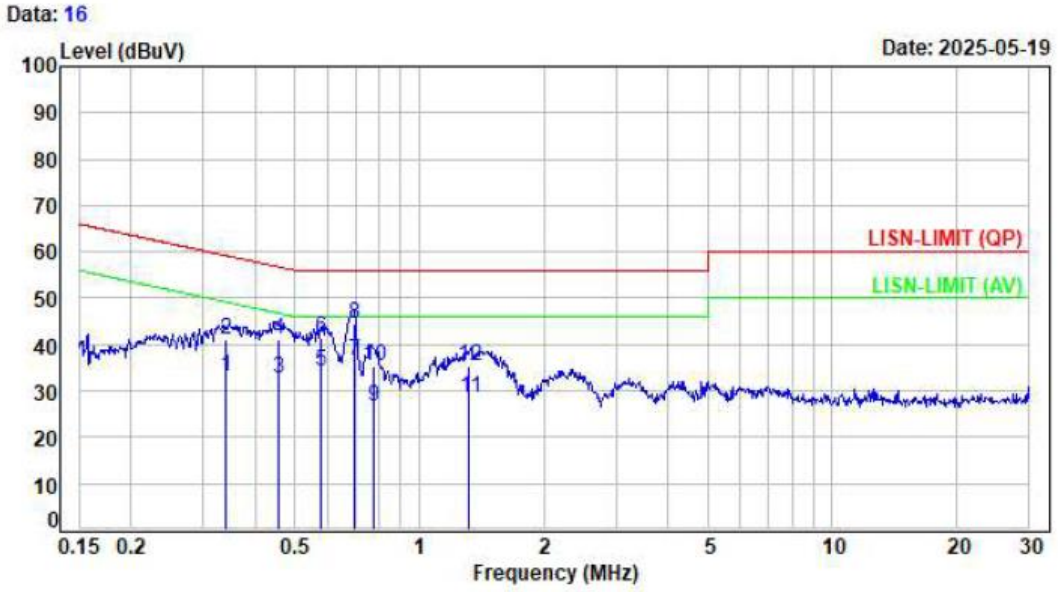


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1584	9.63	9.66	19.29	55.55	-36.26	Average	P
2	0.1584	9.63	27.16	36.79	65.55	-28.76	QP	P
3	0.2736	9.63	13.22	22.85	51.01	-28.16	Average	P
4	0.2736	9.63	27.63	37.26	61.01	-23.75	QP	P
5	0.3354	9.65	13.84	23.49	49.32	-25.83	Average	P
6	0.3354	9.65	26.26	35.91	59.32	-23.41	QP	P
7	0.4417	9.65	15.49	25.14	47.03	-21.89	Average	P
8	0.4417	9.65	26.58	36.23	57.03	-20.80	QP	P
9	0.5878	9.65	16.70	26.35	46.00	-19.65	Average	P
10	0.5878	9.65	26.50	36.15	56.00	-19.85	QP	P
11	0.6879	9.65	20.64	30.29	46.00	-15.71	Average	P
12	0.6879	9.65	30.04	39.69	56.00	-16.31	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

Test Mode	Mode 3

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From Adapter(AC 240V/60Hz)
Phase : Neutral



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.3408	9.62	23.64	33.26	49.18	-15.92	Average	P
2	0.3408	9.62	31.55	41.17	59.18	-18.01	QP	P
3	0.4557	9.62	23.27	32.89	46.77	-13.88	Average	P
4	0.4557	9.62	31.58	41.20	56.77	-15.57	QP	P
5	0.5769	9.62	24.45	34.07	46.00	-11.93	Average	P
6	0.5769	9.62	31.83	41.45	56.00	-14.55	QP	P
7	0.6930	9.64	26.98	36.62	46.00	-9.38	Average	P
8	0.6930	9.64	34.77	44.41	56.00	-11.59	QP	P
9	0.7781	9.64	17.02	26.66	46.00	-19.34	Average	P
10	0.7781	9.64	25.63	35.27	56.00	-20.73	QP	P
11	1.3231	9.66	19.03	28.69	46.00	-17.31	Average	P
12	1.3231	9.66	25.81	35.47	56.00	-20.53	QP	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss

6. Test of Spurious Emission (Radiated)

6.1 Test Limit

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

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

6.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
i. “Cone of radiation” has been considered to be 3dB bandwidth of the measurement antenna.

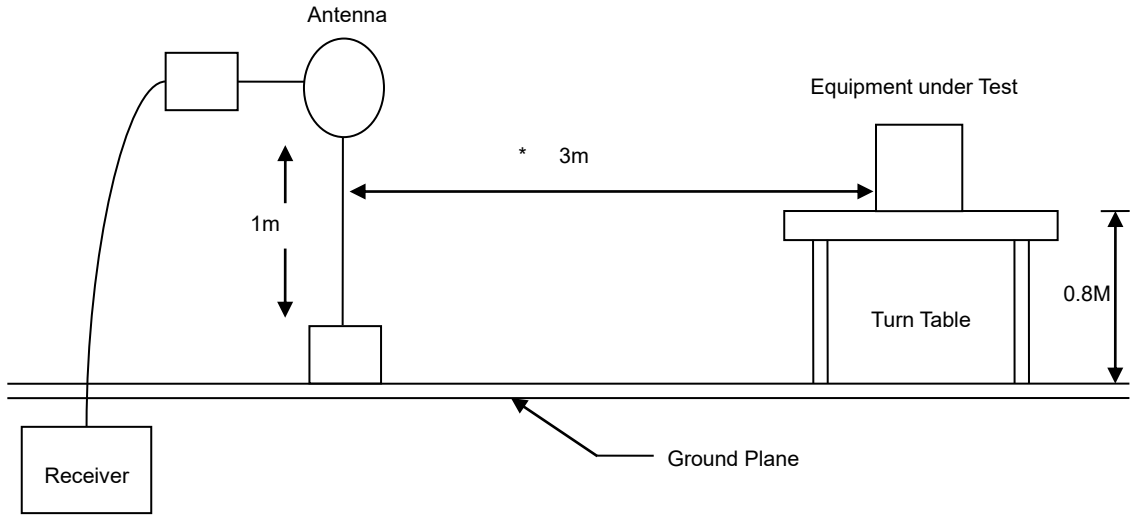
Note:

1.The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized. (Z-AXIS is the worst.)

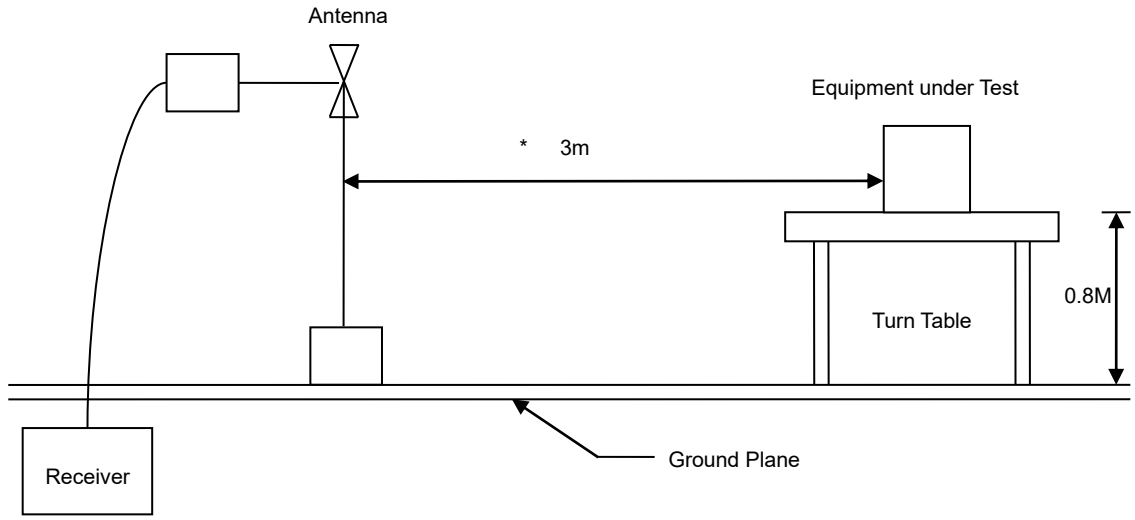
2.Due to the test software function limit the operation band setting(200dBuV/m). There's no corresponding limitation in the actual test item.

6.3 Typical Test Setup

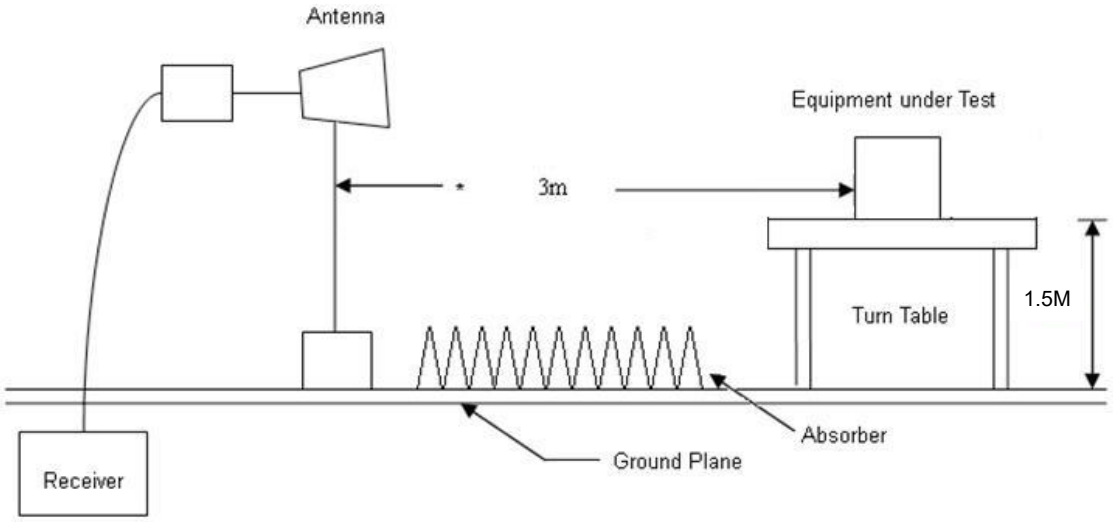
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



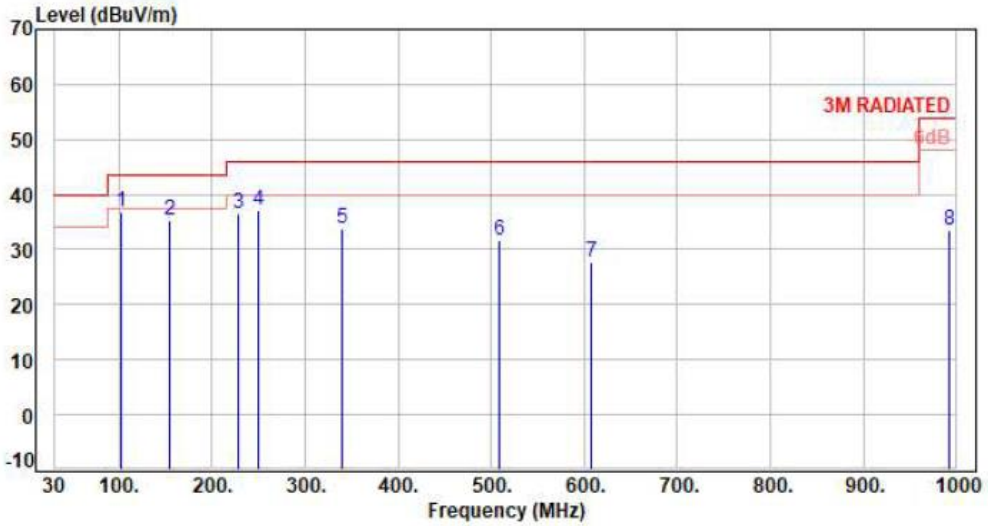
6.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

6.5 Test Result and Data (30MHz ~ 1GHz)

Test Mode	Mode 3

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Vertical

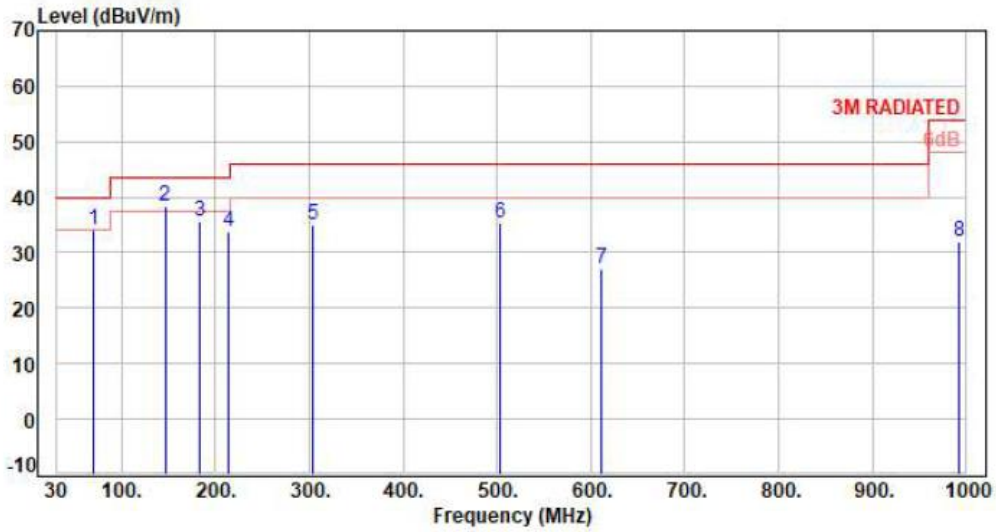


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	101.78	-14.30	51.12	36.82	43.50	-6.68	QP	112	351	P
2	154.16	-9.71	45.04	35.33	43.50	-8.17	Peak	400	360	P
3	227.88	-11.91	48.37	36.46	46.00	-9.54	Peak	400	360	P
4	249.22	-10.54	47.84	37.30	46.00	-8.70	Peak	400	360	P
5	340.40	-6.59	40.37	33.78	46.00	-12.22	Peak	400	360	P
6	509.18	-2.46	34.13	31.67	46.00	-14.33	Peak	400	360	P
7	608.12	-0.06	27.73	27.67	46.00	-18.33	Peak	400	360	P
8	992.24	5.98	27.59	33.57	54.00	-20.43	Peak	400	360	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 3

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Horizontal

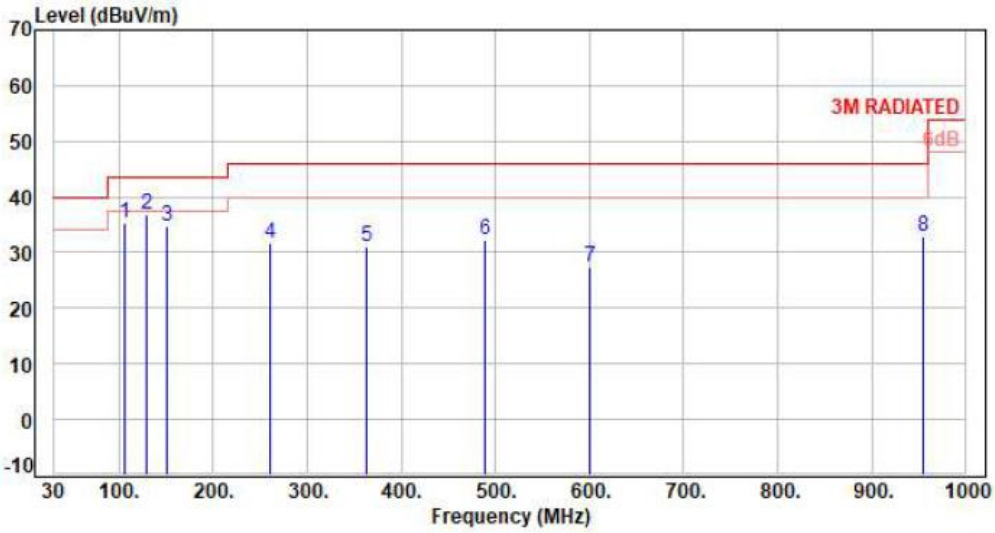


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	70.74	-12.26	46.27	34.01	40.00	-5.99	QP	122	24	P
2	146.40	-9.84	48.12	38.28	43.50	-5.22	QP	342	151	P
3	183.26	-11.13	46.80	35.67	43.50	-7.83	Peak	400	0	P
4	214.30	-12.38	46.24	33.86	43.50	-9.64	Peak	400	0	P
5	303.54	-7.80	42.90	35.10	46.00	-10.90	Peak	400	0	P
6	503.36	-2.81	38.26	35.45	46.00	-10.55	Peak	400	0	P
7	612.00	-0.08	27.27	27.19	46.00	-18.81	Peak	400	0	P
8	992.24	5.98	25.91	31.89	54.00	-22.11	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 3

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Vertical

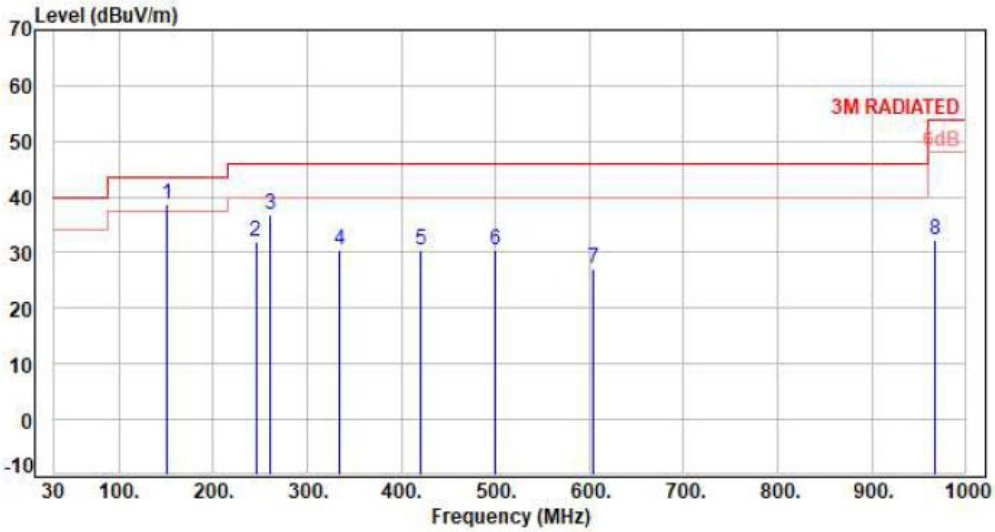


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	106.63	-13.49	48.69	35.20	43.50	-8.30	Peak	400	360	P
2	128.94	-11.71	48.57	36.86	43.50	-6.64	Peak	400	360	P
3	151.00	-9.74	44.59	34.85	43.50	-8.65	QP	100	208	P
4	260.86	-10.14	41.69	31.55	46.00	-14.45	Peak	400	360	P
5	363.68	-5.93	37.14	31.21	46.00	-14.79	Peak	400	360	P
6	489.78	-3.18	35.35	32.17	46.00	-13.83	Peak	400	360	P
7	600.36	-0.27	27.78	27.51	46.00	-18.49	Peak	400	360	P
8	955.38	5.28	27.56	32.84	46.00	-13.16	Peak	400	360	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 3

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Horizontal

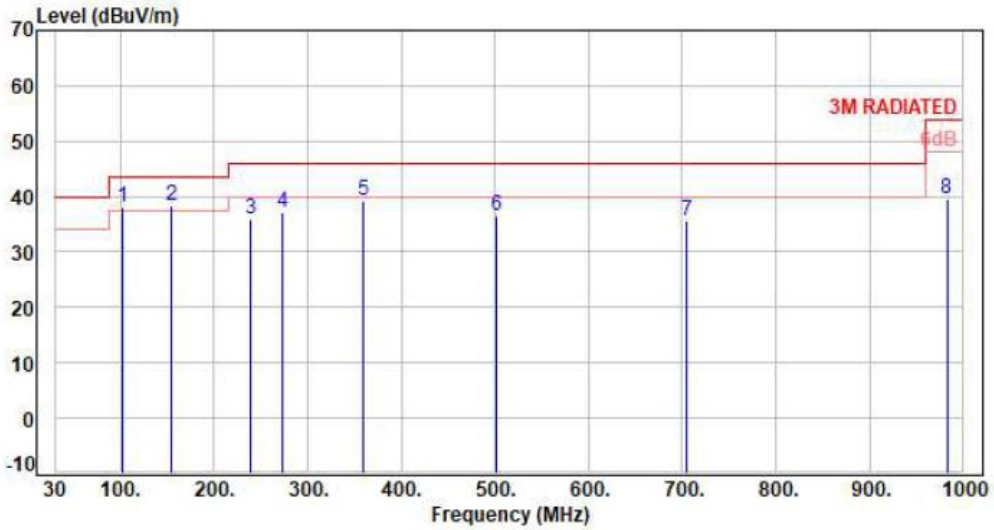


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	151.00	-9.74	48.29	38.55	43.50	-4.95	QP	188	112	P
2	245.34	-10.62	42.62	32.00	46.00	-14.00	Peak	400	0	P
3	260.86	-10.14	47.08	36.94	46.00	-9.06	Peak	400	0	P
4	334.58	-6.74	37.30	30.56	46.00	-15.44	Peak	400	0	P
5	419.94	-4.35	34.69	30.34	46.00	-15.66	Peak	400	0	P
6	499.48	-2.97	33.51	30.54	46.00	-15.46	Peak	400	0	P
7	604.24	-0.10	27.33	27.23	46.00	-18.77	Peak	400	0	P
8	967.02	5.49	26.93	32.42	54.00	-21.58	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 3

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Vertical

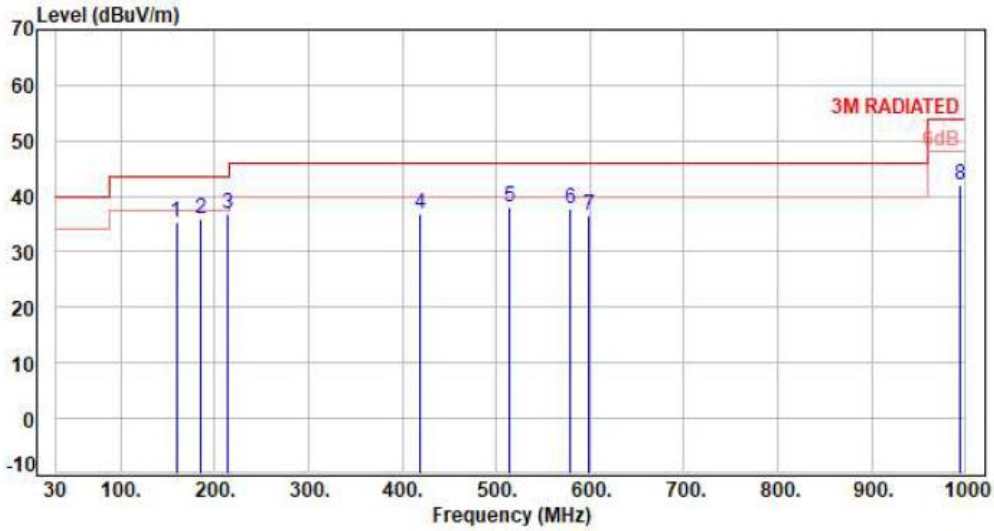


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	101.78	-14.30	52.32	38.02	43.50	-5.48	QP	100	254	P
2	154.16	-9.71	47.94	38.23	43.50	-5.27	QP	142	229	P
3	239.52	-10.87	46.86	35.99	46.00	-10.01	Peak	400	360	P
4	272.50	-9.68	46.74	37.06	46.00	-8.94	Peak	400	360	P
5	359.80	-6.19	45.54	39.35	46.00	-6.65	Peak	400	360	P
6	501.42	-2.89	39.57	36.68	46.00	-9.32	Peak	400	360	P
7	705.12	1.38	34.40	35.78	46.00	-10.22	Peak	400	360	P
8	982.54	5.71	33.84	39.55	54.00	-14.45	Peak	400	360	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 3

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From POE(AC240V/60Hz)
Pol : Horizontal



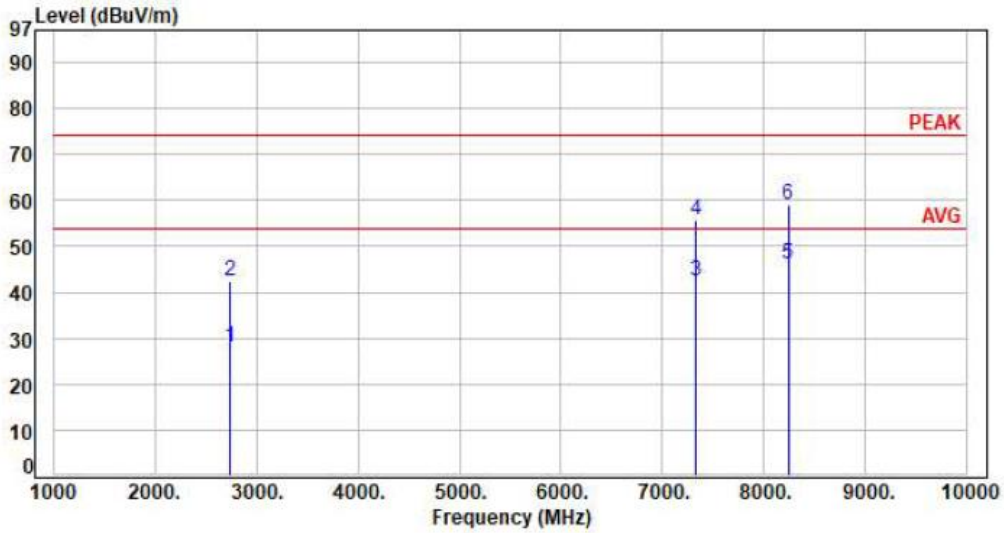
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	159.01	-9.61	44.97	35.36	43.50	-8.14	Peak	400	360	P
2	185.00	-11.19	47.11	35.92	43.50	-7.58	QP	100	245	P
3	214.30	-12.38	49.17	36.79	43.50	-6.71	Peak	400	360	P
4	418.00	-4.47	41.24	36.77	46.00	-9.23	Peak	400	360	P
5	515.00	-2.49	40.56	38.07	46.00	-7.93	Peak	400	360	P
6	579.02	-1.21	39.06	37.85	46.00	-8.15	Peak	400	360	P
7	598.42	-0.29	36.72	36.43	46.00	-9.57	Peak	400	360	P
8	994.18	6.07	35.84	41.91	54.00	-12.09	Peak	400	360	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.6 Test Result and Data (1GHz ~ 10GHz)

Test Mode	Mode 1

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Vertical

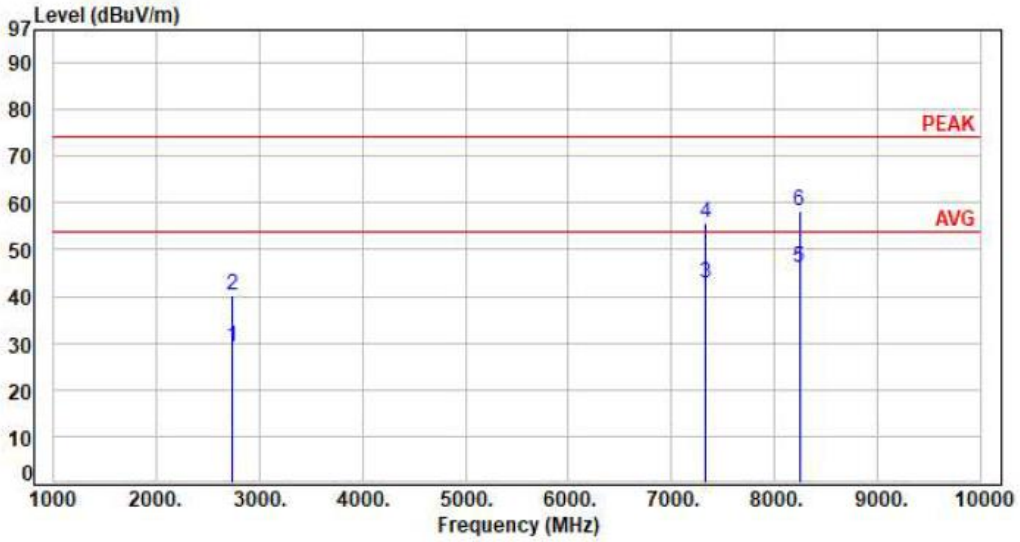


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2745.60	-2.17	30.37	28.20	54.00	-25.80	Average	100	10	P
2	2745.60	-2.17	44.47	42.30	74.00	-31.70	Peak	100	10	P
3	7321.60	12.97	29.26	42.23	54.00	-11.77	Average	100	350	P
4	7321.60	12.97	42.54	55.51	74.00	-18.49	Peak	100	350	P
5	8236.80	14.40	31.71	46.11	54.00	-7.89	Average	100	350	P
6	8236.80	14.40	44.55	58.95	74.00	-15.05	Peak	100	350	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 1

Test Mode : LORA 1TX 915.2MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Horizontal

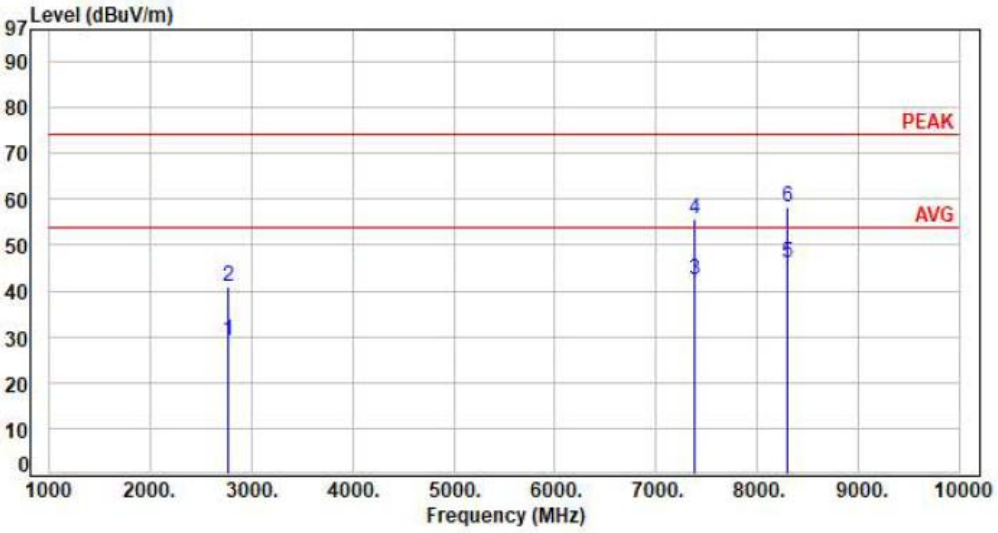


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2745.60	-2.17	31.33	29.16	54.00	-24.84	Average	100	111	P
2	2745.60	-2.17	42.53	40.36	74.00	-33.64	Peak	100	111	P
3	7321.60	12.97	29.94	42.91	54.00	-11.09	Average	100	245	P
4	7321.60	12.97	42.63	55.60	74.00	-18.40	Peak	100	245	P
5	8236.80	14.40	31.78	46.18	54.00	-7.82	Average	100	353	P
6	8236.80	14.40	43.72	58.12	74.00	-15.88	Peak	100	353	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 1

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Vertical

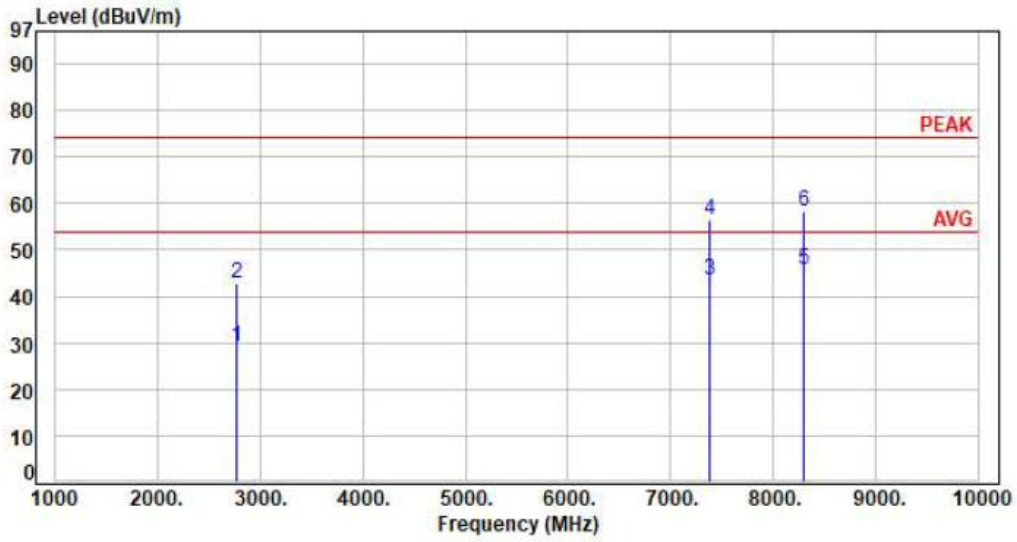


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2764.80	-2.03	31.02	28.99	54.00	-25.01	Average	100	345	P
2	2764.80	-2.03	42.81	40.78	74.00	-33.22	Peak	100	345	P
3	7372.80	13.19	29.07	42.26	54.00	-11.74	Average	100	12	P
4	7372.80	13.19	42.60	55.79	74.00	-18.21	Peak	100	12	P
5	8294.40	14.21	32.06	46.27	54.00	-7.73	Average	100	148	P
6	8294.40	14.21	44.21	58.42	74.00	-15.58	Peak	100	148	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 1

Test Mode : LORA 1TX 921.6MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Horizontal

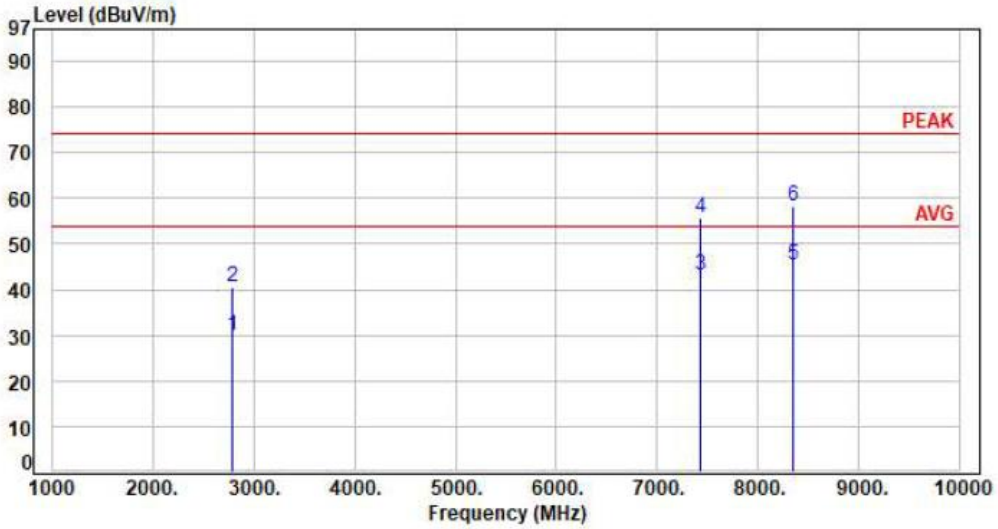


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2764.80	-2.03	31.08	29.05	54.00	-24.95	Average	100	55	P
2	2764.80	-2.03	44.69	42.66	74.00	-31.34	Peak	100	55	P
3	7372.80	13.19	30.26	43.45	54.00	-10.55	Average	100	132	P
4	7372.80	13.19	43.10	56.29	74.00	-17.71	Peak	100	132	P
5	8294.40	14.21	31.55	45.76	54.00	-8.24	Average	100	114	P
6	8294.40	14.21	44.11	58.32	74.00	-15.68	Peak	100	114	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 1

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Vertical

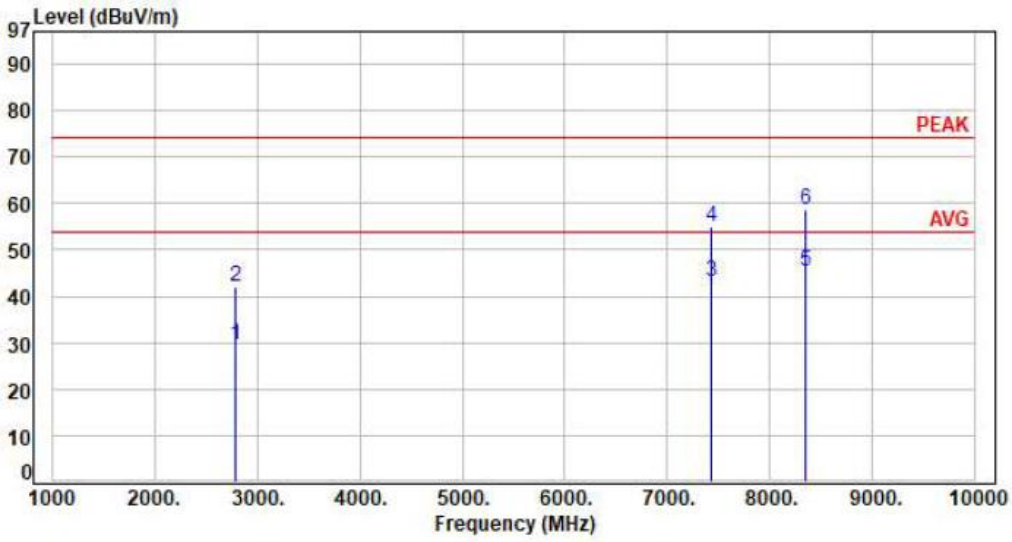


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2783.40	-1.80	31.52	29.72	54.00	-24.28	Average	100	14	P
2	2783.40	-1.80	42.48	40.68	74.00	-33.32	Peak	100	14	P
3	7422.40	13.32	29.71	43.03	54.00	-10.97	Average	100	234	P
4	7422.40	13.32	42.42	55.74	74.00	-18.26	Peak	100	234	P
5	8350.20	14.29	31.07	45.36	54.00	-8.64	Average	100	53	P
6	8350.20	14.29	44.04	58.33	74.00	-15.67	Peak	100	53	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Test Mode	Mode 1

Test Mode : LORA 1TX 927.8MHz 125kbps
Voltage : From POE(AC120V/60Hz)
Pol : Horizontal



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2783.40	-1.80	31.26	29.46	54.00	-24.54	Average	100	171	P
2	2783.40	-1.80	43.92	42.12	74.00	-31.88	Peak	100	171	P
3	7422.40	13.32	29.92	43.24	54.00	-10.76	Average	100	42	P
4	7422.40	13.32	41.73	55.05	74.00	-18.95	Peak	100	42	P
5	8350.20	14.29	31.13	45.42	54.00	-8.58	Average	100	331	P
6	8350.20	14.29	44.43	58.72	74.00	-15.28	Peak	100	331	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.7 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

7. Test of Spurious Emission (Conducted)

7.1 Test Limit

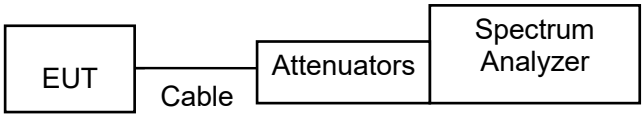
According to the methods defined in ANSI C63.10-2013 Section 11.11.1
Below –20dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

7.2 Test Procedure

According to the methods defined in ANSI C63.10-2013 Section 11.11.2 & 11.11.3

a. The transmitter output was connected to the spectrum analyzer via a low loss cable.
b. Set both RBW and VBW of spectrum analyzer to 100 KHz and 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
c. The band edges was measured and recorded.

7.3 Test Setup Layout

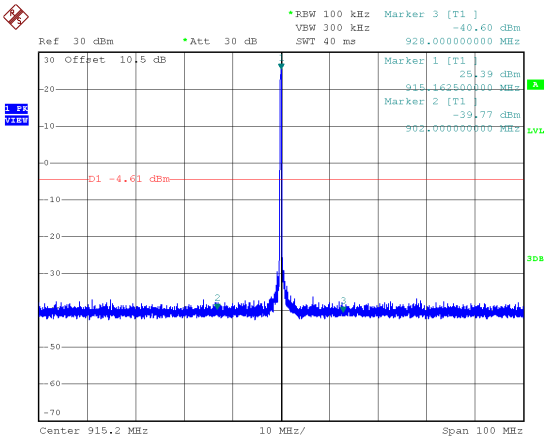


7.4 Test Result and Data

Note: Test plots refer to the following pages.

For Verify Data

CH01



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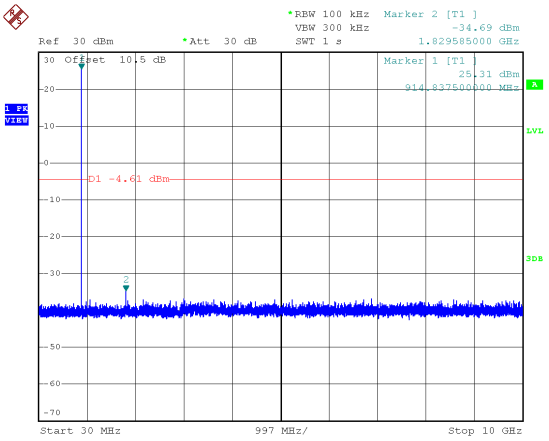
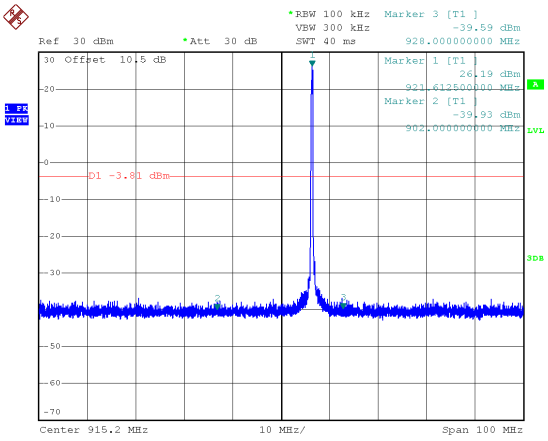
CH01



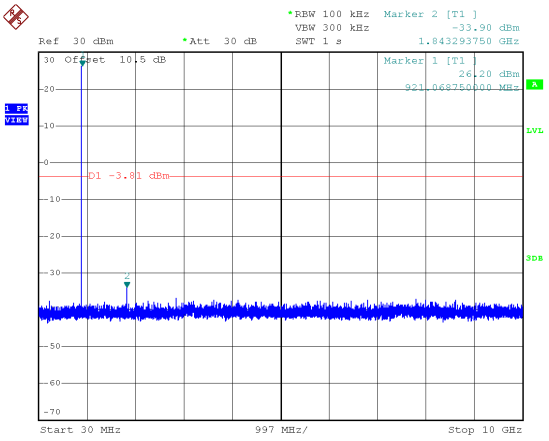
Date: 29.MAY.2025 12:26:12

CH33



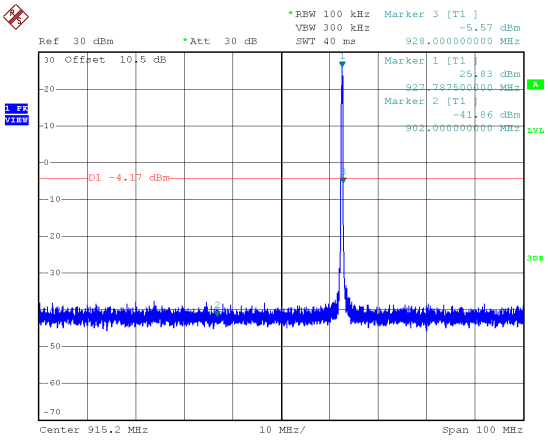
Date: 29.MAY.2025 12:31:45

CH33



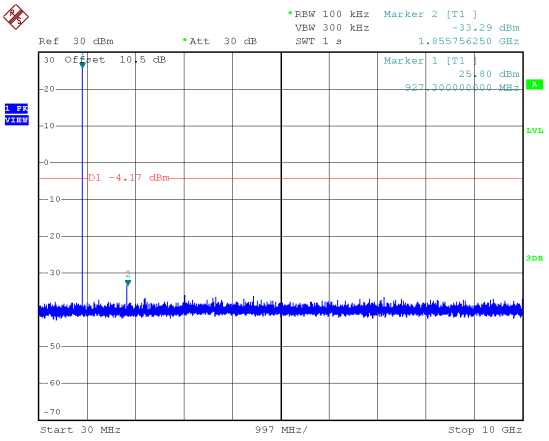
Date: 29.MAY.2025 12:32:37

CH64



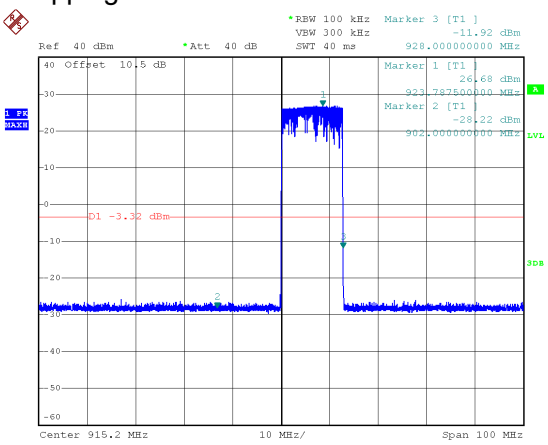
Date: 29.MAY.2025 12:35:53

CH64

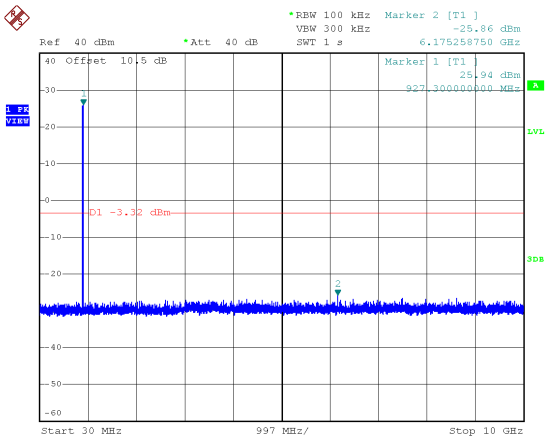


Date: 29.MAY.2025 12:36:58

Hopping



Date: 29.MAY.2025 19:31:24



Date: 29.MAY.2025 19:33:39

8. 20dB Bandwidth Measurement Data

8.1 Test Limit

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

8.2 Test Procedures

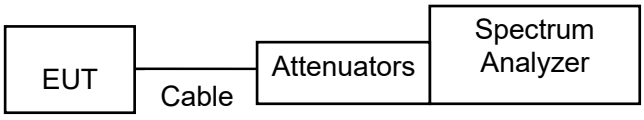
According to the methods defined in ANSI C63.10-2013 Section 6.9

a. The transmitter output was connected to the spectrum analyzer.

b. Set RBW of spectrum analyzer to 10 KHz and VBW to 30 KHz.

c. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

8.3 Test Setup Layout

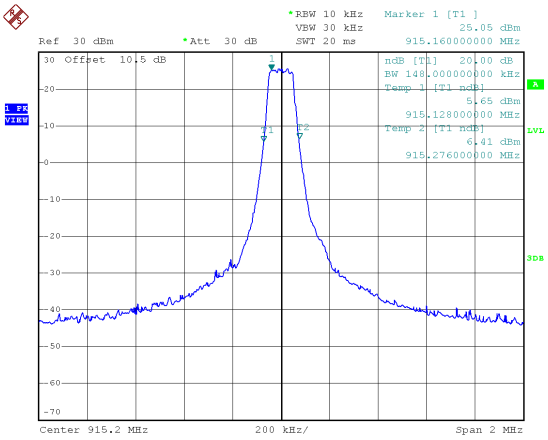


8.4 Test Result and Data

For Verify Data

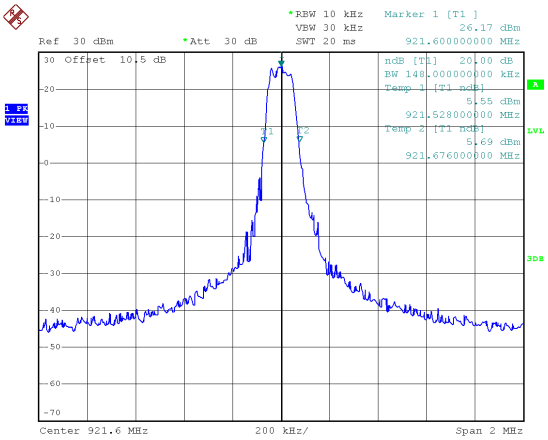
Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
GFSK	1	915.2	0.148	0.500
	33	921.6	0.148	0.500
	64	927.8	0.140	0.500

CH01



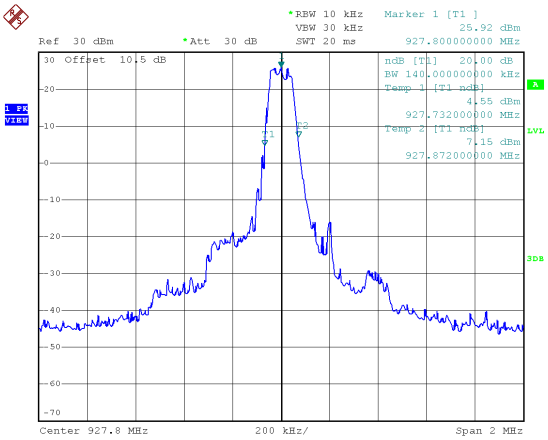
Date: 29.MAY.2025 11:58:33

CH33



Date: 29.MAY.2025 12:09:54

CH64



Date: 29.MAY.2025 12:13:58

9. Frequencies Separation

9.1 Test Limit

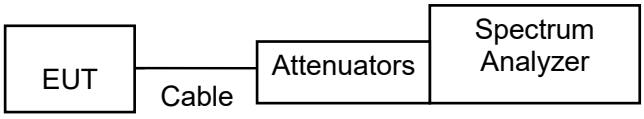
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

9.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 7.8.2

a. The transmitter output was connected to the spectrum analyzer.
b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
c. By using the MaxHold function record the separation of two adjacent channels.
d. Measure the frequency difference of these two adjacent channels.

9.3 Test Setup Layout

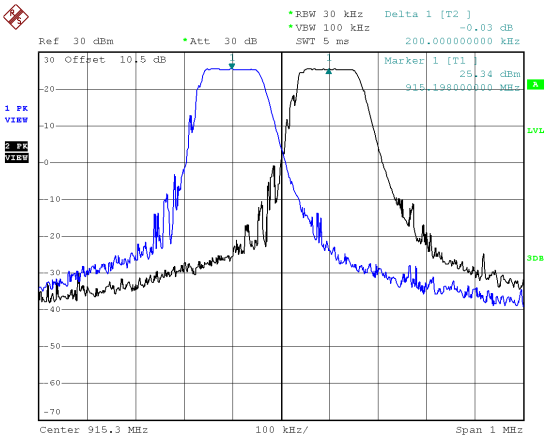


9.4 Test Result and Data

For Verify Data

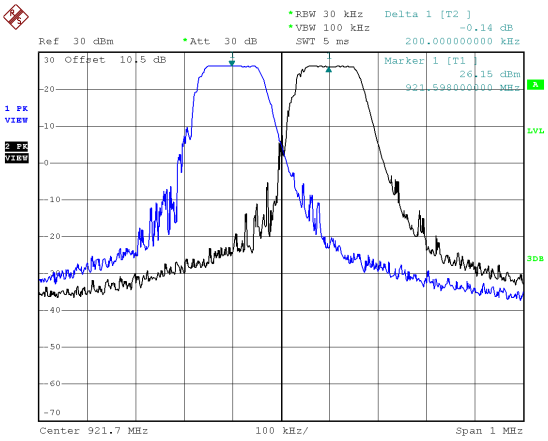
Modulation Type	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
GFSK	1	915.2	0.20	0.148
	33	921.6	0.20	0.148
	64	927.8	0.20	0.14

CH01



Date: 29.MAY.2025 12:43:17

CH33



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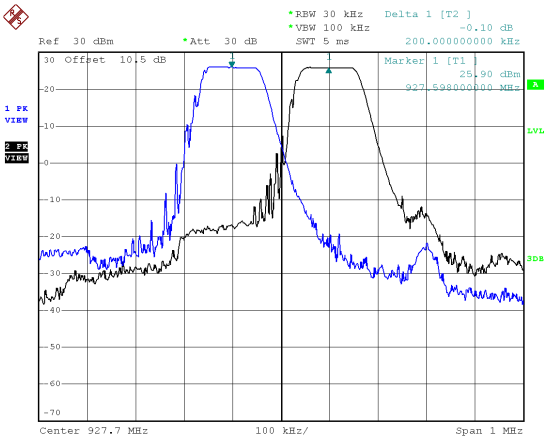
CH64



Date: 29.MAY.2025 12:47:38

10. Dwell Time on each channel

10.1 Test Limit

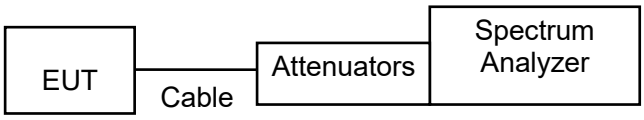
For frequency hopping systems operating in the 902-928 MHz band:
if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;
if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

10.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 7.8.4

1. The transmitter output was connected to the spectrum analyzer.
2. Adjust the center frequency to measure frequency, then set zero span mode.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz.
4. Measure the time duration of one transmission on the measured frequency.

10.3 Test Setup Layout

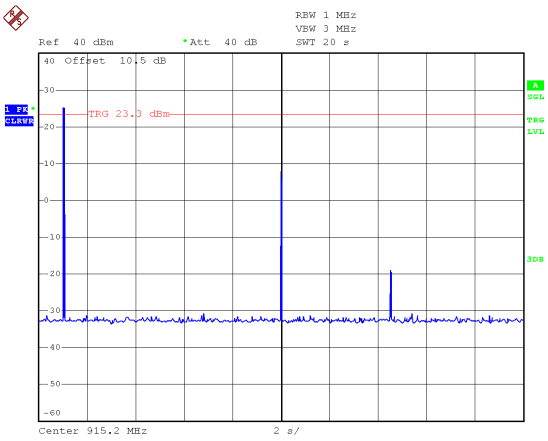


10.4 Test Result and Data

For Verify Data

Channel	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 20 sec	Dwell Time(ms)	Limit (ms)
1	915.2	15.920	1.00	15.92	400
33	921.6	15.960	1.00	15.96	400
64	927.8	15.960	1.00	15.96	400

CH01



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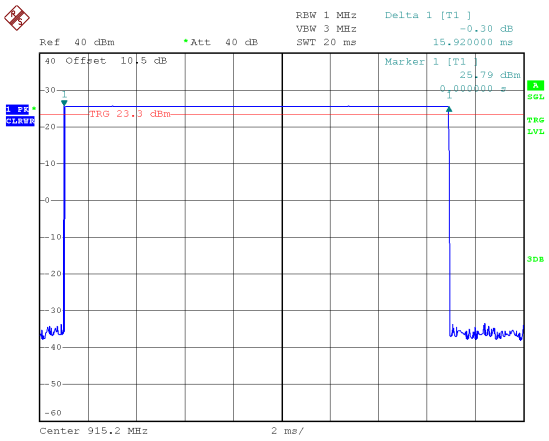
CH01



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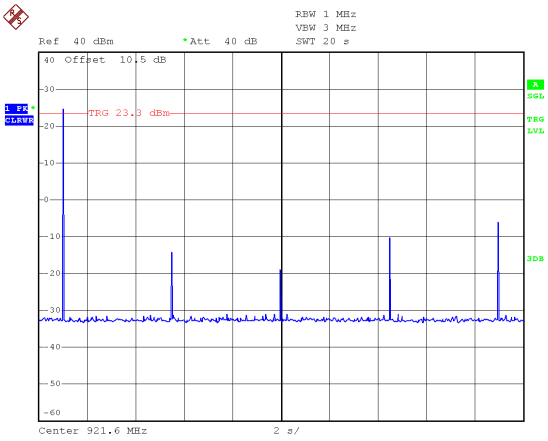
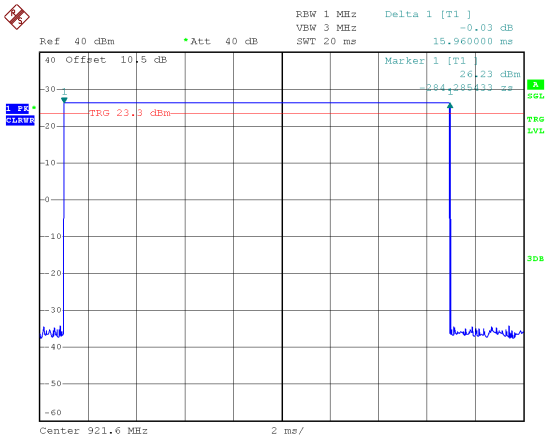
CH33



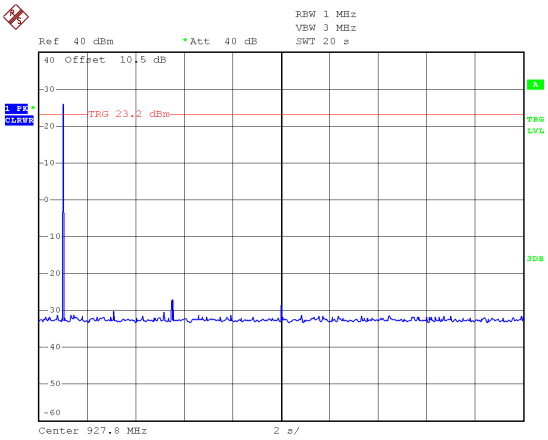
Date: 29.MAY.2025 20:23:15

CH33



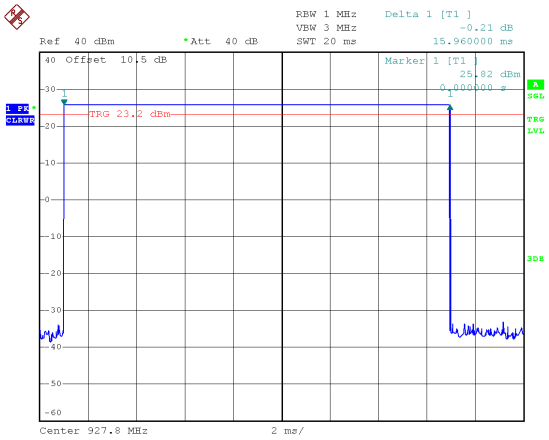
Date: 29.MAY.2025 20:26:39

CH64



Date: 2.JUN.2025 10:32:37

CH64



Date: 2.JUN.2025 10:34:30

11. Number of Hopping Channels

11.1 Test Limit

For frequency hopping systems operating in the 902-928 MHz band:

if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies

if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies

11.2 Test Procedures

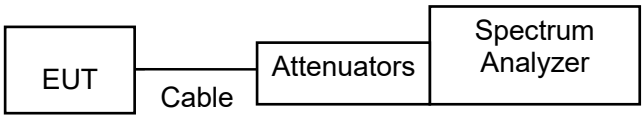
According to the methods defined in ANSI C63.10-2013 Section 7.8.3

a. The transmitter output was connected to the spectrum analyzer.

b. Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.

c. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

11.3 Test Setup Layout

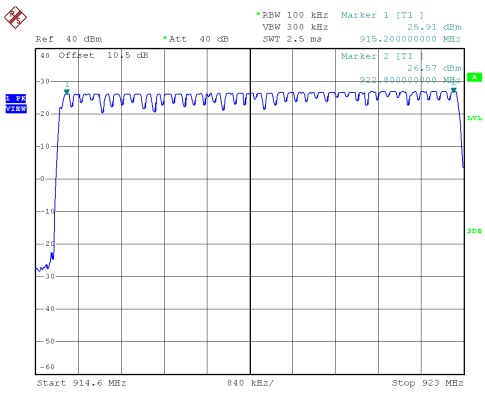


11.4 Test Result and Data

For Verify Data

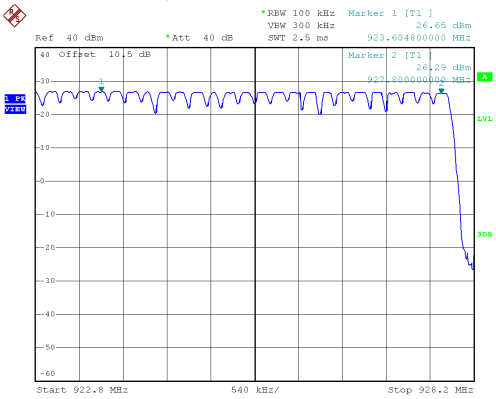
Modulation Type	Hopping Channels	Limit
GFSK	64	50

Modulation Type: GFSK



Date: 29.MAY.2025 16:43:15

Modulation Type: GFSK



Date: 29.MAY.2025 17:02:24

12. Maximum Peak Output Power

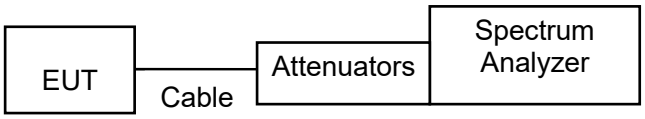
12.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

12.2 Test Procedures

According to the methods defined in ANSI C63.10-2013 Section 7.8.5
The antenna port（RF output）of the EUT was connected to the input（RF input）of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

12.3 Test Setup Layout



12.4 Test Result and Data

For Verify Data

Setting	Modulation Type	Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)
17	GFSK	1	915.2	25.44	349.945
18		33	921.6	26.13	410.204
17		64	927.8	25.86	385.478

Setting	Modulation Type	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
17	GFSK	1	915.2	25.41	347.536
18		33	921.6	26.1	407.380
17		64	927.8	25.82	381.944

For Original data

Setting	Modulation Type	Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)
15	GFSK	1	915.2	25.87	386.367
15		33	921.6	26.91	490.908
15		64	927.8	25.93	391.742

Setting	Modulation Type	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
15	GFSK	1	915.2	25.83	382.825
15		33	921.6	26.88	487.528
15		64	927.8	25.88	387.258

*Average power is for reference only.

----------THE END OF REPORT----------