Product Name:	STM B.T Speaker
Model No.:	STM
Applicant:	TOPMORE TECHNOLOGY INC. 1F., No.101, Sec. 2, Jiafeng S. Rd., Zhubei City, Hsinchu County 302. Taiwan
Date of Receipt:	May. 16, 2017
Finished date of Test:	Jan. 02, 2018
Applicable Standards:	47 CFR Part 15, Subpart C, 15.247 ANSI C63.10: 2013 FCC Public Notice DA 00-705 (March 2000)

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Richard Lin , Date: 1/3/2018

(Richard Lin)

Approved By : Johnson Ho , Date: 1/3/2018

(Johnson Ho, Director)

Testing Laboratory 1016

Revisions History

Report No.	Issue Date	Revisions
FCCA17051604	Jan. 03, 2018	Initial issue

Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT 5
1.1 DOCUMENT POLICY 5
1.2 TEST STATEMENT 5
1.3 EUT MODIFICATION 5
2. DESCRIPTION OF EUT AND TEST MODE 6
2.1 GENERAL DESCRIPTION OF EUT 6
2.2 DESCRIPTION OF EUT INTERNAL DEVICE 6
2.3 DESCRIPTION OF TEST MODE 6
2.4 EUT OPERATING CONDITION 7
2.5 DESCRIPTION OF SYSTEM RECEIVER 8
2.6 DESCRIPTION OF SUPPORT UNIT 8
2.7 DESCRIPTION OF CONNECTION DIAGRAM 9
2.8 CHANNEL AND FREQUENCY TABLE 10
3. DESCRIPTION OF APPLIED STANDARDS 11
3.1 SUMMARY OF TEST RESULTS 11
4. TECHNICAL CHARACTERISTICS TEST 12
4.1 CONDUCTED EMISSION TEST 12
4.1.1 LIMIT 12
4.1.2 TEST EQUIPMENT 12
4.1.3 TEST SETUP 13
4.1.4 TEST PROCEDURE 13
4.1.5 TEST RESULT 14
4.2 RADIATED EMISSION TEST 24
4.2.1 LIMIT 24
4.2.2 TEST EQUIPMENT 25
4.2.3 TEST SET-UP 27
4.2.4 TEST PROCEDURE 28
4.2.5 TEST RESULT 29
4.3 20DB BANDWIDTH 42
4.3.1 LIMIT 42
4.3.2 TEST EQUIPMENT 42
4.3.3 TEST SET-UP 42
4.3.4 TEST PROCEDURE 42
4.3.5 EUT OPERATING CONDITION 42
4.3.6 TEST RESULT 43
4.4 PEAK POWER TEST 45
4.4.1 LIMIT 45
4.4.2 TEST EQUIPMENT 45
4.4.3 TEST SET-UP 45
4.4.4 TEST PROCEDURE 45
4.4.5 EUT OPERATING CONDITION 45
4.4.6 TEST RESULT 46
4.5 BAND EDGE TEST 48

4.5.1 LIMIT 48
4.5.2 TEST EQUIPMENT 48
4.5.3 TEST SETUP 49
4.5.4 TEST PROCEDURE 50
4.5.5 EUT OPERATING CONDITION 50
4.5.6 TEST RESULT 51
4.6 TIME OF OCCUPANCY (DWELL TIME) 60
4.6.1 LIMIT 60
4.6.2 TEST EQUIPMENT 60
4.6.3 TEST SET-UP 60
4.6.4 TEST PROCEDURE 60
4.6.5 EUT OPERATING CONDITION 60
4.6.6 TEST RESULT 61
4.7 QUANTITY OF HOPPING CHANNEL TEST 66
4.7.1 LIMIT 66
4.7.2 TEST EQUIPMENT 66
4.7.3 TEST SET-UP 66
4.7.4 TEST PROCEDURE 66
4.7.5 EUT OPERATING CONDITION 66
4.7.6 TEST RESULT 67
4.8 CHANNEL SEPARATION TEST 68
4.8.1 LIMIT 68
4.8.2 TEST EQUIPMENT 68
4.8.3 TEST SET-UP 68
4.8.4 TEST PROCEDURE 68
4.8.5 EUT OPERATING CONDITION 68
4.8.6 TEST RESULT 69
5. ANTENNA APPLICATION 71
5.1 ANTENNA REQUIREMENT 71
5.2 RESULT 71
6. TERMS OF ABBREVIATION 72

1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source, DC 5.0V from PC USB Port.

- Frequency hopping systems between 2400 and 2483.5 MHz band use at least 75 nonoverlapping channels, except that as few as 15 nonoverlapping channels may be used for systems that intelligently modify their hopsets in accordance with Section 15.247(g)(h). Hopsets modified in this manner must be redetermined at least once every 30 seconds. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

- hopping channel sample :(From left to right, up to down)

18 58 16 76 29 61 69 59 74 51 75 41 09 49 68 66 21 43 61 16 3 7
14 17 28 10 27 06 62 59 70 65 32 51 73 69 67 22 43 62 17 57 38
52 36 30 49 27 46 06 67 05 26 41 58 54 31 59 71 69 28 58 39 16
78 75 74 29 47 69 62 45 62 02 40 17 38 16 57 37 56 11 76 32 50
27 26 05 46 24 17 15 38

1.3 EUT MODIFICATION

- No modification in SRT Lab.

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	STM B.T Speaker
MODEL NO.	STM
POWER SUPPLY	DC 5.0V from PC USB Port
CABLE	NA
FREQUENCY BAND	2.4 GHz ~ 2.4835 GHz
CARRIER FREQUENCY	2.402 GHz ~ 2.480 GHz
NUMBER OF CHANNEL	79
RATED RF OUTPUT POWER	-5.90dBm (0.26 mW)
MODULATION TYPE	GFSK, π/4 DQPSK, 8DPSK
MODE OF OPERATION	Duplex
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	2.0 dBi

NOTE:
For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID / DOC	REMARK
N/A				

2.3 DESCRIPTION OF TEST MODE

The EUT has three modulations(GFSK, π/4 DQPSK, 8DPSK). 966 chamber Pre-test three modulations. Evaluate GFSK was the worst case. So use of GFSK for the final test mode. With Blutooth Dongle Link mode.

Mode		Frequency
1	Tx-1 (GFSK)	2402 MHz
2	Tx-2 (GFSK)	2441 MHz
3	Tx-3 (GFSK)	2480 MHz
4	Standby	N/A
5	Link (with Blutooth Dongle)	N/A

966 chamber Pre-test result summary:

Modulation	Polarizatio	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
GFSK_TX1	H	209.24	36.75	43.5	-6.75
GFSK_TX1	V	236.85	43.42	46.0	-2.58
GFSK_TX2	H	200.96	37.17	43.5	-6.33
GFSK_TX2	**V**	**222.30**	**43.63**	**46.0**	**-2.37**
GFSK_TX3	H	207.84	38.21	43.5	-5.29
GFSK_TX3	V	222.30	41.79	46.0	-4.21
π/4 DQPSK_TX1	H	223.41	39.81	46.0	-6.19
π/4 DQPSK_TX1	V	257.13	42.12	46.0	-3.88
π/4 DQPSK_TX2	H	223.72	40.24	46.0	-5.76
π/4 DQPSK_TX2	V	222.82	41.39	46.0	-4.61
π/4 DQPSK_TX3	H	451329	47.36	54.0	-6.64
π/4 DQPSK_TX3	V	732.91	41.28	46.0	-4.72
8DPSK_TX1	H	223.91	39.71	46.0	-6.29
8DPSK_TX1	V	209.34	39.25	43.5	-4.25
8DPSK_TX2	H	257.83	41.33	46.0	-4.67
8DPSK_TX2	V	499.58	41.56	46.0	-4.44
8DPSK_TX3	H	209.63	39.62	43.5	-3.88
8DPSK_TX3	V	222.60	42.21	46.0	-3.79

NOTE:
1. Below 1 GHz were pre-tested in chamber and chosen the worst case for conducted and radiated emission test.
2. Above 1 GHz were tested individually.
3. The axis X,Y and Z we evaluate in chamber, the X axis is worst case.

2.4 EUT OPERATING CONDITION

Tx-1, Tx-2, Tx3, Standby：

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. Open program “BlueTest 3”. Into mode Tx-1,. Tx-2, Tx3, Standby

Link：

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. PC use Blutooth Dongle Link (Blutooth) to EUT.

2.5 DESCRIPTION OF SYSTEM RECEIVER

1. Required setting (e.g. RBW) of Spectrum Analyzer (System Receiver) be decrypted into Test Procedure of each test item in Test Report.
2. For Bluetooth function, the EUT execute the RF utility which from the BT module supplier to provide channel selection, power level and data rate for transmitting and receiving signals continuously, therefore the Spectrum Analyzer(System Receiver) be set to measure these signals directly without synchronization.3.Each frequency is used equally on the average by each transmitter.
3. Each frequency is used equally on the average by each transmitter.
4. The receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and they shift frequencies in synchronization with the transmitted signals.

2.6 DESCRIPTION OF SUPPORT UNIT

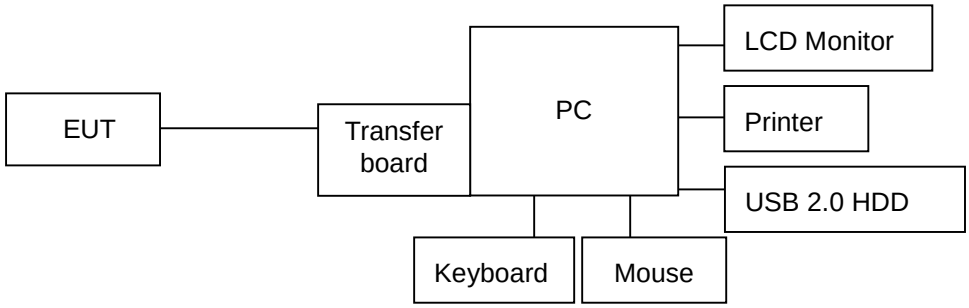
The EUT was configured by the requirement of ANSI C63.10:2013. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	PC	ASUS	CM1735	R31018	1.5m unshielded power cable.
2	LCD Monitor	DELL	U2410Mb	R31018	1.8m unshielded power cable. 1.5m shielded data cable.
3	Keyboard	ASUS	PK1100U	R41108	1.8m unshielded data cable.
4	Mouse	ASUS	MOBTUO	R41108	1.5m unshielded data cable.
5	Printer	HP	C8995A	R33001	1.5m unshielded power cable. 1.5m shielded data cable.
6	USB 2.0 HDD	TERASYS	F12-U	4912A002	1.5m unshielded power cable.
7	Blutooth Dongle	ASUS	WL-BTD202	N/A	N/A
8	USB CABLE	N/A	N/A	N/A	1.0m shielded data cable
9	Transfer board	N/A	N/A	N/A	N/A

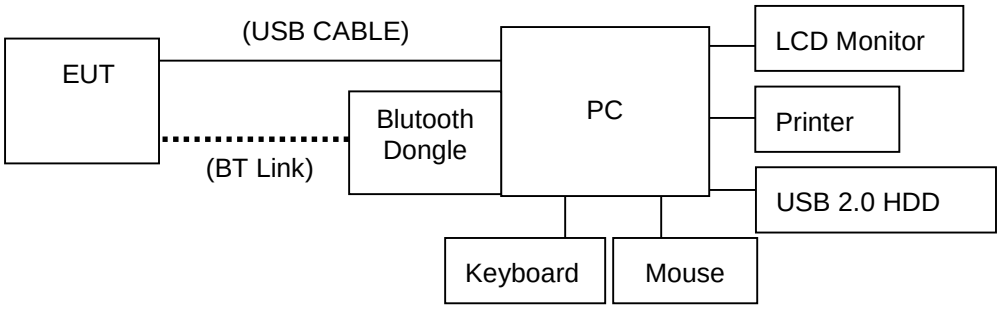
NOTE: For the actual test configuration, please refer to the photos of testing.

2.7 DESCRIPTION OF CONNECTION DIAGRAM

Tx-1, Tx-2, Tx3, Standby：



Link：



2.8 CHANNEL AND FREQUENCY TABLE

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
CH00	2402 MHz	CH20	2422 MHz	CH40	2442 MHz	CH60	2462 MHz
CH01	2403 MHz	CH21	2423 MHz	CH41	2443 MHz	CH61	2463 MHz
CH02	2404 MHz	CH22	2424 MHz	CH42	2444 MHz	CH62	2464 MHz
CH03	2405 MHz	CH23	2425 MHz	CH43	2445 MHz	CH63	2465 MHz
CH04	2406 MHz	CH24	2426 MHz	CH44	2446 MHz	CH64	2466 MHz
CH05	2407 MHz	CH25	2427 MHz	CH45	2447 MHz	CH65	2467 MHz
CH06	2408 MHz	CH26	2428 MHz	CH46	2448 MHz	CH66	2468 MHz
CH07	2409 MHz	CH27	2429 MHz	CH47	2449 MHz	CH67	2469 MHz
CH08	2410 MHz	CH28	2430 MHz	CH48	2450 MHz	CH68	2470 MHz
CH09	2411 MHz	CH29	2431 MHz	CH49	2451 MHz	CH69	2471 MHz
CH10	2412 MHz	CH30	2432 MHz	CH50	2452 MHz	CH70	2472 MHz
CH11	2413 MHz	CH31	2433 MHz	CH51	2453 MHz	CH71	2473 MHz
CH12	2414 MHz	CH32	2434 MHz	CH52	2454 MHz	CH72	2474 MHz
CH13	2415 MHz	CH33	2435 MHz	CH53	2455 MHz	CH73	2475 MHz
CH14	2416 MHz	CH34	2436 MHz	CH54	2456 MHz	CH74	2476 MHz
CH15	2417 MHz	CH35	2437 MHz	CH55	2457 MHz	CH75	2477 MHz
CH16	2418 MHz	CH36	2438 MHz	CH56	2458 MHz	CH76	2478 MHz
CH17	2419 MHz	CH37	2439 MHz	CH57	2459 MHz	CH77	2479 MHz
CH18	2420 MHz	CH38	2440 MHz	CH58	2460 MHz	CH78	2480 MHz
CH19	2421 MHz	CH39	2441 MHz	CH59	2461 MHz		

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C, 15.247

ANSI C63.10: 2013

FCC Public Notice DA 00-705 (March 2000)

All tests have been performed and recorded as the above standards.

3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.203 15.247(c)(1)(i)	Antenna requirement	PASS
15.207	AC Power Line Conducted Emission	PASS
15.247(b)	Peak power test	PASS
15.247(d)	Band Edge Measurement:	PASS
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS
15.247(a)	20dB Bandwidth	PASS
15.247(a)	Channel separation test Limit：minimum of 25 kHz or the 20 dB bandwidth	PASS
15.247(a)(b)	Quantity of hopping channel test Limit：75 non-overlapping hopping channels	PASS
15.247(a)	Time of occupancy (Dwell Time) Limit：greater than 0.4 seconds	PASS

4. TECHNICAL CHARACTERISTICS TEST

4.1 CONDUCTED EMISSION TEST

4.1.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	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 0.15 to 0.50 MHz.

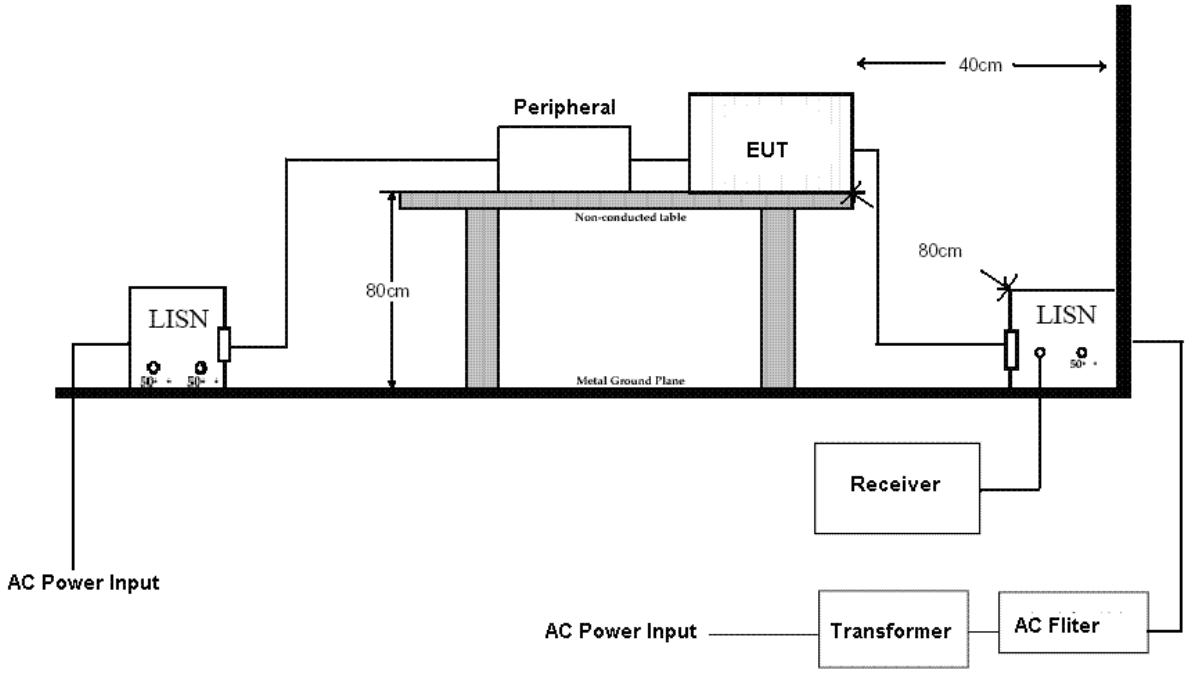
4.1.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	JAN. 02, 2018 ETC	☐
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	JAN. 09, 2018 ETC	■
LISN	50 μH, 50 ohm	SOLAR	9252-50-R-24-BNC / 951315	NOV. 01, 2017 ETC	■
LISN	50 μH, 50 ohm	SCHWARZBECK	NSLK 8127/ 8127-808	DEC. 11, 2017 ETC	■
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	NOV. 17, 2017 ETC	■
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357/ L1TEQU009	MAY 17, 2018 ETC	☐
COAXIAL CABLE	5 m	HUBER+SUHNER	RG214/U / #5M (L1TCAB013)	MAY 08, 2018 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR	■
GROUND PLANE	2 m (H) x 3 m (W)	SRT	N/A	NCR	■
GROUND PLANE	2.5 m (H) x 3 m (W)	SRT	N/A	NCR	☐
PULSE LIMITER	9 kHz ~ 30 MHz Insertion Loss= 10dB±0.3dB	ROHDE & SCHWARZ	ESH3Z2/ L1TTES009	FEB. 23, 2018 ETC	■
THERMO-HYGRO	15 – 40 °C, 0- 100% RH	TOP	20-A / 6644	SEP. 20, 2017 ETC	■

NOTE:
The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.1.3 TEST SETUP



NOTE :
1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.

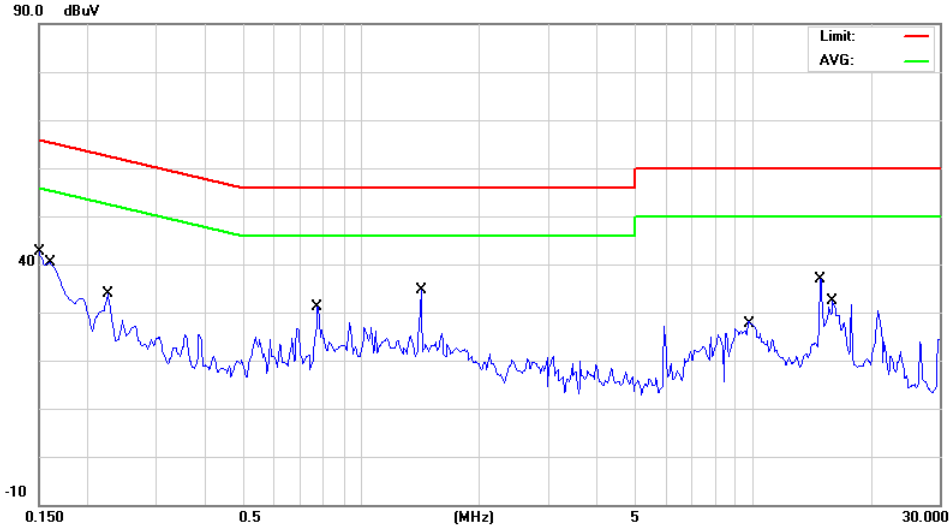
4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50μH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

4.1.5 TEST RESULT

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Line

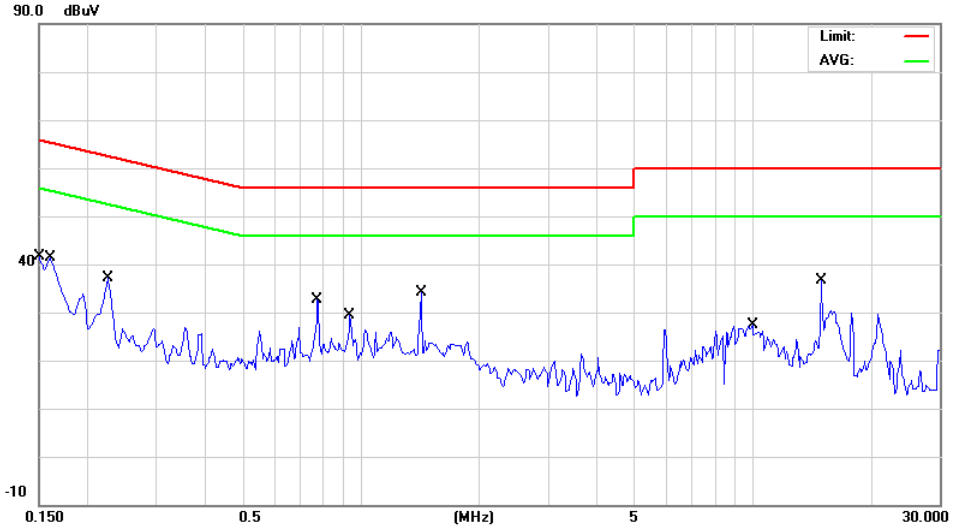


Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	35.14	-0.07	35.07	66.00	-30.93	QP	
	2	0.1500	17.43	-0.07	17.36	56.00	-38.64	AVG	
	3	0.1600	35.78	-0.07	35.71	65.46	-29.75	QP	
	4	0.1600	33.82	-0.07	33.75	55.46	-21.71	AVG	
	5	0.2250	32.08	-0.08	32.00	62.63	-30.63	QP	
	6	0.2250	29.70	-0.08	29.62	52.63	-23.01	AVG	
	7	0.7750	29.68	-0.08	29.60	56.00	-26.40	QP	
	8	0.7750	24.72	-0.08	24.64	46.00	-21.36	AVG	
	9	1.4200	33.28	-0.06	33.22	56.00	-22.78	QP	
*	10	1.4200	29.84	-0.06	29.78	46.00	-16.22	AVG	
	11	10.0000	21.76	0.16	21.92	60.00	-38.08	QP	
	12	10.0000	14.17	0.16	14.33	50.00	-35.67	AVG	
	13	14.9050	34.14	0.33	34.47	60.00	-25.53	QP	
	14	14.9050	25.35	0.33	25.68	50.00	-24.32	AVG	
	15	16.0000	26.88	0.37	27.25	60.00	-32.75	QP	
	16	16.0000	21.33	0.37	21.70	50.00	-28.30	AVG	

NOTE :
1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Neutral



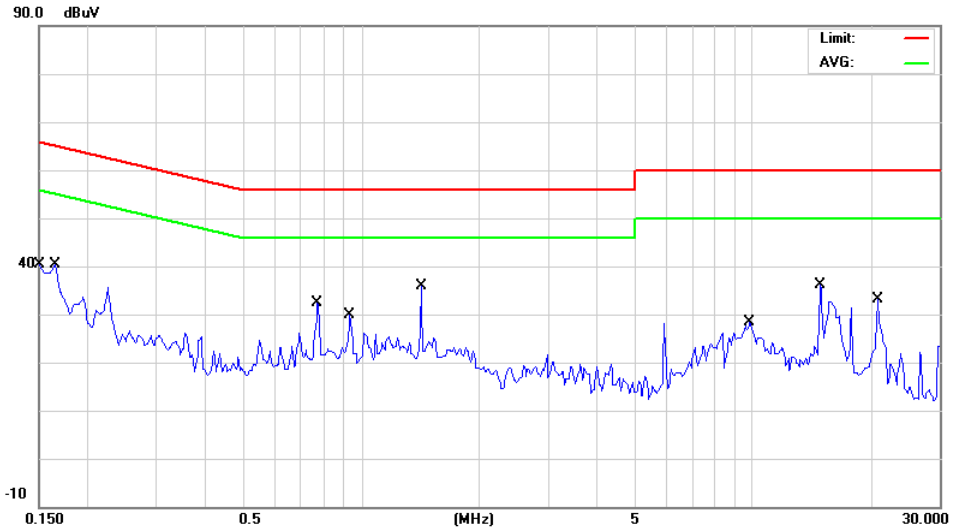
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	35.40	-0.02	35.38	66.00	-30.62	QP	
	2	0.1500	17.73	-0.02	17.71	56.00	-38.29	AVG	
	3	0.1600	36.58	-0.02	36.56	65.46	-28.90	QP	
	4	0.1600	33.97	-0.02	33.95	55.46	-21.51	AVG	
	5	0.2250	35.82	-0.03	35.79	62.63	-26.84	QP	
	6	0.2250	34.45	-0.03	34.42	52.63	-18.21	AVG	
	7	0.7750	30.92	-0.04	30.88	56.00	-25.12	QP	
	8	0.7750	25.47	-0.04	25.43	46.00	-20.57	AVG	
	9	0.9350	26.26	-0.04	26.22	56.00	-29.78	QP	
	10	0.9350	21.13	-0.04	21.09	46.00	-24.91	AVG	
	11	1.4200	33.18	-0.03	33.15	56.00	-22.85	QP	
*	12	1.4200	30.36	-0.03	30.33	46.00	-15.67	AVG	
	13	10.0000	21.38	0.20	21.58	60.00	-38.42	QP	
	14	10.0000	14.23	0.20	14.43	50.00	-35.57	AVG	
	15	14.9100	34.06	0.35	34.41	60.00	-25.59	QP	
	16	14.9100	23.68	0.35	24.03	50.00	-25.97	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Line



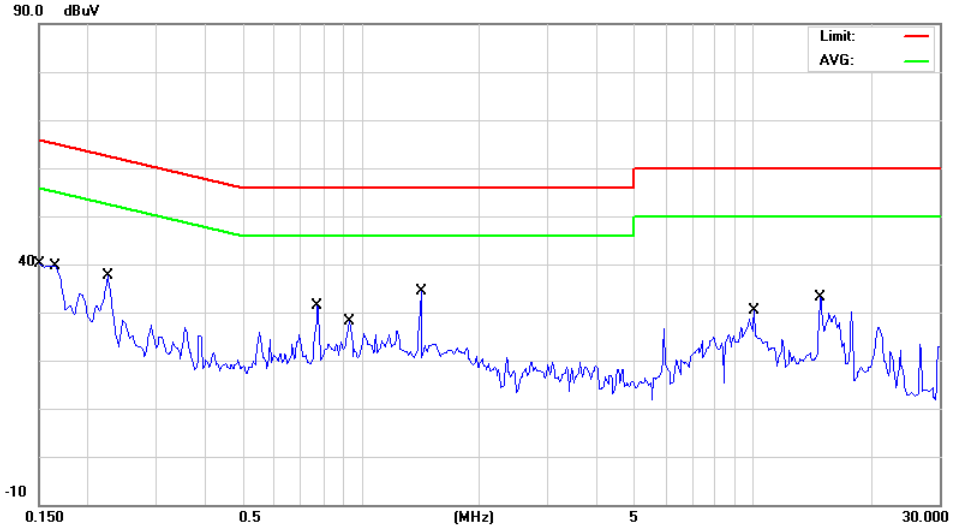
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.74	-0.07	34.67	66.00	-31.33	QP	
	2	0.1500	17.51	-0.07	17.44	56.00	-38.56	AVG	
	3	0.1650	35.92	-0.07	35.85	65.21	-29.36	QP	
	4	0.1650	31.75	-0.07	31.68	55.21	-23.53	AVG	
	5	0.7750	29.80	-0.08	29.72	56.00	-26.28	QP	
	6	0.7750	25.22	-0.08	25.14	46.00	-20.86	AVG	
	7	0.9350	25.60	-0.08	25.52	56.00	-30.48	QP	
	8	0.9350	19.86	-0.08	19.78	46.00	-26.22	AVG	
	9	1.4200	32.98	-0.06	32.92	56.00	-23.08	QP	
*	10	1.4200	30.19	-0.06	30.13	46.00	-15.87	AVG	
	11	10.0000	21.38	0.16	21.54	60.00	-38.46	QP	
	12	10.0000	14.01	0.16	14.17	50.00	-35.83	AVG	
	13	14.8950	33.56	0.33	33.89	60.00	-26.11	QP	
	14	14.8950	28.93	0.33	29.26	50.00	-20.74	AVG	
	15	20.8600	29.80	0.51	30.31	60.00	-29.69	QP	
	16	20.8600	19.20	0.51	19.71	50.00	-30.29	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Neutral



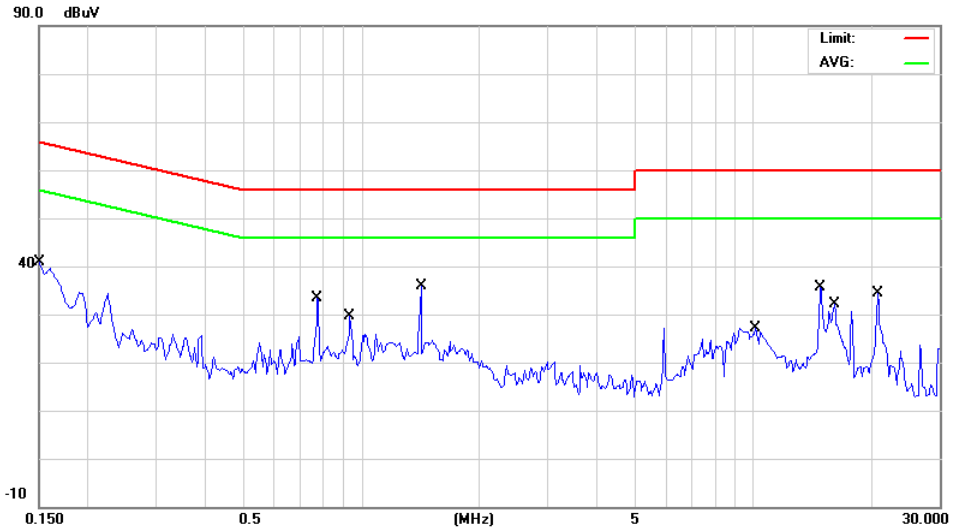
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.16	-0.02	34.14	66.00	-31.86	QP	
	2	0.1500	17.43	-0.02	17.41	56.00	-38.59	AVG	
	3	0.1650	36.32	-0.02	36.30	65.21	-28.91	QP	
	4	0.1650	32.50	-0.02	32.48	55.21	-22.73	AVG	
	5	0.2250	35.90	-0.03	35.87	62.63	-26.76	QP	
	6	0.2250	34.11	-0.03	34.08	52.63	-18.55	AVG	
	7	0.7750	30.06	-0.04	30.02	56.00	-25.98	QP	
	8	0.7750	25.10	-0.04	25.06	46.00	-20.94	AVG	
	9	0.9350	25.68	-0.04	25.64	56.00	-30.36	QP	
	10	0.9350	20.03	-0.04	19.99	46.00	-26.01	AVG	
	11	1.4200	32.10	-0.03	32.07	56.00	-23.93	QP	
*	12	1.4200	29.84	-0.03	29.81	46.00	-16.19	AVG	
	13	10.0000	20.56	0.20	20.76	60.00	-39.24	QP	
	14	10.0000	13.66	0.20	13.86	50.00	-36.14	AVG	
	15	14.8950	34.10	0.35	34.45	60.00	-25.55	QP	
	16	14.8950	26.05	0.35	26.40	50.00	-23.60	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Line



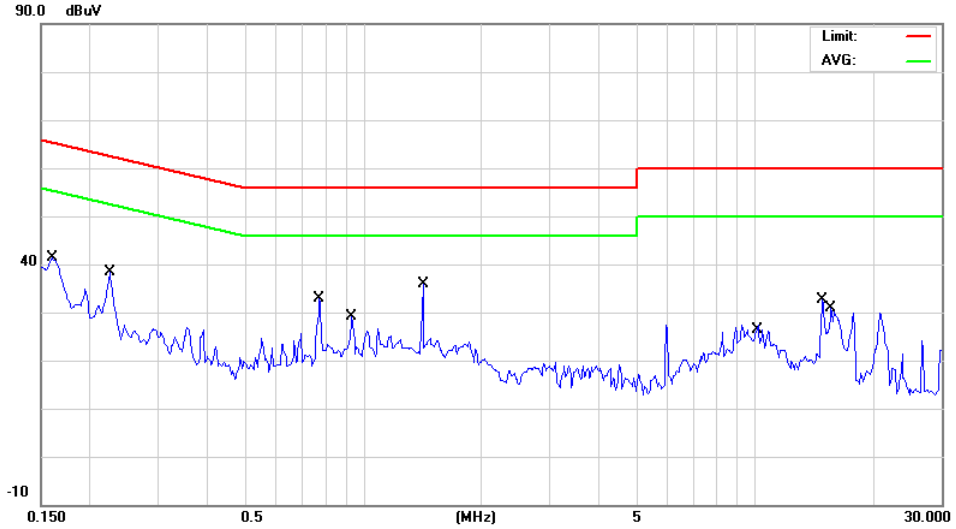
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	33.98	-0.07	33.91	66.00	-32.09	QP	
	2	0.1500	16.73	-0.07	16.66	56.00	-39.34	AVG	
	3	0.7750	30.20	-0.08	30.12	56.00	-25.88	QP	
	4	0.7750	25.76	-0.08	25.68	46.00	-20.32	AVG	
	5	0.9350	25.32	-0.08	25.24	56.00	-30.76	QP	
	6	0.9350	19.20	-0.08	19.12	46.00	-26.88	AVG	
	7	1.4200	32.72	-0.06	32.66	56.00	-23.34	QP	
*	8	1.4200	29.84	-0.06	29.78	46.00	-16.22	AVG	
	9	10.0000	20.94	0.16	21.10	60.00	-38.90	QP	
	10	10.0000	13.84	0.16	14.00	50.00	-36.00	AVG	
	11	14.8950	33.16	0.33	33.49	60.00	-26.51	QP	
	12	14.8950	21.80	0.33	22.13	50.00	-27.87	AVG	
	13	16.1500	28.92	0.37	29.29	60.00	-30.71	QP	
	14	16.1500	26.05	0.37	26.42	50.00	-23.58	AVG	
	15	20.8550	25.02	0.51	25.53	60.00	-34.47	QP	
	16	20.8550	15.21	0.51	15.72	50.00	-34.28	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Neutral



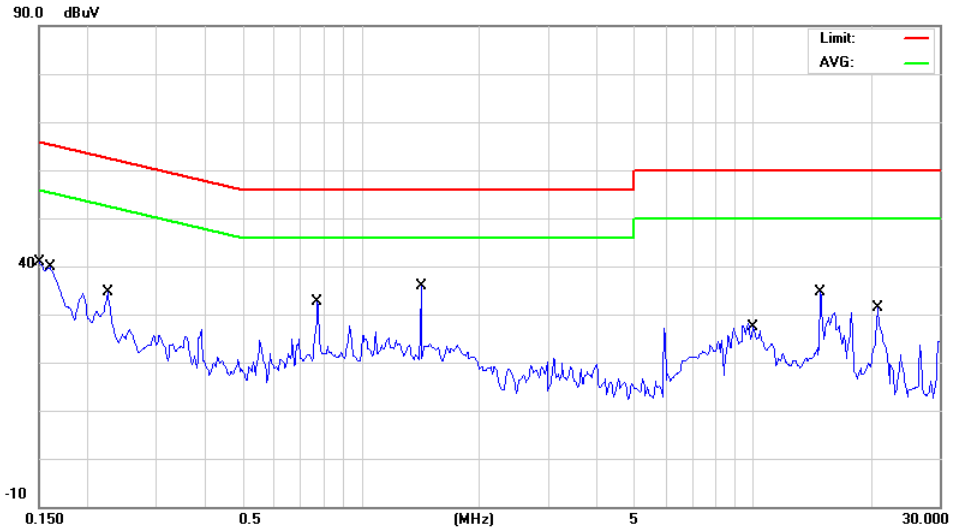
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1600	35.56	-0.02	35.54	65.46	-29.92	QP	
	2	0.1600	33.22	-0.02	33.20	55.46	-22.26	AVG	
	3	0.2250	35.94	-0.03	35.91	62.63	-26.72	QP	
	4	0.2250	34.18	-0.03	34.15	52.63	-18.48	AVG	
	5	0.7750	30.50	-0.04	30.46	56.00	-25.54	QP	
	6	0.7750	25.47	-0.04	25.43	46.00	-20.57	AVG	
	7	0.9350	26.00	-0.04	25.96	56.00	-30.04	QP	
	8	0.9350	20.78	-0.04	20.74	46.00	-25.26	AVG	
	9	1.4200	32.90	-0.03	32.87	56.00	-23.13	QP	
*	10	1.4200	29.77	-0.03	29.74	46.00	-16.26	AVG	
	11	10.0000	20.90	0.20	21.10	60.00	-38.90	QP	
	12	10.0000	13.84	0.20	14.04	50.00	-35.96	AVG	
	13	14.8900	33.06	0.35	33.41	60.00	-26.59	QP	
	14	14.8900	27.49	0.35	27.84	50.00	-22.16	AVG	
	15	15.6600	27.44	0.37	27.81	60.00	-32.19	QP	
	16	15.6600	24.97	0.37	25.34	50.00	-24.66	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Line



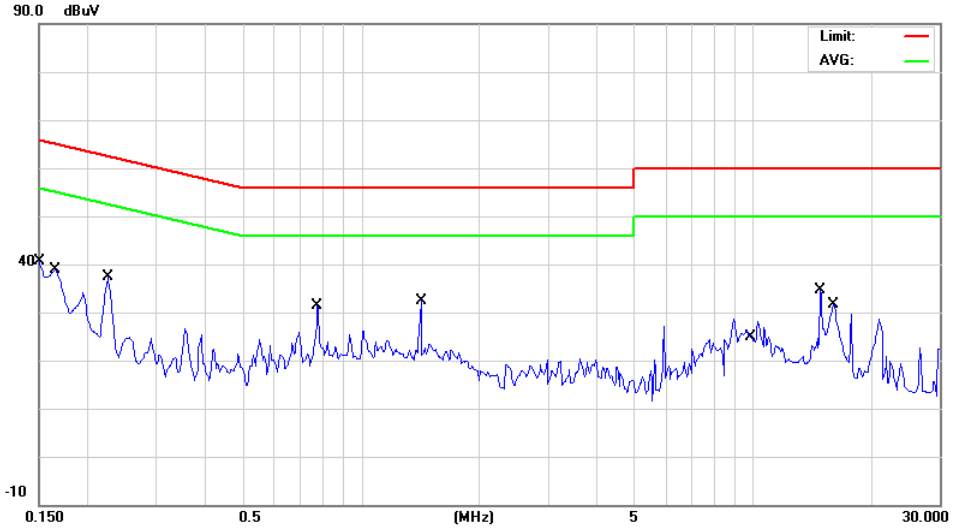
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.06	-0.07	33.99	66.00	-32.01	QP	
	2	0.1500	16.97	-0.07	16.90	56.00	-39.10	AVG	
	3	0.1600	35.62	-0.07	35.55	65.46	-29.91	QP	
	4	0.1600	33.60	-0.07	33.53	55.46	-21.93	AVG	
	5	0.2250	32.30	-0.08	32.22	62.63	-30.41	QP	
	6	0.2250	29.62	-0.08	29.54	52.63	-23.09	AVG	
	7	0.7750	30.24	-0.08	30.16	56.00	-25.84	QP	
	8	0.7750	25.65	-0.08	25.57	46.00	-20.43	AVG	
	9	1.4200	32.48	-0.06	32.42	56.00	-23.58	QP	
*	10	1.4200	29.62	-0.06	29.56	46.00	-16.44	AVG	
	11	10.0000	21.68	0.16	21.84	60.00	-38.16	QP	
	12	10.0000	13.78	0.16	13.94	50.00	-36.06	AVG	
	13	14.8850	32.92	0.33	33.25	60.00	-26.75	QP	
	14	14.8850	27.00	0.33	27.33	50.00	-22.67	AVG	
	15	20.8400	31.32	0.51	31.83	60.00	-28.17	QP	
	16	20.8400	20.67	0.51	21.18	50.00	-28.82	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Neutral



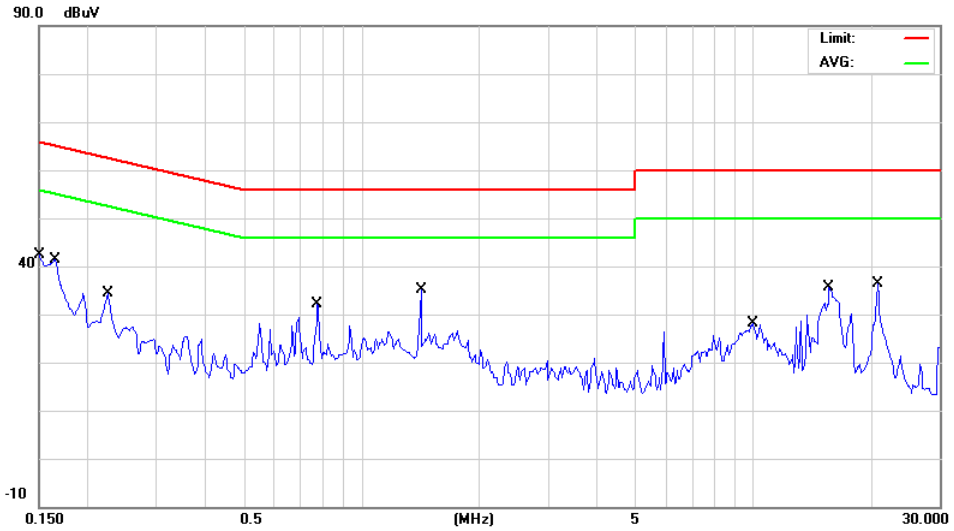
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.00	-0.02	33.98	66.00	-32.02	QP	
	2	0.1500	14.91	-0.02	14.89	56.00	-41.11	AVG	
	3	0.1650	35.96	-0.02	35.94	65.21	-29.27	QP	
	4	0.1650	32.33	-0.02	32.31	55.21	-22.90	AVG	
	5	0.2250	35.78	-0.03	35.75	62.63	-26.88	QP	
*	6	0.2250	34.25	-0.03	34.22	52.63	-18.41	AVG	
	7	0.7750	28.82	-0.04	28.78	56.00	-27.22	QP	
	8	0.7750	24.04	-0.04	24.00	46.00	-22.00	AVG	
	9	1.4200	29.98	-0.03	29.95	56.00	-26.05	QP	
	10	1.4200	26.69	-0.03	26.66	46.00	-19.34	AVG	
	11	10.0000	20.16	0.20	20.36	60.00	-39.64	QP	
	12	10.0000	13.89	0.20	14.09	50.00	-35.91	AVG	
	13	14.8950	28.98	0.35	29.33	60.00	-30.67	QP	
	14	14.8950	16.56	0.35	16.91	50.00	-33.09	AVG	
	15	16.1150	23.00	0.38	23.38	60.00	-36.62	QP	
	16	16.1150	17.13	0.38	17.51	50.00	-32.49	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Line



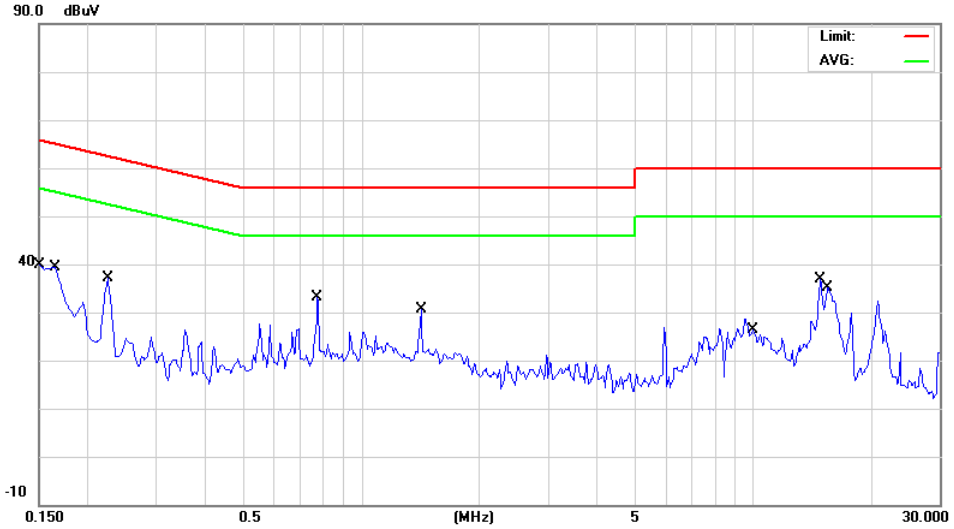
Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.32	-0.07	34.25	66.00	-31.75	QP	
	2	0.1500	18.83	-0.07	18.76	56.00	-37.24	AVG	
	3	0.1650	35.84	-0.07	35.77	65.21	-29.44	QP	
	4	0.1650	31.84	-0.07	31.77	55.21	-23.44	AVG	
	5	0.2250	32.66	-0.08	32.58	62.63	-30.05	QP	
	6	0.2250	29.70	-0.08	29.62	52.63	-23.01	AVG	
	7	0.7750	34.10	-0.08	34.02	56.00	-21.98	QP	
	8	0.7750	28.35	-0.08	28.27	46.00	-17.73	AVG	
	9	1.4200	32.32	-0.06	32.26	56.00	-23.74	QP	
*	10	1.4200	29.17	-0.06	29.11	46.00	-16.89	AVG	
	11	10.0000	21.42	0.16	21.58	60.00	-38.42	QP	
	12	10.0000	14.12	0.16	14.28	50.00	-35.72	AVG	
	13	15.7000	25.94	0.35	26.29	60.00	-33.71	QP	
	14	15.7000	19.08	0.35	19.43	50.00	-30.57	AVG	
	15	20.8350	31.78	0.51	32.29	60.00	-27.71	QP	
	16	20.8350	23.97	0.51	24.48	50.00	-25.52	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

Temperature:	18 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Power Line Measured：Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	34.04	-0.02	34.02	66.00	-31.98	QP	
	2	0.1500	13.61	-0.02	13.59	56.00	-42.41	AVG	
	3	0.1650	36.12	-0.02	36.10	65.21	-29.11	QP	
	4	0.1650	32.41	-0.02	32.39	55.21	-22.82	AVG	
	5	0.2250	35.92	-0.03	35.89	62.63	-26.74	QP	
*	6	0.2250	34.38	-0.03	34.35	52.63	-18.28	AVG	
	7	0.7750	30.30	-0.04	30.26	56.00	-25.74	QP	
	8	0.7750	26.05	-0.04	26.01	46.00	-19.99	AVG	
	9	1.4200	28.36	-0.03	28.33	56.00	-27.67	QP	
	10	1.4200	24.72	-0.03	24.69	46.00	-21.31	AVG	
	11	10.0000	20.92	0.20	21.12	60.00	-38.88	QP	
	12	10.0000	13.89	0.20	14.09	50.00	-35.91	AVG	
	13	14.8850	28.94	0.35	29.29	60.00	-30.71	QP	
	14	14.8850	18.83	0.35	19.18	50.00	-30.82	AVG	
	15	15.5500	28.32	0.36	28.68	60.00	-31.32	QP	
	16	15.5500	20.19	0.36	20.55	50.00	-29.45	AVG	

NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN
   Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.

4.2 RADIATED EMISSION TEST

4.2.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	FIELD STRENGTH (microvolts/meter)	DISTANCE (m)	FIELD STRENGTH (dBμV/m)
0.009 - 0.490	2400/F(kHz)	300	67.6-20log(kHz)
0.490 - 1.705	24000/F(kHz)	30	87.6-20log(kHz)
1.705 - 30	30	30	30
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
Above 960	500	3	54.0

NOTE:
1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
2. In the emission tables above , the tighter limit applies at the band edges.
3. Distance refers to the distance between measuring instrument, antemma, and the closest point of any part of the device or system.

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Section15.247(1), 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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

NOTE: 125 mW = 128 dBuV (in 3m).

Fundamental frequency	Field strength of fundamental	
	PEAK (dBuV/m)	AVERAGE (dBuV/m)
2400-2483.5 MHz	128	108

4.2.2 TEST EQUIPMENT

Below 1 GHz The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
LOOP ANTENNA	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	HFH2-Z2 / 860605/002	FEB. 24, 2018 ETC	□
BICONICAL ANTENNA	30 MHz ~ 200 MHz	EMCO	3110/ 11966C	MAY 14, 2018 ETC	■
LOG PERIODIC ANTENNA	200 MHz ~ 1 GHz	EMCO	3146/ 9002-2686	OCT. 27, 2017 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
PRE-AMPLIFIER	0.1 MHz ~ 1.3 GHz	HP	8447D / 2944A06746	NOV. 14, 2017 ETC	■
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2018 SRT	■
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 17, 2017 SRT	■
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	NOV. 20, 2017 ETC	■
RF CABLE	UP TO 26.5 GHz 3.5 m	EMCI	EMC104-SM-SM-3500 / 150601	AUG. 28, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■
THERMO-HYGRO	15 – 40 ℃, 0- 100% RH	TOP	20-A / 7685	SEP. 20, 2017 ETC	■

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

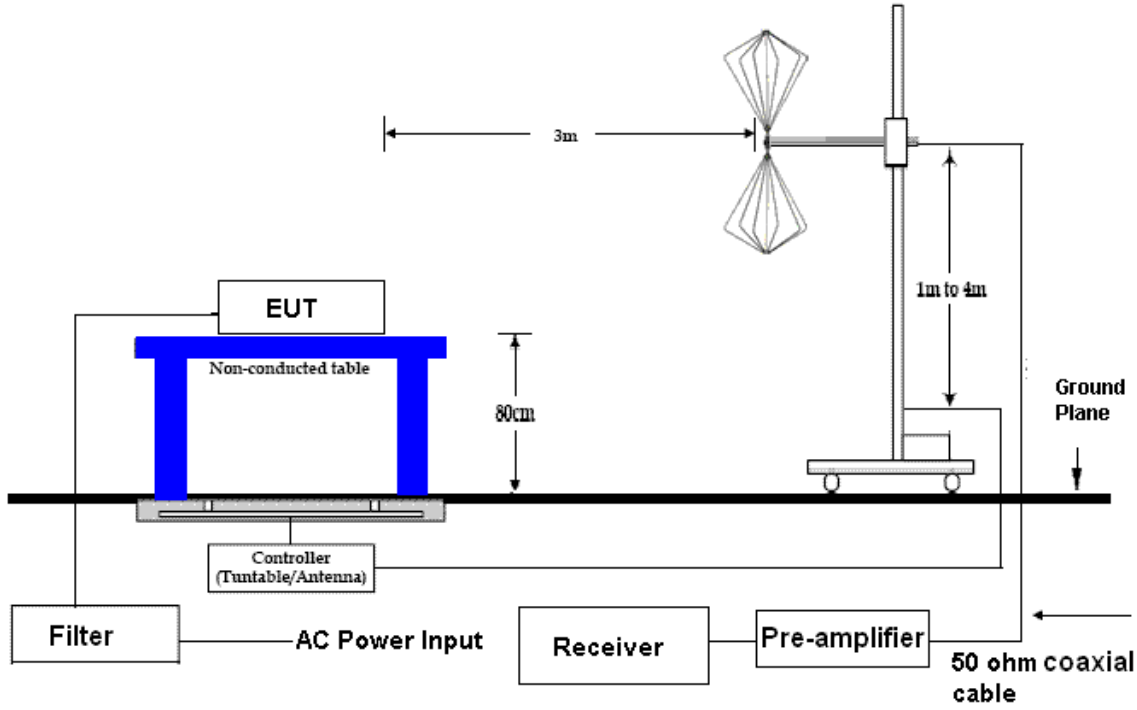
Above 1 GHz The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	DEC. 25, 2017 ETC	□
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2017 ETC	■
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 17, 2017 SRT	■
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK252 /MY2611/2	FEB. 28, 2017 ETC	■
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNER	SF102/2*11SK252 /MY3331/2	OCT. 03, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■
THERMO-HYGRO	15 ~ 40 ℃, 0- 100% RH	TOP	20-A / 7685	SEP. 20, 2017 ETC	■
TEST SOFTWARE	---	EZ-EMC	SRT-03A1	NCR	■

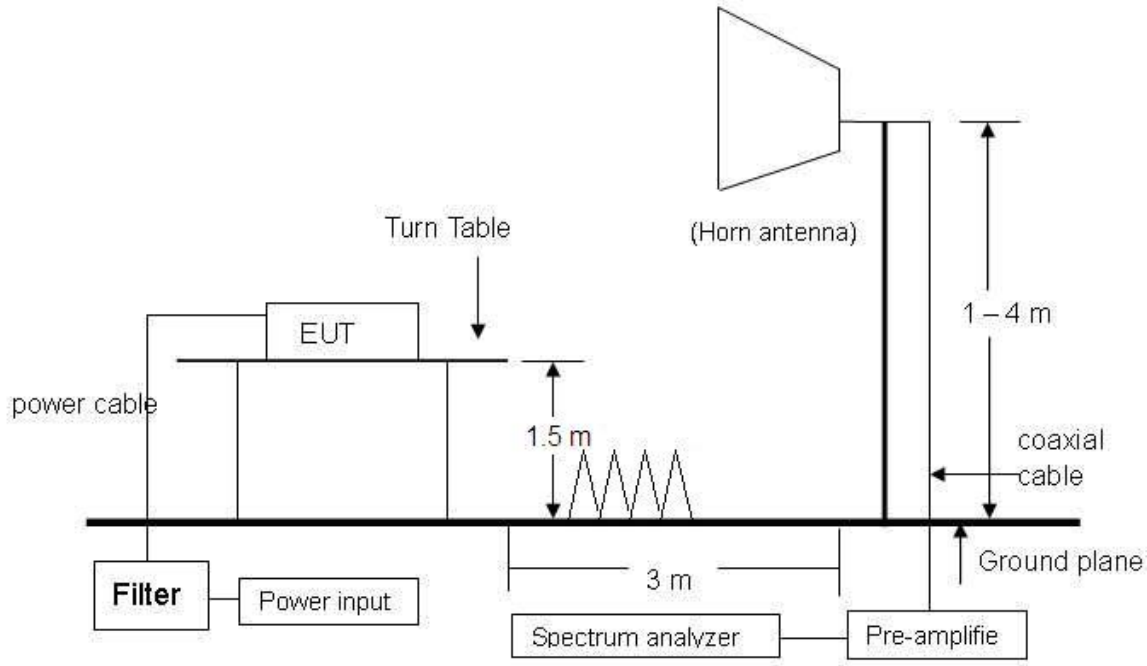
NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST SET-UP

30 MHz ~ 1 GHz



Above 1 GHz



NOTE: The EUT system was put on a wooden table with 1.5m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.

4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR 22:2003. When the frequency spectrum measured started from 30 MHz to 1 GHz, then use antenna is a BICONICAL ANTENNA & LOG PERIODIC ANTENNA. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

4.2.5 TEST RESULT

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo	Tested Date:	Dec. 28, 2017

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
223.30	3.23	11.73	27.46	44.99	32.49	46	-13.51	36	3.41
279.84	3.60	13.66	27.23	44.69	34.73	46	-11.27	155	3.18
287.25	3.67	13.91	27.19	44.77	35.15	46	-10.85	291	3.01
319.92	3.90	15.44	27.28	44.41	36.46	46	-9.54	178	2.88
326.66	3.95	15.45	27.33	44.00	36.07	46	-9.93	46	2.76
497.53	4.99	19.02	28.36	36.36	32.02	46	-13.98	305	2.23

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
120.53	2.66	13.30	27.91	39.38	27.43	44	-16.07	82	1.25
177.99	2.93	16.18	27.66	39.09	30.54	44	-12.96	60	1.47
214.02	3.17	11.76	27.50	43.85	31.28	44	-12.22	175	1.62
221.67	3.22	11.71	27.47	47.41	34.87	46	-11.13	224	1.69
498.85	5.00	19.11	28.36	35.70	31.45	46	-14.55	31	2.31
513.42	5.09	18.66	28.38	42.73	38.10	46	-7.90	196	2.58

NOTE :
1. Measurement uncertainty is 4.20 dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo	Tested Date:	Dec. 28, 2017

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
217.14	3.19	11.73	27.49	45.01	32.44	46	-13.56	156	3.45
270.92	3.55	13.30	27.27	45.46	35.04	46	-10.96	270	3.23
290.58	3.69	14.00	27.18	44.16	34.67	46	-11.33	114	3.09
321.13	3.91	15.44	27.30	44.56	36.62	46	-9.38	308	2.97
338.94	4.03	15.48	27.42	42.79	34.88	46	-11.12	96	2.78
513.70	5.09	18.66	28.38	37.89	33.26	46	-12.74	182	2.34

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
214.42	3.17	11.76	27.50	43.24	30.67	44	-12.83	73	1.58
221.50	3.22	11.71	27.47	46.65	34.11	46	-11.89	184	1.77
488.79	4.94	18.33	28.31	42.34	37.30	46	-8.70	296	2.35
497.98	4.99	19.02	28.36	39.35	35.01	46	-10.99	101	2.49
515.63	5.10	18.68	28.38	39.29	34.69	46	-11.31	75	2.54
763.20	6.50	22.10	28.10	37.93	38.43	46	-7.57	319	3.22

NOTE :
1. Measurement uncertainty is 4.20 dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-3
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo	Tested Date:	Dec. 28, 2017

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
37.25	2.06	16.18	28.20	32.41	22.45	40	-17.55	330	3.58
290.37	3.69	14.00	27.18	44.33	34.84	46	-11.16	275	3.19
334.95	4.00	15.47	27.39	43.54	35.62	46	-10.38	142	3.05
347.88	4.10	15.28	27.49	41.13	33.02	46	-12.98	251	2.97
513.01	5.09	18.66	28.38	44.26	39.63	46	-6.37	94	2.53
623.62	5.69	20.47	28.40	35.59	33.35	46	-12.65	135	2.11

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
120.58	2.66	13.30	27.91	39.23	27.28	44	-16.22	64	1.26
214.13	3.17	11.76	27.50	42.68	30.11	44	-13.39	199	1.58
221.92	3.22	11.71	27.47	46.90	34.36	46	-11.64	78	1.63
319.87	3.90	15.44	27.28	37.15	29.20	46	-16.80	165	1.92
351.02	4.13	15.26	27.52	38.61	30.48	46	-15.52	234	2.04
366.77	4.24	15.92	27.63	36.35	28.88	46	-17.12	191	2.15

NOTE :
1. Measurement uncertainty is 4.20 dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Standby
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo	Tested Date:	Dec. 28, 2017

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
214.31	3.17	11.76	27.50	41.37	28.80	44	-14.70	124	3.40
221.91	3.22	11.71	27.47	44.15	31.61	46	-14.39	39	3.36
274.52	3.57	13.46	27.25	42.66	32.44	46	-13.56	275	3.18
322.64	3.92	15.44	27.30	42.53	34.59	46	-11.41	288	3.07
358.29	4.18	15.65	27.57	41.83	34.09	46	-11.91	153	2.96
488.63	4.94	18.33	28.31	36.89	31.85	46	-14.15	49	2.51

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
120.68	2.66	13.30	27.91	39.59	27.64	44	-15.86	63	1.29
214.38	3.17	11.76	27.50	43.34	30.77	44	-12.73	170	1.58
221.57	3.22	11.71	27.47	47.26	34.72	46	-11.28	83	1.67
479.99	4.89	18.21	28.27	34.21	29.04	46	-16.96	311	2.03
493.08	4.97	18.64	28.34	38.32	33.60	46	-12.40	259	2.41
513.24	5.09	18.66	28.38	44.46	39.83	46	-6.17	60	2.53

NOTE :
1. Measurement uncertainty is 4.20 dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Link
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo	Tested Date:	Dec. 28, 2017

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
36.81	2.03	16.54	28.20	31.68	22.05	40	-17.95	235	3.58
179.97	2.94	16.26	27.65	35.31	26.86	44	-16.64	119	3.39
214.24	3.17	11.76	27.50	41.99	29.42	44	-14.08	39	3.19
362.03	4.21	15.81	27.60	40.57	32.99	46	-13.01	270	2.95
433.52	4.65	17.46	28.04	37.12	31.18	46	-14.82	194	2.71
515.77	5.10	18.68	28.38	38.00	33.40	46	-12.60	103	2.55

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
61.69	2.26	8.50	28.12	43.14	25.78	40	-14.22	50	1.13
214.18	3.17	11.76	27.50	42.91	30.34	44	-13.16	79	1.56
221.50	3.22	11.71	27.47	46.29	33.75	46	-12.25	136	1.78
361.88	4.20	15.79	27.59	38.22	30.62	46	-15.38	278	2.01
441.91	4.68	17.58	28.08	39.86	34.04	46	-11.96	44	2.29
513.72	5.09	18.66	28.38	38.86	34.23	46	-11.77	192	2.54

NOTE :

1. Measurement uncertainty is 4.20 dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1591.35	-32.25	26.51	49.46	38.99	43.72	33.25	74	54	-30.28	-20.75	250	2.35
2723.12	-31.06	29.35	45.81	35.31	44.10	33.60	74	54	-29.90	-20.40	219	1.97
3664.97	-30.04	31.52	44.22	33.74	45.71	35.23	74	54	-28.29	-18.77	106	1.71
4128.58	-29.64	32.60	43.99	33.45	46.95	36.41	74	54	-27.05	-17.59	72	1.55
5197.44	-28.56	34.06	42.98	32.49	48.48	37.99	74	54	-25.52	-16.01	186	1.23
5658.29	-28.52	34.30	42.92	32.41	48.70	38.19	74	54	-25.30	-15.81	44	1.12

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1597.21	-32.24	26.53	49.14	38.62	43.43	32.91	74	54	-30.57	-21.09	193	1.19
2559.77	-31.15	28.72	46.85	36.37	44.43	33.95	74	54	-29.57	-20.05	51	1.48
3286.93	-30.48	30.74	44.26	33.77	44.52	34.03	74	54	-29.48	-19.97	99	1.68
4061.05	-29.71	32.60	43.73	33.24	46.62	36.13	74	54	-27.38	-17.87	202	1.93
4608.87	-29.10	32.88	44.54	34.01	48.32	37.79	74	54	-25.68	-16.21	311	2.06
5072.49	-28.56	33.96	43.72	33.29	49.12	38.69	74	54	-24.88	-15.31	294	2.25

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00 (F)	-31.26	28.38	88.71	75.36	85.84	72.49	--	--	--	---	155	1.53
4804.00	-28.83	33.39	42.96	32.44	47.52	37.00	74	54	-26.48	-17.00	324	1.59
7206.00	-27.84	35.79	41.24	30.78	49.20	38.74	74	54	-24.80	-15.26	198	1.51
9608.00	-27.22	37.76	41.63	31.12	52.17	41.66	74	54	-21.83	-12.34	220	1.48
12010.00	-26.10	39.30	39.97	29.47	53.17	42.67	74	54	-20.83	-11.33	125	1.44
14412.00	-23.73	42.29	31.52	21.03	50.09	39.60	74	54	-23.91	-14.40	64	1.63

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00 (F)	-31.26	28.38	86.58	74.01	83.71	71.14	--	--	--	---	308	1.60
4804.00	-28.83	33.39	43.36	32.91	47.92	37.47	74	54	-26.08	-16.53	299	1.57
7206.00	-27.84	35.79	41.55	31.01	49.51	38.97	74	54	-24.49	-15.03	41	1.52
9608.00	-27.22	37.76	41.73	31.20	52.27	41.74	74	54	-21.73	-12.26	186	1.50
12010.00	-26.10	39.30	40.01	29.59	53.21	42.79	74	54	-20.79	-11.21	275	1.66
14412.00	-23.73	42.29	31.56	21.09	50.13	39.66	74	54	-23.87	-14.34	33	1.61

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1592.24	-32.25	26.51	48.56	38.01	42.83	32.28	74	54	-31.17	-21.72	235	2.35
2268.70	-31.36	28.22	45.93	35.42	42.79	32.28	74	54	-31.21	-21.72	71	2.11
3741.95	-29.98	31.77	43.95	33.48	45.74	35.27	74	54	-28.26	-18.73	109	1.69
4069.47	-29.70	32.60	44.32	33.87	47.22	36.77	74	54	-26.78	-17.23	64	1.54
5086.11	-28.56	33.97	43.29	32.72	48.70	38.13	74	54	-25.30	-15.87	308	1.28
5483.52	-28.55	34.29	43.63	33.19	49.37	38.93	74	54	-24.63	-15.07	315	1.13

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1591.69	-32.25	26.51	50.08	39.51	44.34	33.77	74	54	-29.66	-20.23	44	1.14
2197.42	-31.42	28.14	45.79	35.28	42.51	32.00	74	54	-31.49	-22.00	192	1.37
2876.03	-30.97	29.93	45.58	35.04	44.54	34.00	74	54	-29.46	-20.00	255	1.59
3759.88	-29.96	31.83	44.23	33.79	46.10	35.66	74	54	-27.90	-18.34	261	1.82
4716.95	-28.95	33.16	44.14	33.65	48.35	37.86	74	54	-25.65	-16.14	87	2.11
5538.17	-28.54	34.30	43.33	32.83	49.09	38.59	74	54	-24.91	-15.41	280	2.37

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00 (F)	-31.23	28.43	90.22	77.16	87.42	74.36	--	--	--	---	199	1.59
4882.00	-28.72	33.59	43.99	33.45	48.86	38.32	74	54	-25.14	-15.68	224	1.51
7323.00	-27.75	36.08	41.39	30.86	49.71	39.18	74	54	-24.29	-14.82	135	1.57
9764.00	-27.15	37.86	41.62	31.17	52.33	41.88	74	54	-21.67	-12.12	327	1.57
12205.00	-25.62	39.26	39.70	29.28	53.34	42.92	74	54	-20.66	-11.08	91	1.44
14646.00	-23.77	41.76	31.14	20.69	49.13	38.68	74	54	-24.87	-15.32	58	1.48

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2441.00 (F)	-31.23	28.43	90.35	77.19	87.55	74.39	--	--	--	---	102	1.63
4882.00	-28.72	33.59	45.49	34.92	50.36	39.79	74	54	-23.64	-14.21	167	1.61
7323.00	-27.75	36.08	41.44	30.95	49.76	39.27	74	54	-24.24	-14.73	281	1.59
9764.00	-27.15	37.86	41.37	30.89	52.08	41.60	74	54	-21.92	-12.40	200	1.54
12205.00	-25.62	39.26	39.60	29.15	53.24	42.79	74	54	-20.76	-11.21	37	1.52
14646.00	-23.77	41.76	31.05	20.54	49.04	38.53	74	54	-24.96	-15.47	302	1.56

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1588.52	-32.25	26.50	47.57	37.01	41.82	31.26	74	54	-32.18	-22.74	330	2.33
2169.88	-31.44	28.10	45.06	34.55	41.72	31.21	74	54	-32.28	-22.79	226	2.15
2607.97	-31.12	28.91	45.67	35.19	43.46	32.98	74	54	-30.54	-21.02	215	2.01
3926.36	-29.83	32.36	43.76	33.24	46.29	35.77	74	54	-27.71	-18.23	107	1.67
5124.05	-28.56	34.00	44.20	33.76	49.64	39.20	74	54	-24.36	-14.80	33	1.28
5829.41	-28.49	34.30	43.77	33.25	49.58	39.06	74	54	-24.42	-14.94	152	1.06

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1591.26	-32.25	26.51	47.42	36.92	41.68	31.18	74	54	-32.32	-22.82	247	1.19
2304.83	-31.33	28.26	45.51	35.04	42.44	31.97	74	54	-31.56	-22.03	91	1.38
3108.07	-30.74	30.53	44.86	34.33	44.65	34.12	74	54	-29.35	-19.88	115	1.65
3692.55	-30.02	31.61	44.25	33.86	45.85	35.46	74	54	-28.15	-18.54	204	1.82
3933.64	-29.82	32.39	44.03	33.57	46.59	36.13	74	54	-27.41	-17.87	347	1.99
4731.18	-28.93	33.20	43.93	33.42	48.20	37.69	74	54	-25.80	-16.31	91	2.14

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00 (F)	-31.20	28.48	89.44	77.19	86.72	74.47	--	--	--	---	115	1.50
4960.00	-28.62	33.80	42.87	32.38	48.05	37.56	74	54	-25.95	-16.44	268	1.59
7440.00	-27.67	36.36	41.62	31.15	50.30	39.83	74	54	-23.70	-14.17	34	1.51
9920.00	-27.08	37.95	41.18	30.68	52.06	41.56	74	54	-21.94	-12.44	197	1.55
12400.00	-25.14	39.22	38.77	28.26	52.85	42.34	74	54	-21.15	-11.66	235	1.49
14880.00	-23.81	40.73	31.84	21.32	48.76	38.24	74	54	-25.24	-15.76	41	1.47

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00 (F)	-31.20	28.48	84.67	72.06	81.95	69.34	--	--	--	---	102	1.63
4960.00	-28.62	33.80	42.24	31.77	47.42	36.95	74	54	-26.58	-17.05	174	1.68
7440.00	-27.67	36.36	41.98	31.50	50.66	40.18	74	54	-23.34	-13.82	225	1.57
9920.00	-27.08	37.95	41.21	30.71	52.09	41.59	74	54	-21.91	-12.41	311	1.59
12400.00	-25.14	39.22	38.55	28.06	52.63	42.14	74	54	-21.37	-11.86	296	1.55
14880.00	-23.81	40.73	31.79	21.27	48.71	38.19	74	54	-25.29	-15.81	78	1.48

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Standby
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2871.75	-30.97	29.91	44.17	33.69	43.11	32.63	74	54	-30.89	-21.37	219	2.04
3077.06	-30.79	30.49	44.10	33.51	43.80	33.21	74	54	-30.20	-20.79	155	1.89
3796.37	-29.93	31.95	42.87	32.34	44.88	34.35	74	54	-29.12	-19.65	84	1.65
4192.92	-29.57	32.60	43.30	32.87	46.33	35.90	74	54	-27.67	-18.10	103	1.53
4813.18	-28.82	33.41	43.09	32.53	47.69	37.13	74	54	-26.31	-16.87	57	1.34
5469.45	-28.55	34.28	42.60	32.11	48.32	37.83	74	54	-25.68	-16.17	309	1.17

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2758.39	-31.04	29.48	44.35	33.89	42.79	32.33	74	54	-31.21	-21.67	44	1.54
3291.65	-30.48	30.75	43.91	33.42	44.18	33.69	74	54	-29.82	-20.31	121	1.68
3896.08	-29.85	32.27	43.86	33.36	46.27	35.77	74	54	-27.73	-18.23	206	1.88
4263.21	-29.50	32.60	43.26	32.72	46.36	35.82	74	54	-27.64	-18.18	334	1.96
4647.68	-29.05	32.98	43.88	33.38	47.82	37.32	74	54	-26.18	-16.68	198	2.07
5582.53	-28.54	34.30	42.73	32.21	48.49	37.97	74	54	-25.51	-16.03	280	2.35

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

Temperature:	21 °C	Humidity:	65 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Link
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jan. 02, 2018

Antenna Polarization：Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2128.07	-31.47	28.05	44.94	34.42	41.52	31.00	74	54	-32.48	-23.00	263	2.18
3231.84	-30.56	30.68	44.25	33.79	44.36	33.90	74	54	-29.64	-20.10	211	1.86
3792.33	-29.94	31.93	43.25	32.71	45.25	34.71	74	54	-28.75	-19.29	85	1.67
4639.56	-29.06	32.96	43.58	33.02	47.48	36.92	74	54	-26.52	-17.08	91	1.42
5134.90	-28.56	34.01	42.54	32.08	47.99	37.53	74	54	-26.01	-16.47	132	1.27
5469.78	-28.55	34.28	41.85	31.36	47.57	37.08	74	54	-26.43	-16.92	350	1.15

Antenna Polarization：Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2558.03	-31.15	28.72	47.76	37.35	45.33	34.92	74	54	-28.67	-19.08	129	1.48
3059.88	-30.81	30.47	45.06	34.57	44.72	34.23	74	54	-29.28	-19.77	65	1.63
3601.75	-30.09	31.32	43.66	33.19	44.89	34.42	74	54	-29.11	-19.58	109	1.79
4273.14	-29.49	32.60	43.65	33.12	46.76	36.23	74	54	-27.24	-17.77	71	1.95
4832.92	-28.79	33.46	43.79	33.28	48.46	37.95	74	54	-25.54	-16.05	192	2.12
5339.62	-28.55	34.17	43.15	32.66	48.77	38.28	74	54	-25.23	-15.72	228	2.33

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field stregth of fundamental frequency.

4.3 20dB Bandwidth

4.3.1 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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

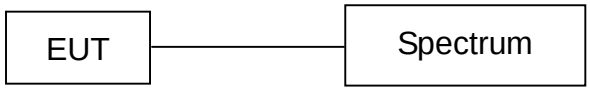
4.3.2 TEST EQUIPMENT

The following test equipment was used during the test：

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC

NOTE： The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.3.4 TEST PROCEDURE

The EUT was operated in hopping mode or any specific channel.

Printed out the test result from the spectrum by hard copy function.

4.3.5 EUT OPERATING CONDITION

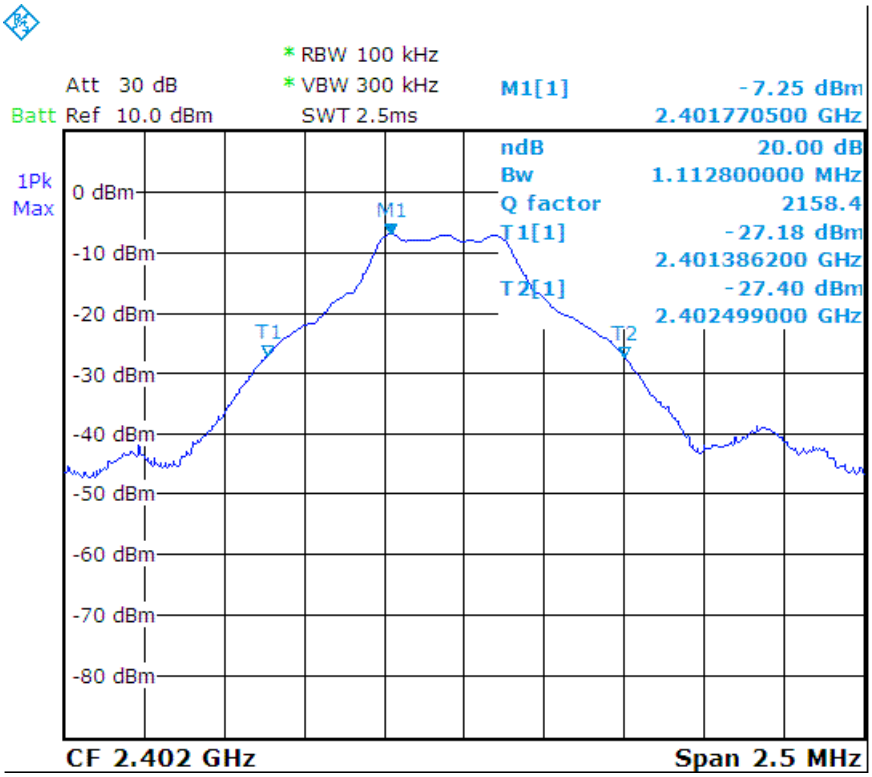
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.3.6 TEST RESULT

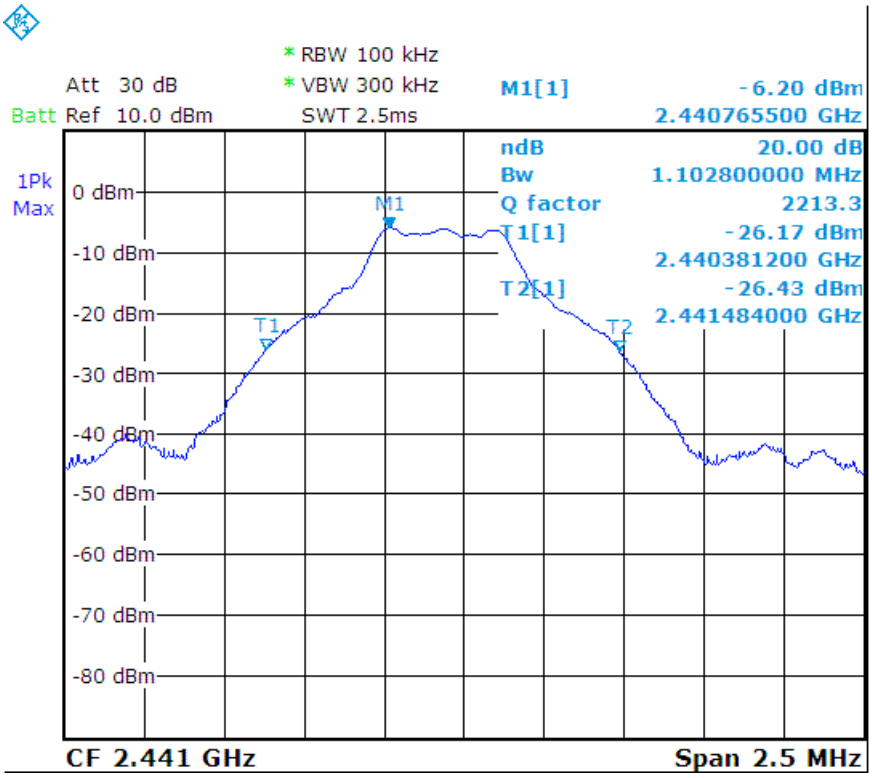
Temperature:	22 °C	Humidity:	68 %RH
Detector:	Peak	Test Mode:	Tx-1, Tx-2, Tx-3
RBW:	100 kHz	VBW:	300 kHz
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Channel Number	Channel Frequency (MHz)	20dB Down Bandwidth (MHz)
CH00	2402	1.1128
CH39	2441	1.1028
CH78	2480	1.0978

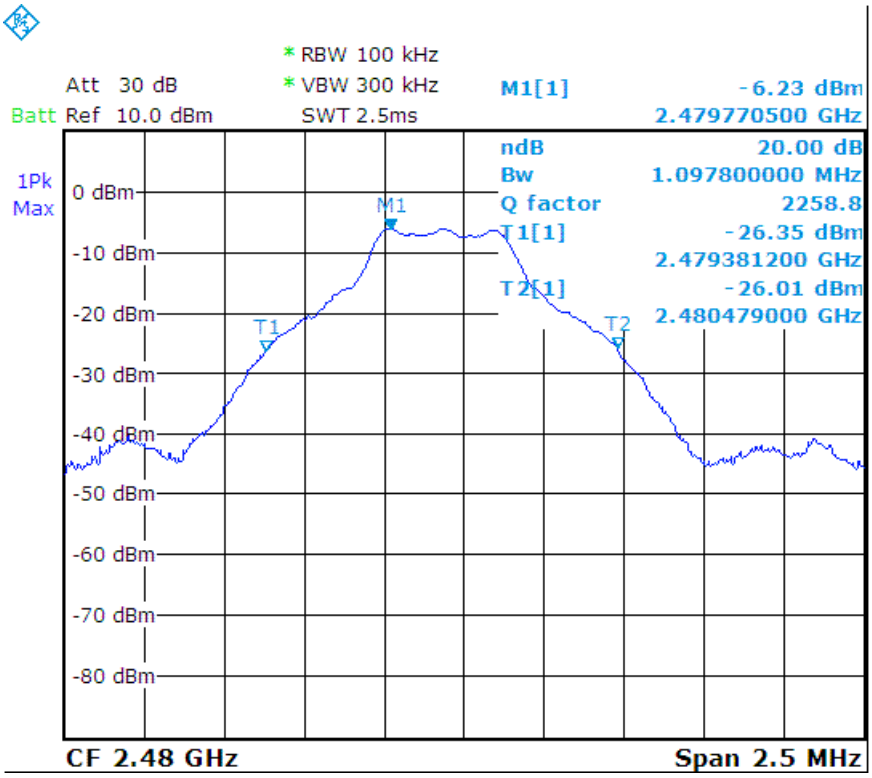
CH00：



CH39：


* RBW 100 kHz
Att 30 dB
* VBW 300 kHz
M1[1]
-6.20 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.440765500 GHz
ndB
20.00 dB
1Pk
Max
0 dBm
Bw
1.102800000 MHz
Q factor
2213.3
M1
T1[1]
-26.17 dBm
-10 dBm
2.440381200 GHz
T2[1]
-26.43 dBm
-20 dBm
T1
T2
2.441484000 GHz
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
Span 2.5 MHz

CH78：


* RBW 100 kHz
Att 30 dB
* VBW 300 kHz
M1[1]
-6.23 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.479770500 GHz
ndB
20.00 dB
1Pk
Max
0 dBm
Bw
1.097800000 MHz
Q factor
2258.8
M1
T1[1]
-26.35 dBm
-10 dBm
2.479381200 GHz
T2[1]
-26.01 dBm
-20 dBm
T1
T2
2.480479000 GHz
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
Span 2.5 MHz

4.4 PEAK POWER TEST

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247(b).

Frequency Range (MHz)	Limit(W)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30 dBm)	0.125(21 dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30 dBm)
5725-5850		NA	NA	NA	1(30 dBm)

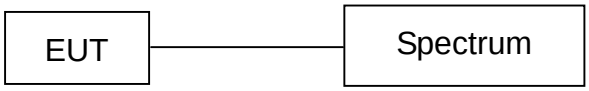
4.4.2 TEST EQUIPMENT

The following test equipment was used during the test：

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC

NOTE： The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.4.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.

Printed out the test result from the spectrum by hard copy function.

4.4.5 EUT OPERATING CONDITION

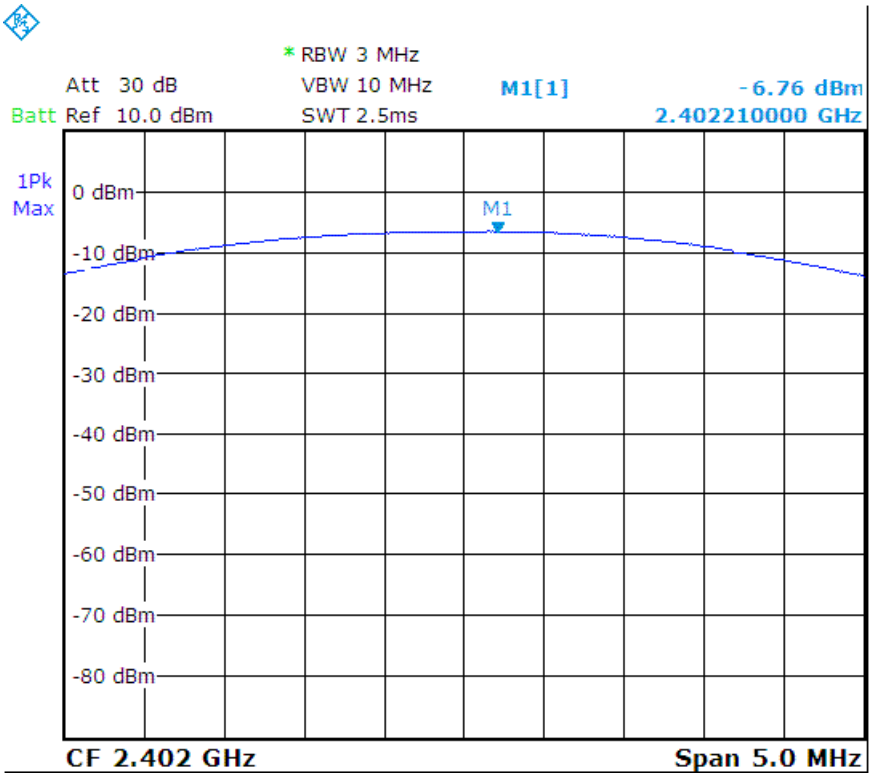
1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

4.4.6 TEST RESULT

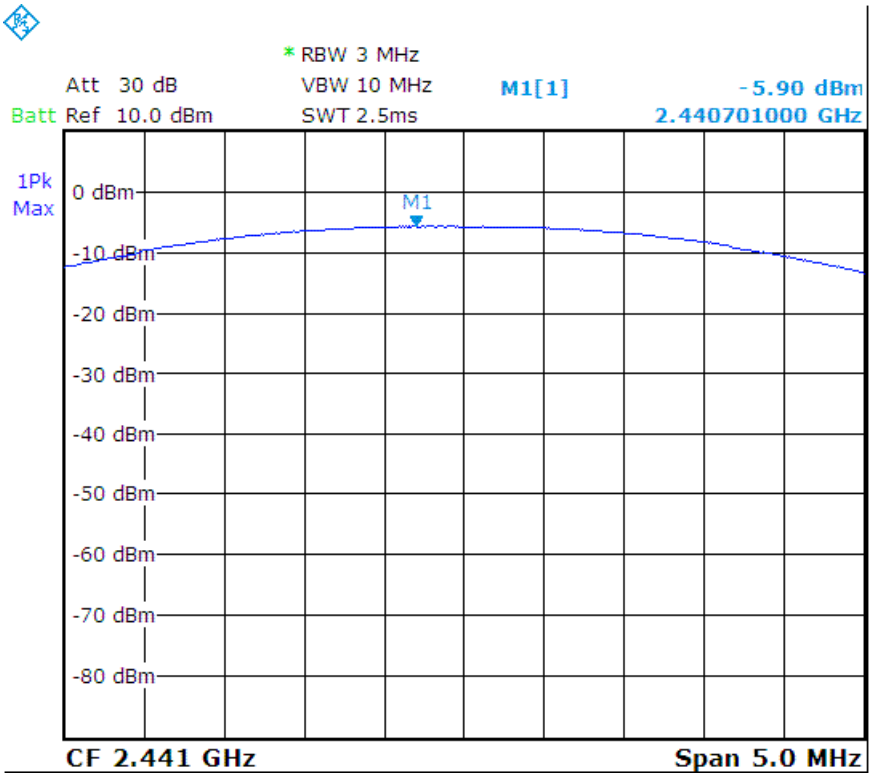
Temperature:	22 °C	Humidity:	68 %RH
Spectrum Detector:	PK.	Test Mode:	Tx-1, Tx-2, Tx-3
RBW:	3 MHz	VBW:	3 MHz
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Channel Number	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
CH00	2402	-6.76	0.21	30
CH39	2441	-5.90	0.26	30
CH78	2480	-6.03	0.25	30

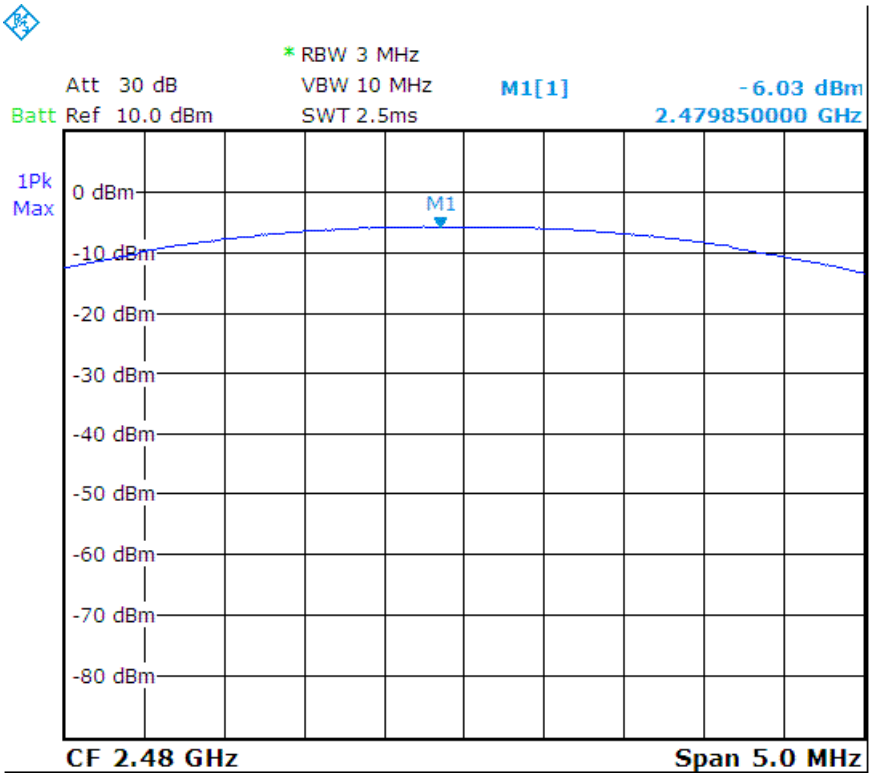
CH00：



CH39：


* RBW 3 MHz
Att 30 dB
VBW 10 MHz
M1[1]
-5.90 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.440701000 GHz
1Pk
Max
0 dBm
M1
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
Span 5.0 MHz

CH78：


* RBW 3 MHz
Att 30 dB
VBW 10 MHz
M1[1]
-6.03 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.479850000 GHz
1Pk
Max
0 dBm
M1
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
Span 5.0 MHz

4.5 BAND EDGE TEST

4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

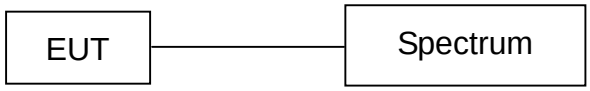
4.5.2 TEST EQUIPMENT

The following test equipment was used during the test:

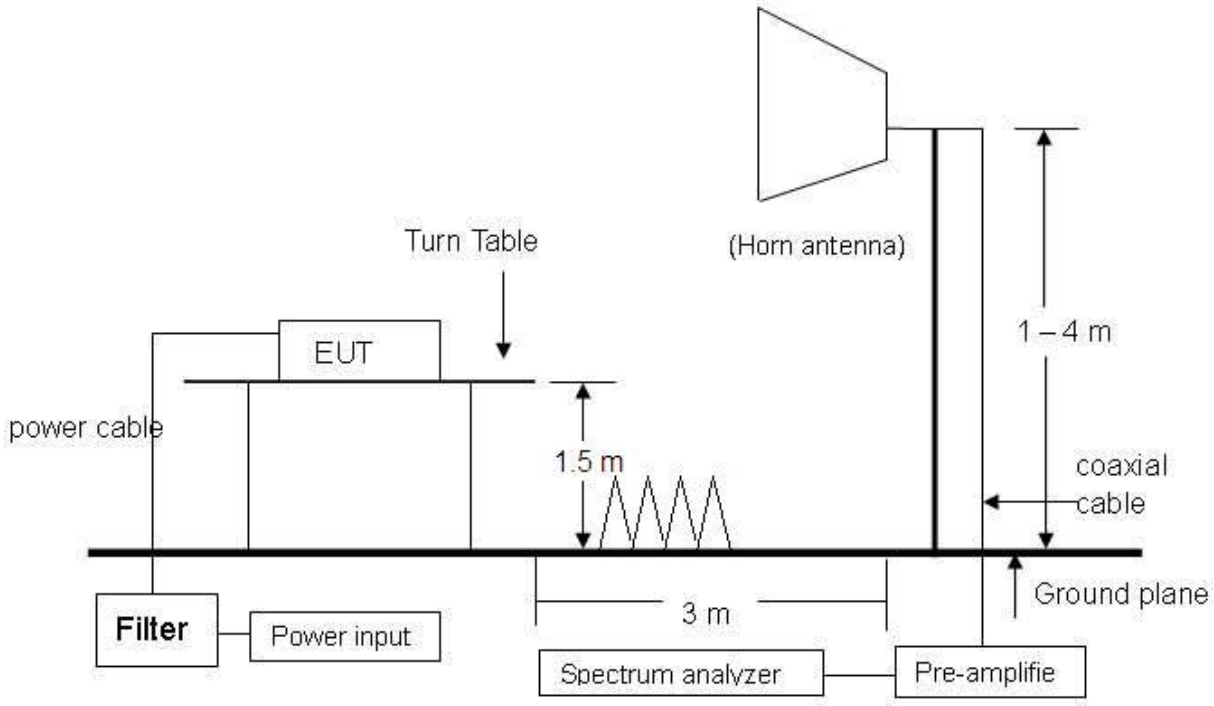
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2017 ETC	■
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 17, 2017 SRT	■
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK252 /MY2611/2	FEB. 23, 2018 ETC	■
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNER	SF102/2*11SK252 /MY3331/2	OCT. 03, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■

4.5.3 TEST SETUP

FOR RF CONDUCTED TEST (dBc)



The EUT was connected to a spectrum through a 50Ω RF cable.



NOTE: The EUT system was put on a wooden table with 1.5m heights above a ground plane.
For the actual test configuration, please refer to the photos of testing.

4.5.4 TEST PROCEDURE

1. The EUT was operating in continuous transmission mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

2. The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR 22. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.5.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

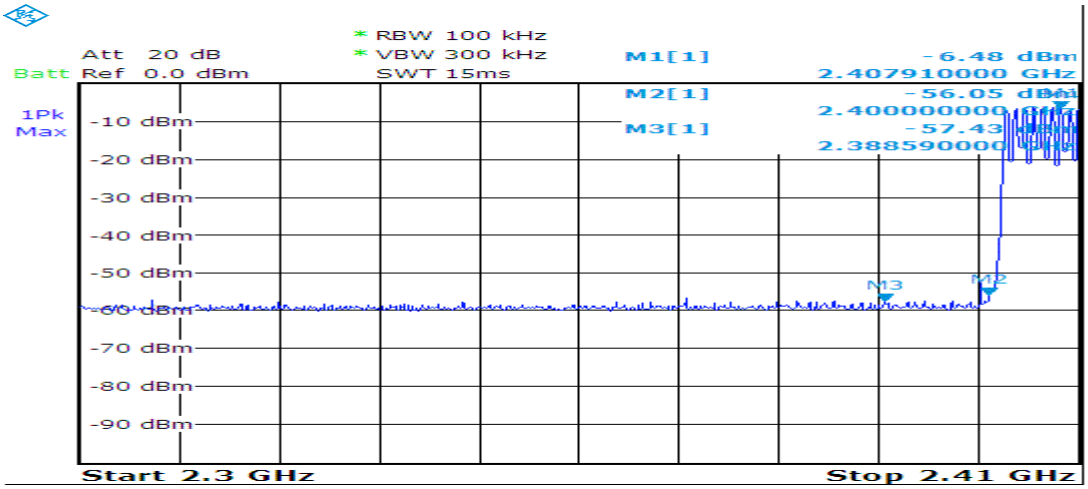
4.5.6 TEST RESULT

Temperature:	22 °C	Humidity:	68 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping on
RBW:	100 kHz	VBW:	300 kHz
Modulation:	GFSK	Tested Date:	Dec. 27, 2017

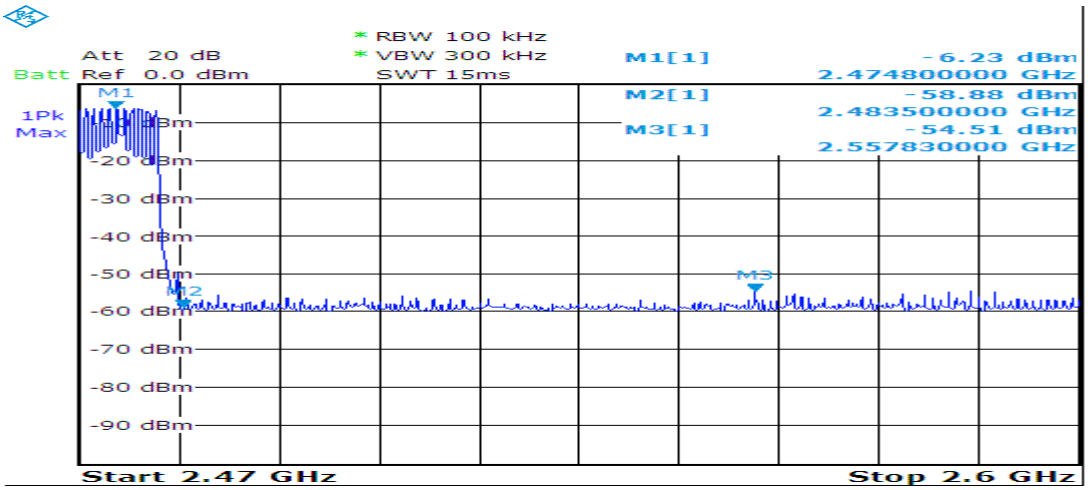
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-6.48	-57.43	50.94	> 20 dBc
> 2483.5	-6.23	-54.51	48.28	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：



2. Radiated emission test：

Below 2400MHz (CH00)

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	2.3 GHz – 2.41 GHz	Tested Mode:	Tx-1
Receiver Detector:	PK. and AV.	IF Bandwidth:	100 kHz
Modulation:	GFSK	Tested Date:	Dec. 28, 2017

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2390.54	-31.27	28.37	H	35.81	25.33	32.91	22.43	74.00	54.00	-41.09	-31.57
2393.13	-31.26	28.37	V	38.34	27.82	35.45	24.93	74.00	54.00	-38.55	-29.07
2400.00	-31.26	28.38	H	32.91	22.47	30.03	19.59	74.00	54.00	-43.97	-34.41
2400.00	-31.26	28.38	V	38.95	28.45	36.07	25.57	74.00	54.00	-37.93	-28.43

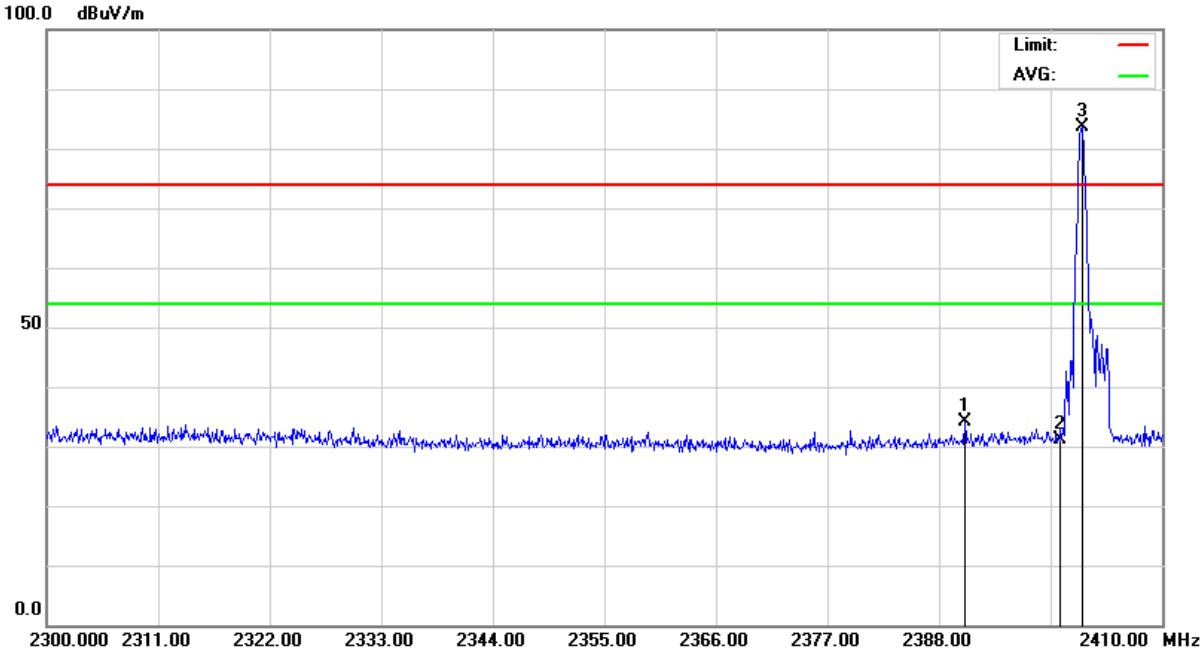
Above 2483.5MHz (CH78)

Temperature:	19 °C	Humidity:	67 %RH
Frequency Range:	2.47 GHz – 2.6 GHz	Tested Mode:	Tx-3
Receiver Detector:	PK. and AV.	IF Bandwidth:	1 MHz
Modulation:	GFSK	Tested Date:	Dec. 28, 2017

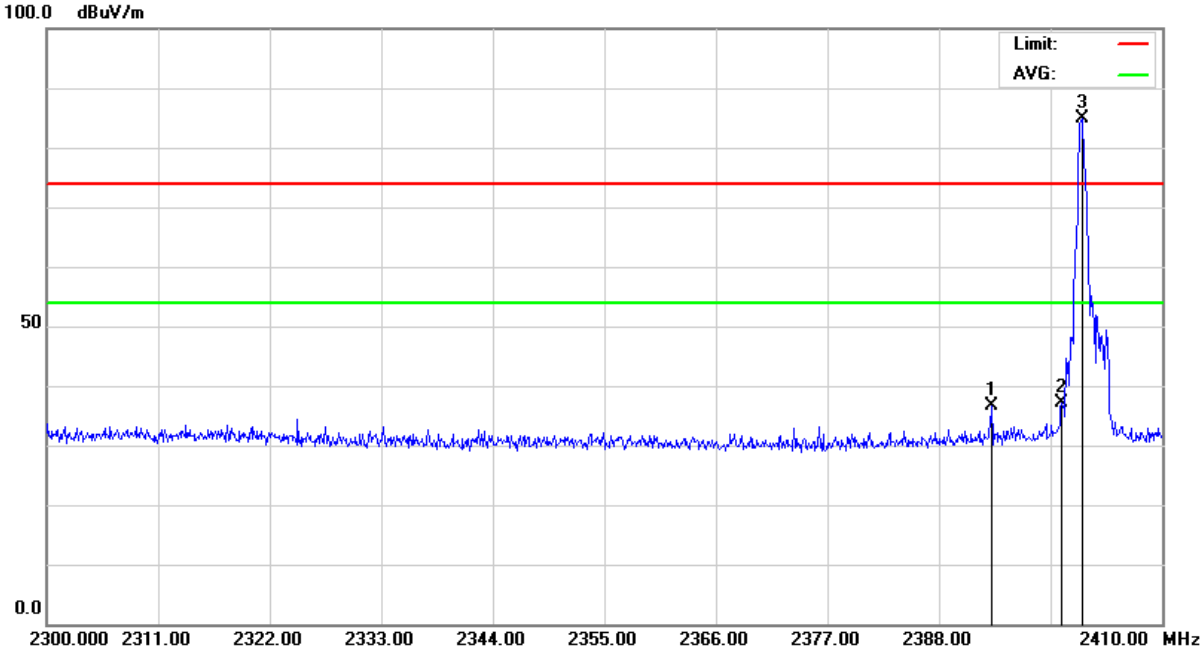
Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2483.50	-31.19	28.48	H	35.03	24.56	32.32	21.85	74.00	54.00	-41.68	-32.15
2483.50	-31.19	28.48	V	32.07	21.51	29.36	18.80	74.00	54.00	-44.64	-35.20
2495.06	-31.18	28.49	H	36.69	26.18	34.00	23.49	74.00	54.00	-40.00	-30.51
2511.72	-31.17	28.54	V	37.07	26.55	34.44	23.92	74.00	54.00	-39.56	-30.08

Below 2400MHz (CH00)

Antenna Polarization：Horizontal

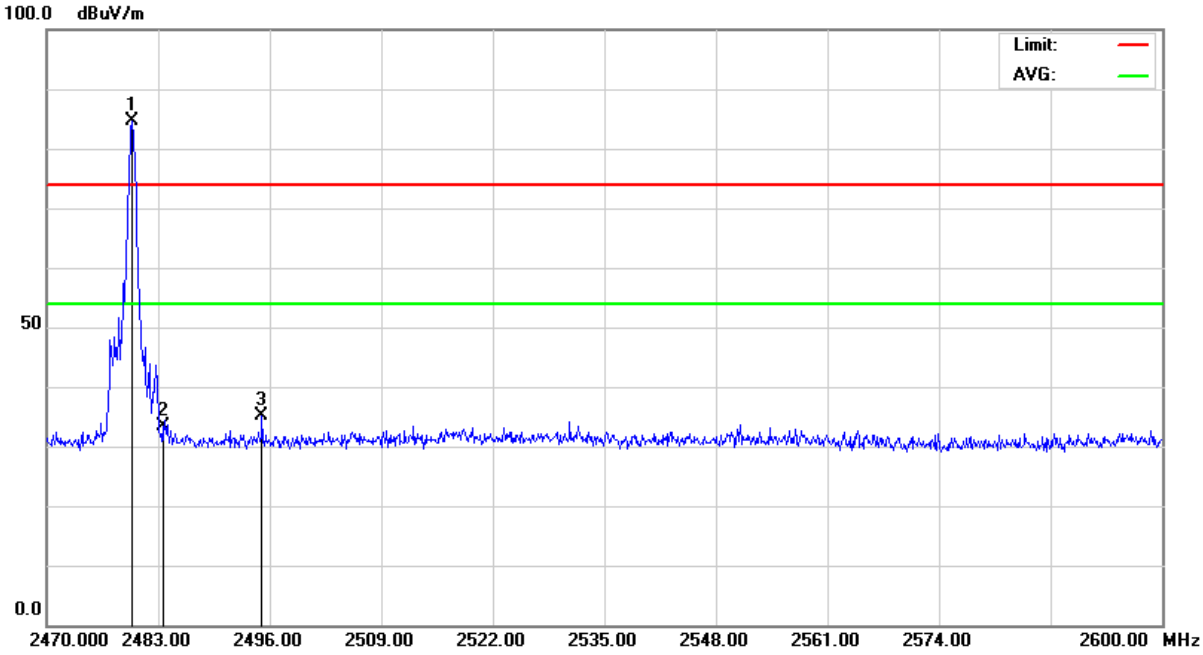


Antenna Polarization：Vertical

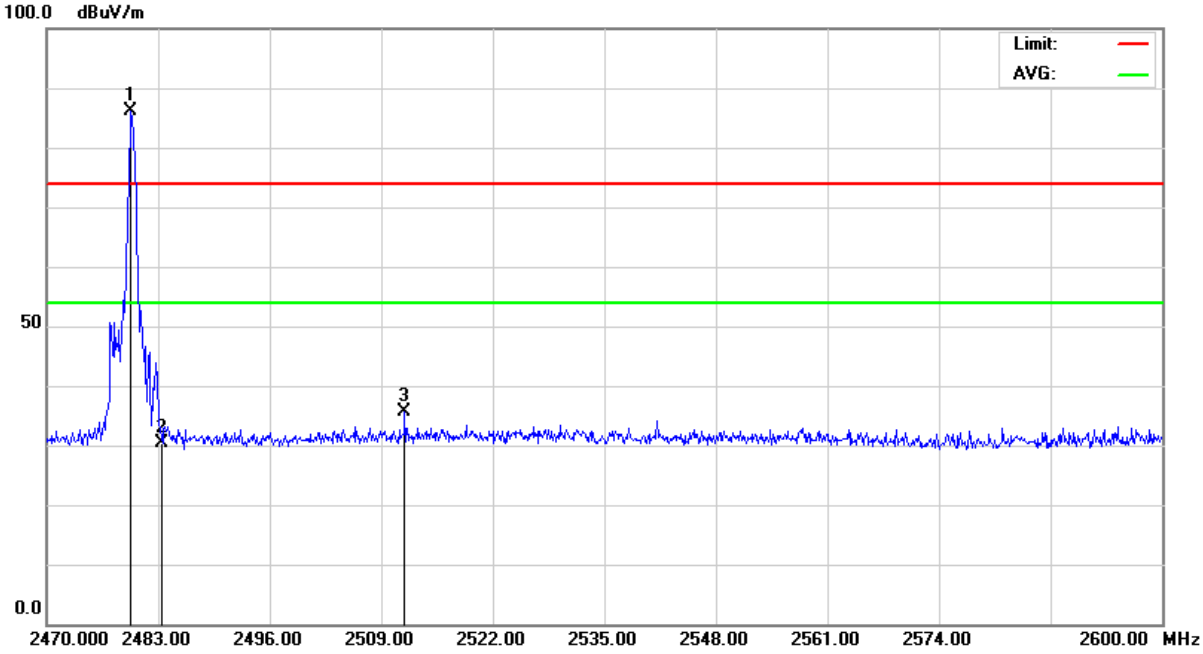


Above 2483.5MHz (CH78)

Antenna Polarization：Horizontal



Antenna Polarization：Vertical

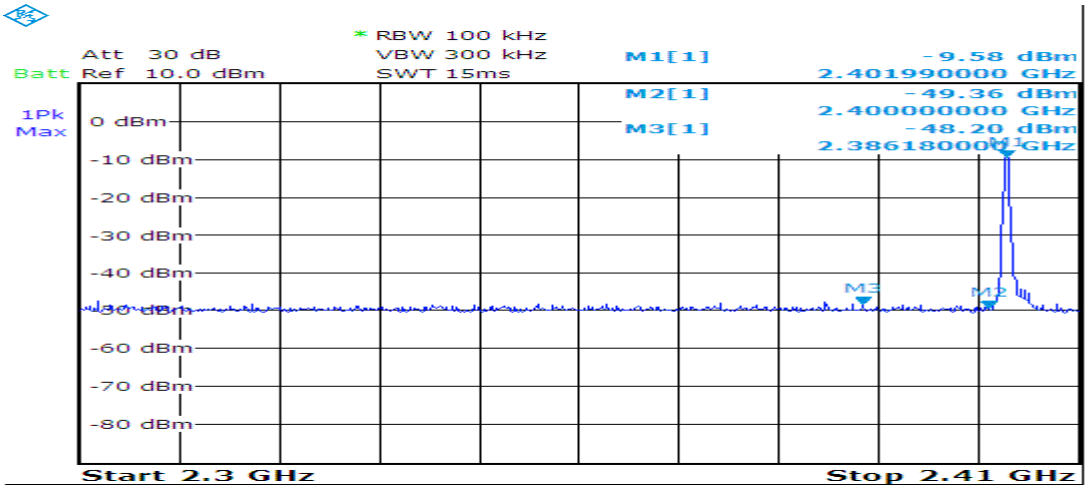


Temperature:	24 °C	Humidity:	66 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping off
RBW:	100 kHz	VBW:	300 kHz
Modulation:	GFSK	Tested Date:	Jan. 17, 2018

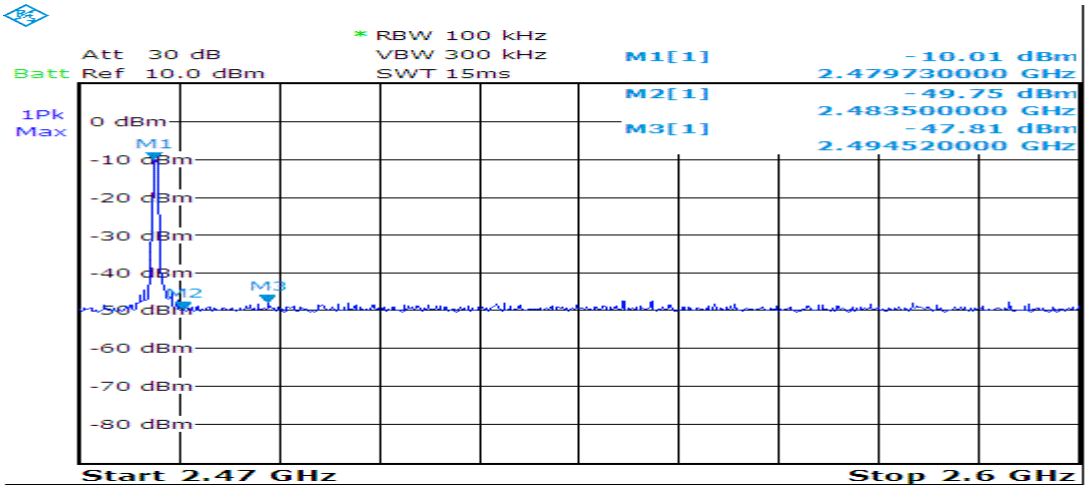
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-9.58	-48.20	38.62	> 20 dBc
> 2483.5	-10.01	-47.81	37.80	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：

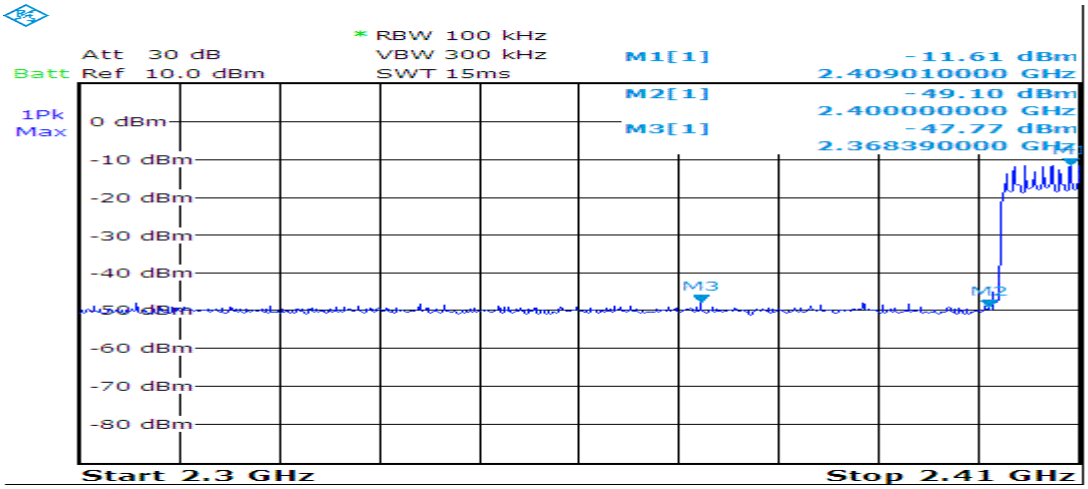


Temperature:	24 °C	Humidity:	66 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping on
RBW:	100 kHz	VBW:	300 kHz
Modulation:	π/4 DQPSK	Tested Date:	Jan. 17, 2018

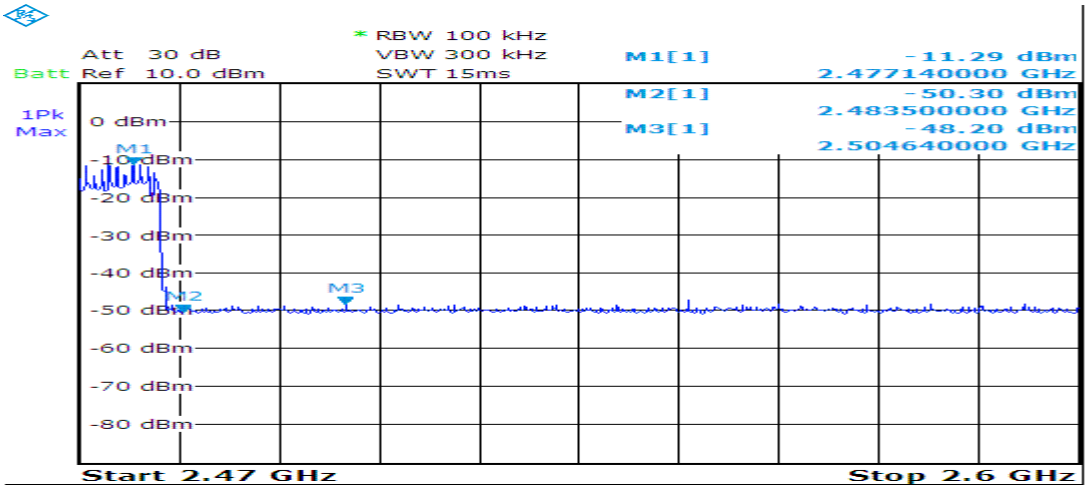
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-11.61	-47.77	36.16	> 20 dBc
> 2483.5	-11.29	-48.20	36.91	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：

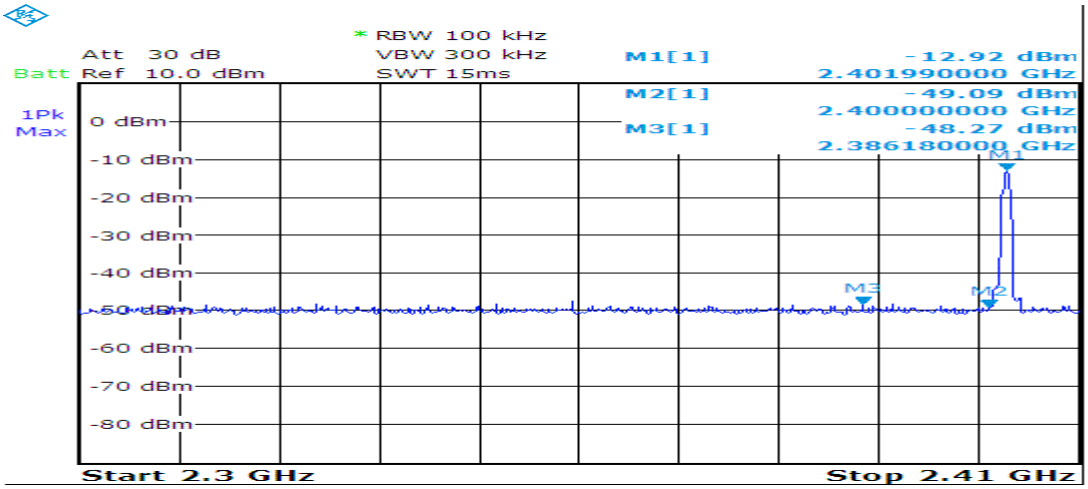


Temperature:	24 °C	Humidity:	66 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping off
RBW:	100 kHz	VBW:	300 kHz
Modulation:	π/4 DQPSK	Tested Date:	Jan. 17, 2018

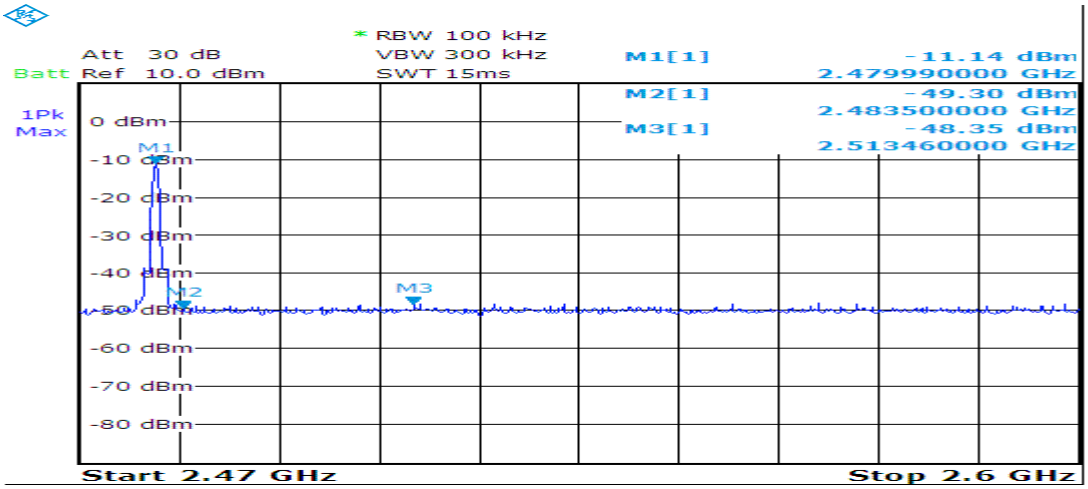
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-12.92	-48.27	35.35	> 20 dBc
> 2483.5	-11.14	-48.35	37.21	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：

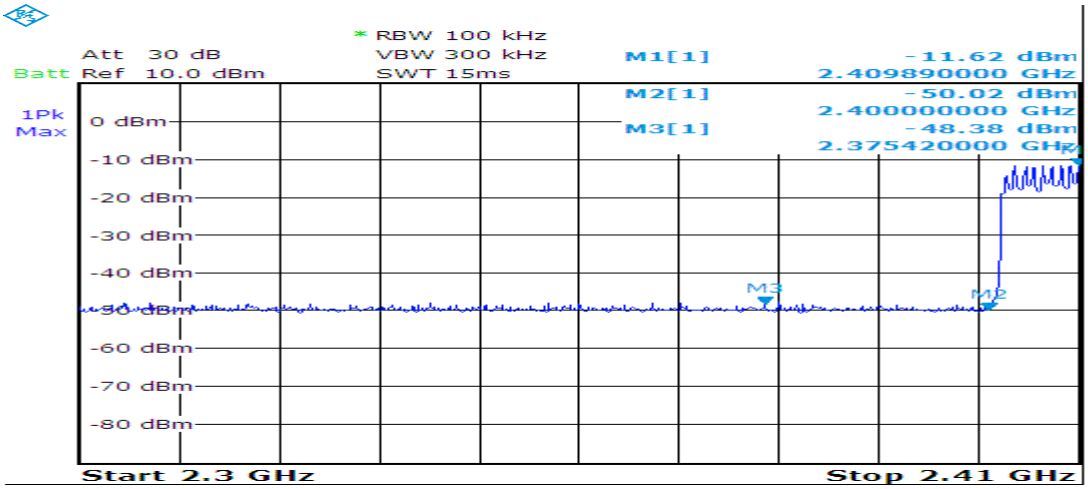


Temperature:	24 °C	Humidity:	66 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping on
RBW:	100 kHz	VBW:	300 kHz
Modulation:	8DPSK	Tested Date:	Jan. 17, 2018

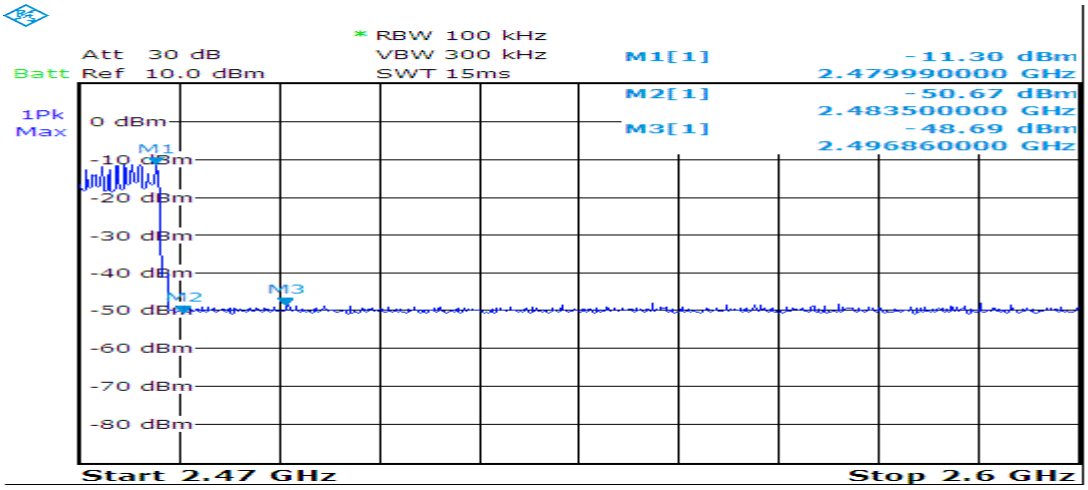
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-11.62	-48.38	36.76	> 20 dBc
> 2483.5	-11.30	-48.69	37.39	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：

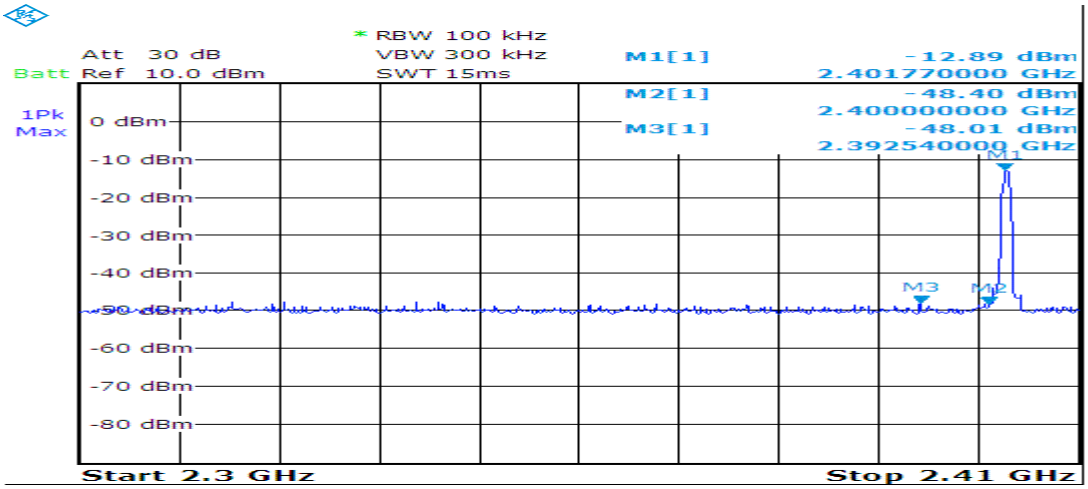


Temperature:	24 °C	Humidity:	66 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping off
RBW:	100 kHz	VBW:	300 kHz
Modulation:	8DPSK	Tested Date:	Jan. 17, 2018

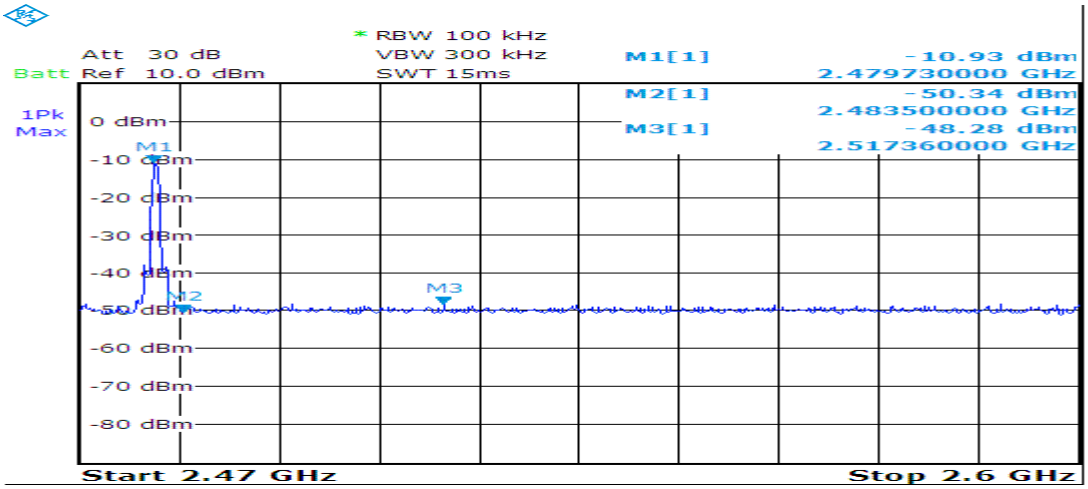
1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-12.89	-48.01	35.12	> 20 dBc
> 2483.5	-10.93	-48.28	37.35	> 20 dBc

Below 2400MHz (CH00)：



Above 2483.5 MHz (CH78)：



4.6 TIME OF OCCUPANCY (Dwell Time)

4.6.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(iii).
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

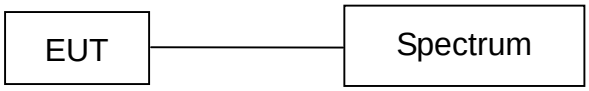
4.6.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.6.4 TEST PROCEDURE

The EUT was operating in transmitter mode and could be controlled its channel.
Printed out the test result from the spectrum by hard copy function.

4.6.5 EUT OPERATING CONDITION

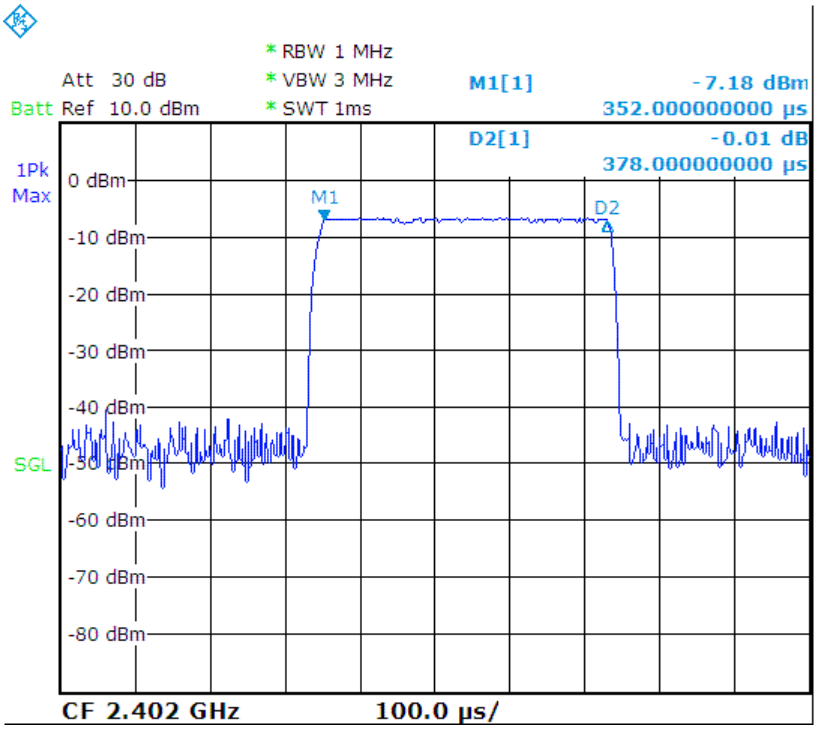
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.6.6 TEST RESULT

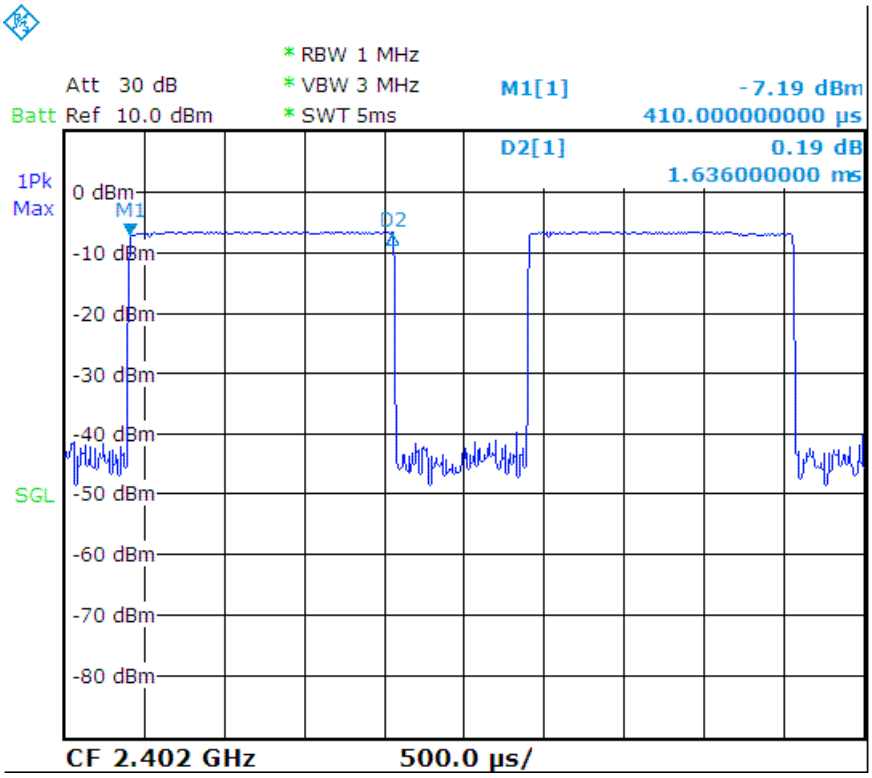
Temperature:	22 °C	Humidity:	68 %RH
Spectrum Detector:	PK.	Test Mode:	Tx-1, Tx-2, Tx-3
RBW:	1 MHz	VBW:	3 MHz
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Channel Number	Channel Frequency (MHz)	Hopping mode	Pulse Time (ms)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
CH00	2402	DH1	0.378	120.96	400
CH00	2402	DH3	1.636	261.76	400
CH00	2402	DH5	2.856	304.64	400
CH39	2441	DH1	0.386	123.52	400
CH39	2441	DH3	1.636	261.76	400
CH39	2441	DH5	2.876	306.77	400
CH78	2480	DH1	0.386	123.52	400
CH78	2480	DH3	1.626	260.16	400
CH78	2480	DH5	2.896	308.91	400

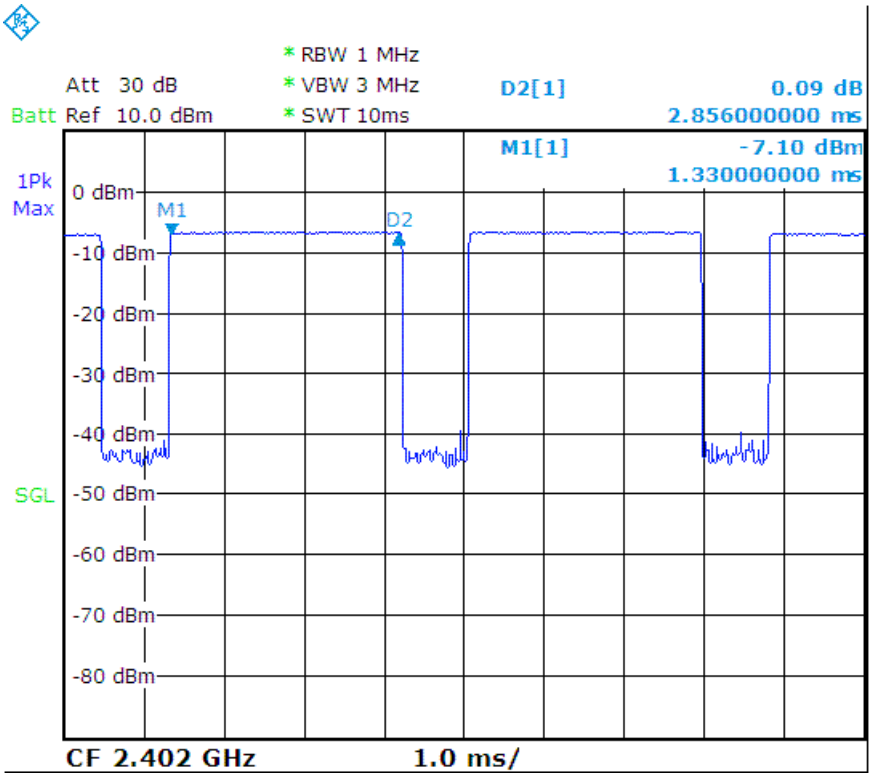
CH00_DH1：



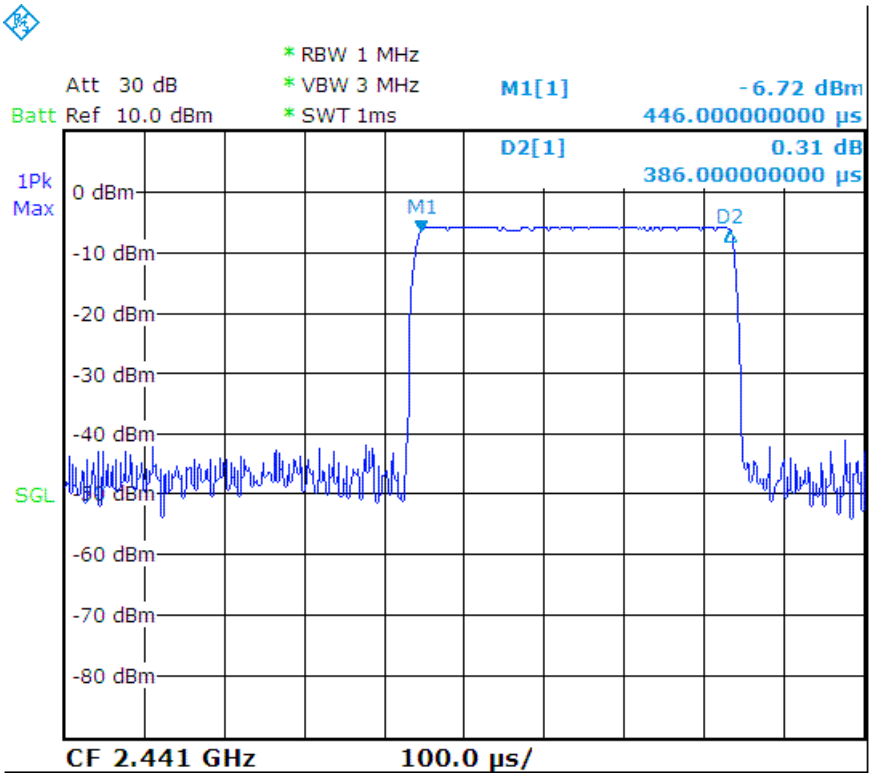
CH00_DH3：



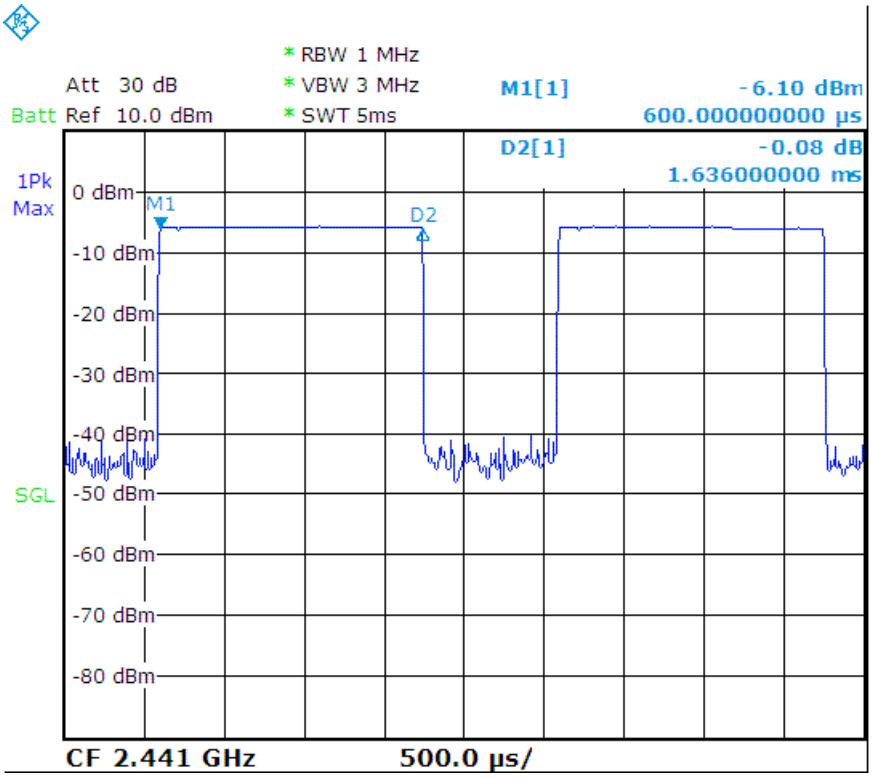
CH00_DH5：



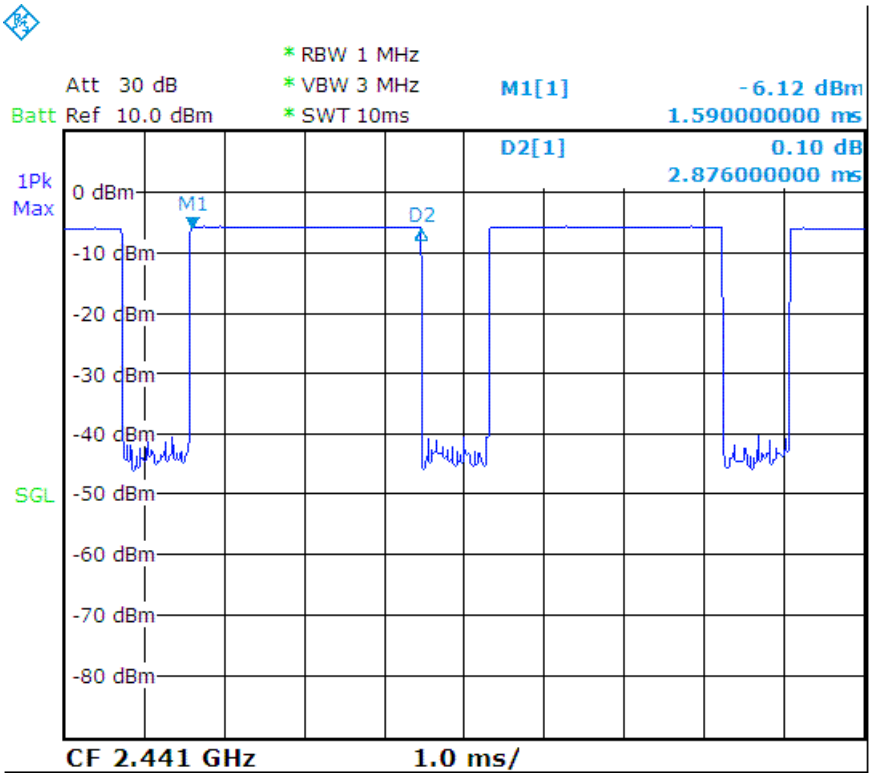
CH39_DH1：



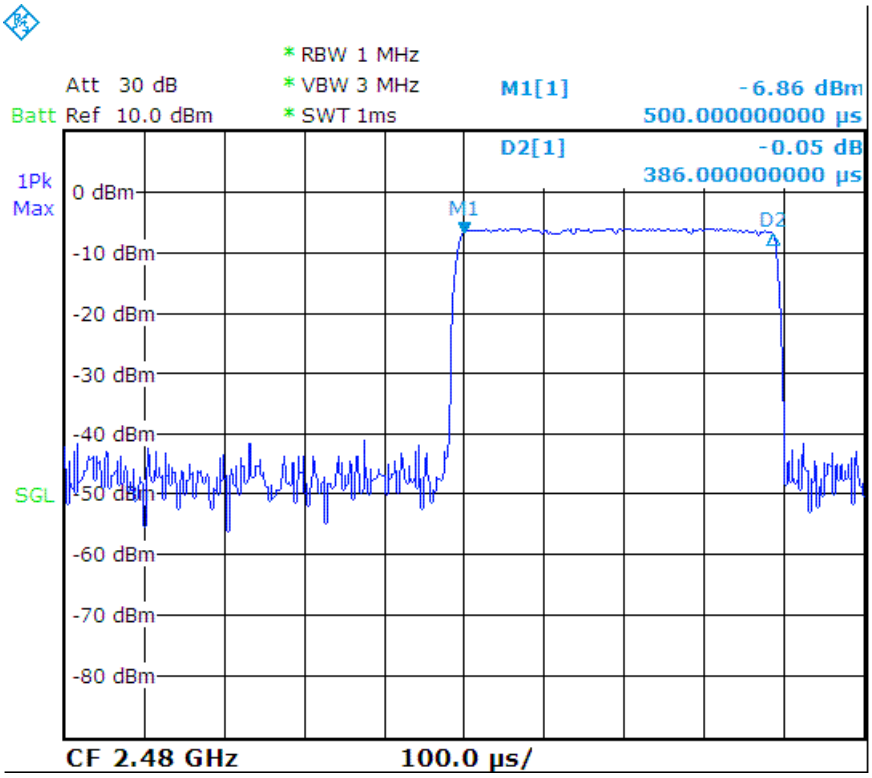
CH39_DH3：



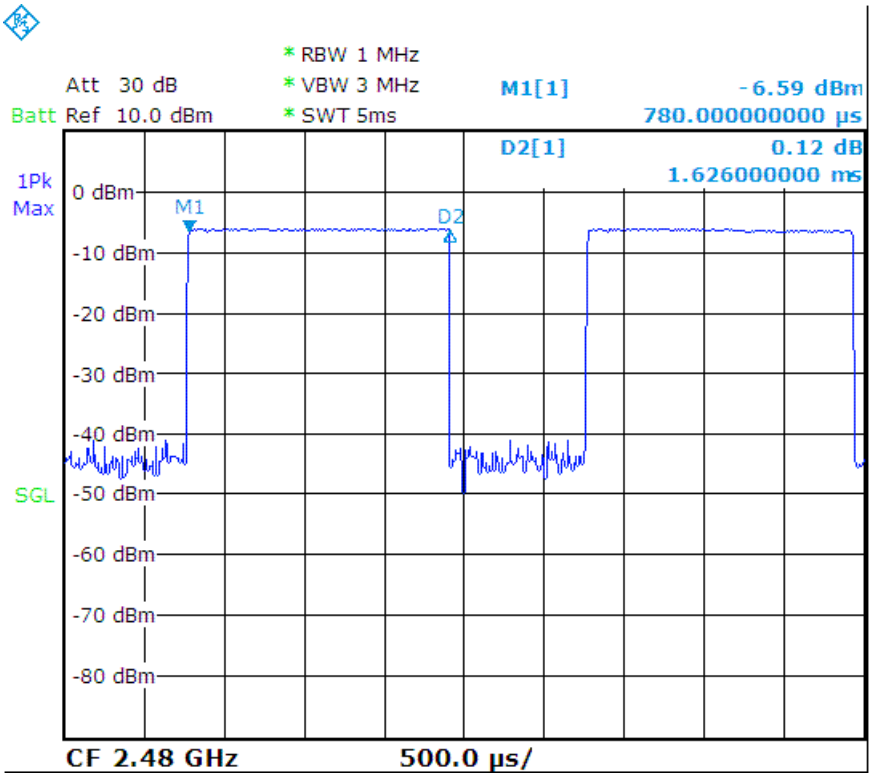
CH39_DH5：



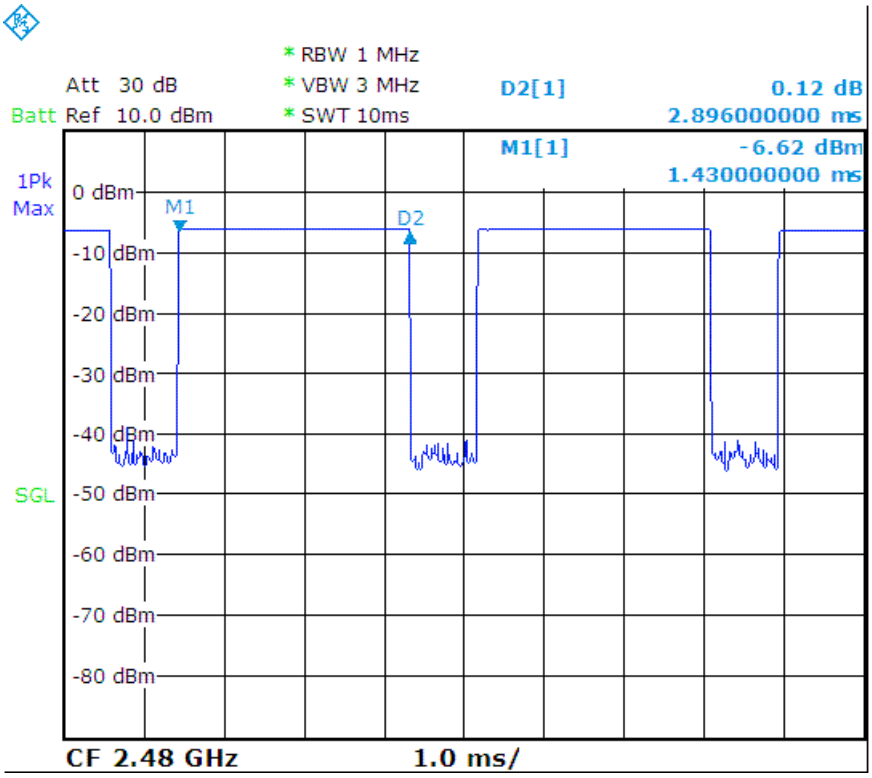
CH78_DH1：



CH78_DH3：



CH78_DH5：



4.7 QUANTITY OF HOPPING CHANNEL TEST

4.7.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(b).
Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

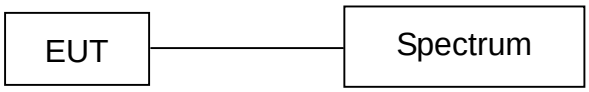
4.7.2 TEST EQUIPMENT

The following test equipment was used during the test：

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC

NOTE： The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.7.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.7.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.
Printed out the test result from the spectrum by hard copy function.

4.7.5 EUT OPERATING CONDITION

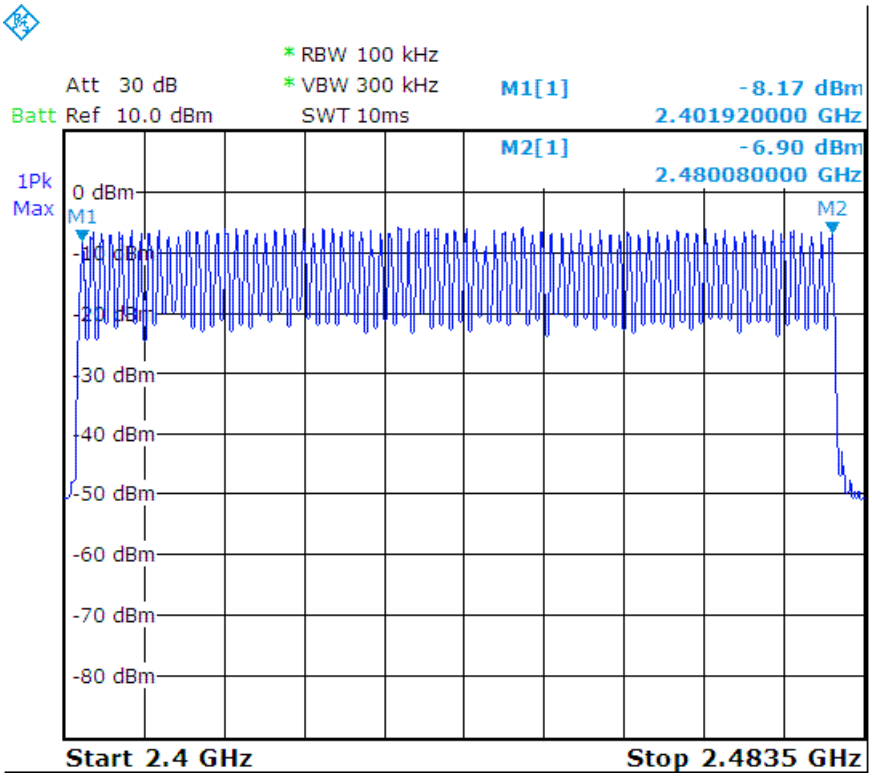
1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

4.7.6 TEST RESULT

Temperature:	22 °C	Humidity:	68 %RH
Spectrum Detector:	PK.	Test Mode:	Hopping
RBW:	100 kHz	VBW:	300 kHz
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Hopping Channel Frequency Range(MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

CH00 ~ CH78：



4.8 CHANNEL SEPARATION TEST

4.8.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(1).

frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel

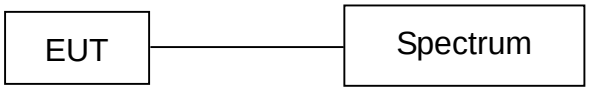
4.8.2 TEST EQUIPMENT

The following test equipment was used during the test：

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC

NOTE：The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.8.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.

Printed out the test result from the spectrum by hard copy function.

4.8.5 EUT OPERATING CONDITION

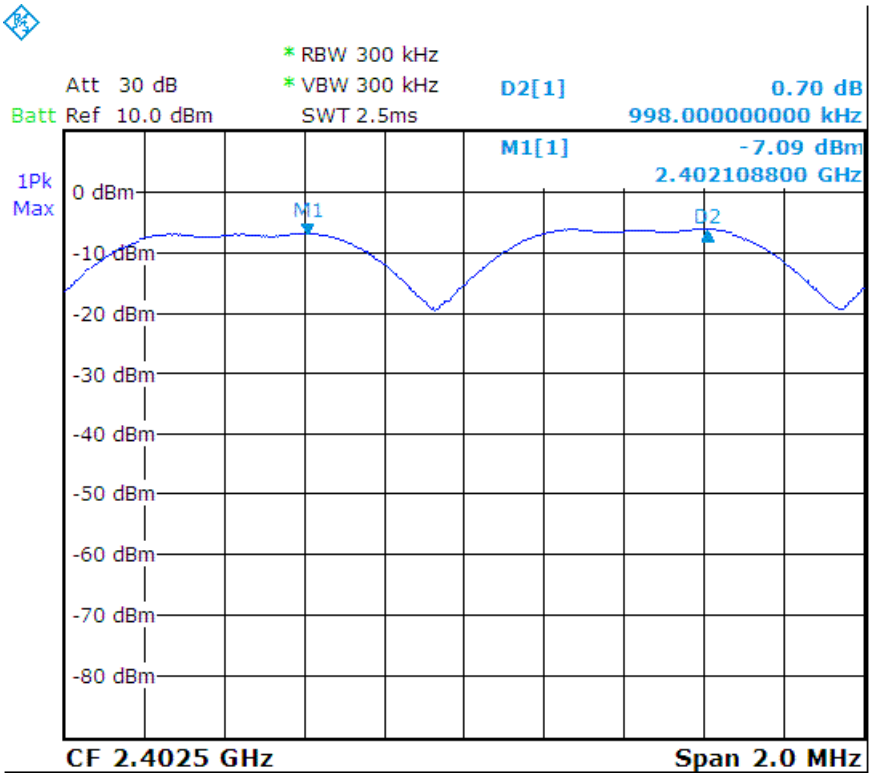
1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

4.8.6 TEST RESULT

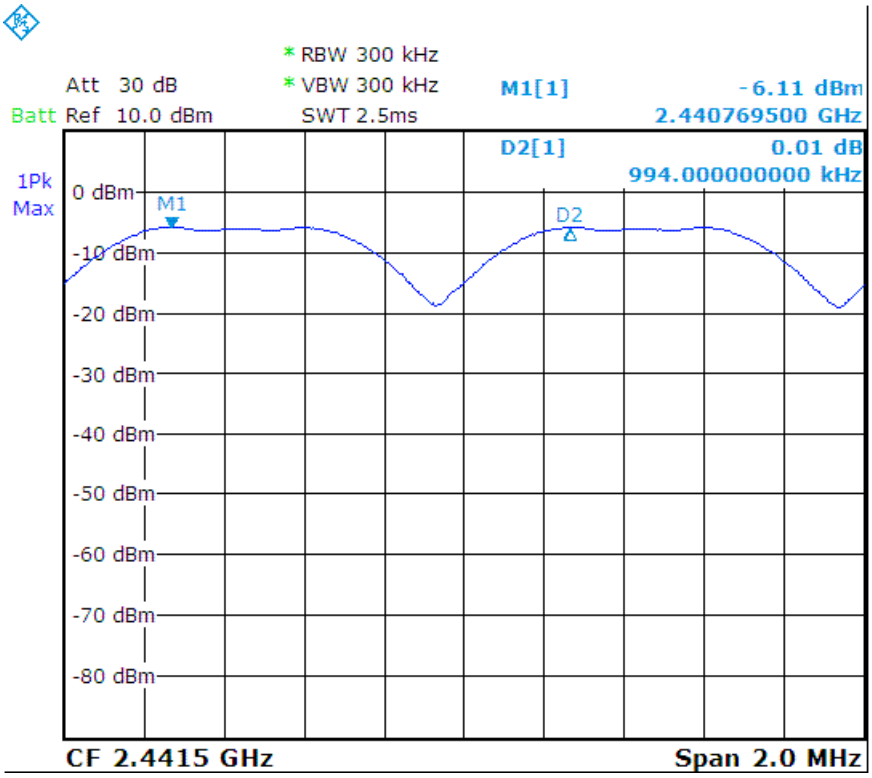
Temperature:	22 °C	Humidity:	68 %RH
Spectrum Detector:	PK.	Tesr Mode:	Hopping
RBW:	300 kHz	VBW:	300 kHz
Tested By:	Leo	Tested Date:	Dec. 27, 2017

Channel Number	Channel Frequency (MHz)	Separation Read Value (kHz)	Limit
CH00	2402	998	> 25 kHz or two-thirds of the 20 dB bandwidth
CH39	2441	994	> 25 kHz or two-thirds of the 20 dB bandwidth
CH78	2480	998	> 25 kHz or two-thirds of the 20 dB bandwidth

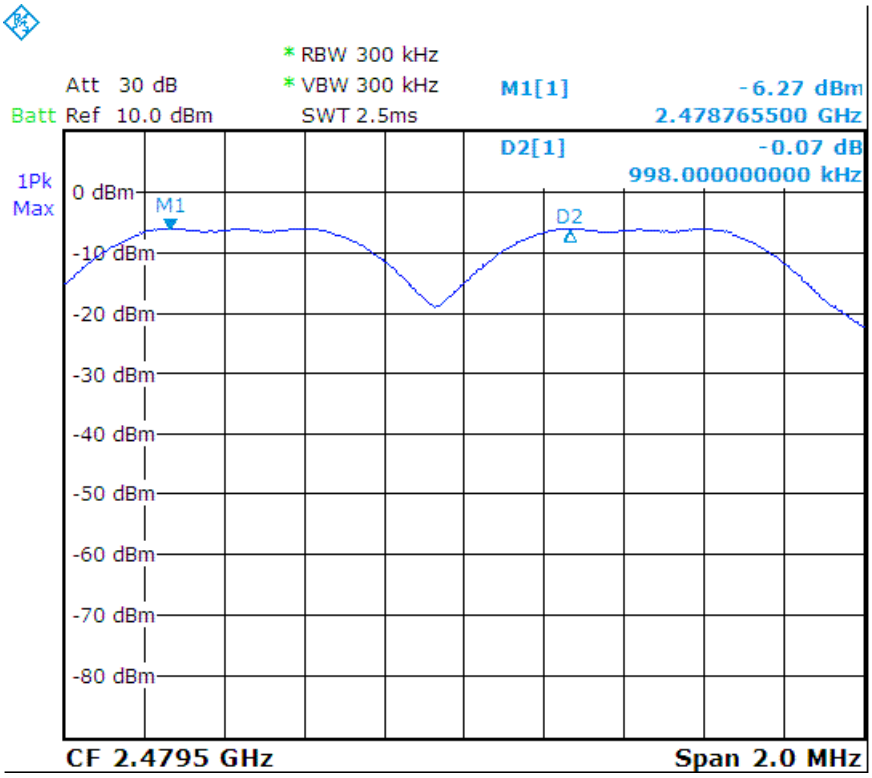
CH00：



CH00：


* RBW 300 kHz
Att 30 dB
* VBW 300 kHz
M1[1]
-6.11 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.440769500 GHz
D2[1]
0.01 dB
994.000000000 kHz
1Pk
Max
0 dBm
M1
D2
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4415 GHz
Span 2.0 MHz

CH78：


* RBW 300 kHz
Att 30 dB
* VBW 300 kHz
M1[1]
-6.27 dBm
Batt Ref 10.0 dBm
SWT 2.5ms
2.478765500 GHz
D2[1]
-0.07 dB
998.000000000 kHz
1Pk
Max
0 dBm
M1
D2
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4795 GHz
Span 2.0 MHz

5. Antenna application

5.1 Antenna requirement

The EUT’s antenna is met the requirement of FCC Part 15C section 15.203.

FCC part15C section15.247 requirement:
Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Result

The EUT’s antenna used a Chip Antenna. Gain of antenna types is 2.0 dBi that meet the requirement.

6. TERMS OF ABBREVIATION

AV.	Average detection
AZ(º)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction