



RADIO TEST REPORT

Report No:STS1912045W03

Issued for

Prentke Romich Company

1022 Heyl Rd. Wooster, Ohio 44691, USA

Product Name:	Accent 1400
Brand Name:	Accent
Model Name:	ACN1400-30
Series Model:	N/A
FCC ID:	2AD9PA-ACN140030PRC
IC:	23408-ACN140030
Test Standard:	FCC Part 15.247
	RSS-247 Issue 2, February 2017

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TEST RESULT CERTIFICATION

Applicant's Name: Prentke Romich Company
Address: 1022 Heyl Rd. Wooster, Ohio 44691, USA
Manufacture's Name: Prentke Romich Company
Address: 1022 Heyl Rd. Wooster, Ohio 44691, USA

Product Description

Product Name: Accent 1400
Brand Name: Accent
Model Name: ACN1400-30
Series Model: N/A
Test Standards: FCC Part15.247
RSS-247 Issue 2, February 2017
Test Procedure: ANSI C63.10-2013

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

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Date of Test:
Date of receipt of test item: 12 Dec. 2019
Date (s) of performance of tests: 12 Dec. 2019 ~ 31 Dec. 2019
Date of Issue: 02 Jan. 2019
Test Result: **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sunday Hu)

Authorized Signatory :

(Vita Li)





Table of Contents	Page
1. SUMMARY OF TEST RESULTS	6
1.1 TEST FACTORY	7
1.2 MEASUREMENT UNCERTAINTY	7
2. GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF THE EUT	8
2.2 DESCRIPTION OF THE TEST MODES	10
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	11
2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS	12
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	13
3. EMC EMISSION TEST	14
3.1 CONDUCTED EMISSION MEASUREMENT	14
3.2 RADIATED EMISSION MEASUREMENT	20
4.CONDUCTED SPURIOUS & BAND EDGE EMISSION	37
4.1 LIMIT	37
4.2 TEST PROCEDURE	37
4.3 DEVIATION FROM STANDARD	37
4.4 TEST SETUP	37
4.5 EUT OPERATION CONDITIONS	37
4.6 TEST RESULTS	38
5. POWER SPECTRAL DENSITY TEST	54
5.1 LIMIT	54
5.2 TEST PROCEDURE	54
5.3 DEVIATION FROM STANDARD	54
5.4 TEST SETUP	54
5.5 EUT OPERATION CONDITIONS	54
5.6 TEST RESULTS	55
6. BANDWIDTH TEST	71
6.1 LIMIT	71
6.2 TEST PROCEDURE	71
6.3 DEVIATION FROM STANDARD	71
6.4 TEST SETUP	71
6.5 EUT OPERATION CONDITIONS	71
6.6 TEST RESULTS	72



Table of Contents	Page
7. PEAK OUTPUT POWER TEST	88
7.1 LIMIT	88
7.2 TEST PROCEDURE	88
7.3 DEVIATION FROM STANDARD	88
7.4 TEST SETUP	88
7.5 EUT OPERATION CONDITIONS	88
7.6 TEST RESULTS	89
8. ANTENNA REQUIREMENT	92
8.1 STANDARD REQUIREMENT	92
8.2 EUT ANTENNA	92
9. FREQUENCY STABILITY	93
9.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT	93
9.2 TEST PROCEDURE	93
9.3 TEST RESULT	93
APPENDIX-PHOTOS OF TEST SETUP	94

**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	02 Jan. 2019	STS1912045W03	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247, Subpart C RSS-247 Issue 2			
Standard Section	Test Item	Judgment	Remark
15.207 RSS-Gen Issue 5, Amendment 1, March 2019	Conducted Emission & Receiver AC power-line conducted emissions	PASS	--
15.247 (a)(2) RSS-GEN clause 6.7	6dB Bandwidth & 99% Bandwidth	PASS	--
15.247 (b)(3) RSS-247 Issue 2, February 2017 (5.4)	Output Power	PASS	--
15.247 (c) RSS-247 Issue 2, February 2017 (5.5) RSS-Gen Issue 5, Amendment 1, March 2019	Radiated Spurious Emission & Receiver radiated emissions	PASS	--
15.247 (e) RSS-247 Issue 2, February 2017	Power Spectral Density	PASS	--
15.205 RSS-Gen Issue 5, Amendment 1, March 2019	Restricted bands of operation	PASS	--
Part 15.247(d)/part 15.209(a) RSS-247 Issue 2, February 2017	Band Edge Emission	PASS	--
15.203 RSS-Gen Issue 5, Amendment 1, March 2019	Antenna Requirement	PASS	--
RSS-Gen Issue 5, Amendment 1, March 2019	Frequency Stability	PASS	--

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 30-1GHz	$\pm 6.7\text{dB}$
4	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
5	All emissions, radiated >6G	$\pm 5.8\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 4.43\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 5\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Accent 1400	
Trade Name	Accent	
Model Name	ACN1400-30	
Series Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a Accent 1400	
	Operation Frequency:	802.11b/g/n 20: 2412~2462 MHz 802.11n(40MHz):2422~2452MHz
	Modulation Type:	802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM
	Number of Channel:	802.11b/g/n20: 11CH 802.11n 40: 7CH
	Antenna Designation:	Please see Note 4.
	Antenn Type:	PIFA
	AntennaGain (dBi):	Antenna number: 2 Antenna A gain : 0dBi Antenna B gain : 0dBi MIMO technology Directional gain=3.01dBi
	Duty Cycle:	>98%
Channel List	Please refer to the Note 2.	
Adapter	Input: AC 100~240V, 1500mA, 50/60Hz Output: DC 18V, 3330mA	
Battery	Rated Voltage: 7.4V Charge Limit: 8.4V Capacity: 9200mAh	
Hardware version number	A1400-30_MB_VERC	
Software versionnumber	Windows 10 Pro 64-bit	
Radio Hardware Version of Test Equipment	MPLY.LR9.W1444,MD.LWTG.MP.V79.P4	
Radio Software Version of Test Equipment	SC6531_W13.04.05_Release	
Test Software	3.18.19	
RF Power Setting TEST Software (power class)	2.4 GHz:802.11 b/g/n 20:12/10/9 2.4 GHz:802.11 n 40:9	
Connecting I/O Port(s)	Please refer to the User's Manual	



802.11b/g : SISO mode only, 802.11n H20 /H40: MIMO mode only

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.

2.

Operation Frequency of channel			
802.11b/g/n(20MHz)		Channel List for 802.11n(40MHz)	
Channel	Frequency	Channel	Frequency
01	2412	03	2422
02	2417	04	2427
03	2422	05	2432
04	2427	06	2437
05	2432	07	2442
06	2437	08	2447
07	2442	09	2452
08	2447		
09	2452		
10	2457		
11	2462		

3. Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Carrier Frequency Channel

2.4GHz Test Frequency:

For 802.11b/g/n (HT20)		For 802.11n (HT40)	
Channel	Freq.(MHz)	Channel	Freq.(MHz)
01	2412	03	2422
06	2437	06	2437
11	2462	09	2452

4. KDB 662911 D01 Multiple Transmitter Output v02r01

2) Directional Gain Calculations for In-Band Measurements

a) Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as follows:

(i) If any transmit signals are correlated with each other,

Directional gain = GANT + 10 log(NANT) dBi

(ii) If all transmit signals are completely uncorrelated with each other,

Directional gain = GANT

ANT A=0 dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0 +10log2=3.01dBi



2.2 DESCRIPTION OF THE TEST MODES

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11b CH1	1 Mbps
Mode 2	TX IEEE 802.11b CH6	1 Mbps
Mode 3	TX IEEE 802.11 b CH11	1 Mbps
Mode 4	SISO mode	1 Mbps
Mode 5	TX IEEE 802.11g CH1	6 Mbps
Mode 6	TX IEEE 802.11g CH6	6 Mbps
Mode 7	TX IEEE 802.11g CH11	6 Mbps
Mode 8	SISO mode	6 Mbps
Mode 9	TX IEEE 802.11n HT20 CH1	MCS 0
Mode 10	TX IEEE 802.11n HT20 CH6	MCS 0
Mode 11	TX IEEE 802.11n HT20 CH11	MCS 0
Mode 12	keeping MIMO TX mode	MCS 0
Mode 13	TX IEEE 802.11n HT40 CH3	MCS 0
Mode 14	TX IEEE 802.11n HT40 CH6	MCS 0
Mode 15	TX IEEE 802.11n HT40 CH9	MCS 0
Mode 16	keeping MIMO TX mode	MCS 0

Note:

- (1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.
- (2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V /60Hz is shown in the report

AC Conducted Emission

Test Case	
AC Conducted Emission	Mode17: Keeping TX + WLAN Link

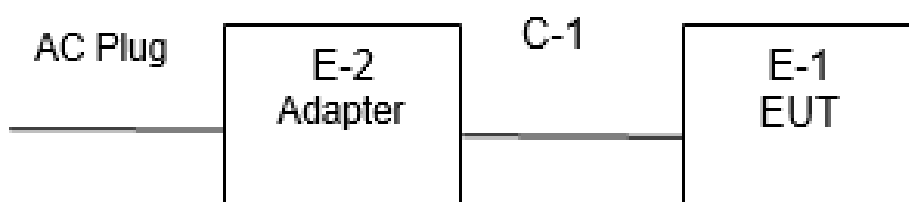


2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiation Test Set



Conduction Test Set





2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Adapter	MEGMEET	MANGO60S-18BB-PRC	N/A	N/A
C-1	DC Cable	N/A	100cm	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.07.29	2020.07.28
Signal Analyzer	Agilent	N9020A	MY51110105	2019.03.02	2020.03.01
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.01
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier(0.1M-3G Hz)	EM	EM330	060665	2019.10.09	2020.10.08
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK201808090 1	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.09	2020.10.08
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			
	BULUN	BL410-E/18.905			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.07.29	2020.07.28
LISN	R&S	ENV216	101242	2019.10.09	2020.10.08
LISN	EMCO	3810/2NM	23625	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2019.10.09	2020.10.08
Signal Analyzer	Agilent	N9020A	MY49100060	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15. 207(a) and RSS-Gen Issue 5 limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “ * ” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

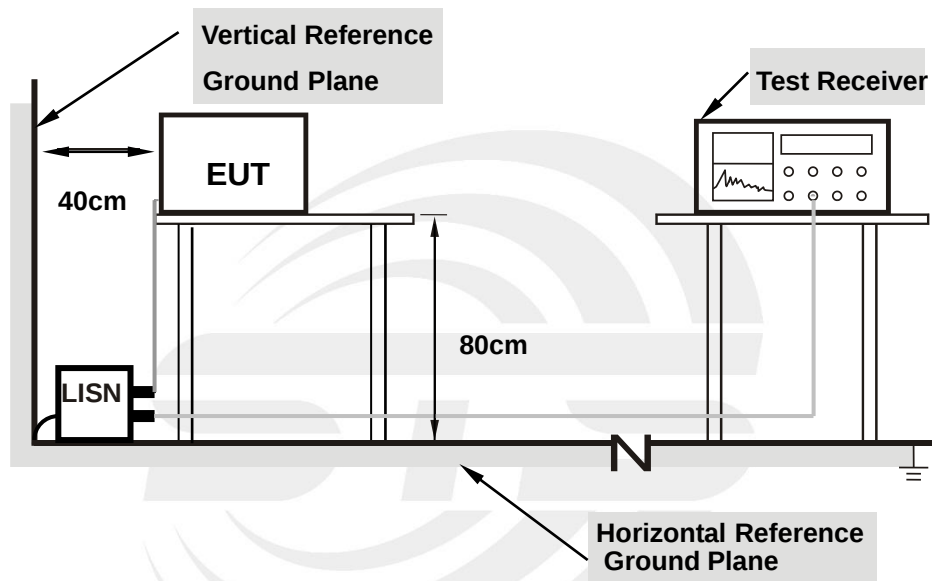
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.5 TEST RESULT

Temperature:	19.76	Relative Humidity:	19.76
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 17/TX		

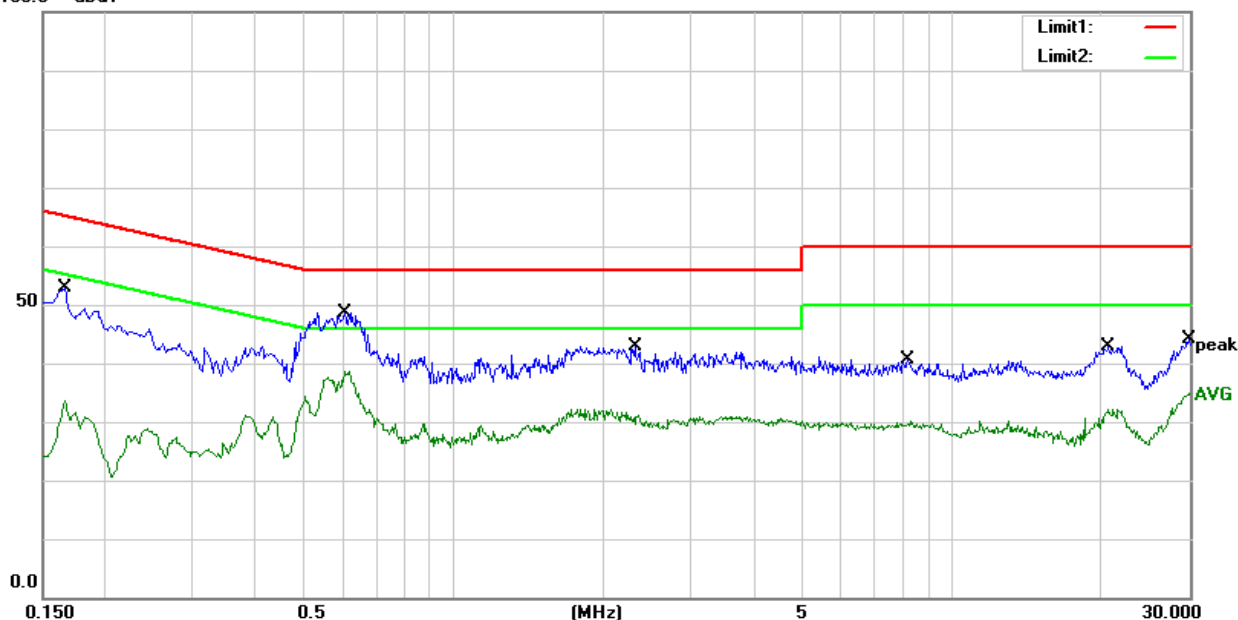
No.	Frequen cy	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(d B)	(dBuV)	(dBuV)	(dB)	
1	0.1660	33.03	19.76	52.79	65.16	-12.37	QP
2	0.1660	13.79	19.76	33.55	55.16	-21.61	AVG
3	0.6060	28.85	19.89	48.74	56.00	-7.26	QP
4	0.6060	18.72	19.89	38.61	46.00	-7.39	AVG
5	2.3180	23.25	19.74	42.99	56.00	-13.01	QP
6	2.3180	11.77	19.74	31.51	46.00	-14.49	AVG
7	8.1900	20.59	19.92	40.51	60.00	-19.49	QP
8	8.1900	10.08	19.92	30.00	50.00	-20.00	AVG
9	20.6780	22.55	20.25	42.80	60.00	-17.20	QP
10	20.6780	11.98	20.25	32.23	50.00	-17.77	AVG
11	29.8460	24.06	20.07	44.13	60.00	-15.87	QP
12	29.8460	14.76	20.07	34.83	50.00	-15.17	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result = Reading + Factor) - Limit

100.0 dBuV





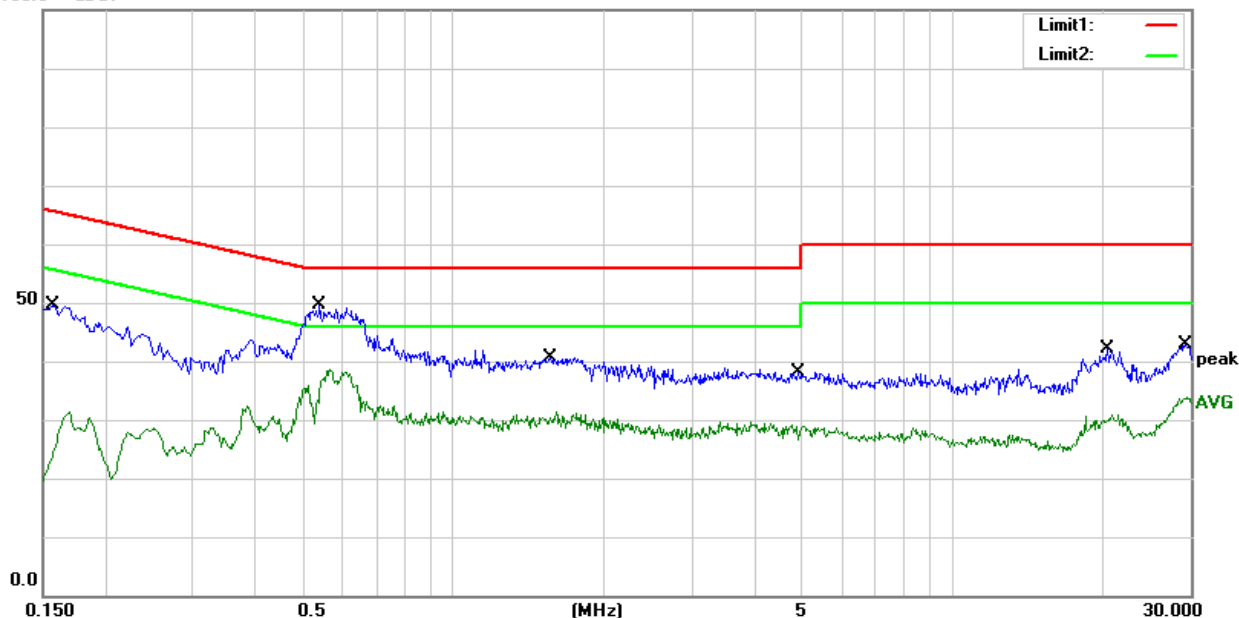
Temperature:	19.76	Relative Humidity:	19.76
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 17/TX		

No.	Frequen cy (MHz)	Reading (dBuV)	Correct Factor(d B)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	29.97	19.76	49.73	65.57	-15.84	QP
2	0.1580	11.50	19.76	31.26	55.57	-24.31	AVG
3	0.5380	29.56	19.95	49.51	56.00	-6.49	QP
4	0.5380	18.70	19.95	38.65	46.00	-7.35	AVG
5	1.5620	20.85	19.74	40.59	56.00	-15.41	QP
6	1.5620	11.52	19.74	31.26	46.00	-14.74	AVG
7	4.9220	18.42	19.78	38.20	56.00	-17.80	QP
8	4.9220	9.65	19.78	29.43	46.00	-16.57	AVG
9	20.3900	21.79	20.26	42.05	60.00	-17.95	QP
10	20.3900	10.56	20.26	30.82	50.00	-19.18	AVG
11	29.3100	22.75	20.05	42.80	60.00	-17.20	QP
12	29.3100	13.72	20.05	33.77	50.00	-16.23	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit

100.0 dBuV





Temperature:	23.1(C)	Relative Humidity:	46%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	RX Mode		

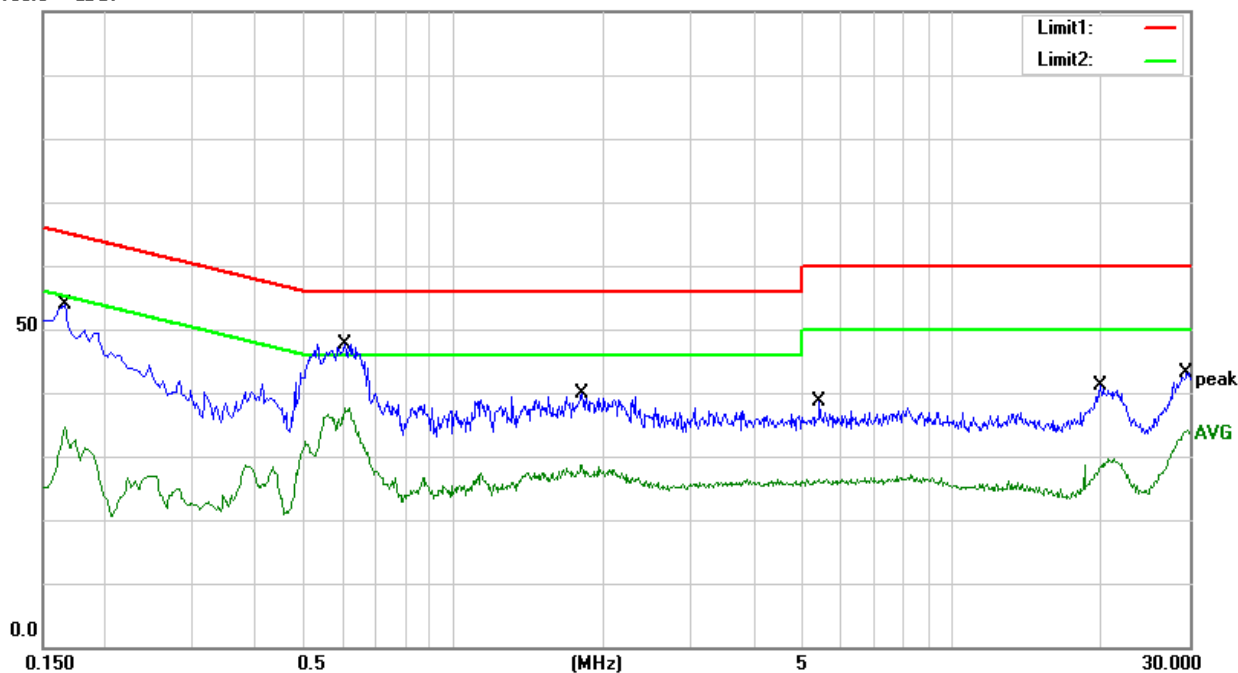
No.	Frequen cy	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(d B)	(dBuV)	(dBuV)	(dB)	
1	0.1660	34.03	19.76	53.79	65.16	-11.37	QP
2	0.1660	14.79	19.76	34.55	55.16	-20.61	AVG
3	0.6060	27.85	19.89	47.74	56.00	-8.26	QP
4	0.6060	17.72	19.89	37.61	46.00	-8.39	AVG
5	1.8140	20.18	19.73	39.91	56.00	-16.09	QP
6	1.8140	8.82	19.73	28.55	46.00	-17.45	AVG
7	5.4380	18.80	19.78	38.58	60.00	-21.42	QP
8	5.4380	6.64	19.78	26.42	50.00	-23.58	AVG
9	19.8460	20.89	20.28	41.17	60.00	-18.83	QP
10	19.8460	9.31	20.28	29.59	50.00	-20.41	AVG
11	29.6740	23.10	20.06	43.16	60.00	-16.84	QP
12	29.6740	13.99	20.06	34.05	50.00	-15.95	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result = Reading + Factor) – Limit

100.0 dBuV



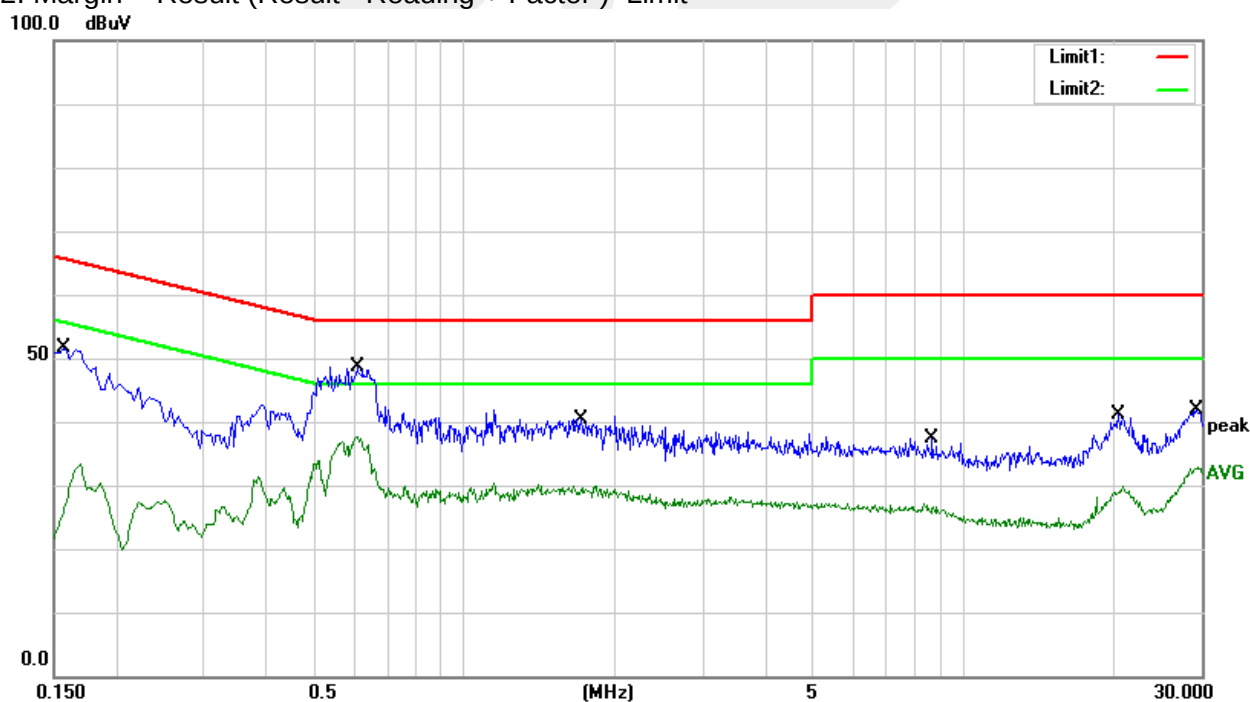


Temperature:	23.1(C)	Relative Humidity:	46%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	RX Mode		

No.	Frequen cy	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(d B)	(dBuV)	(dBuV)	(dB)	
1	0.1580	31.97	19.76	51.73	65.57	-13.84	QP
2	0.1580	13.50	19.76	33.26	55.57	-22.31	AVG
3	0.6100	28.63	19.89	48.52	56.00	-7.48	QP
4	0.6100	17.81	19.89	37.70	46.00	-8.30	AVG
5	1.7100	20.69	19.74	40.43	56.00	-15.57	QP
6	1.7100	10.26	19.74	30.00	46.00	-16.00	AVG
7	8.6540	17.45	19.97	37.42	60.00	-22.58	QP
8	8.6540	7.09	19.97	27.06	50.00	-22.94	AVG
9	20.3900	20.79	20.26	41.05	60.00	-18.95	QP
10	20.3900	9.56	20.26	29.82	50.00	-20.18	AVG
11	29.3100	21.75	20.05	41.80	60.00	-18.20	QP
12	29.3100	12.72	20.05	32.77	50.00	-17.23	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) and RSS-Gen Issue 5, Amendment 1, March 2019 and RSS-247 Issue 2, February 2017 (5.5) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (1000MHz-25GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FCC:

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			



IC:

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



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Restricted band

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2310 to 2425 MHz Upper Band Edge: 2448 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

Receiver Parameter	Setting
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

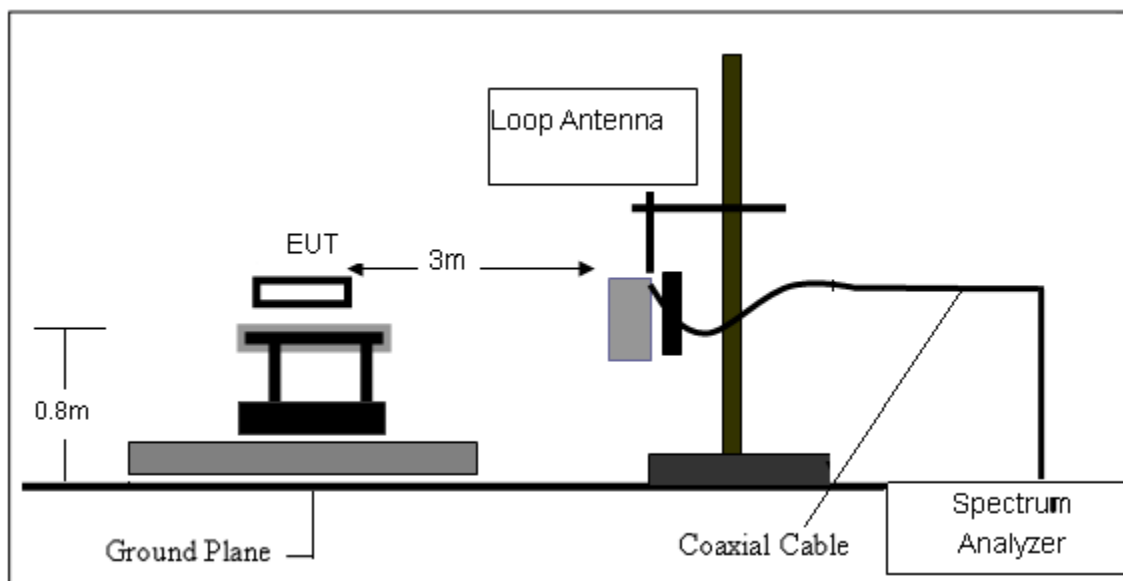
- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

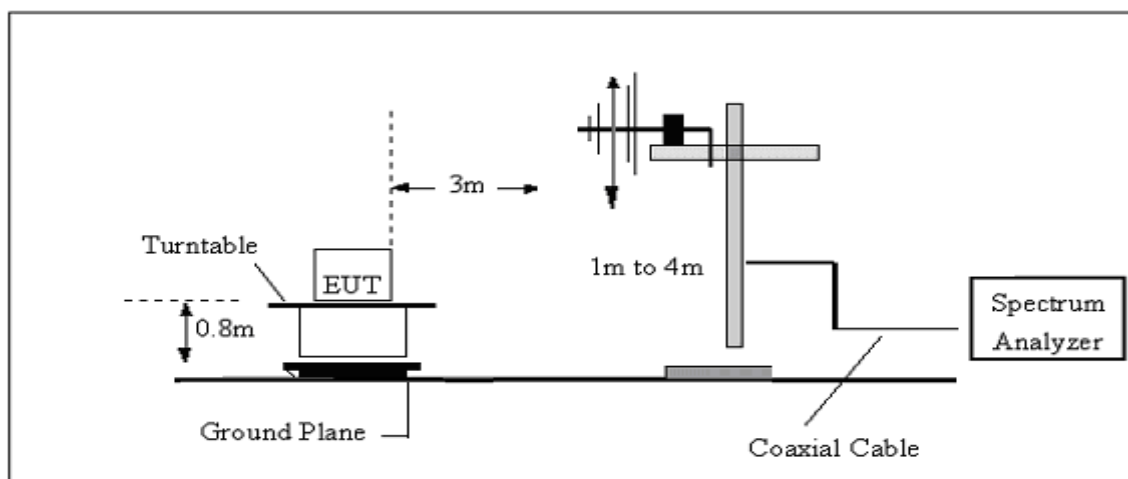
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported.

3.2.3 TEST SETUP

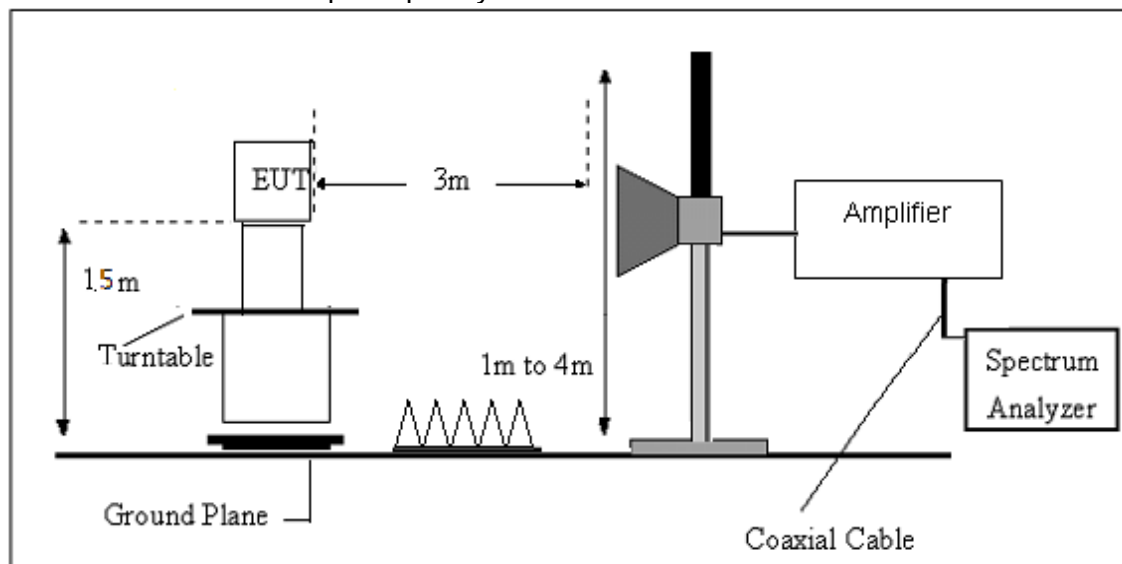
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$





3.2.6 TEST RESULT

9KHz-30MHz

Temperature:	22.7(C)	Relative Humidity:	61%RH
Test Voltage:	DC 7.4V from battery	Polarization:	--
Test Mode:	TX Mode		

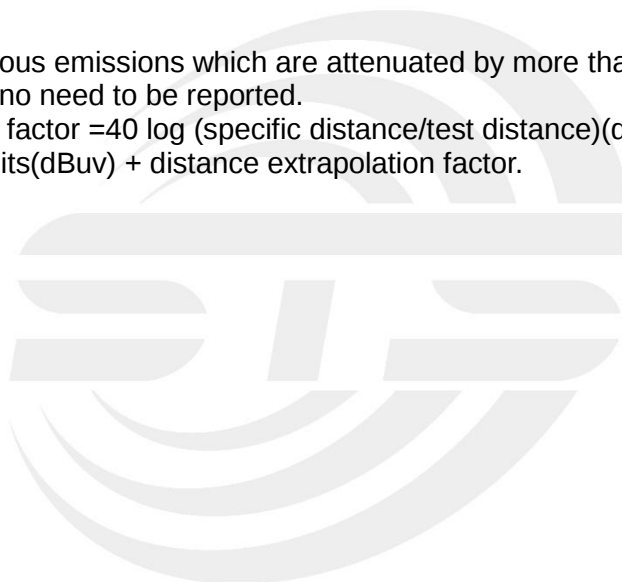
Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.





(30MHz - 1000MHz)

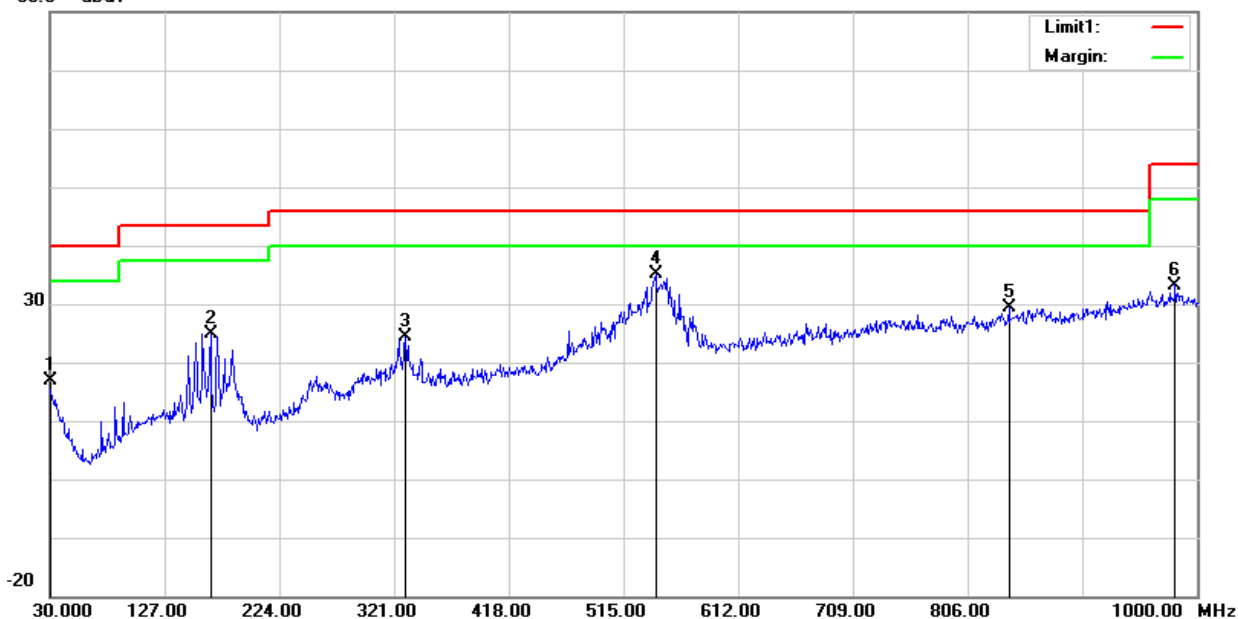
Temperature:	22.7(C)	Relative Humidity:	61%RH
Test Voltage:	DC 7.4V from battery	Phase:	Horizontal
Test Mode:	TX Mode 1-16 (Mode 12 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	30.0000	29.64	-12.85	16.79	40.00	-23.21	QP
2	165.8000	44.27	-19.40	24.87	43.50	-18.63	QP
3	330.7000	38.13	-13.68	24.45	46.00	-21.55	QP
4	542.1600	41.68	-6.63	35.05	46.00	-10.95	QP
5	840.9200	29.66	-0.38	29.28	46.00	-16.72	QP
6	981.5700	30.68	2.57	33.25	54.00	-20.75	QP

Remark:

1. Margin = Result (Result = Reading + Factor) - Limit

80.0 dBuV



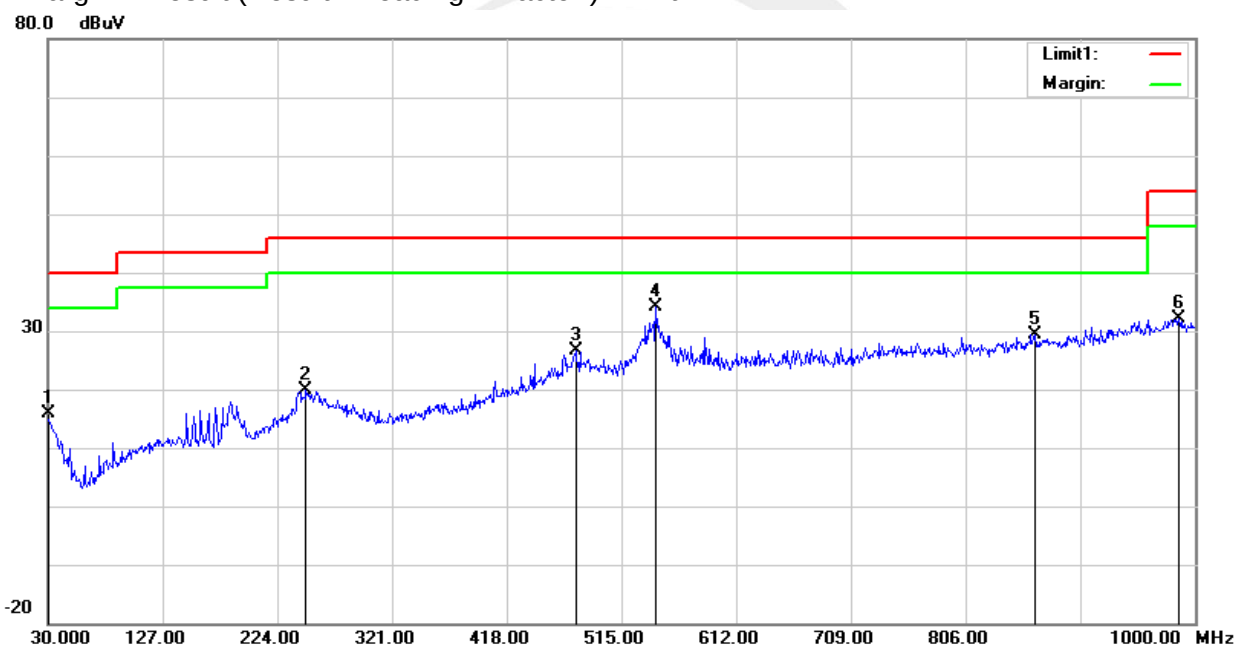


Temperature:	22.7(C)	Relative Humidity:	61%RH
Test Voltage:	DC 7.4V from battery	Phase:	Vertical
Test Mode:	TX Mode 1-16 (Mode 12 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	30.0000	28.84	-12.85	15.99	40.00	-24.01	QP
2	248.2500	36.19	-16.43	19.76	46.00	-26.24	QP
3	476.2000	35.49	-8.78	26.71	46.00	-19.29	QP
4	544.1000	40.42	-6.41	34.01	46.00	-11.99	QP
5	865.1700	29.76	-0.48	29.28	46.00	-16.72	QP
6	986.4200	29.83	2.27	32.10	54.00	-21.90	QP

Remark:.

1. Margin = Result (Result = Reading + Factor) – Limit





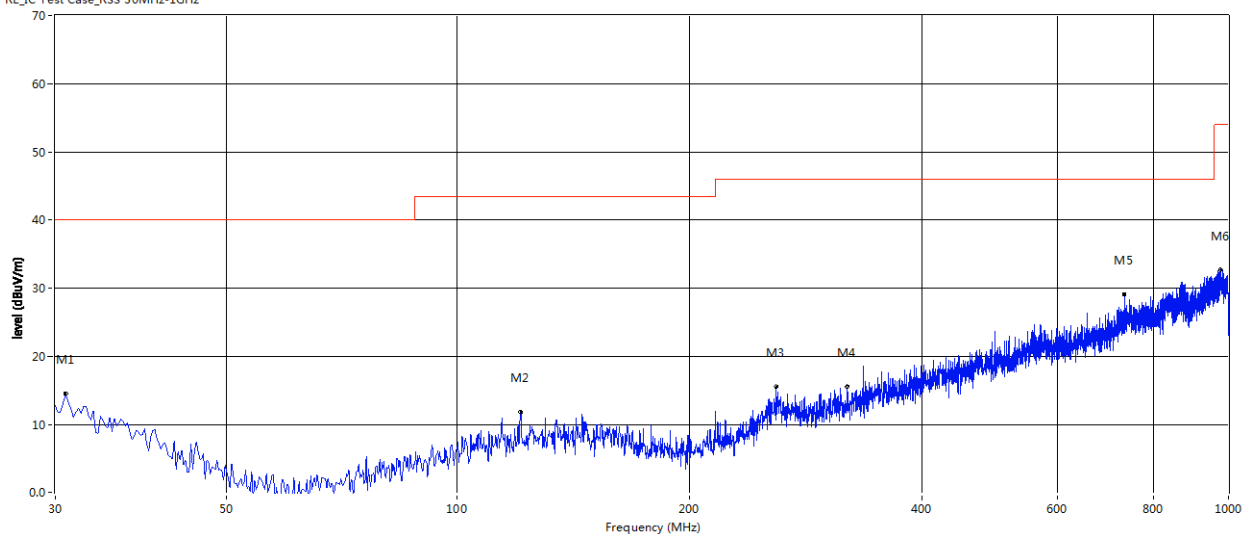
Temperature:	22.7(C)	Relative Humidity:	61%RH
Test Voltage:	DC 7.4V from battery	Phase:	Horizontal
Test Mode:	RX Mode 1-16 (Mode 12 worst mode)		

Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
30.000	12.87	--	--	-12.01	--	40.0	--	-27.13	Horizontal	Pass
120.695	11.81	--	--	-16.95	--	43.5	--	-31.69	Horizontal	Pass
258.677	15.64	--	--	-12.96	--	46.0	--	-30.36	Horizontal	Pass
320.515	15.52	--	--	-11.92	--	46.0	--	-30.48	Horizontal	Pass
733.492	29.11	--	--	0.56	--	46.0	--	-16.89	Horizontal	Pass
978.175	32.76	--	--	5.90	--	54.0	--	-21.24	Horizontal	Pass

Remark:

1. Margin = Result (Result = Reading + Factor) – Limit

RE_IC Test Case_RSS 30MHz-1GHz





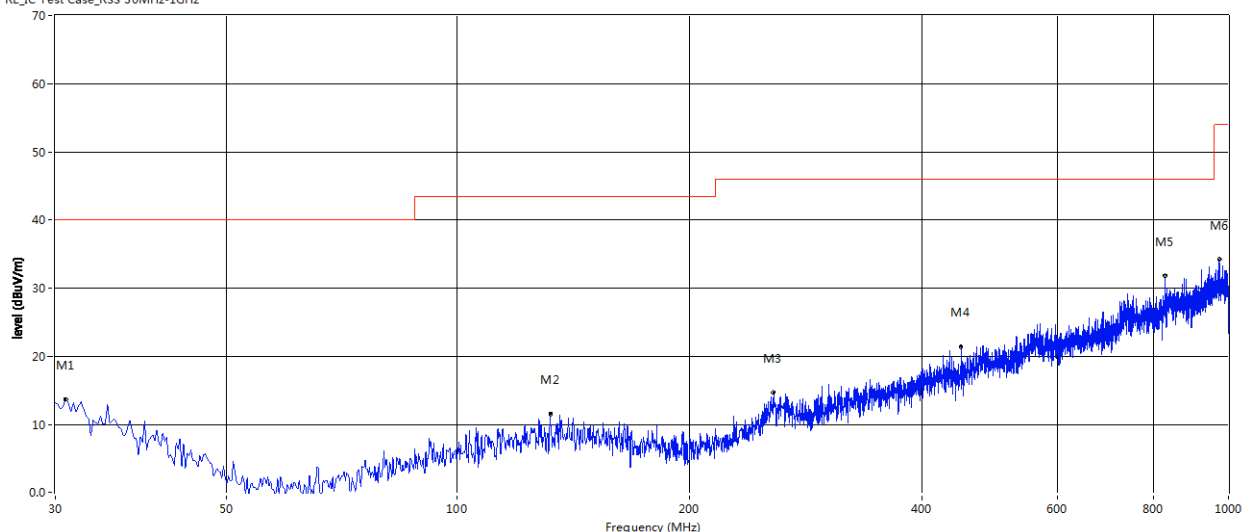
Temperature:	22.7(C)	Relative Humidity:	61%RH
Test Voltage:	DC 7.4V from battery	Phase:	Vertical
Test Mode:	RX Mode 1-16 (Mode 12 worst mode)		

Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
30.970	13.68	--	--	-12.50	--	40.0	--	-26.32	Horizontal	Pass
131.850	11.51	--	--	-16.79	--	43.5	--	-31.99	Horizontal	Pass
256.980	14.69	--	--	-13.17	--	46.0	--	-31.31	Horizontal	Pass
450.253	21.39	--	--	-7.31	--	46.0	--	-24.61	Horizontal	Pass
828.795	31.82	--	--	2.25	--	46.0	--	-14.18	Horizontal	Pass
973.567	34.22	--	--	5.59	--	54.0	--	-19.78	Horizontal	Pass

Remark:.

1. Margin = Result (Result =Reading + Factor)–Limit

RE_IC Test Case_RSS 30MHz-1GHz





(1000MHz-25GHz) Restricted band and Spurious emission Requirements

TX Mode

802.11 g

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
Low Channel (802.11g/2412 MHz)										
3264.85	61.65	44.70	6.70	28.20	-9.80	51.85	74.00	-22.15	PK	Vertical
3264.85	50.71	44.70	6.70	28.20	-9.80	40.91	54.00	-13.09	AV	Vertical
3264.78	62.02	44.70	6.70	28.20	-9.80	52.22	74.00	-21.78	PK	Horizontal
3264.78	50.91	44.70	6.70	28.20	-9.80	41.11	54.00	-12.89	AV	Horizontal
4824.34	58.23	44.20	9.04	31.60	-3.56	54.67	74.00	-19.33	PK	Vertical
4824.34	49.81	44.20	9.04	31.60	-3.56	46.25	54.00	-7.75	AV	Vertical
4824.52	59.52	44.20	9.04	31.60	-3.56	55.96	74.00	-18.04	PK	Horizontal
4824.52	50.32	44.20	9.04	31.60	-3.56	46.76	54.00	-7.24	AV	Horizontal
5359.85	48.39	44.20	9.86	32.00	-2.34	46.05	74.00	-27.95	PK	Vertical
5359.85	39.92	44.20	9.86	32.00	-2.34	37.58	54.00	-16.42	AV	Vertical
5359.68	47.80	44.20	9.86	32.00	-2.34	45.46	74.00	-28.54	PK	Horizontal
5359.68	38.79	44.20	9.86	32.00	-2.34	36.45	54.00	-17.55	AV	Horizontal
7235.83	53.87	43.50	11.40	35.50	3.40	57.27	74.00	-16.73	PK	Vertical
7235.83	44.63	43.50	11.40	35.50	3.40	48.03	54.00	-5.97	AV	Vertical
7235.66	54.03	43.50	11.40	35.50	3.40	57.43	74.00	-16.57	PK	Horizontal
7235.66	43.60	43.50	11.40	35.50	3.40	47.00	54.00	-7.00	AV	Horizontal
Middle Channel (802.11g/2437 MHz)										
3264.88	62.28	44.70	6.70	28.20	-9.80	52.48	74.00	-21.52	PK	Vertical
3264.88	50.62	44.70	6.70	28.20	-9.80	40.82	54.00	-13.18	AV	Vertical
3264.77	62.08	44.70	6.70	28.20	-9.80	52.28	74.00	-21.72	PK	Horizontal
3264.77	50.62	44.70	6.70	28.20	-9.80	40.82	54.00	-13.18	AV	Horizontal
4874.52	58.34	44.20	9.04	31.60	-3.56	54.78	74.00	-19.22	PK	Vertical
4874.52	49.59	44.20	9.04	31.60	-3.56	46.03	54.00	-7.97	AV	Vertical
4874.42	59.28	44.20	9.04	31.60	-3.56	55.72	74.00	-18.28	PK	Horizontal
4874.42	49.27	44.20	9.04	31.60	-3.56	45.71	54.00	-8.29	AV	Horizontal
5359.86	48.87	44.20	9.86	32.00	-2.34	46.53	74.00	-27.47	PK	Vertical
5359.86	39.14	44.20	9.86	32.00	-2.34	36.80	54.00	-17.20	AV	Vertical
5359.63	48.11	44.20	9.86	32.00	-2.34	45.77	74.00	-28.23	PK	Horizontal
5359.63	39.13	44.20	9.86	32.00	-2.34	36.79	54.00	-17.21	AV	Horizontal
7310.88	54.41	43.50	11.40	35.50	3.40	57.81	74.00	-16.19	PK	Vertical
7310.88	43.59	43.50	11.40	35.50	3.40	46.99	54.00	-7.01	AV	Vertical
7310.96	53.58	43.50	11.40	35.50	3.40	56.98	74.00	-17.02	PK	Horizontal
7310.96	44.42	43.50	11.40	35.50	3.40	47.82	54.00	-6.18	AV	Horizontal



High Channel (802.11g/2462 MHz)										
3264.72	60.84	44.70	6.70	28.20	-9.80	51.04	74.00	-22.96	PK	Vertical
3264.72	51.27	44.70	6.70	28.20	-9.80	41.47	54.00	-12.53	AV	Vertical
3264.59	61.27	44.70	6.70	28.20	-9.80	51.47	74.00	-22.53	PK	Horizontal
3264.59	49.88	44.70	6.70	28.20	-9.80	40.08	54.00	-13.92	AV	Horizontal
4924.40	58.47	44.20	9.04	31.60	-3.56	54.91	74.00	-19.09	PK	Vertical
4924.40	49.42	44.20	9.04	31.60	-3.56	45.86	54.00	-8.14	AV	Vertical
4924.58	59.27	44.20	9.04	31.60	-3.56	55.71	74.00	-18.29	PK	Horizontal
4924.58	50.57	44.20	9.04	31.60	-3.56	47.01	54.00	-6.99	AV	Horizontal
5359.77	48.83	44.20	9.86	32.00	-2.34	46.49	74.00	-27.51	PK	Vertical
5359.77	39.89	44.20	9.86	32.00	-2.34	37.55	54.00	-16.45	AV	Vertical
5359.78	47.53	44.20	9.86	32.00	-2.34	45.19	74.00	-28.81	PK	Horizontal
5359.78	39.12	44.20	9.86	32.00	-2.34	36.78	54.00	-17.22	AV	Horizontal
7385.85	53.72	43.50	11.40	35.50	3.40	57.12	74.00	-16.88	PK	Vertical
7385.85	43.73	43.50	11.40	35.50	3.40	47.13	54.00	-6.87	AV	Vertical
7385.90	53.65	43.50	11.40	35.50	3.40	57.05	74.00	-16.95	PK	Horizontal
7385.90	44.16	43.50	11.40	35.50	3.40	47.56	54.00	-6.44	AV	Horizontal

Remark:

- Factor = Antenna Factor + Cable Loss – Pre-amplifier.
- Scan with 802.11b, 802.11g, 802.11n (HT-20), 802.11n (HT-40) all have been tested the antenna A, antenna B and antenna A+B, the worst case is 802.11g of the antenna B.
Emission Level = Reading + Factor
Margin = Limit - Emission Level
- The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

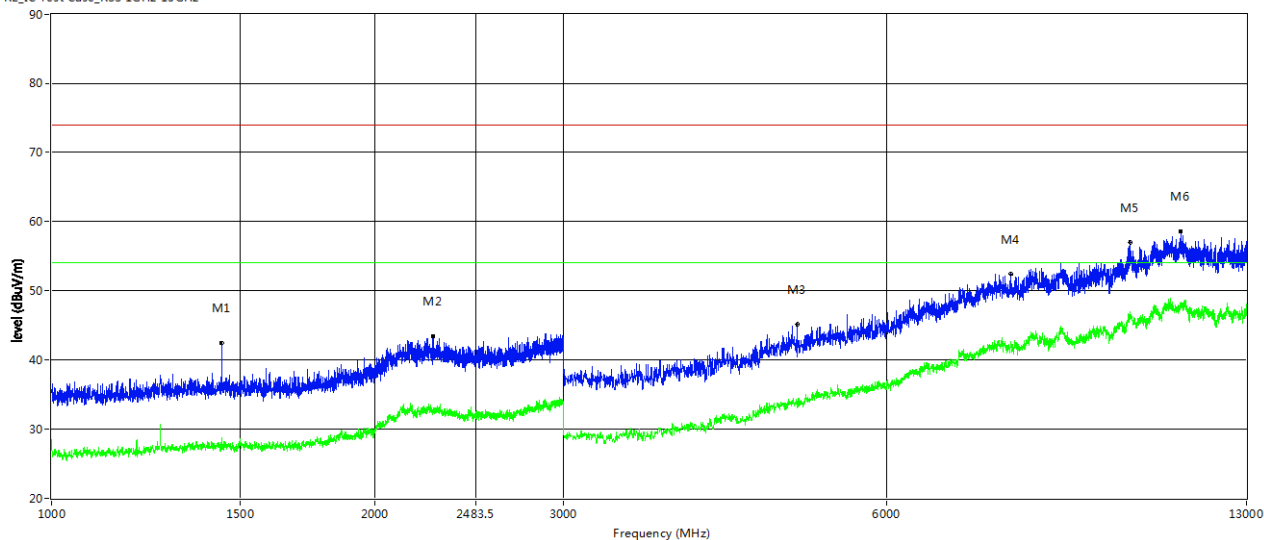


RX Mode

802.11 g

RSE-H

RE_IC Test Case_RSS 1GHz-13GHz

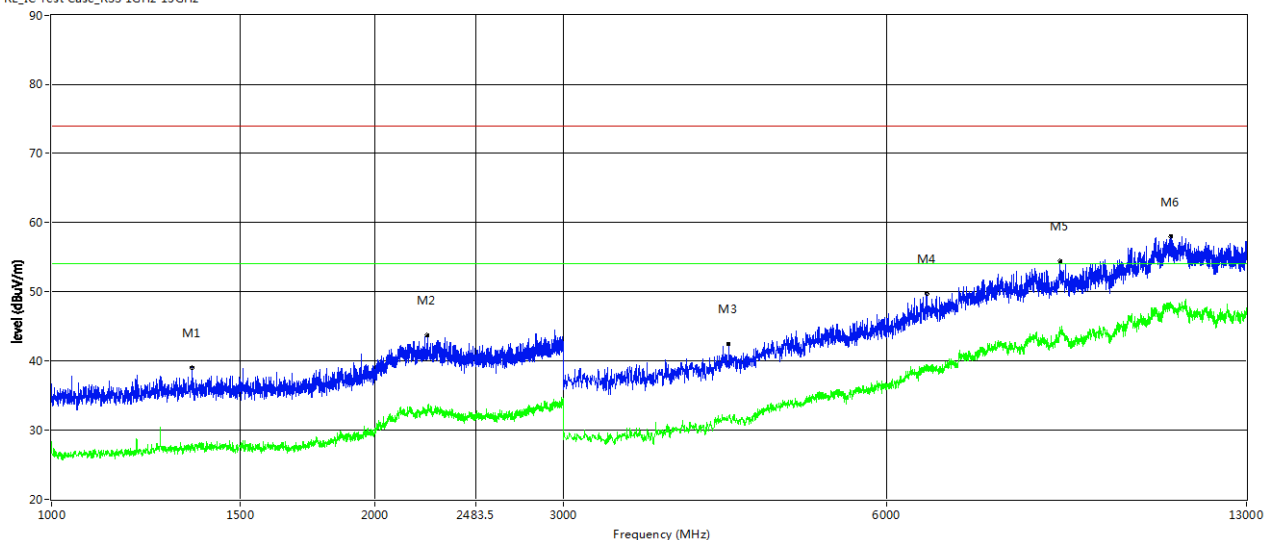


Frequency (MHz)	Peak Level (dBuV /m)	Q-peak Level (dBuV /m)	Average Level (dBuV /m)	Factor (dB)	PK Limit (dBuV /m)	QP Limit (dBuV /m)	AV Limit (dBuV /m)	Over Limit (dB)	ANT	Verdict
1440.500	42.43	--	28.72	-0.60	74.0	--	54.0	-25.28	Horizontal	Pass
2266.500	43.40	--	32.79	4.62	74.0	--	54.0	-21.21	Horizontal	Pass
4950.000	45.17	--	33.70	-6.38	74.0	--	54.0	-20.30	Horizontal	Pass
7832.500	52.44	--	42.59	2.36	74.0	--	54.0	-11.41	Horizontal	Pass
10117.500	56.94	--	46.16	5.87	74.0	--	54.0	-7.84	Horizontal	Pass
11287.500	58.62	--	48.31	8.61	74.0	--	54.0	-5.69	Horizontal	Pass



RSE-V

RE_IC Test Case_RSS 1GHz-13GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1350.000	39.03	--	27.93	-0.79	74.0	--	54.0	-26.07	Vertical	Pass
2239.000	43.70	--	33.06	4.52	74.0	--	54.0	-20.94	Vertical	Pass
4275.000	42.46	--	32.10	-8.96	74.0	--	54.0	-21.90	Vertical	Pass
6537.500	49.72	--	39.53	-0.42	74.0	--	54.0	-14.47	Vertical	Pass
8710.000	54.42	--	44.87	4.30	74.0	--	54.0	-9.13	Vertical	Pass
11032.500	58.02	--	48.03	8.76	74.0	--	54.0	-5.97	Vertical	Pass

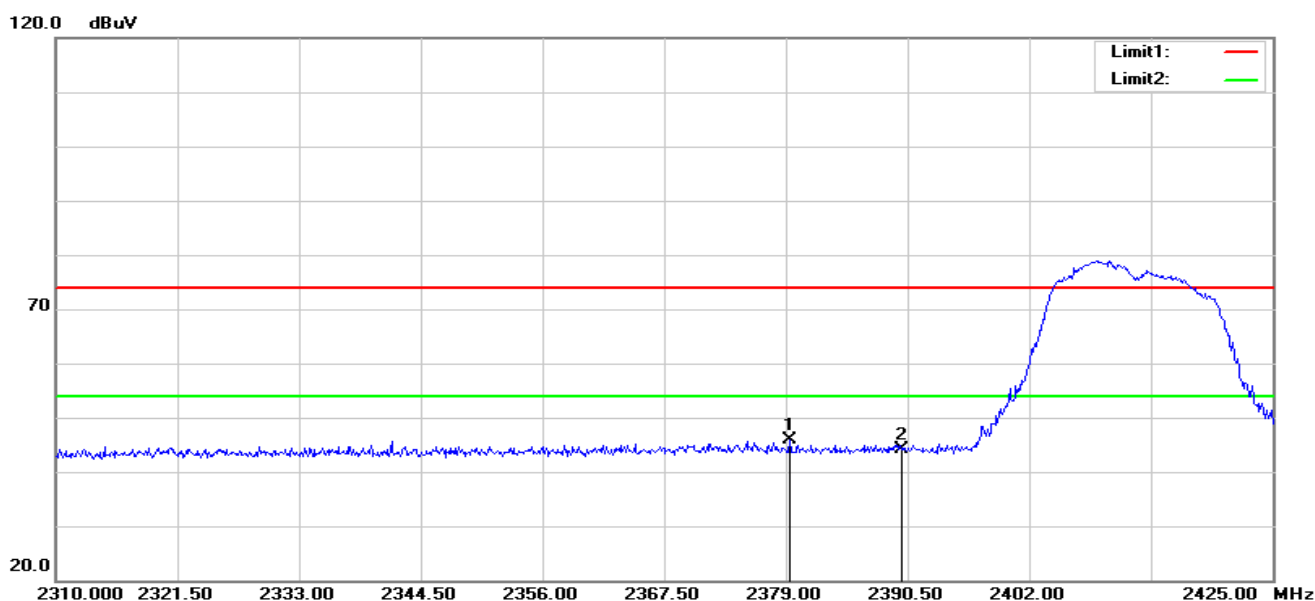
Note: All mode has been tested, only shown the worst case in this report.



3.2.6 TEST RESULTS(Restricted band Requirements)

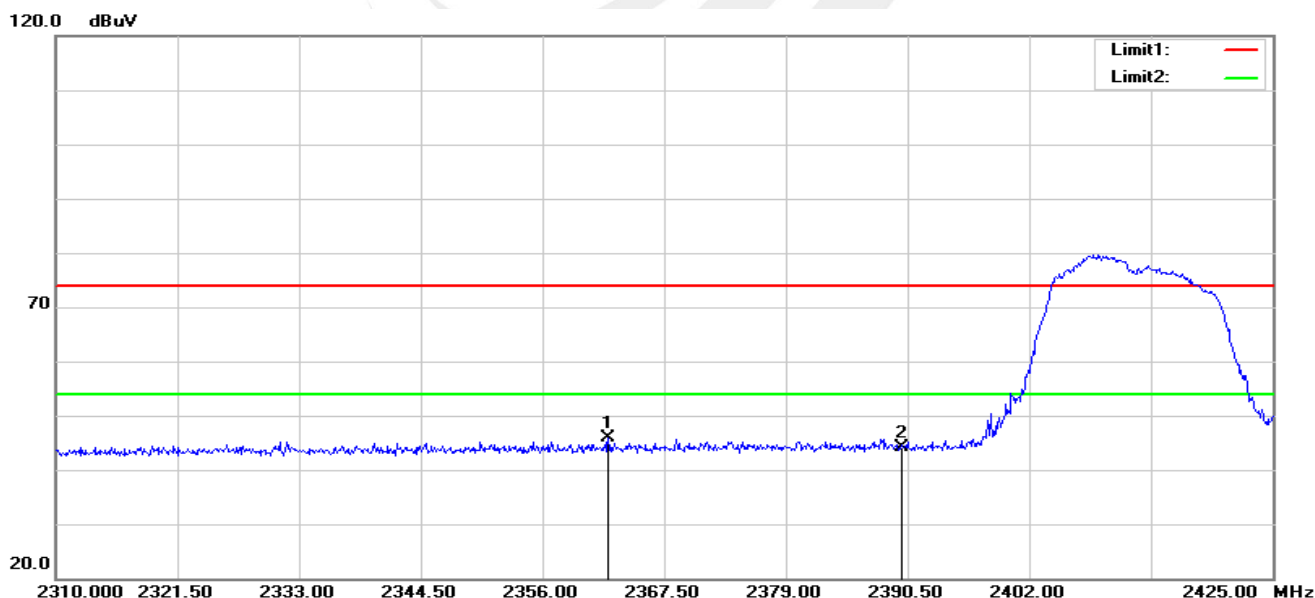
802.11 g-Low

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2379.345	41.82	4.18	46.00	74.00	-28.00	peak
2	2390.000	39.69	4.34	44.03	74.00	-29.97	peak

Vertical

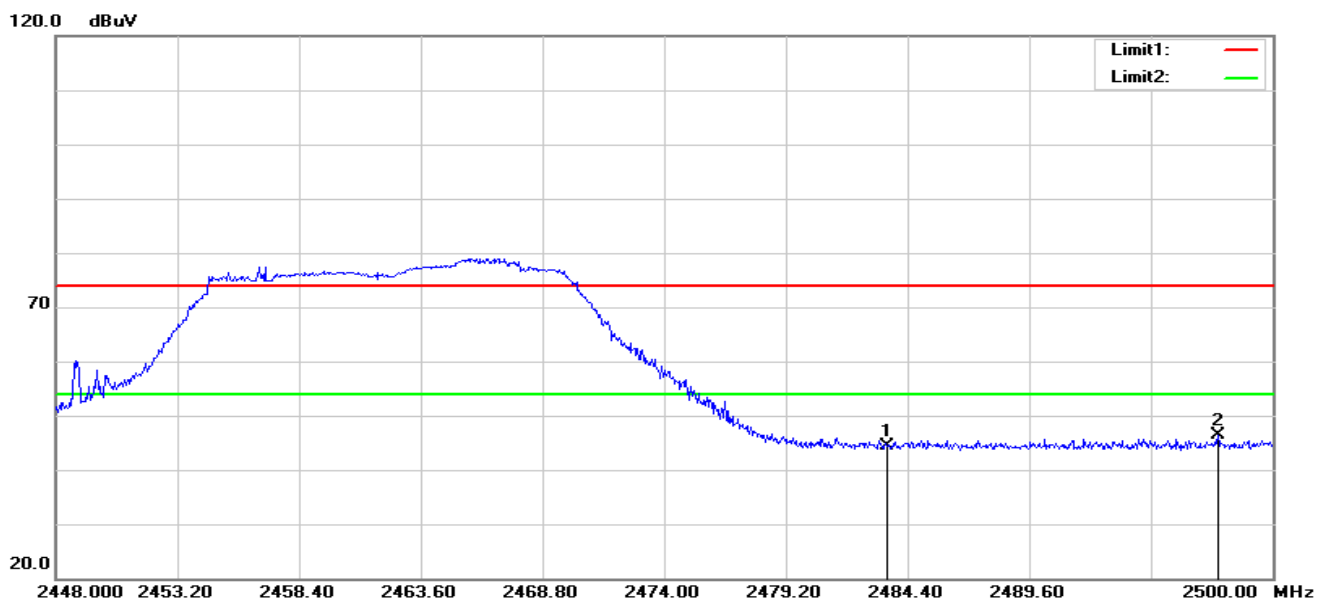


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2362.210	41.96	3.92	45.88	74.00	-28.12	peak
2	2390.000	39.86	4.34	44.20	74.00	-29.80	peak



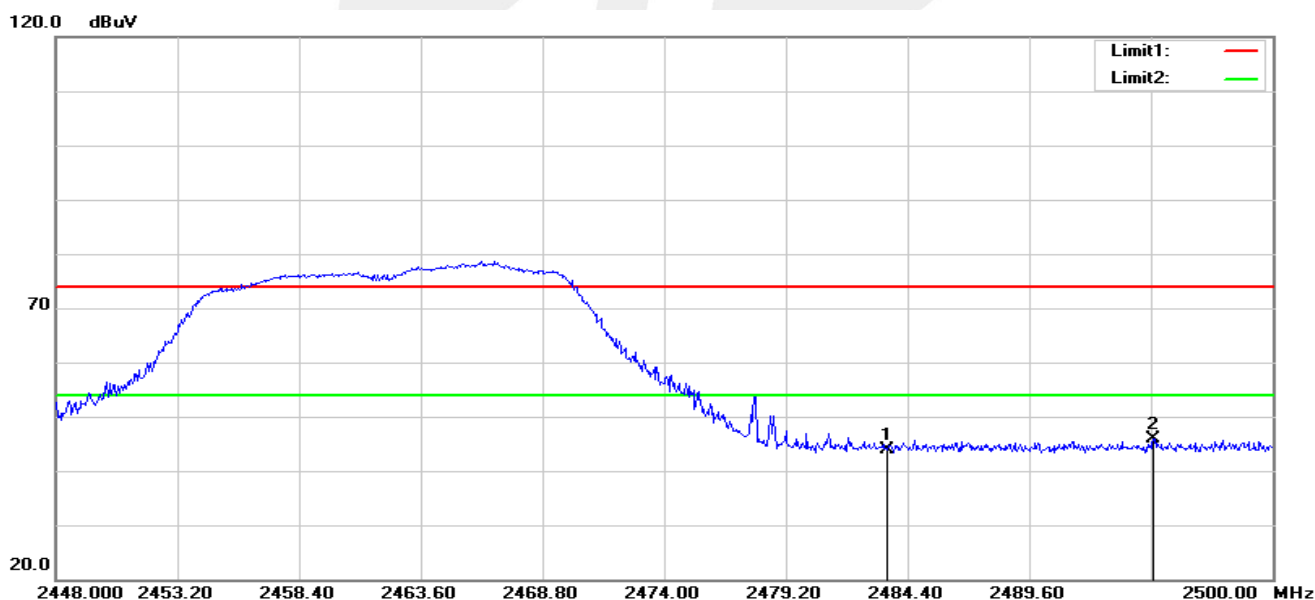
802.11 g-High

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2483.500	39.69	4.60	44.29	74.00	-29.71	peak
2	2497.660	41.72	4.64	46.36	74.00	-27.64	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2483.500	39.28	4.60	43.88	74.00	-30.12	peak
2	2494.904	41.26	4.63	45.89	74.00	-28.11	peak

Note: 802.11b, 802.11g, 802.11n (HT-20), 802.11n (HT-40), all have been tested the antenna A, antenna B and antenna A+B, the worst case is 802.11 g of the antenna B.

4.CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d) and RSS-247 Issue 2, 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.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

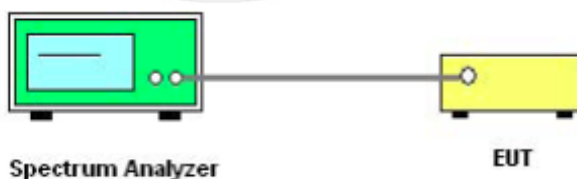
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 to 2432 MHz Upper Band Edge: 2442 to 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the Battery, is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



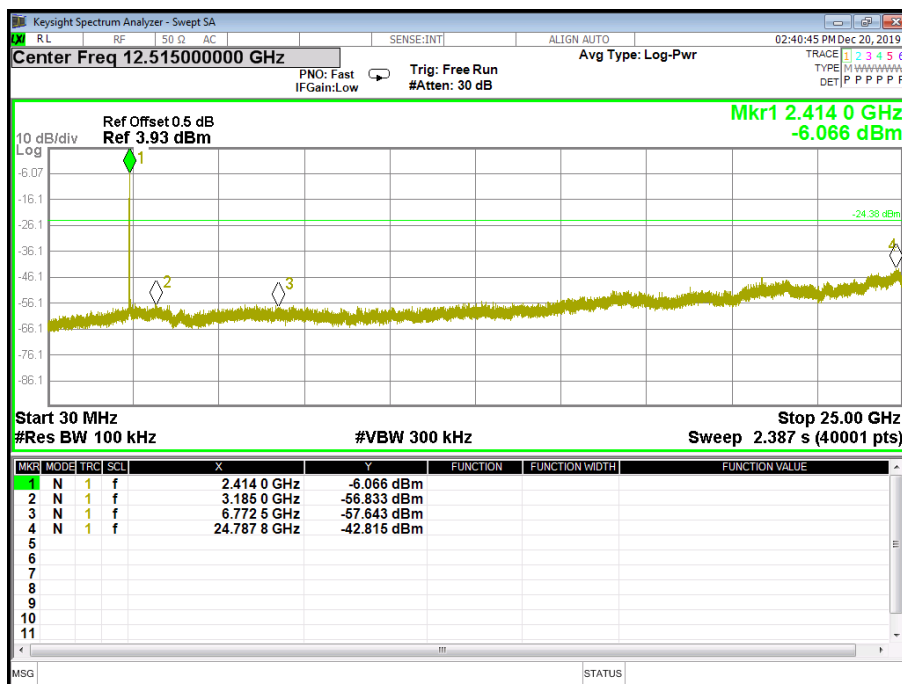
4.6 TEST RESULTS

Note: Antenna B Power > Antenna A Power, Both antenna A and B have been test, Only show the worst data of Antenna B

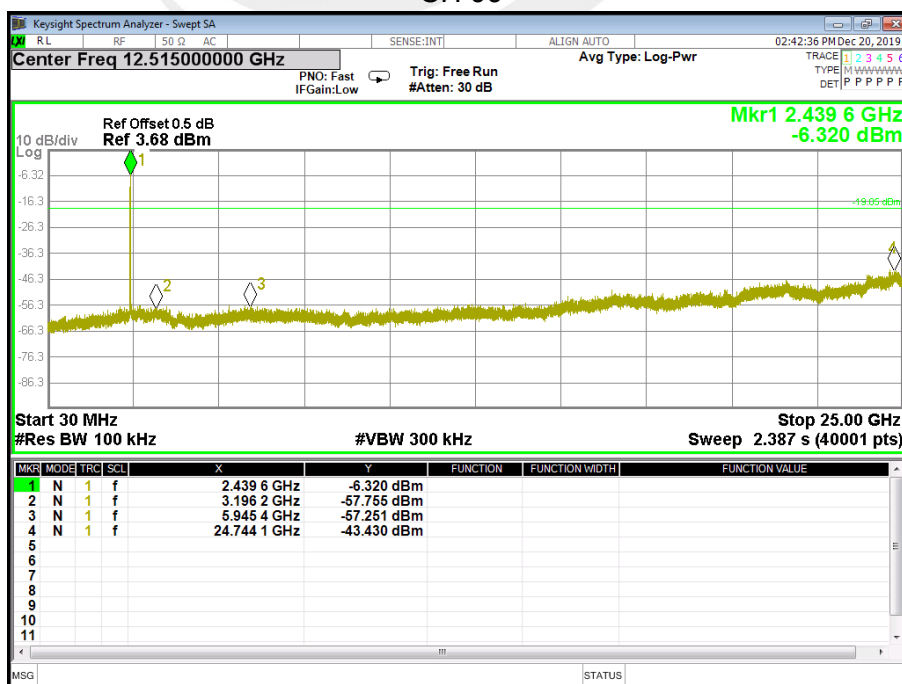
Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX b Mode /CH01, CH06, CH11

Antenna B

CH 01

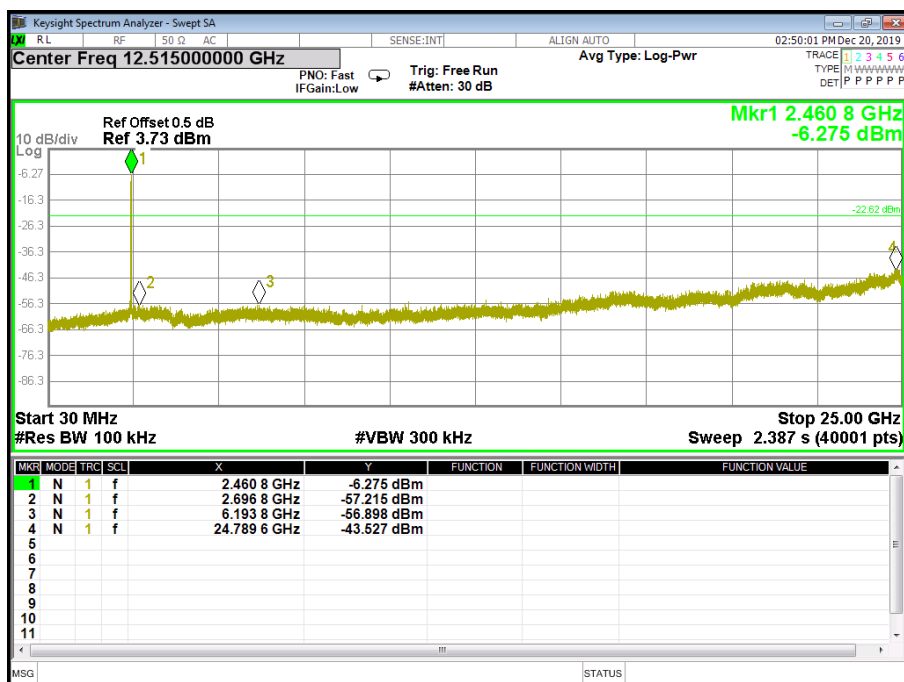


CH 06





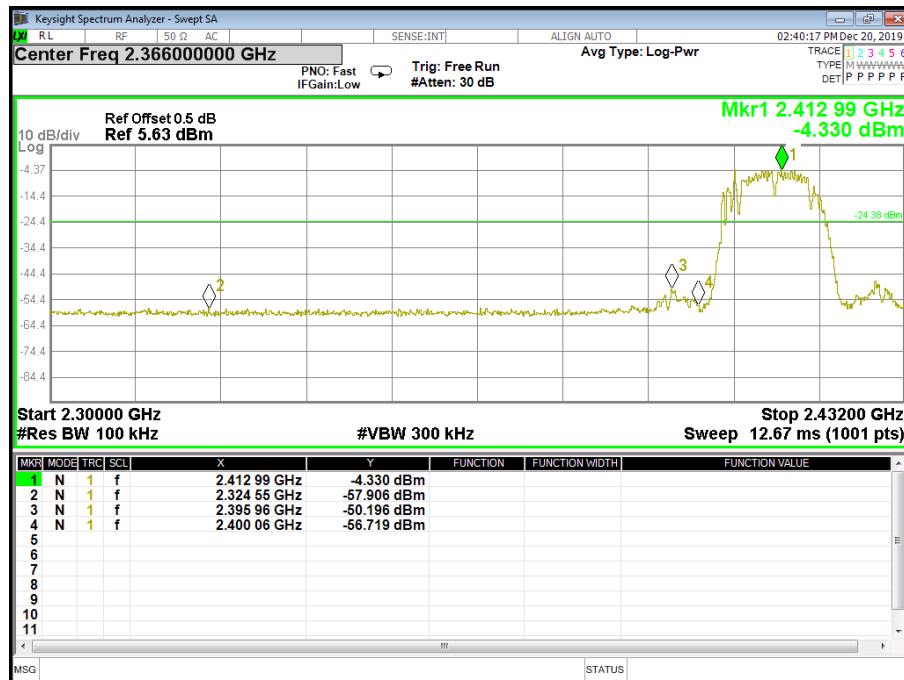
CH 11



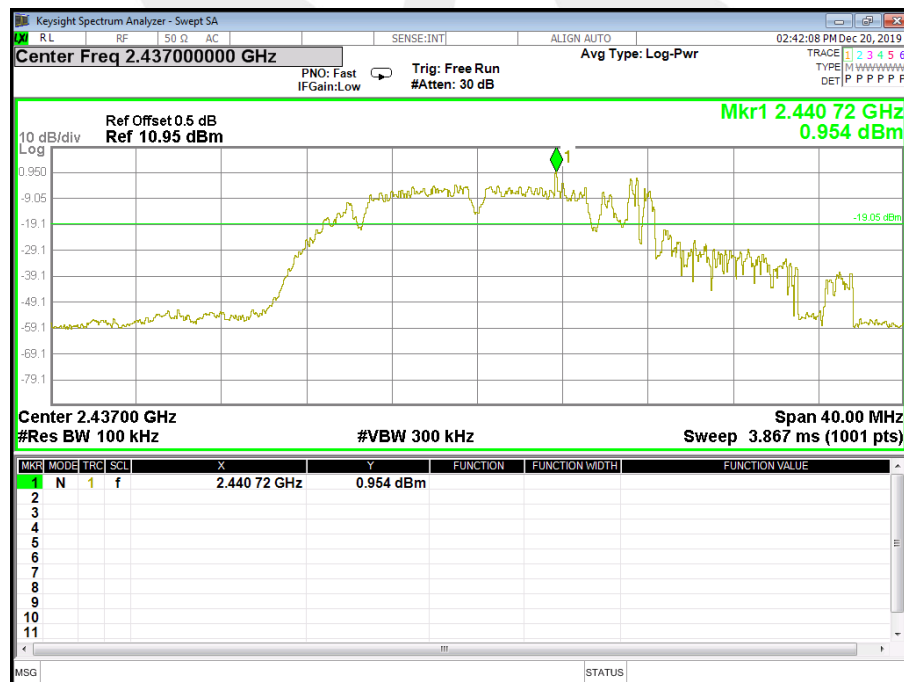


Band edge(it's also the reference level for conducted spurious emission)

CH 01

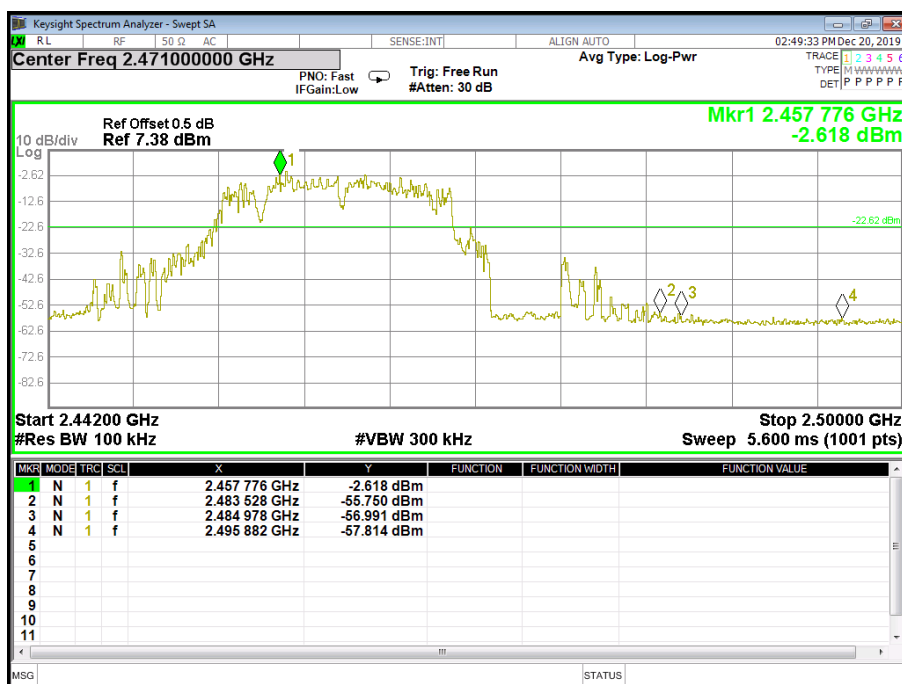


CH 06





CH 11

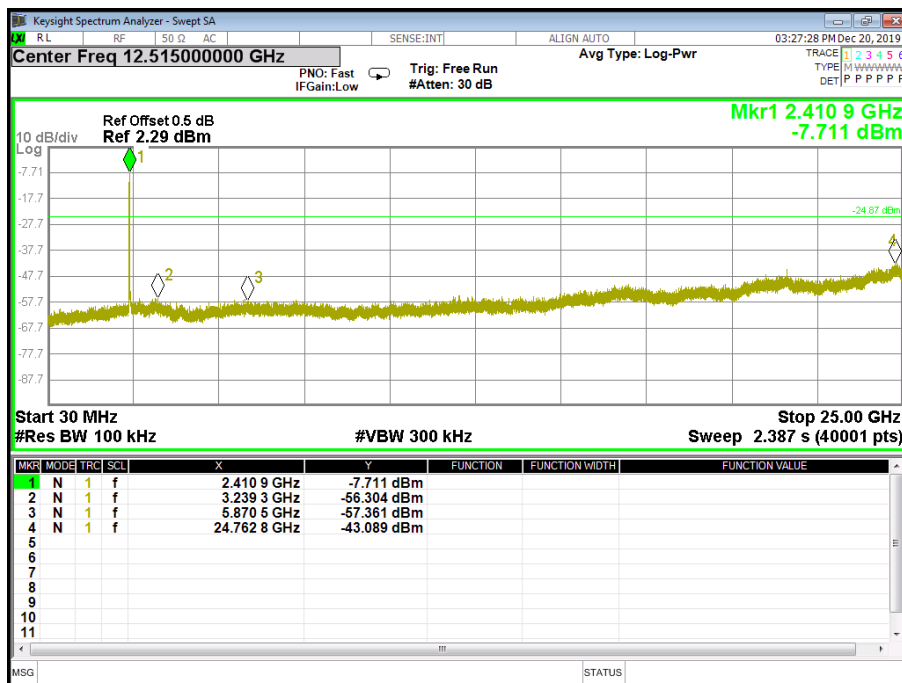




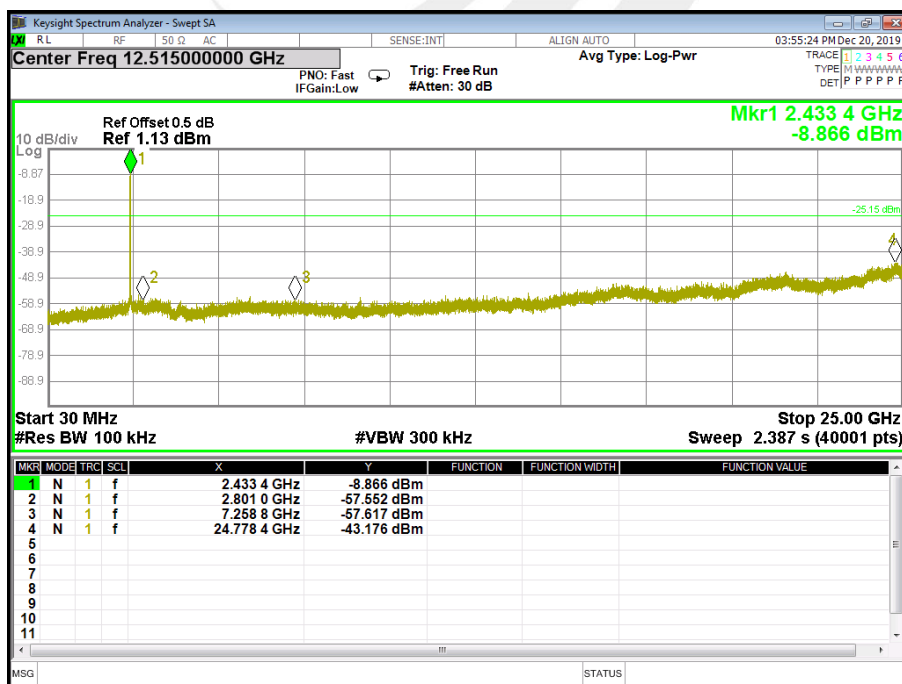
Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX g Mode /CH01, CH06, CH11

Antenna B

CH 01

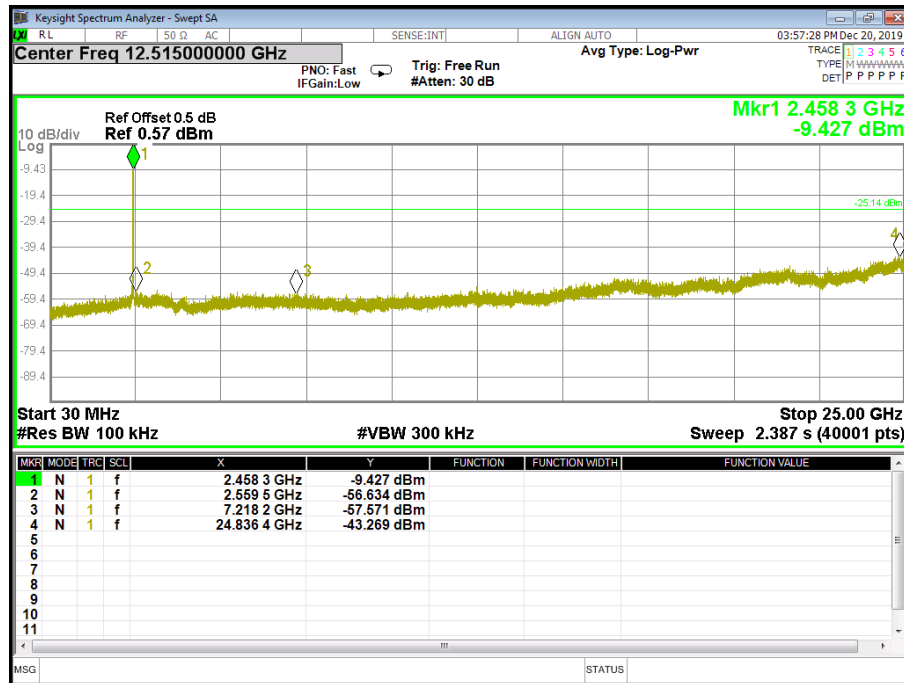


CH06





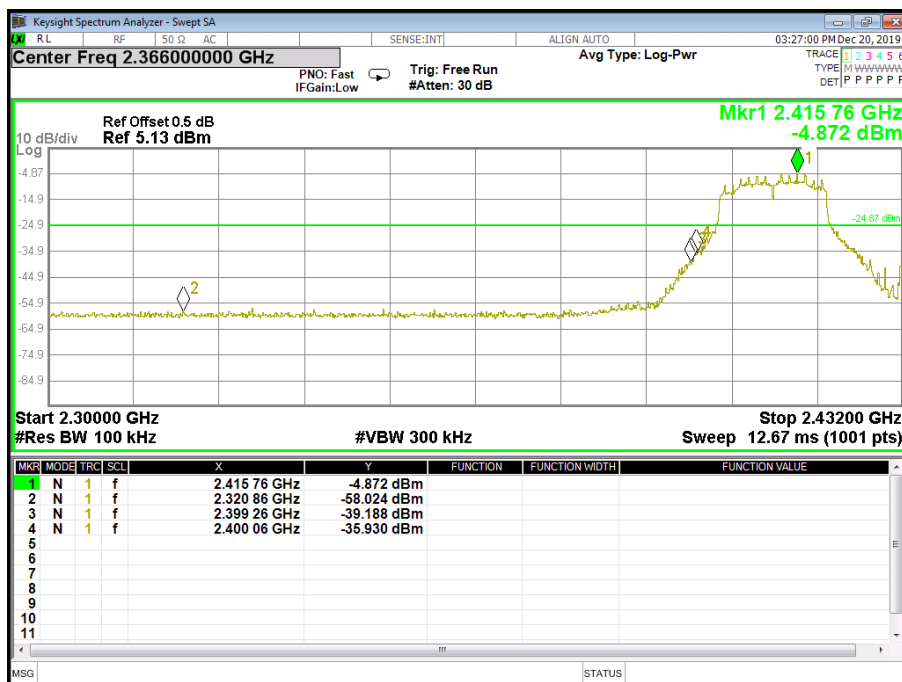
CH 11



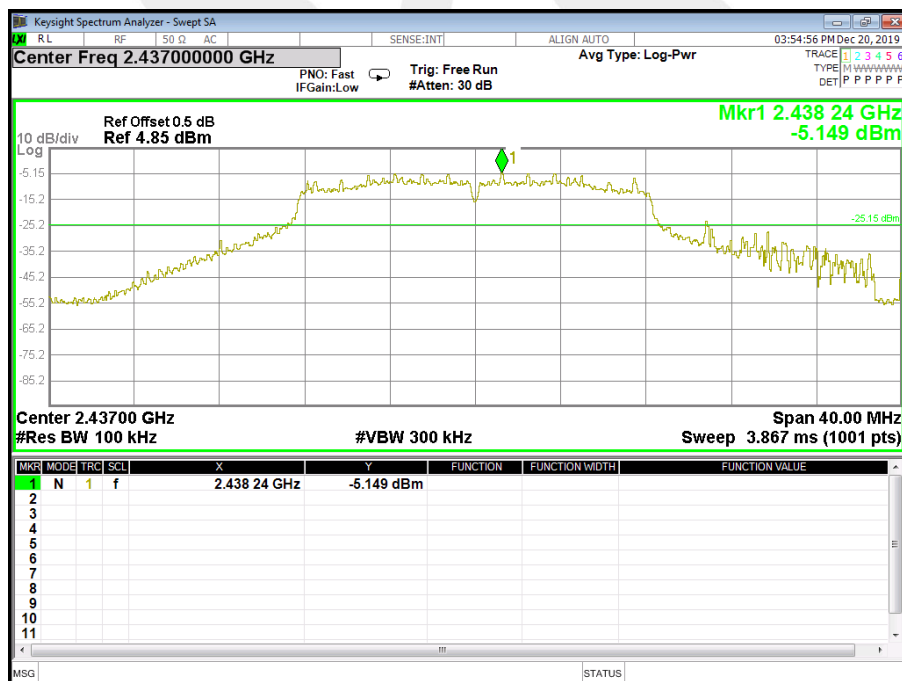


Band edge(it's also the reference level for conducted spurious emission)

CH 01

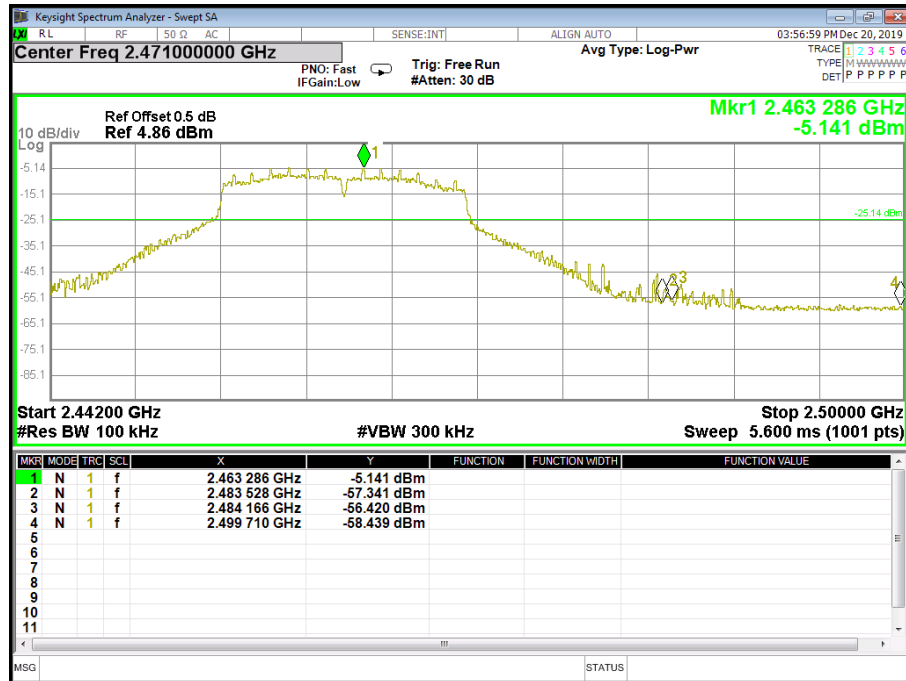


CH06





CH11

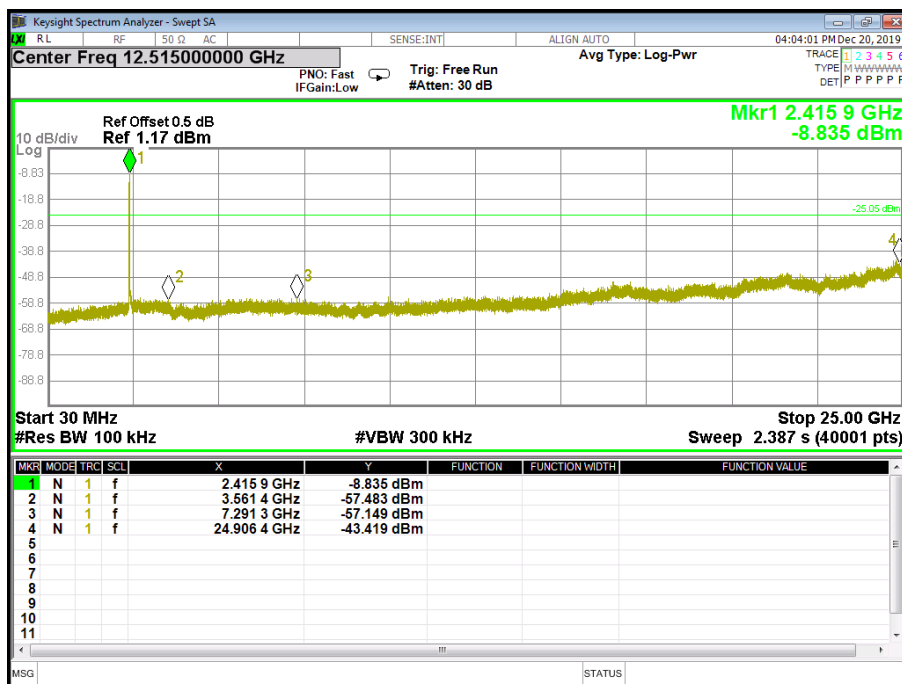




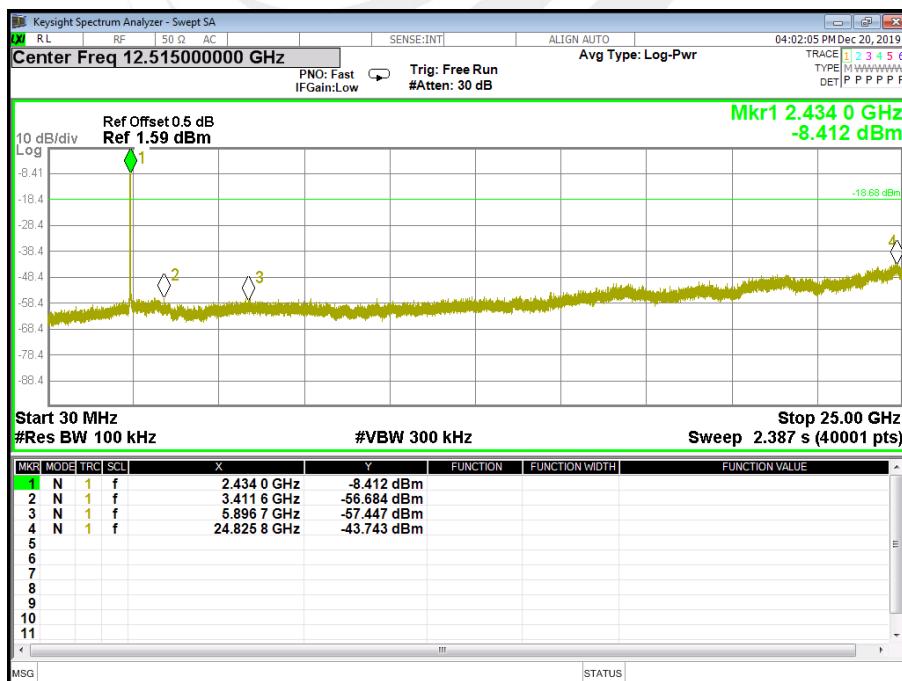
Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

Antenna B

CH 01

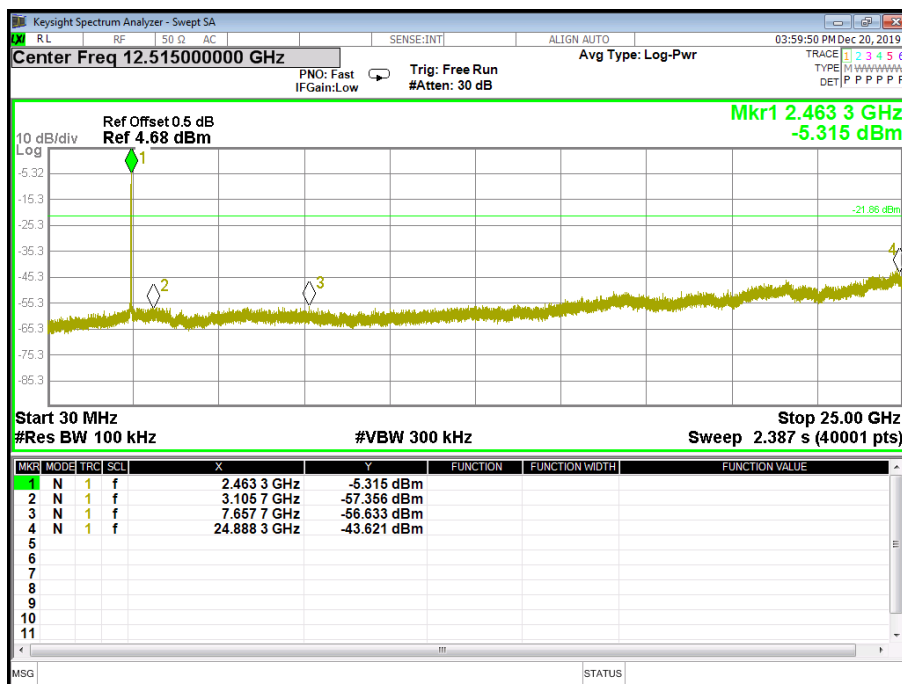


CH 06





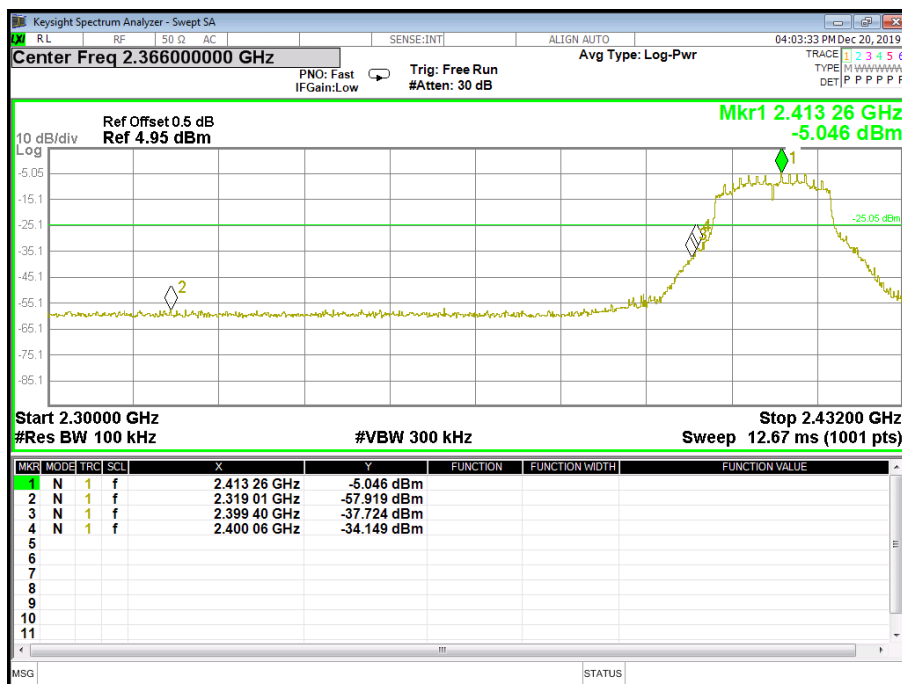
CH 11





Band edge(it's also the reference level for conducted spurious emission)

CH 01

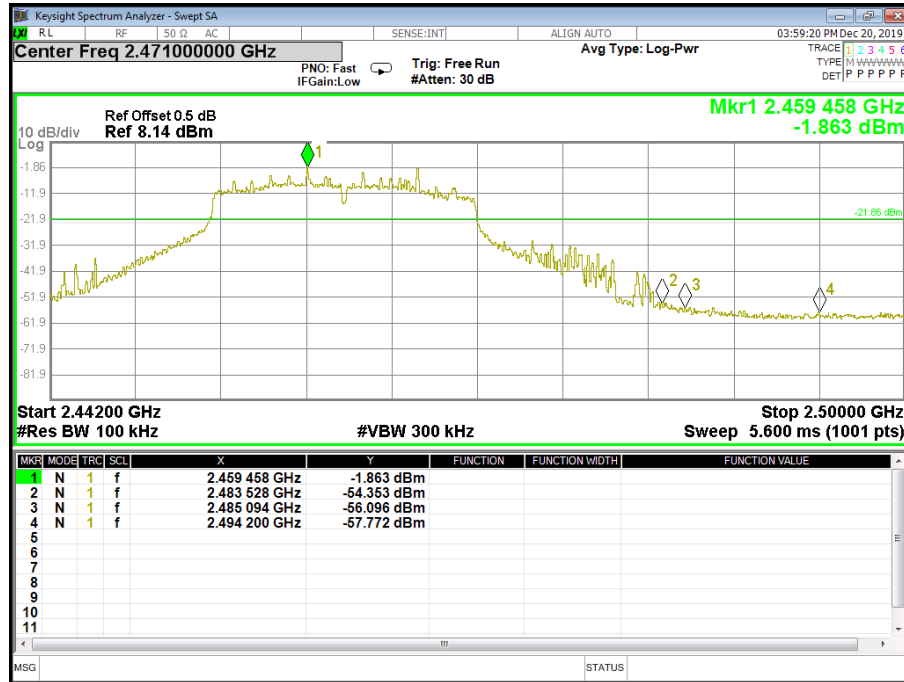


CH 06





CH 11

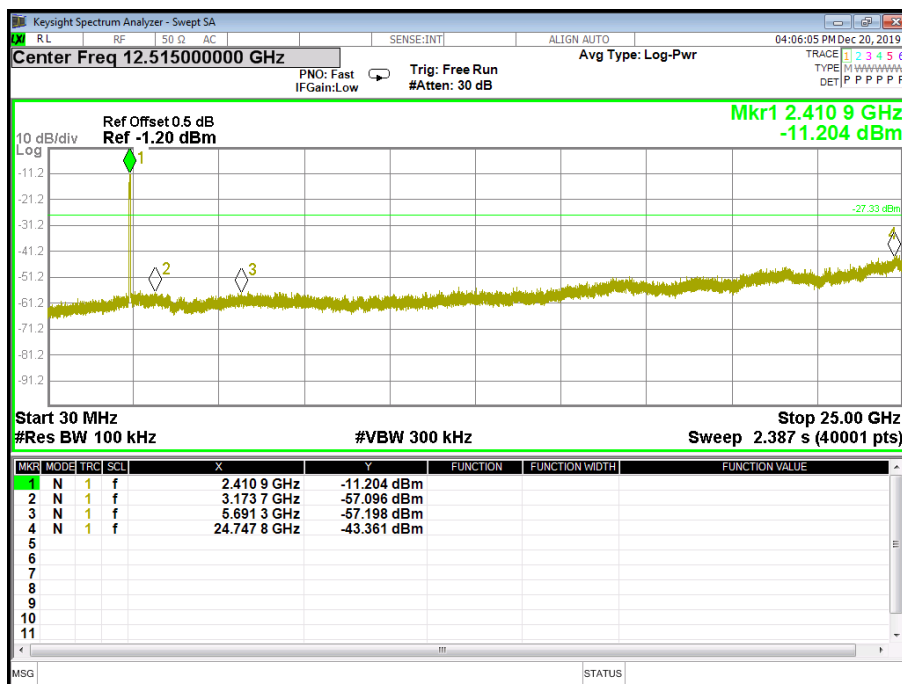




Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(40M) /CH03, CH06, CH09

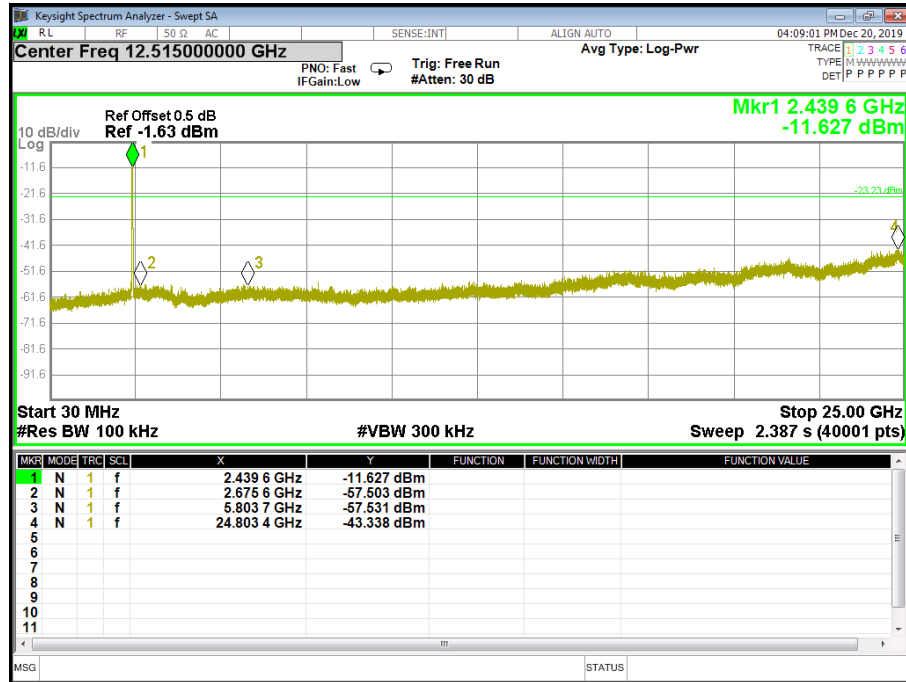
Antenna B

CH 03

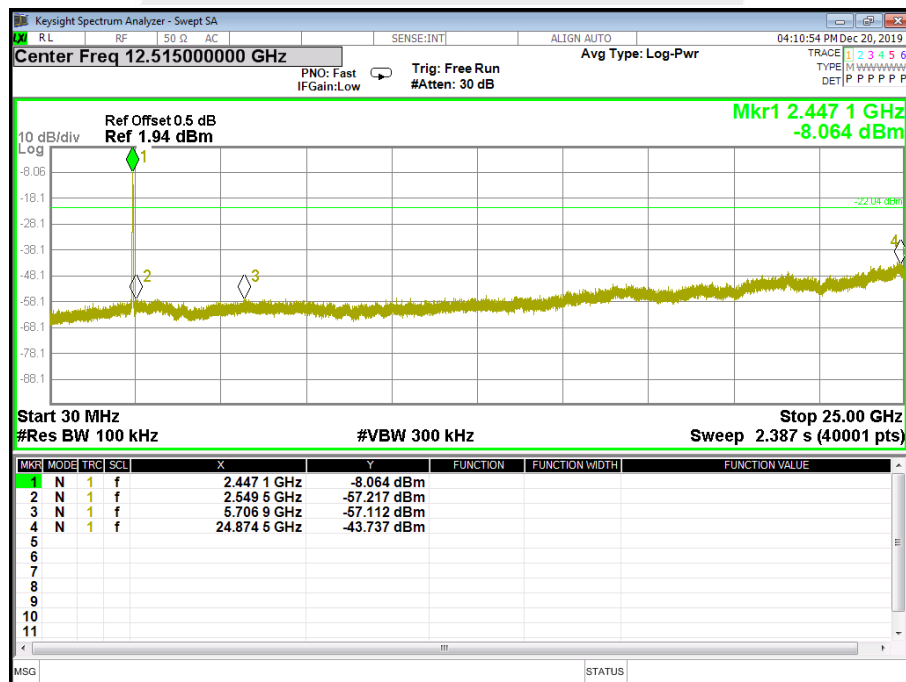




CH06



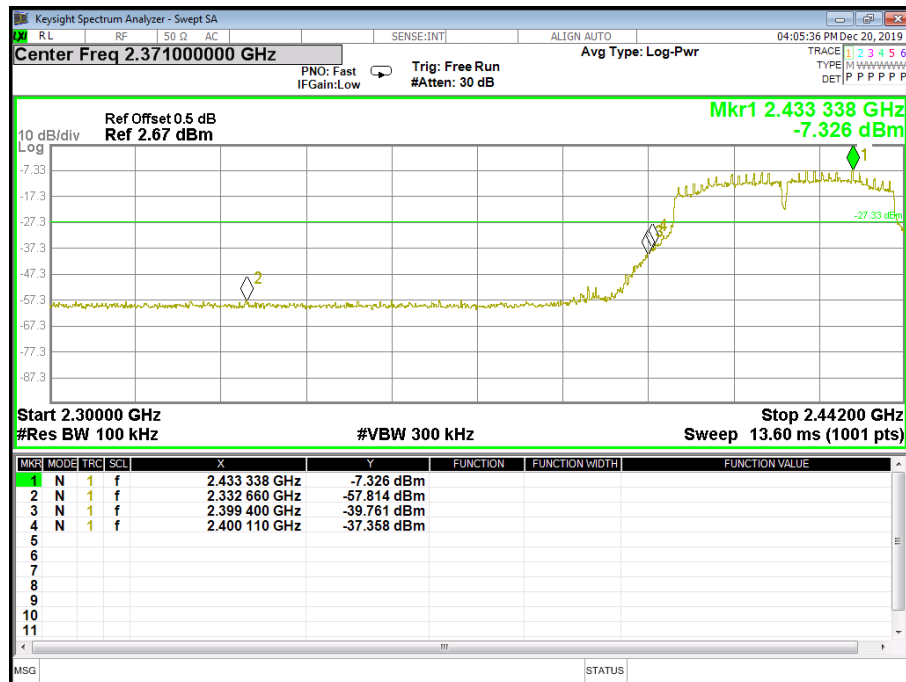
CH09



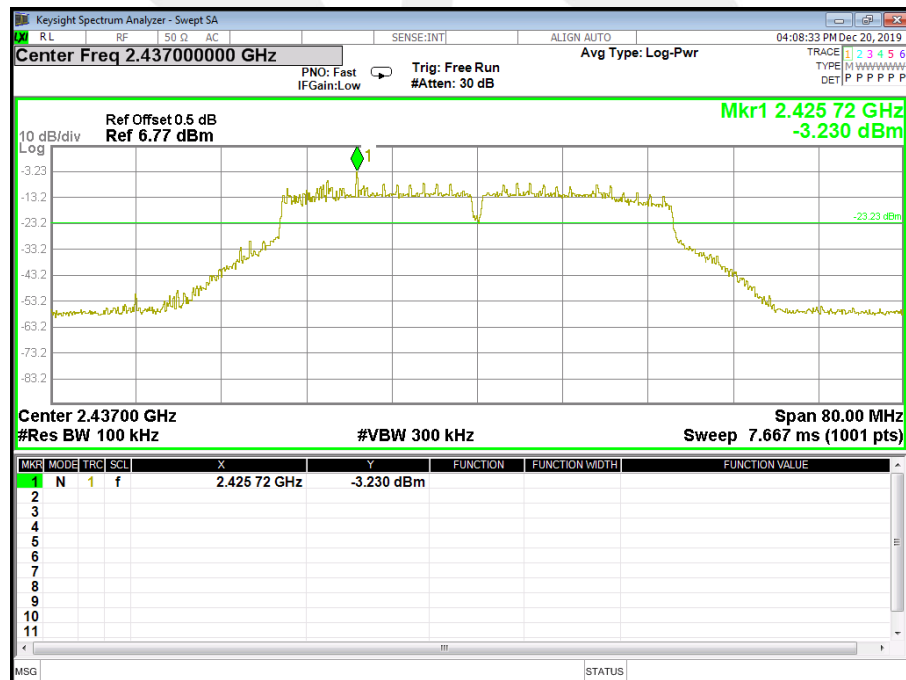


Band edge(it's also the reference level for conducted spurious emission)

CH03

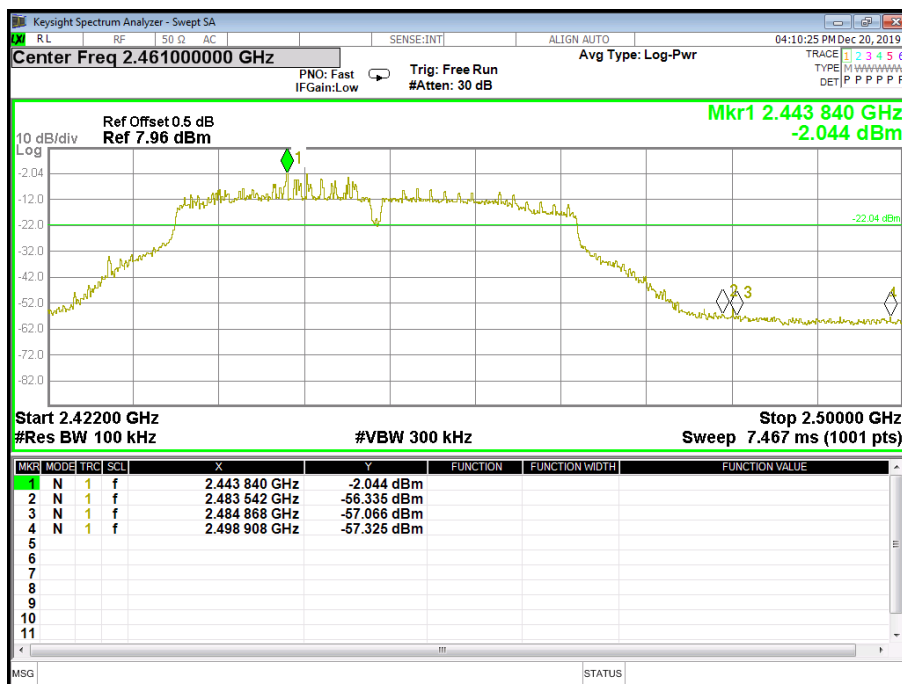


CH 06





CH 09





5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

FCC Part15.247 , Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e) RSS-247 Issue 2	Power Spectral Density	≤ 8 dBm (RBW ≥ 3 KHz)	2400-2483.5	PASS

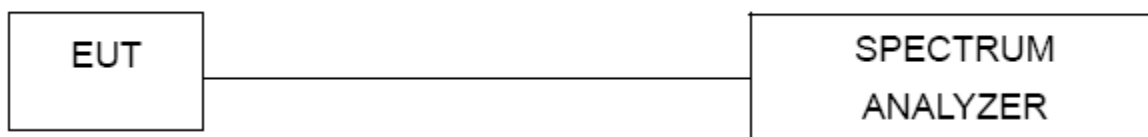
5.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the $100 \text{ kHz} \geq \text{RBW} \geq 3 \text{ kHz}$.
4. Set the $\text{VBW} \geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



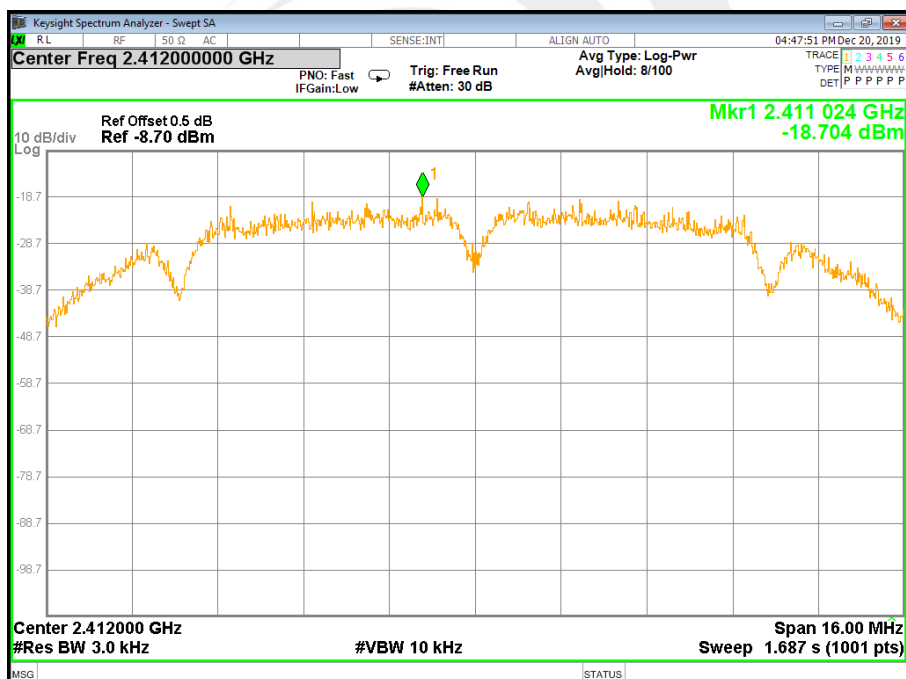
5.6 TEST RESULTS

Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX b Mode /CH01, CH06, CH11

Frequency	Power Density			Limit (dBm)	Result
	ANT A (dBm)	ANT B (dBm)	TOTAL (dBm)		
2412	-18.70	-18.53	--	8	PASS
2437	-19.13	-18.57	--	8	PASS
2462	-19.01	-17.31	--	8	PASS

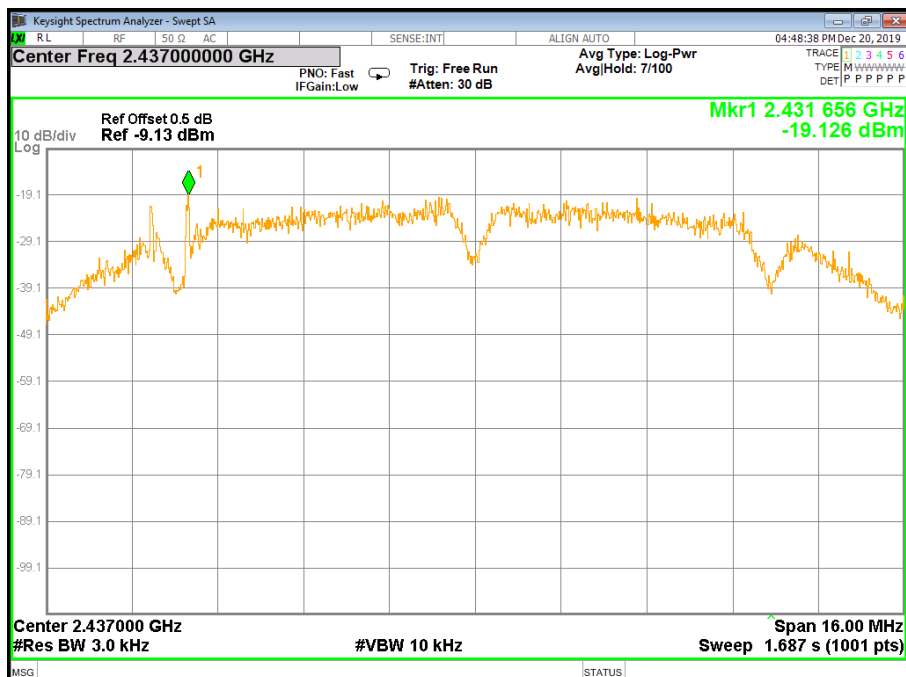
Test plots for Ant A

TX CH01

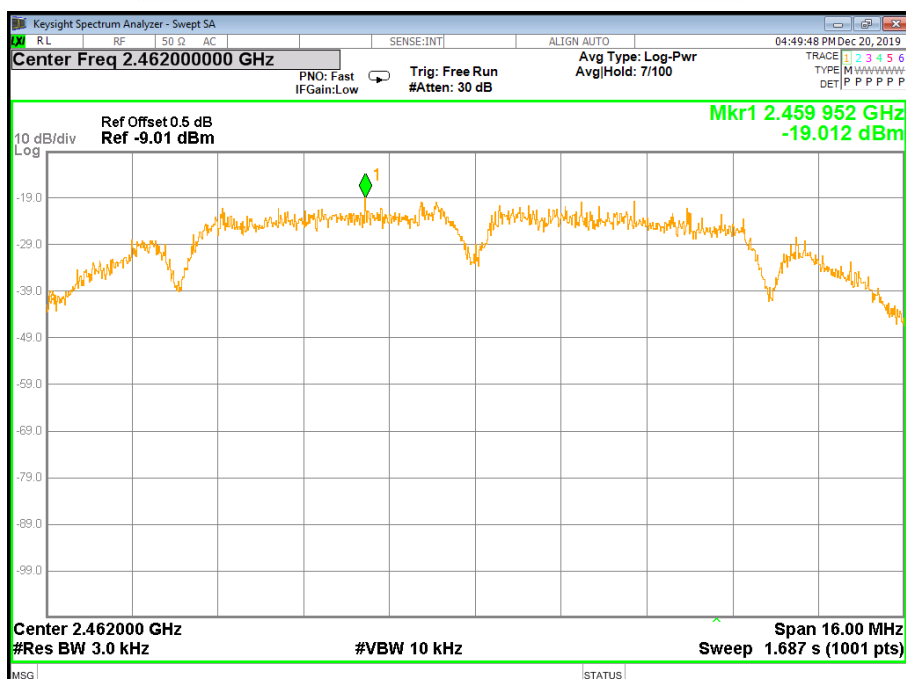




TX CH06



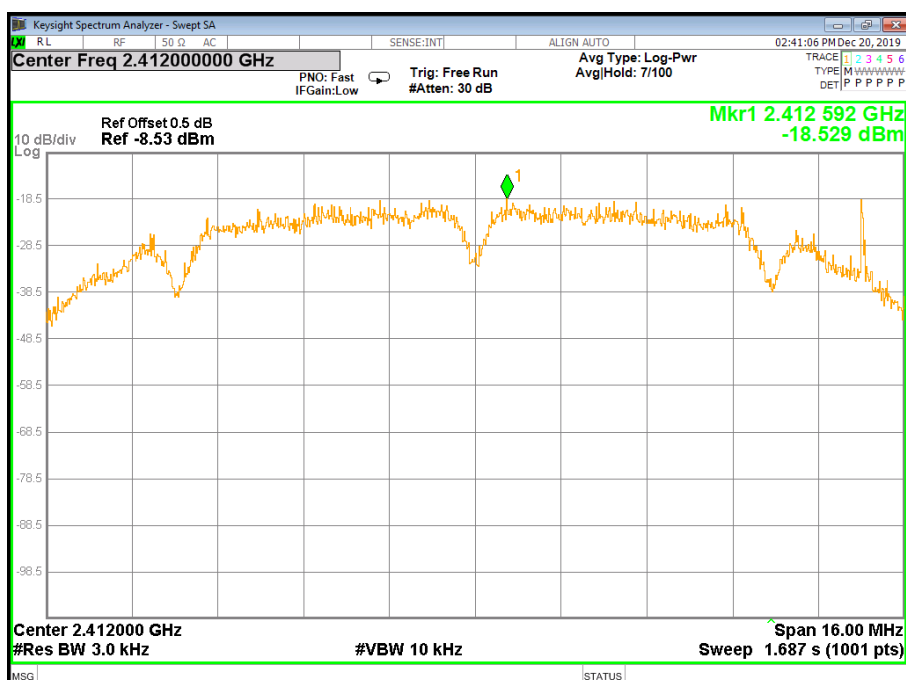
TX CH11



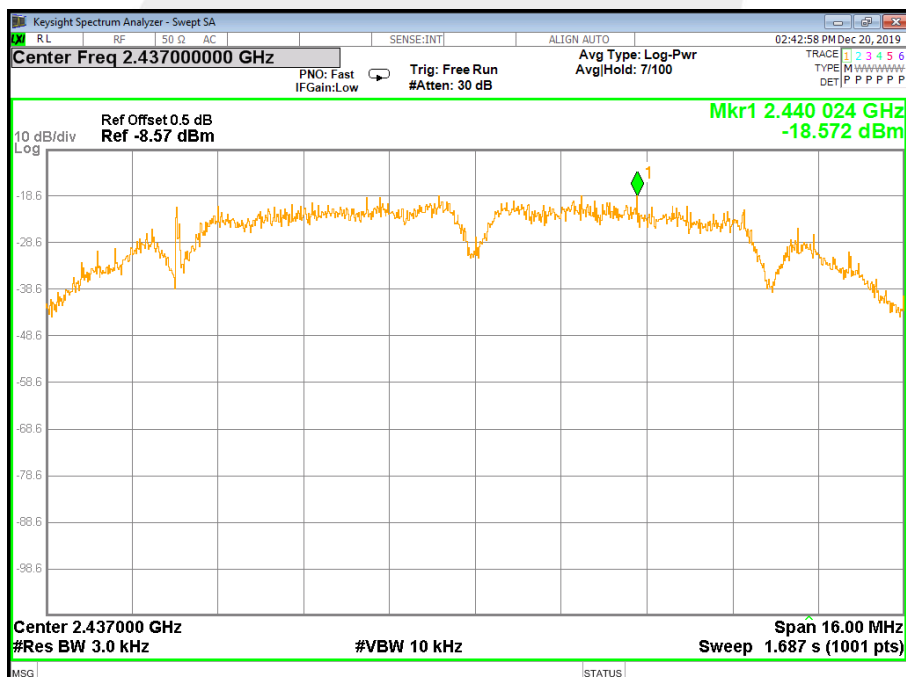


Test plots for Ant B

TX CH01

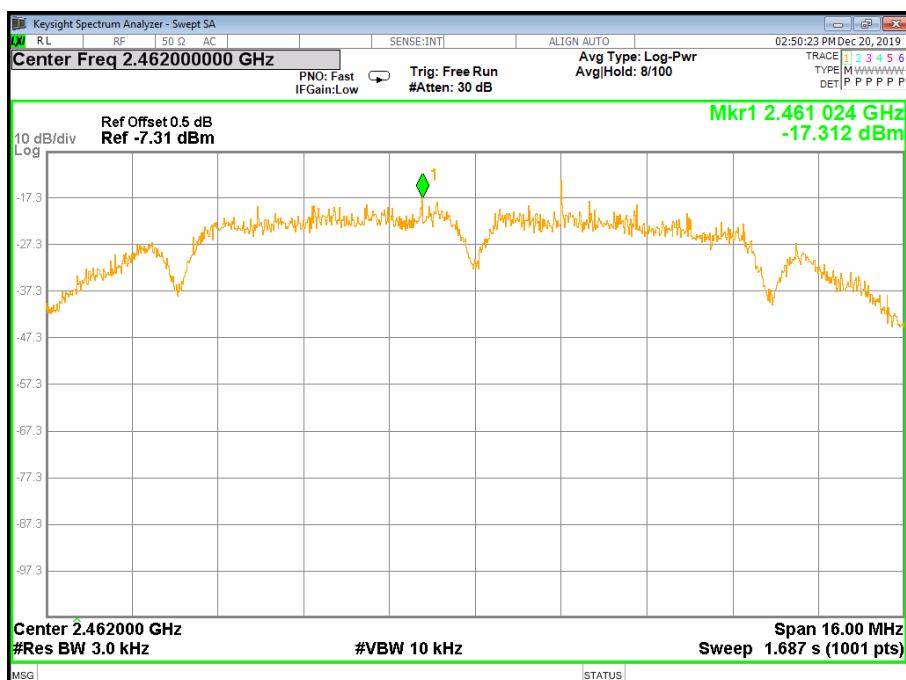


TX CH06





TX CH11



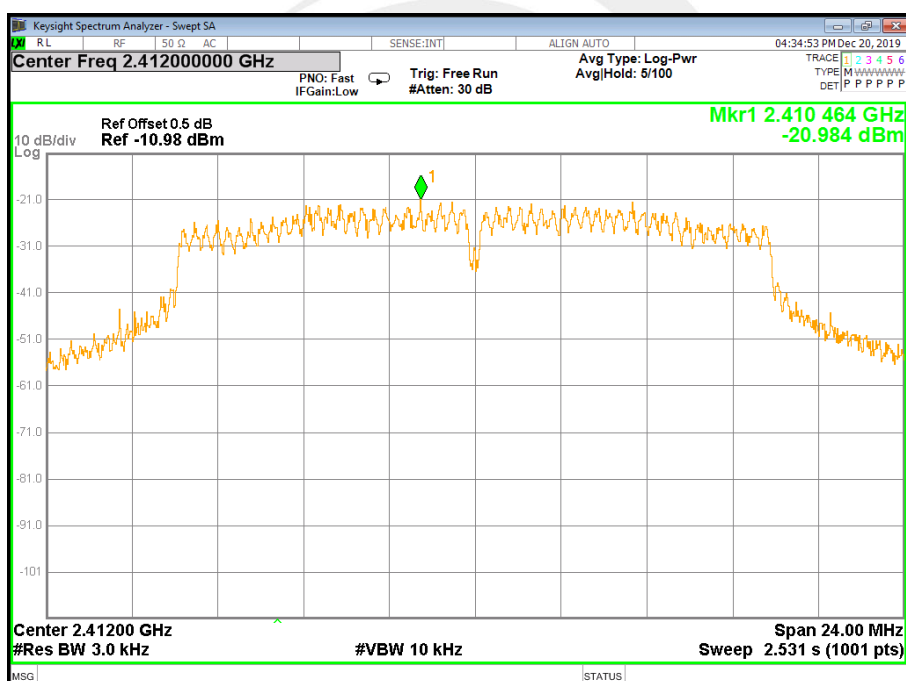


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX g Mode /CH01, CH06, CH11

Frequency	Power Density			Limit	Result
	ANT A (dBm)	ANT B (dBm)	TOTAL (dBm)	(dBm)	
2412	-20.98	-16.56	--	8	PASS
2437	-20.25	-19.81	--	8	PASS
2462	-20.34	-14.93	--	8	PASS

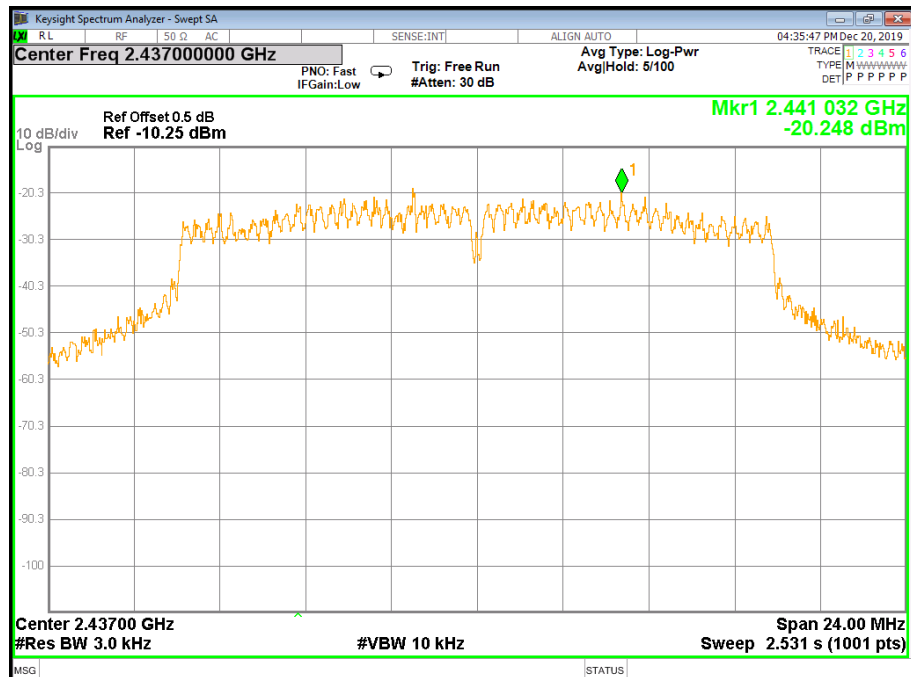
Test plots for Ant A

TX CH01

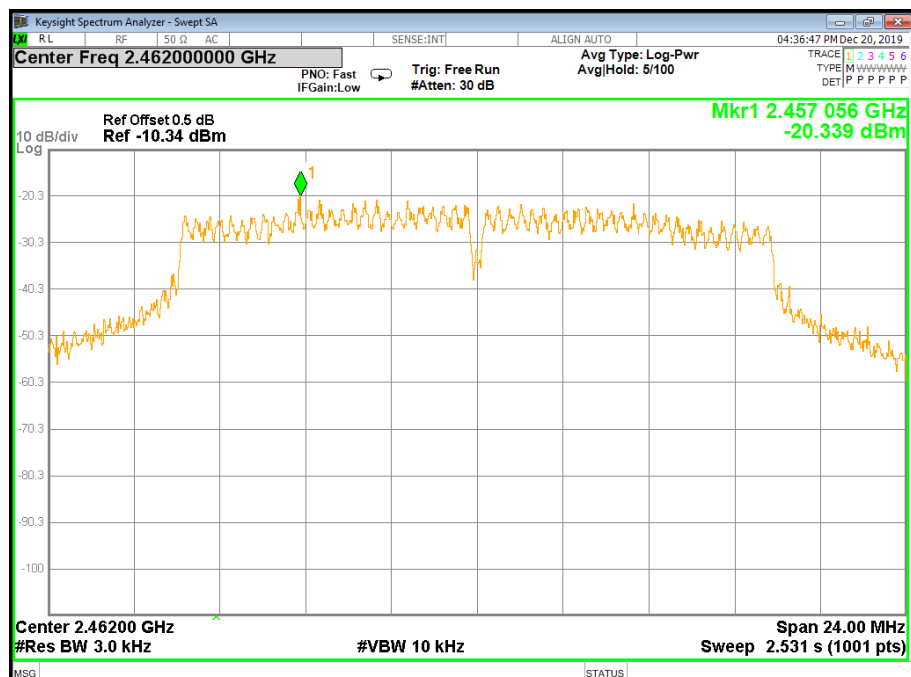




TX CH06



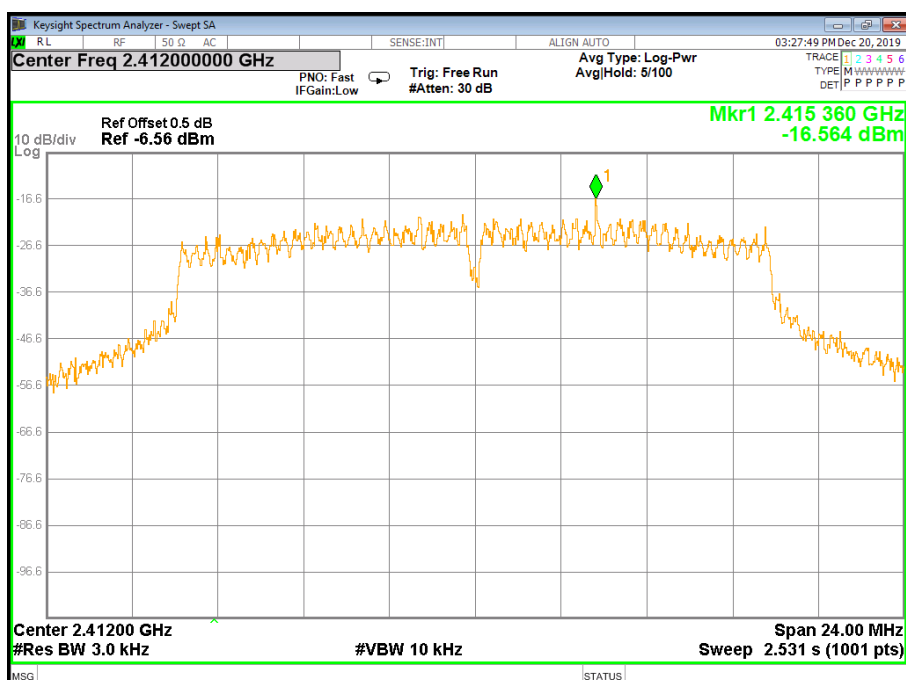
TX CH11



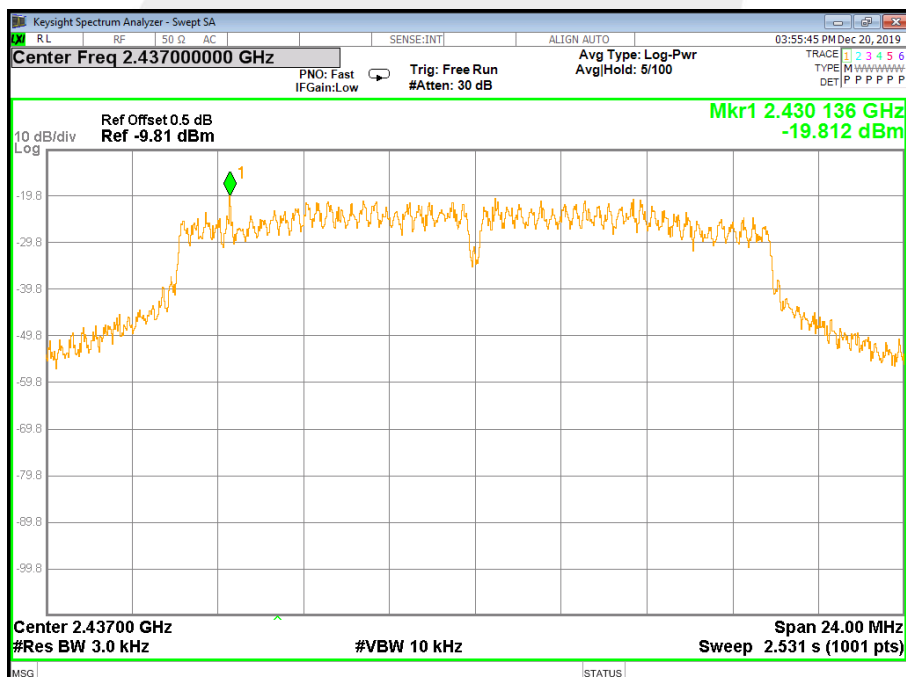


Test plots for Ant B

TX CH01

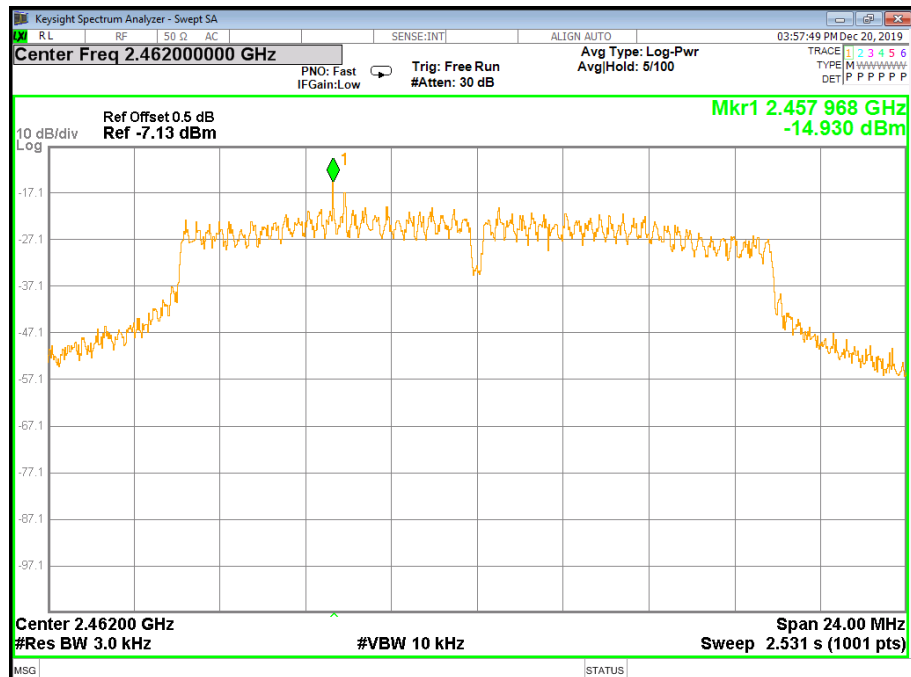


TX CH06





TX CH11

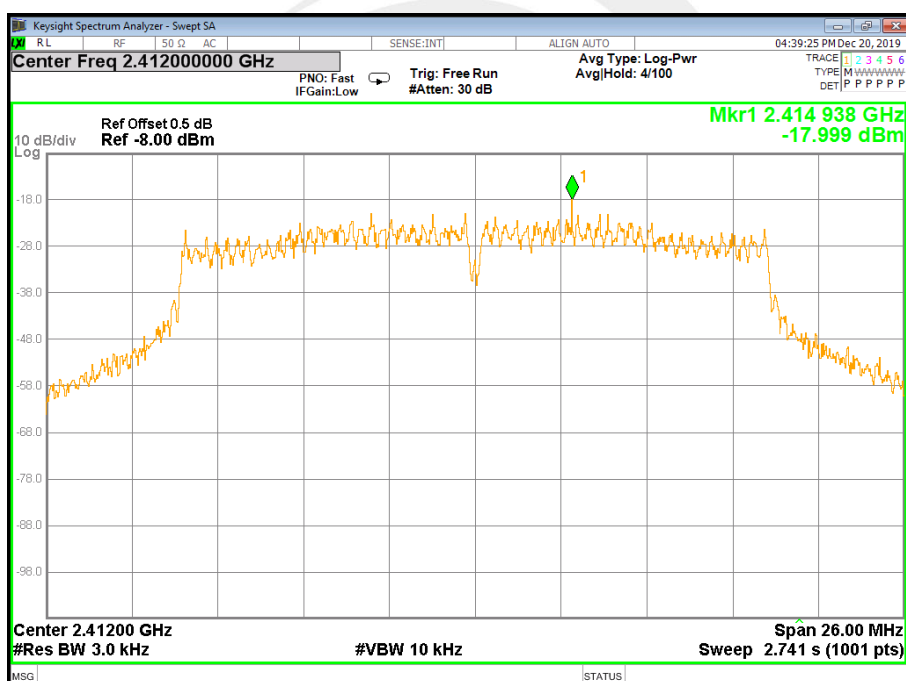


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

Frequency	Power Density			Limit	Result
	ANT A (dBm)	ANT B (dBm)	TOTAL (dBm)	(dBm)	
2412	-18.00	-15.04	-13.26	8	PASS
2437	-20.91	-11.19	-10.75	8	PASS
2462	-21.48	-19.63	-17.45	8	PASS

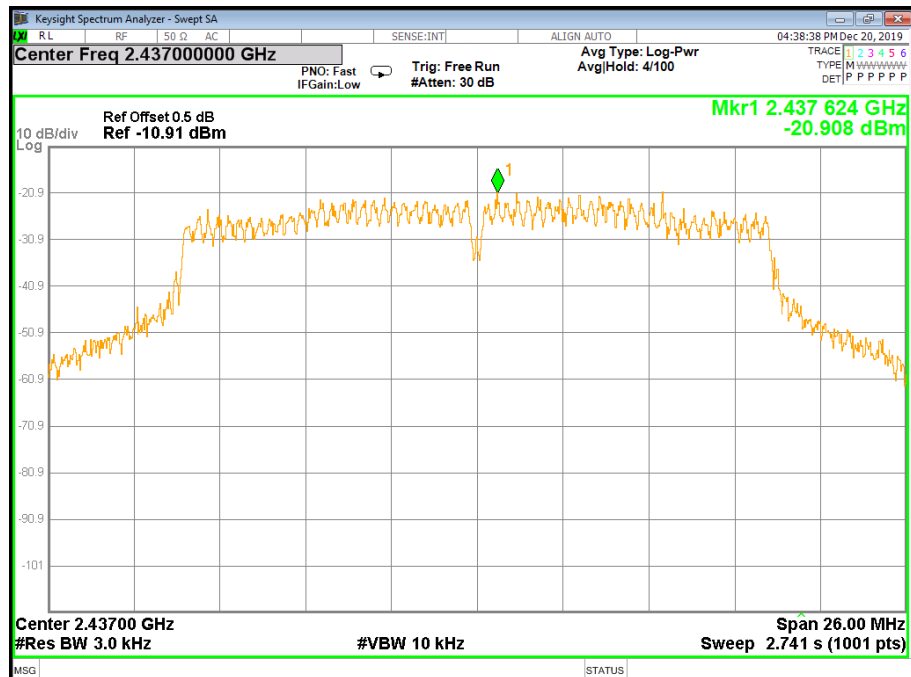
Test plots for Ant A

TX CH01

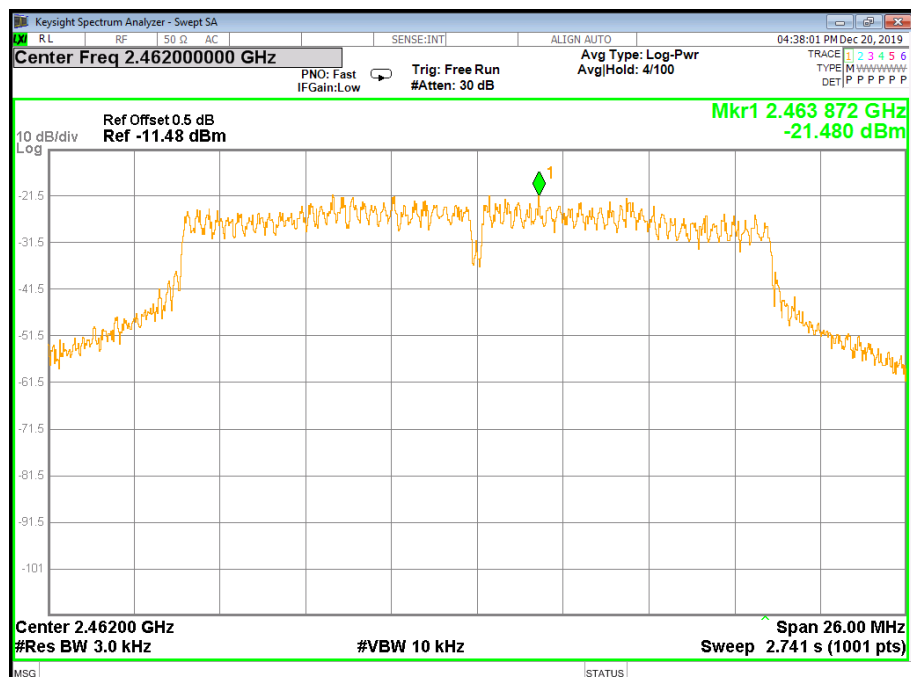




TX CH06



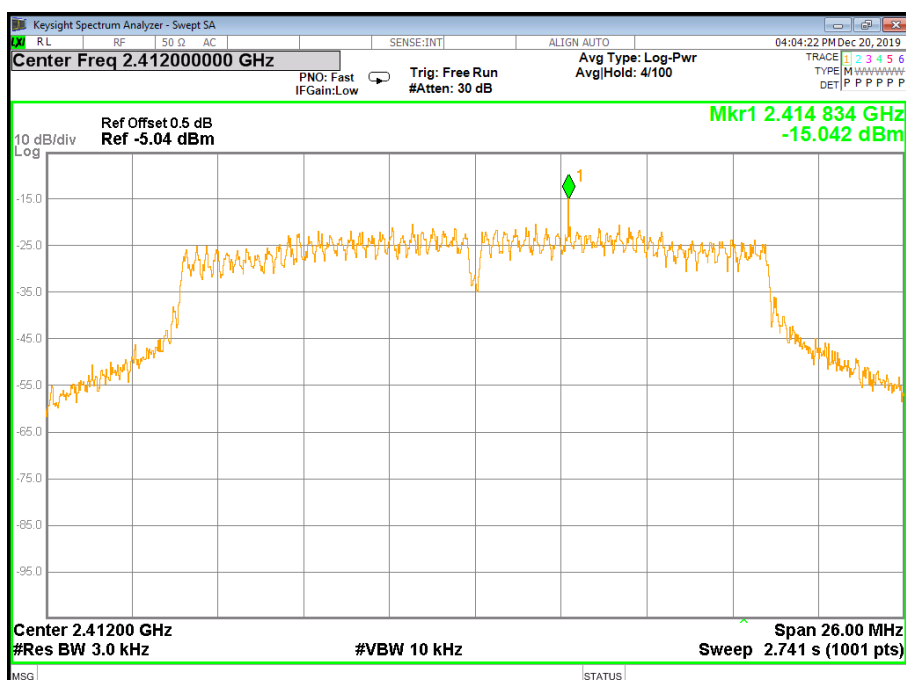
TX CH11



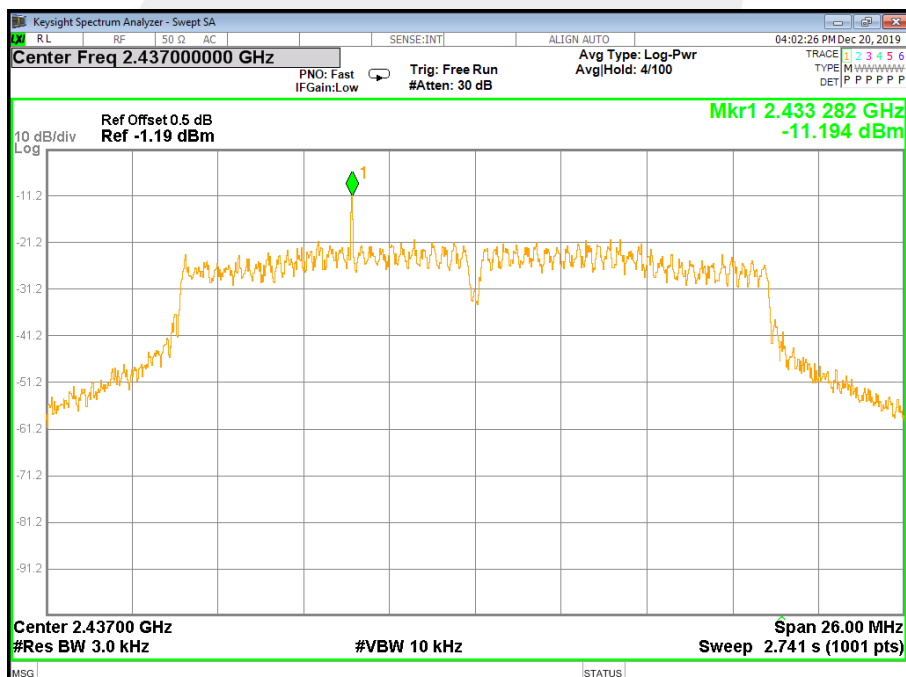


Test plots for Ant B

TX CH01

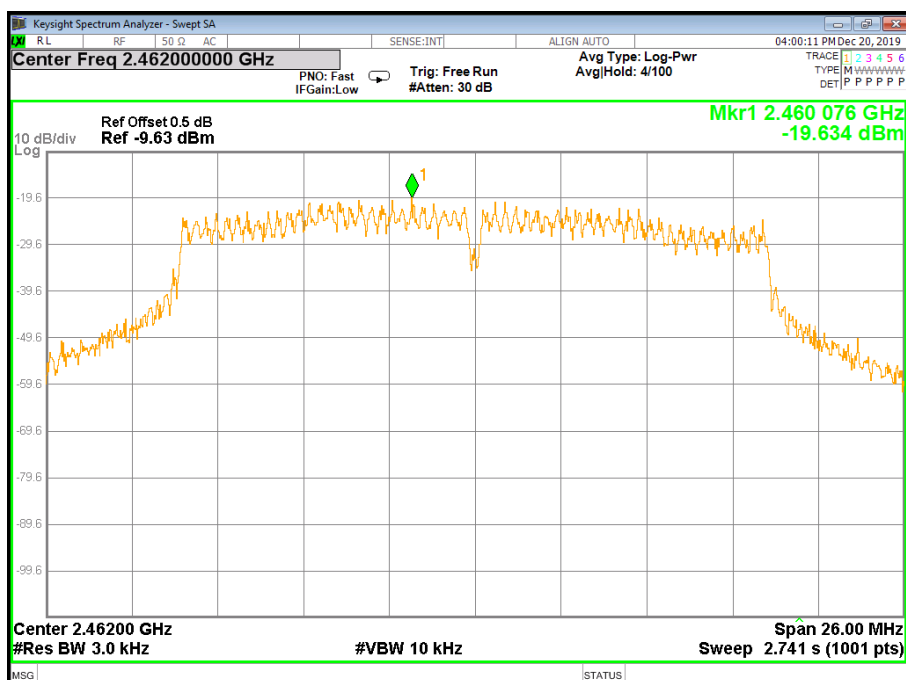


TX CH06





TX CH11



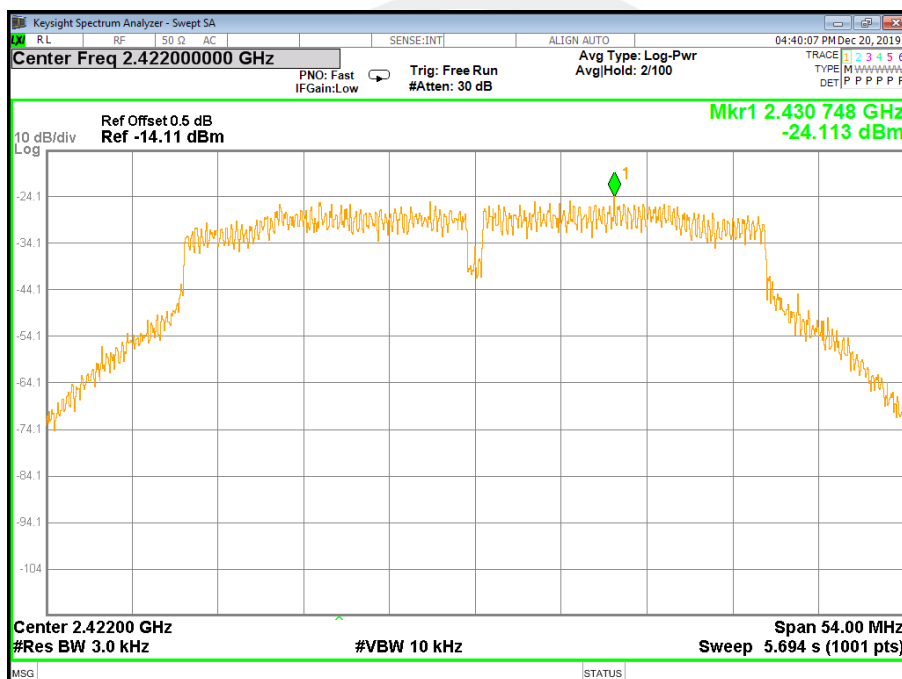


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(40M) /CH03, CH06, CH09

Frequency	Power Density			Limit (dBm)	Result
	ANT A (dBm)	ANT B (dBm)	TOTAL (dBm)		
2422	-24.11	-22.55	-20.25	8	PASS
2437	-24.03	-23.02	-20.48	8	PASS
2452	-23.73	-22.26	-19.92	8	PASS

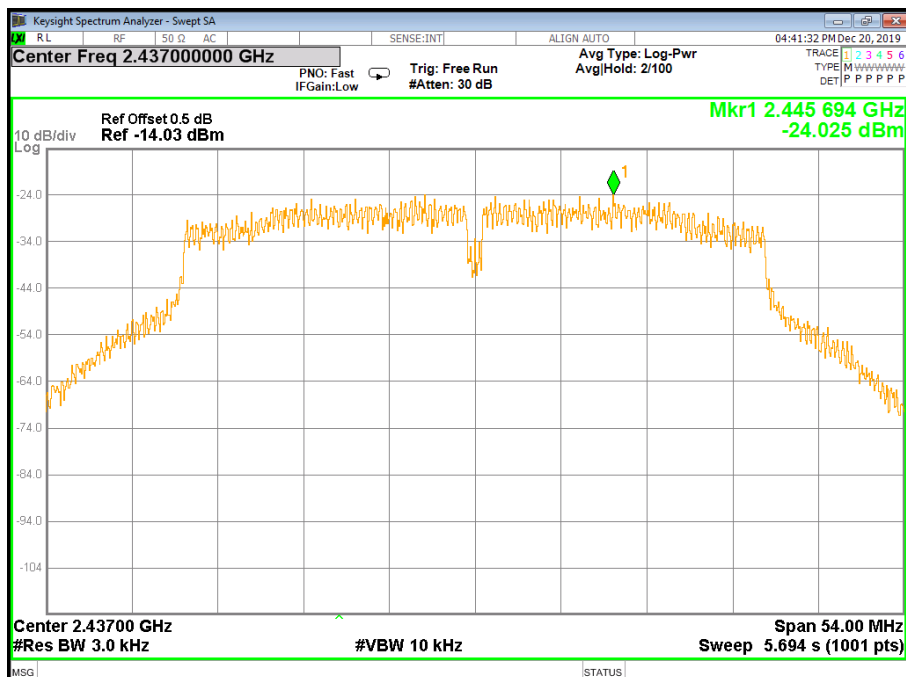
Test plots for Ant A

TX CH03

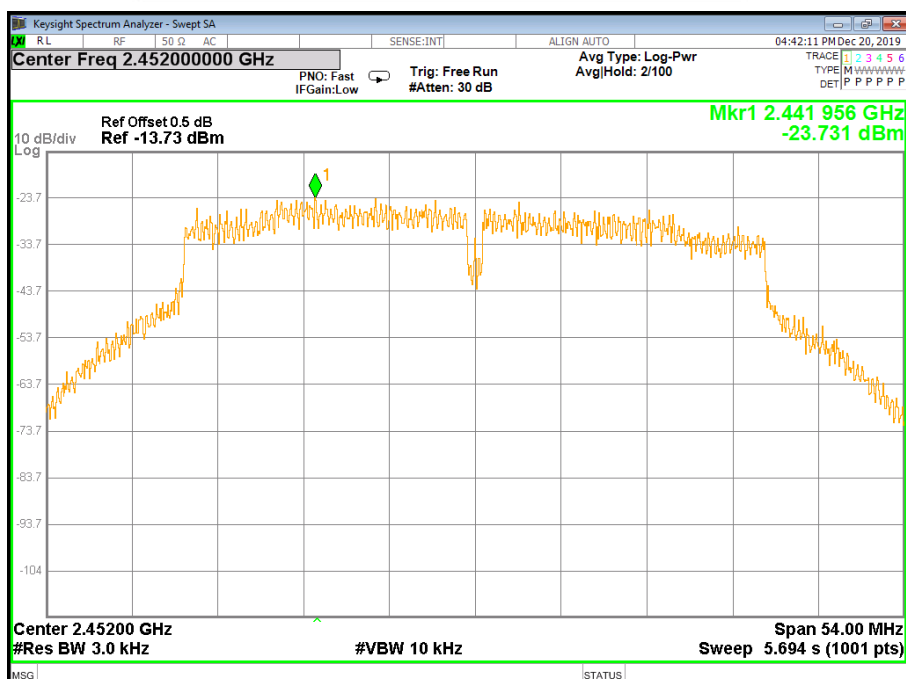




TX CH06



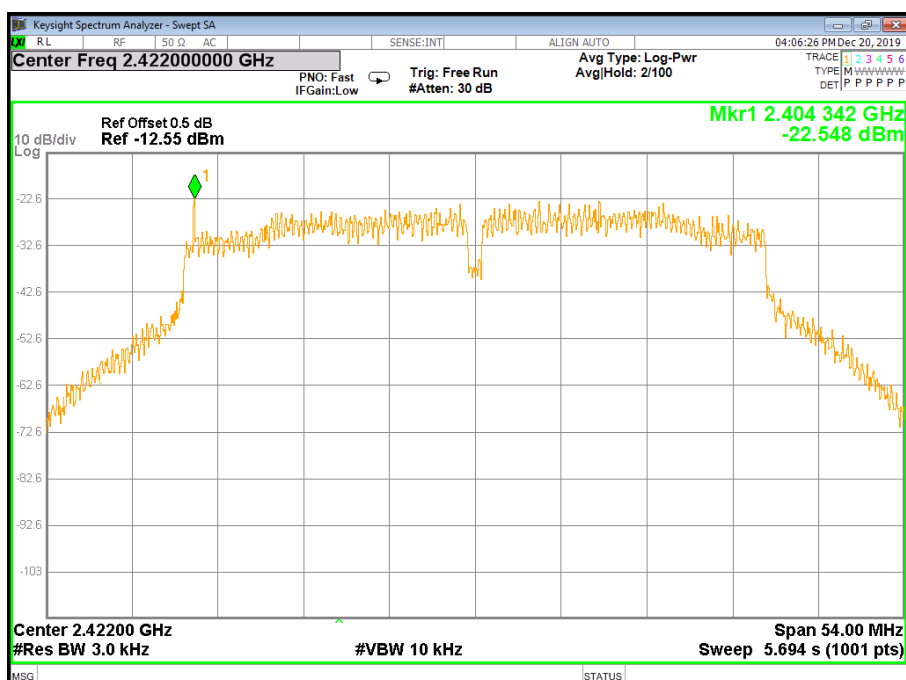
TX CH09



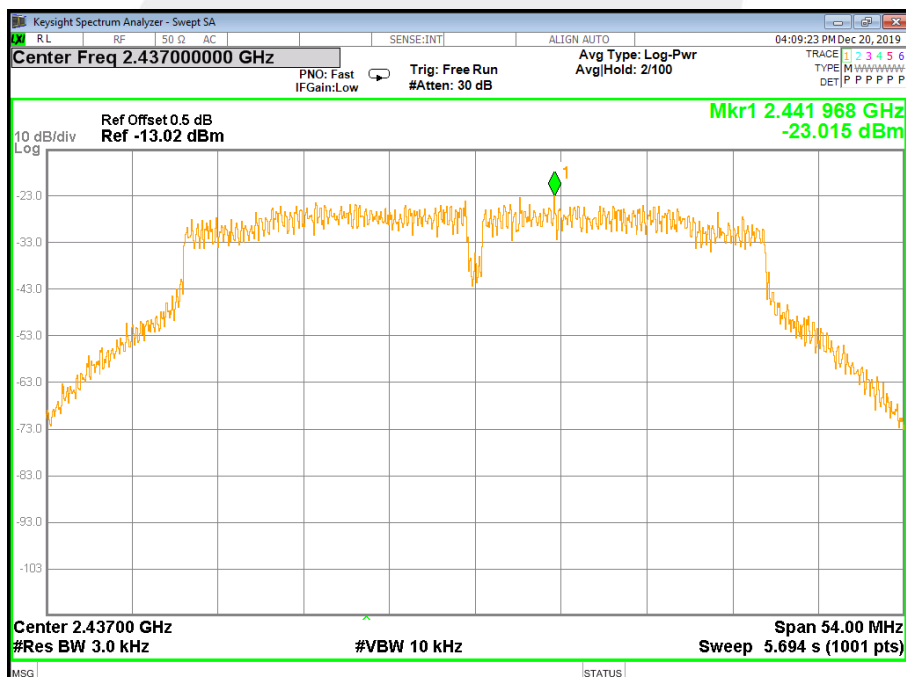


Test plots for Ant B

TX CH03

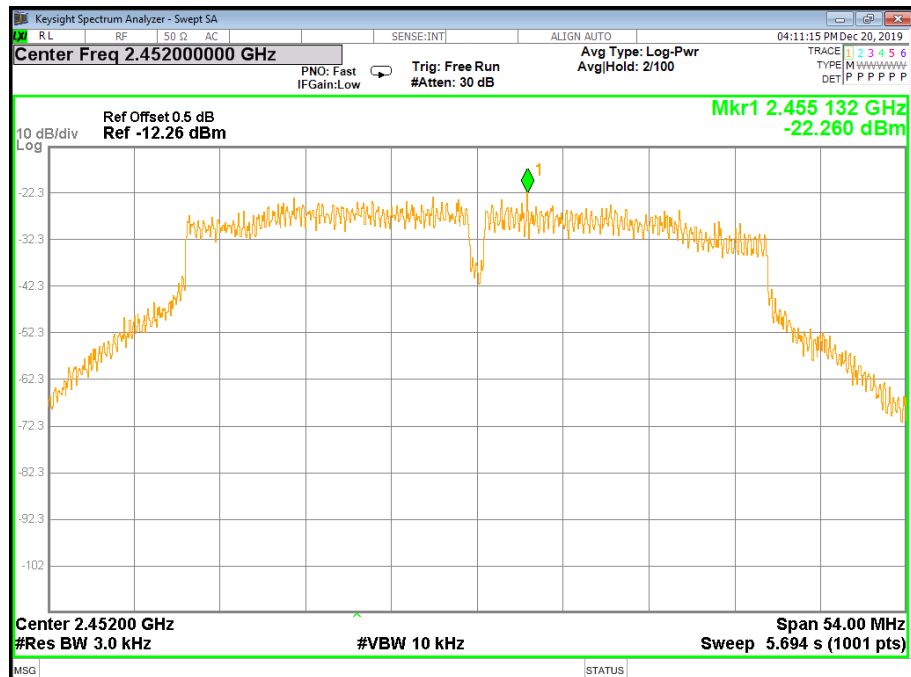


TX CH06





TX CH09





6. BANDWIDTH TEST

6.1 LIMIT

FCC Part15.247,Subpart C RSS-Gen Clause 6.7				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2) RSS-Gen Clause 6.7	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS
RSS-Gen Clause 6.7	99% Bandwidth	For reporting purposes only.	2400-2483.5	PASS

6.2 TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

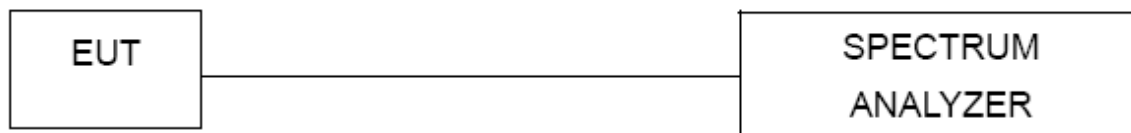
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100KHz For 99% Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : $\geq 3 \times \text{RBW}$ For 99% Bandwidth : approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



6.6 TEST RESULTS

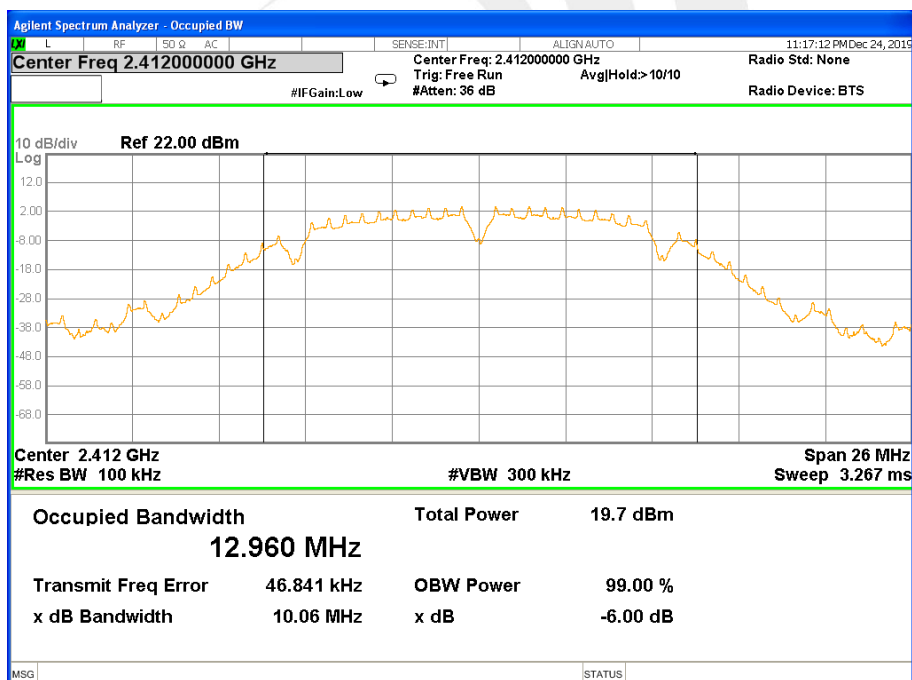
Note: Antenna B Power > Antenna A Power, Both antenna A and B have been test, Only show the worst data of Antenna B

Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX b Mode /CH01, CH06, CH11

Remark: PEAK DETECTOR IS USED

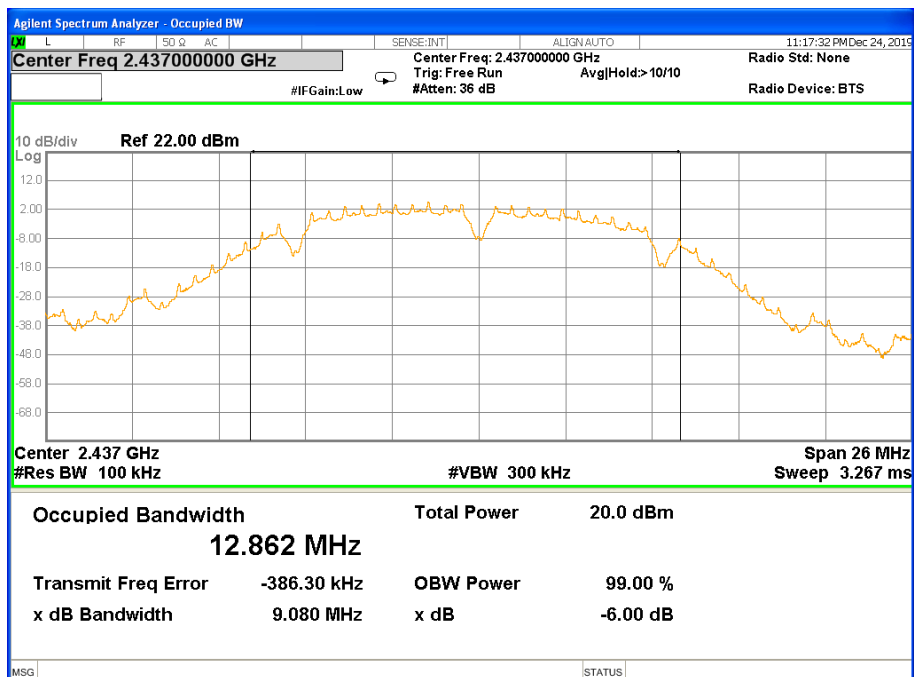
Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (KHz)	Result
2412 MHz	10.060	13.495	≥500KHz	PASS
2437 MHz	9.080	13.571	≥500KHz	PASS
2462 MHz	8.533	13.491	≥500KHz	PASS

Antenna B
6dB Bandwidth TX CH 01

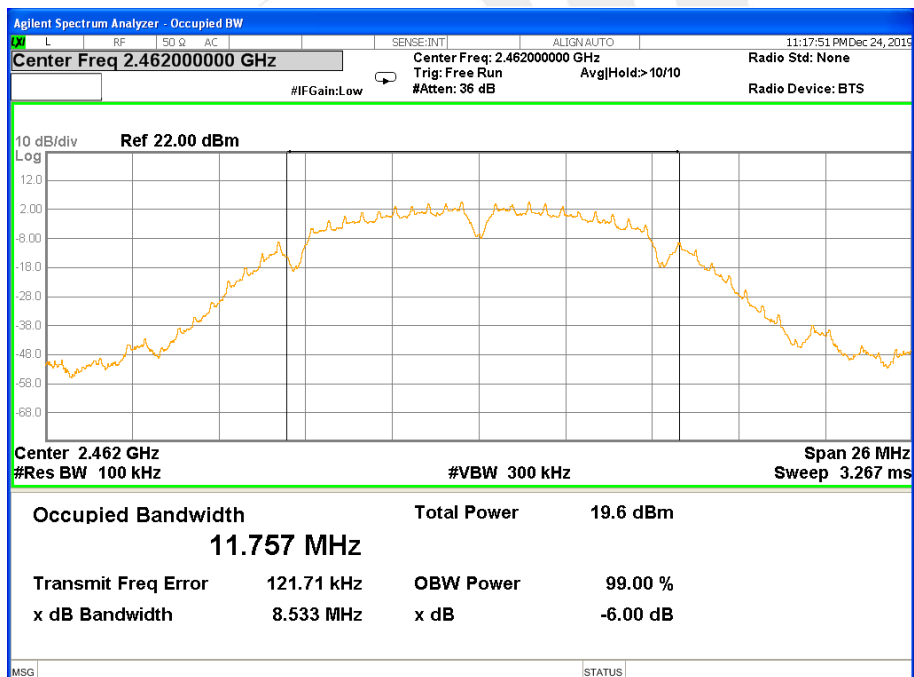




6dB Bandwidth TX CH 06

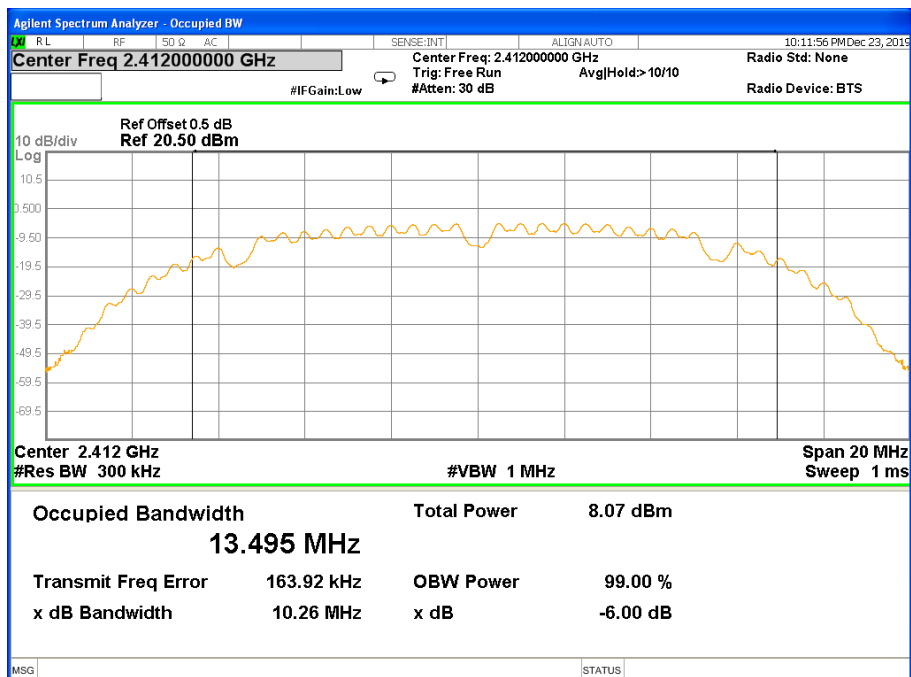


6dB Bandwidth TX CH 11

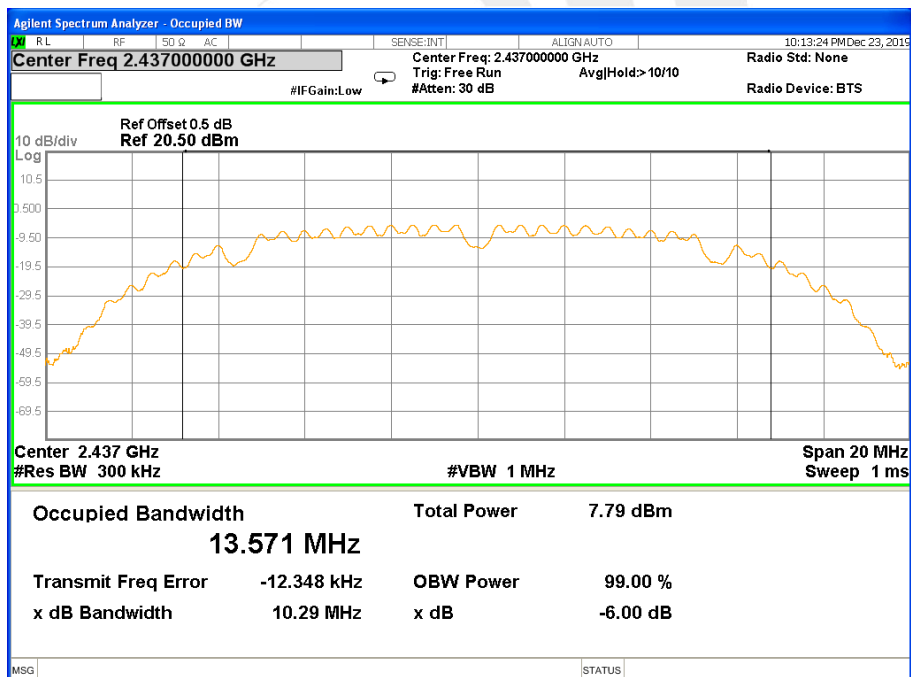




99% Bandwidth TX CH 01

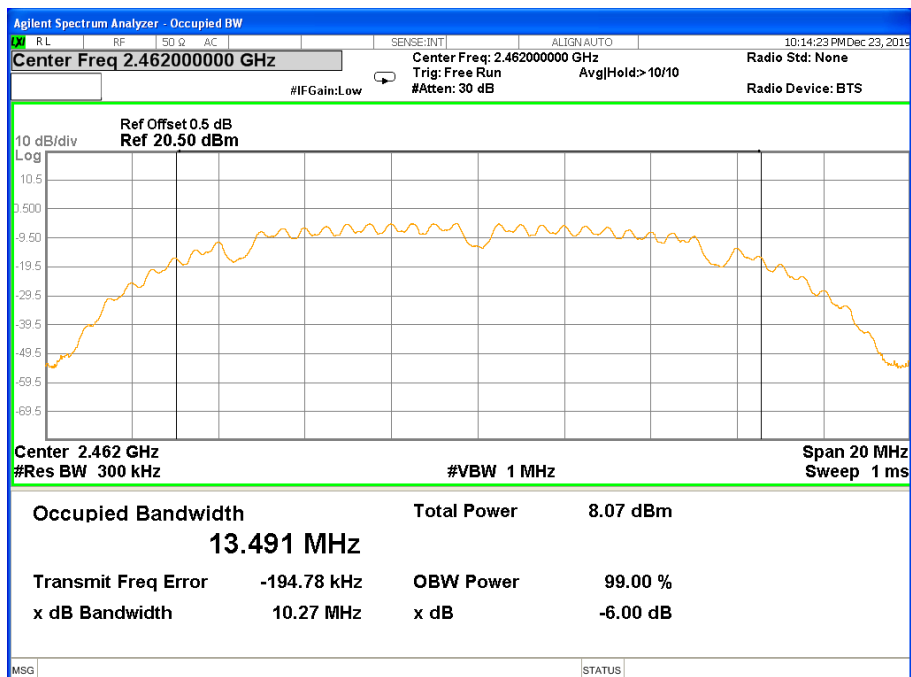


99% Bandwidth TX CH 06





99% Bandwidth TX CH 11



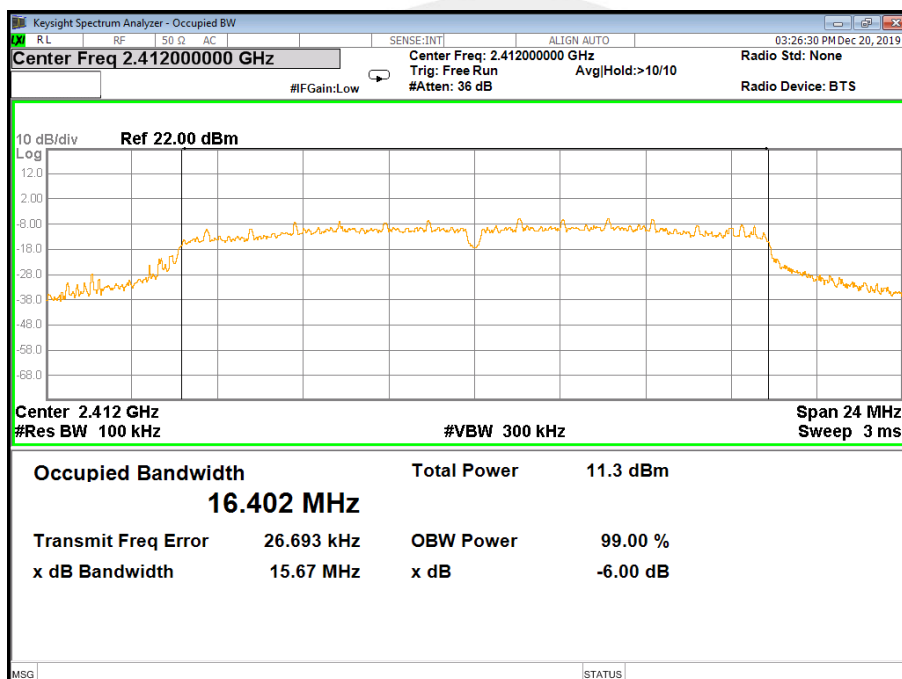


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX g Mode /CH01, CH06, CH11

Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (KHz)	Result
2412 MHz	15.67	16.52	≥500KHz	PASS
2437 MHz	15.01	16.56	≥500KHz	PASS
2462 MHz	15.39	16.57	≥500KHz	PASS

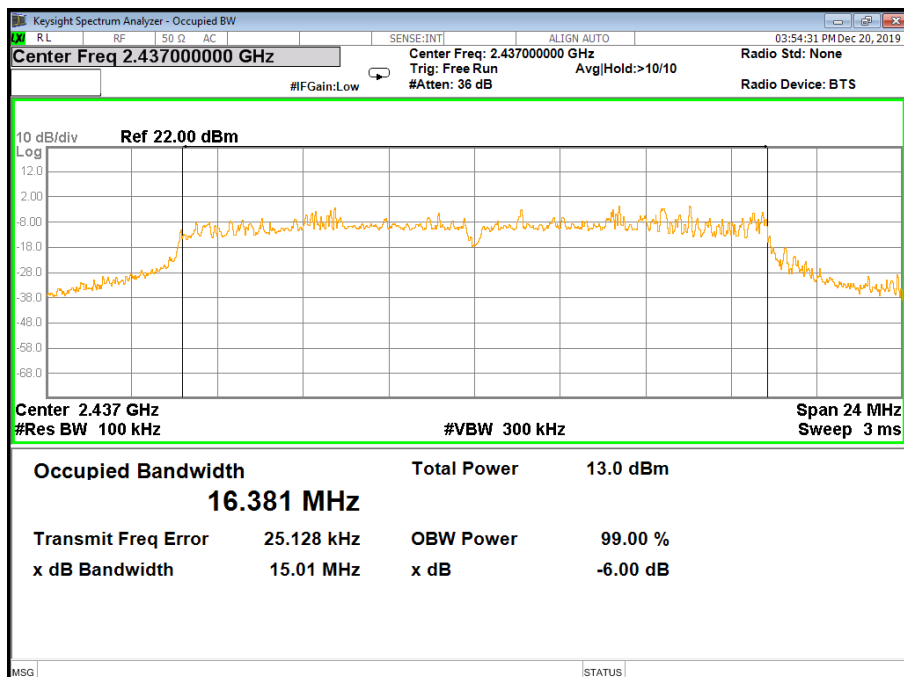
Antenna B

6dB Bandwidth TX CH 01

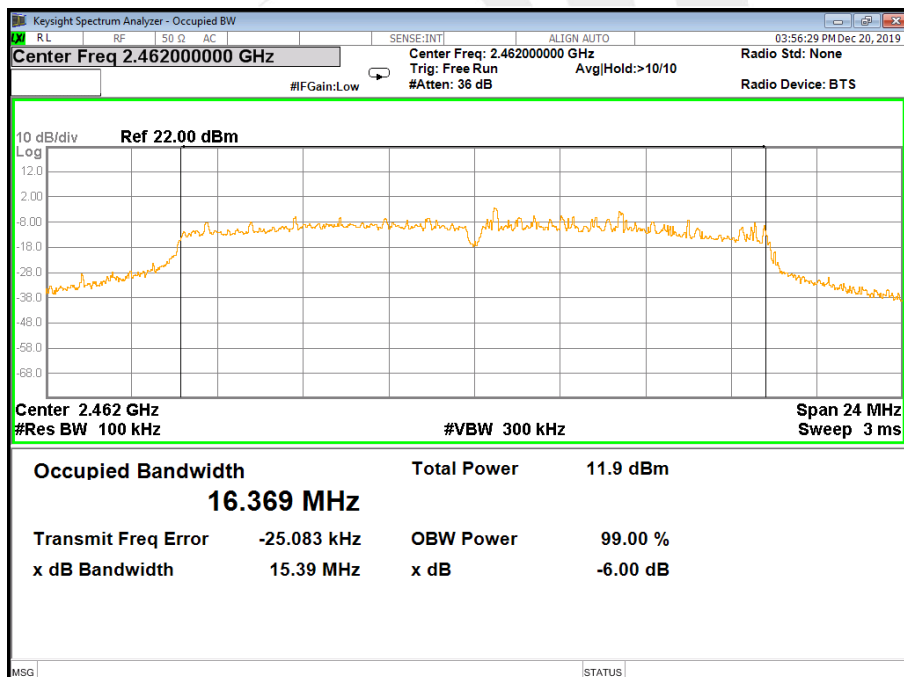




6dB Bandwidth TX CH 06

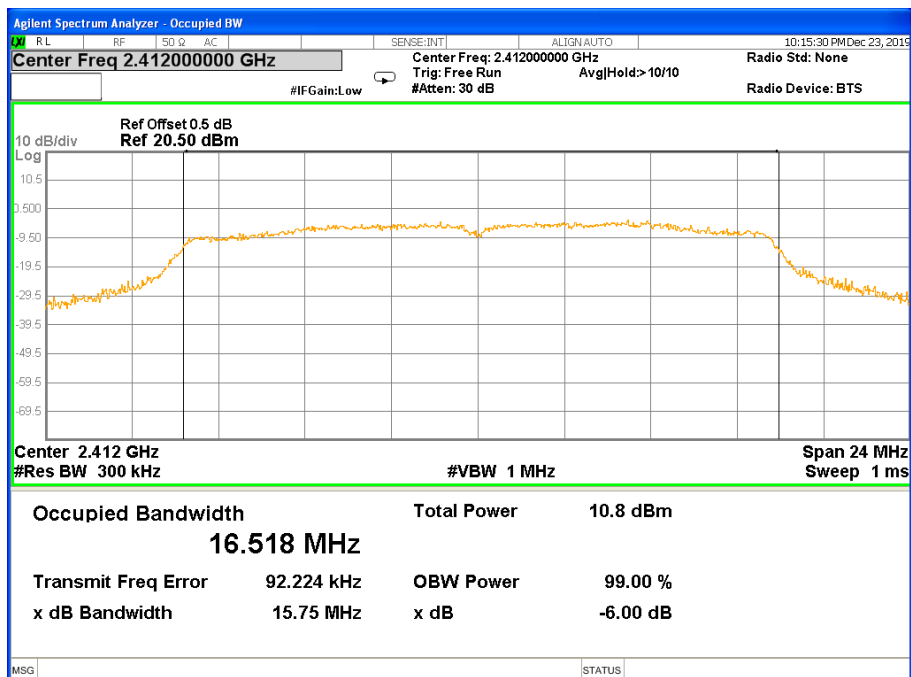


6dB Bandwidth TX CH 11

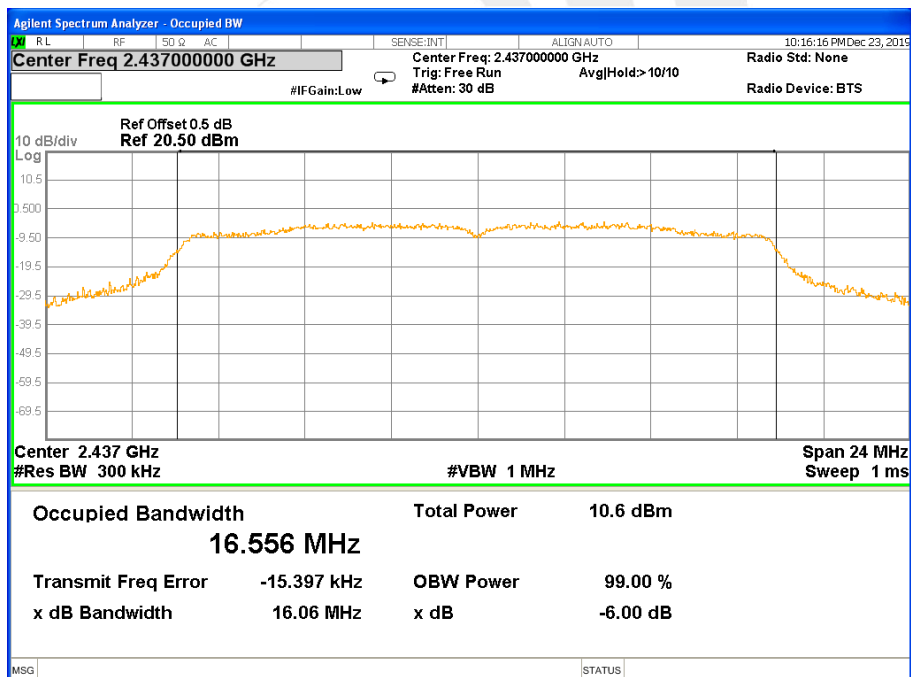




99% Bandwidth TX CH 01

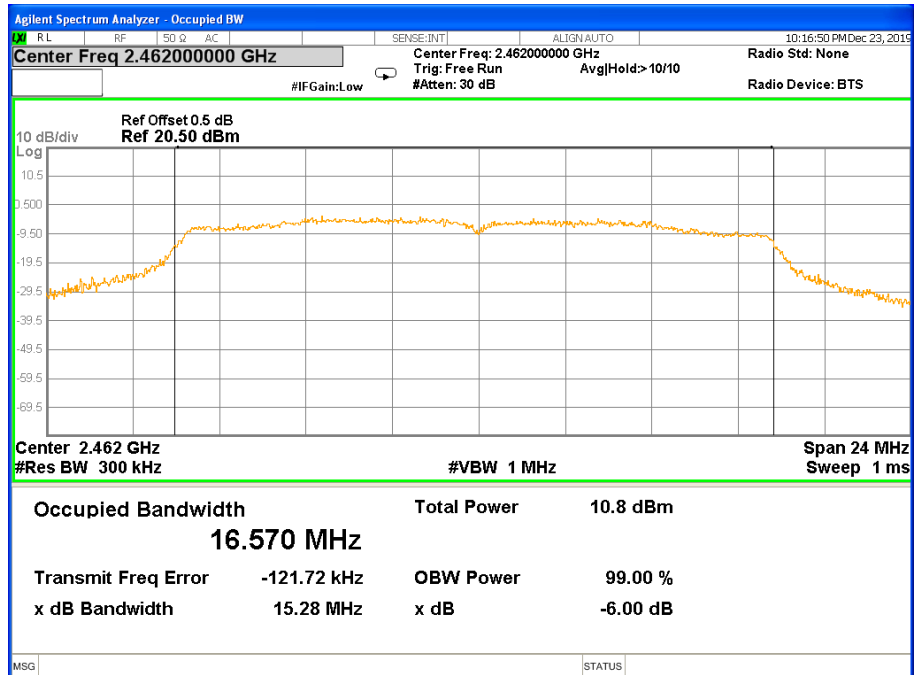


99% Bandwidth TX CH 06





99% Bandwidth TX CH 11



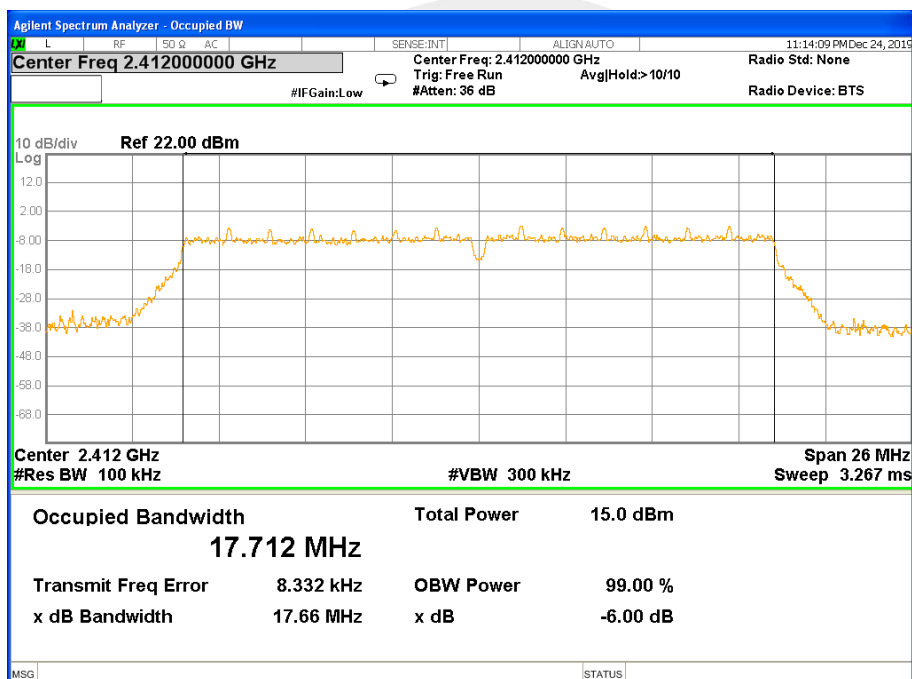


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (KHz)	Result
2412 MHz	17.66	17.70	≥500KHz	PASS
2437 MHz	16.34	17.71	≥500KHz	PASS
2462 MHz	15.57	17.72	≥500KHz	PASS

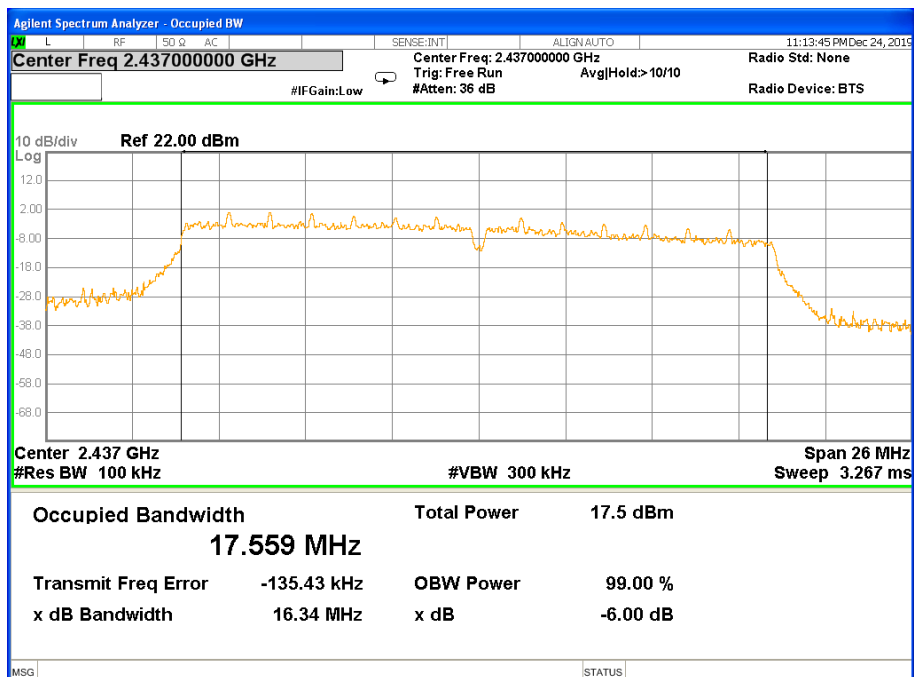
Antenna B

6dB Bandwidth TX CH 01

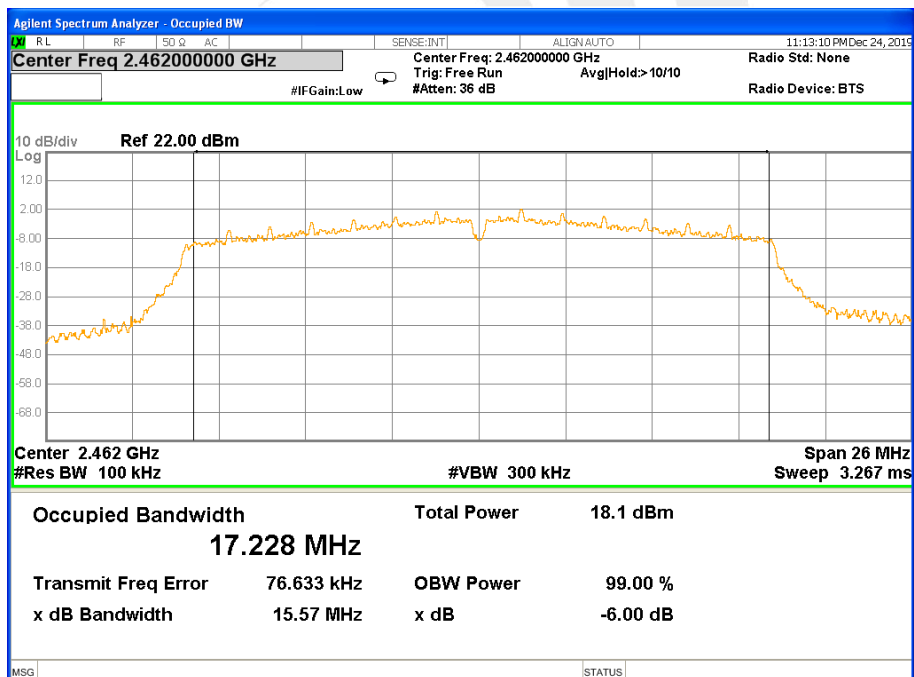




6dB Bandwidth TX CH 06

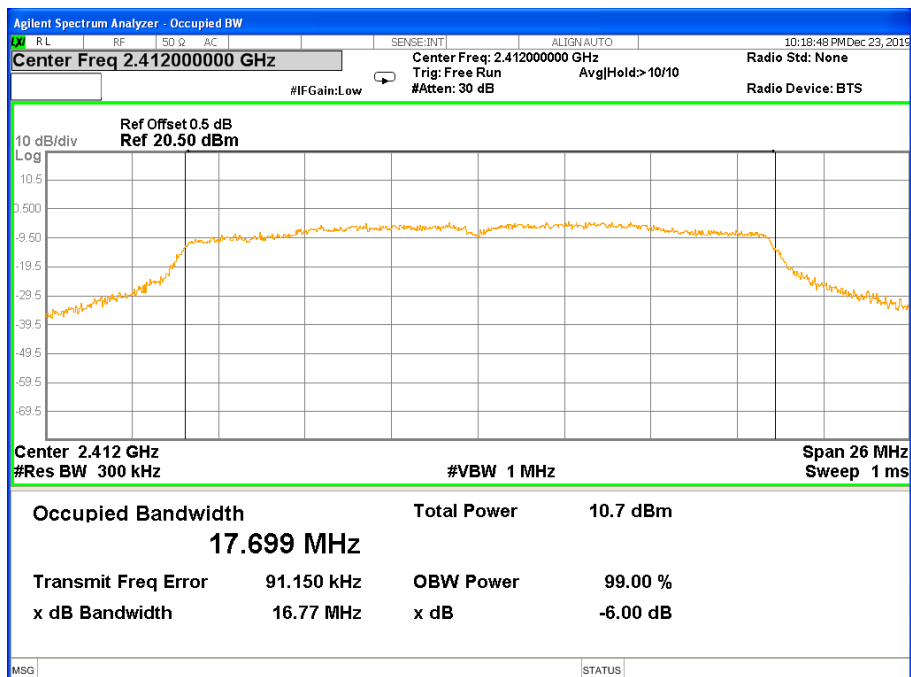


6dB Bandwidth TX CH 11

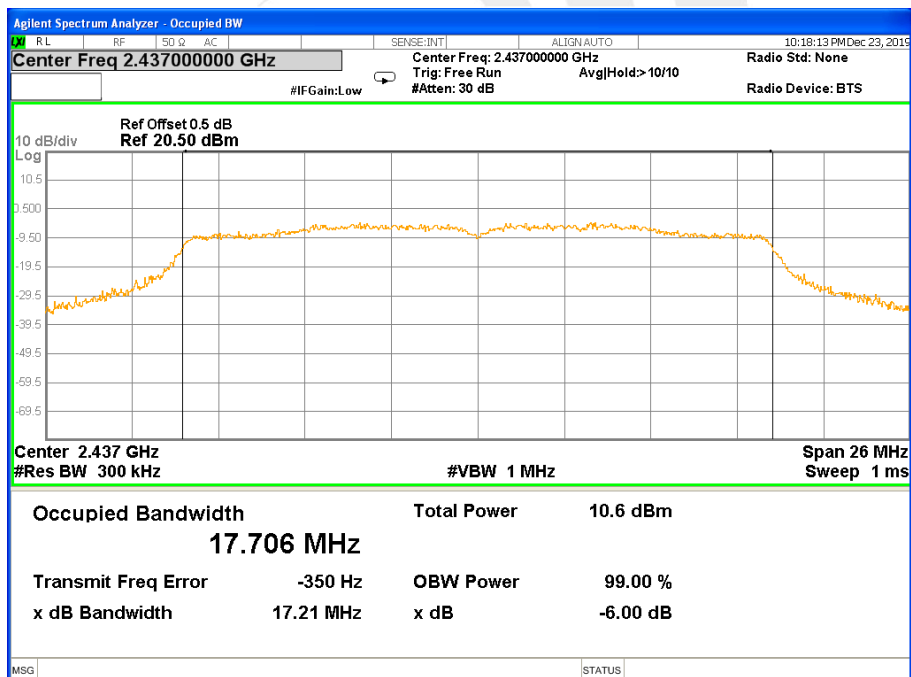




99% Bandwidth TX CH 01

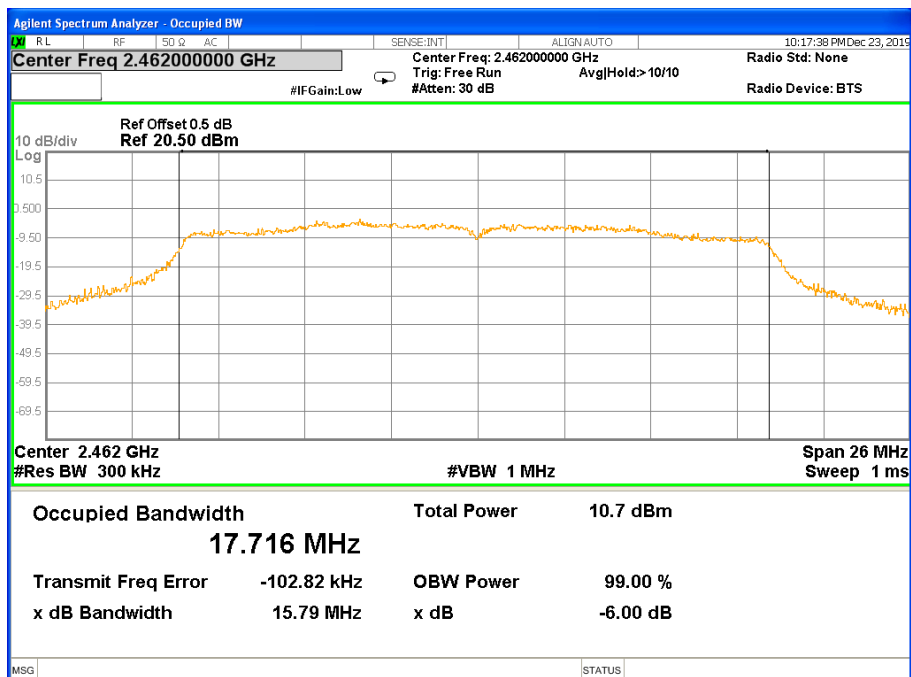


99% Bandwidth TX CH 06





99% Bandwidth TX CH 11



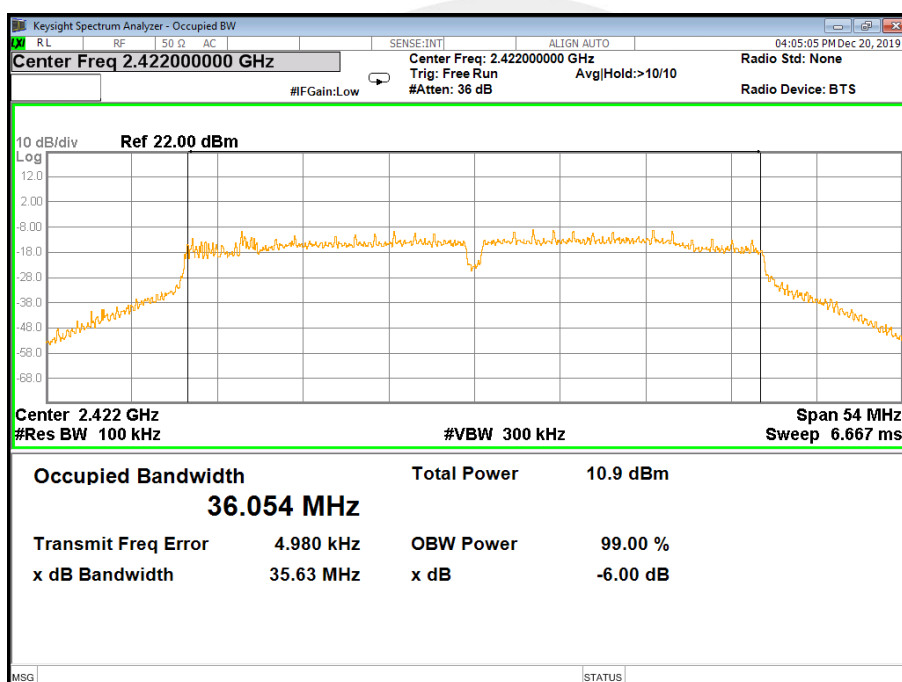


Temperature:	25°C	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery	Test Mode:	TX n Mode(40M) /CH03, CH06, CH09

Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (KHz)	Result
2422 MHz	35.63	35.84	≥500KHz	PASS
2437 MHz	35.07	35.98	≥500KHz	PASS
2452 MHz	32.55	35.81	≥500KHz	PASS

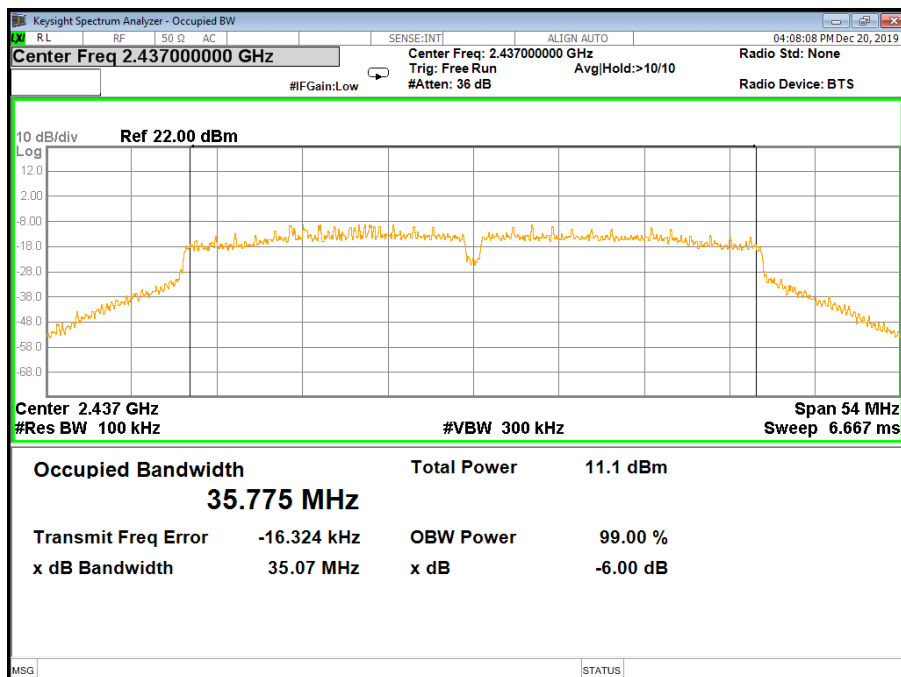
Antenna B

6dB Bandwidth TX CH 03

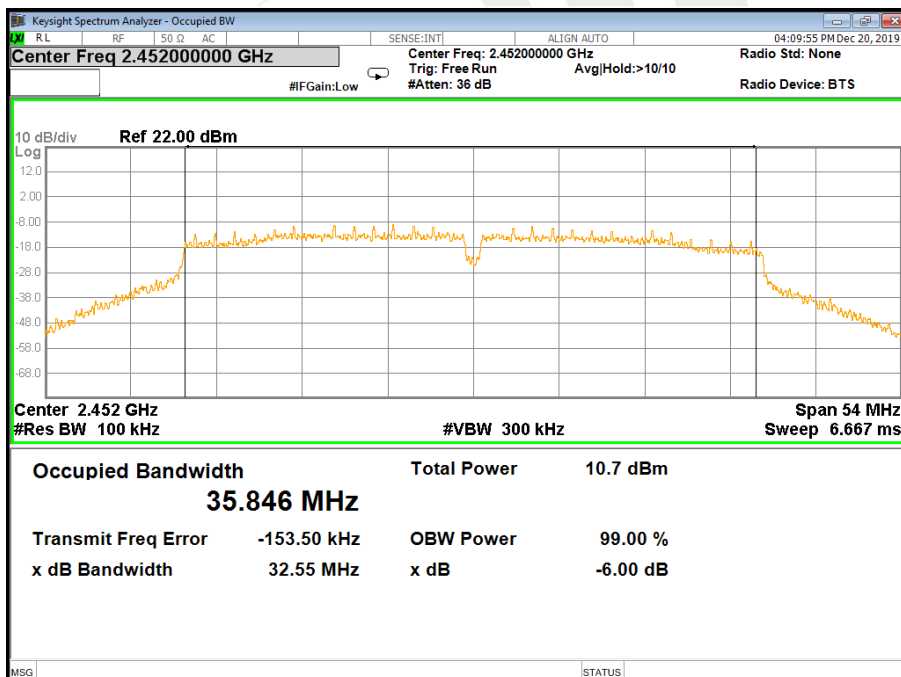




6dB Bandwidth TX CH 06

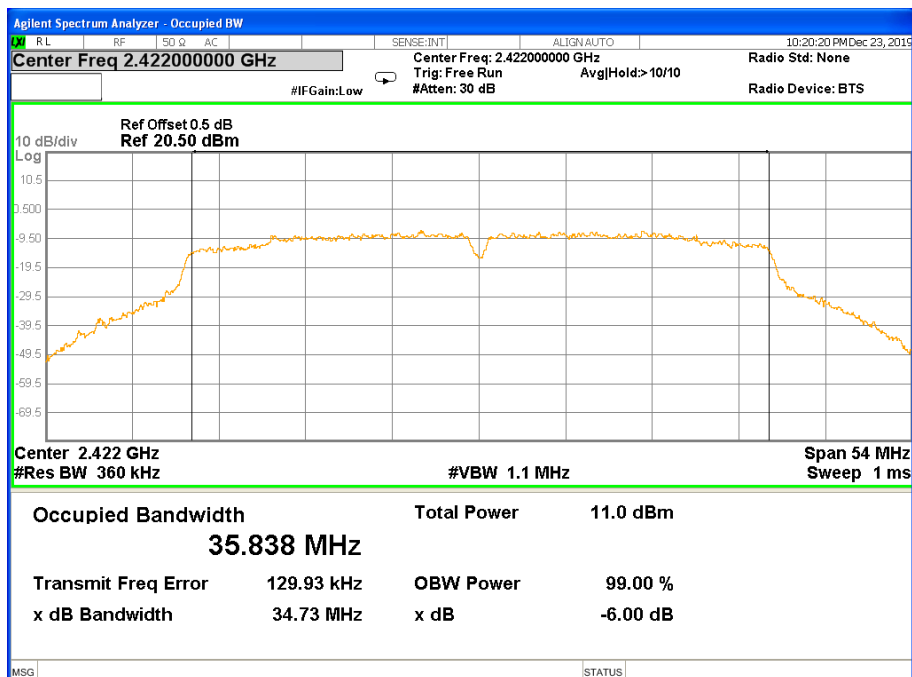


6dB Bandwidth TX CH 09

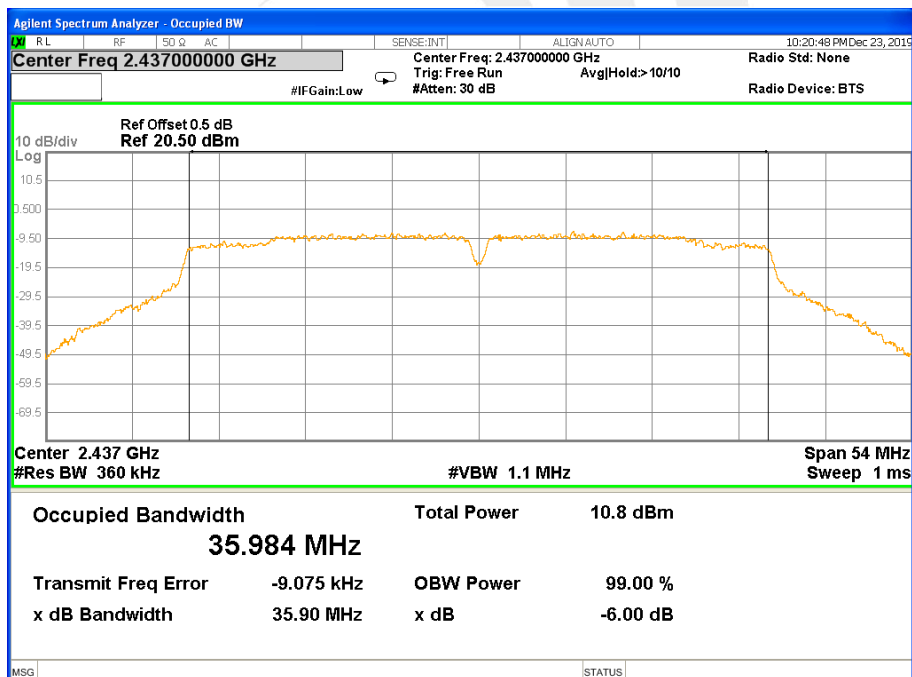




99% Bandwidth TX CH 03

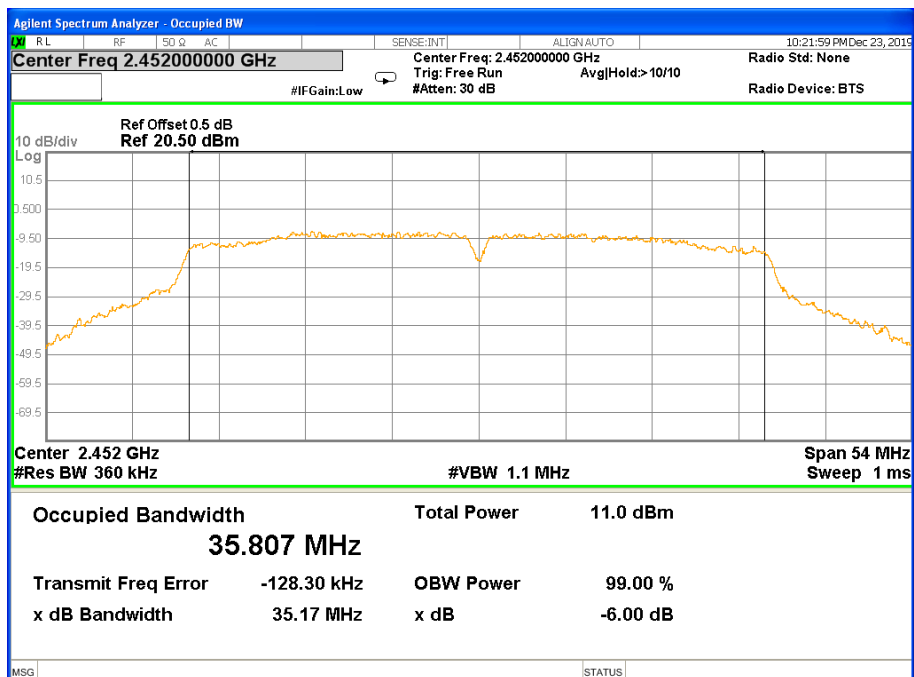


99% Bandwidth TX CH 06





99% Bandwidth TX CH 09





7. PEAK OUTPUT POWER TEST

7.1 LIMIT

FCC Part15.247,Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) RSS 247 Issue 2	Output Power	1 watt or 30dBm	2400-2483.5	PASS
RSS-247	EIRP	4W	2400-2483.5	PASS

7.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

RBW $\geq$ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq$ [3 $\times$ RBW].
- Set span $\geq$ [3 $\times$ RBW].
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

Integrated band power method:

The following procedure can be used when the maximum available RBW of the instrument is less than the

DTS bandwidth:

- Set the RBW = 1 MHz.
- Set the VBW $\geq$ [3 $\times$ RBW].
- Set the span $\geq$ [1.5 $\times$ DTS bandwidth].
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

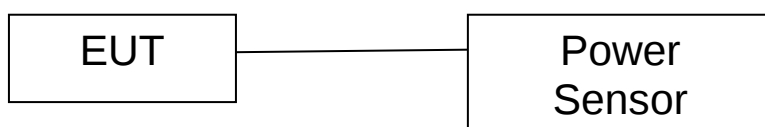
PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULTS

Temperature:	25℃	Relative Humidity:	60%
Test Voltage:	DC 7.4V from battery		

TX 802.11b Mode								
Test Channel	Frequency	PK Power ANT A	PK Power ANT B	PK Power ANT A+ANT B	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	6.30	7.26	--	3.39	4.63	--	30
CH06	2437	6.59	7.24	--	3.59	4.48	--	30
CH11	2462	6.40	7.32	--	3.66	4.61	--	30

TX 802.11g Mode								
Test Channel	Frequency	PK Power ANT A	PK Power ANT B	PK Power ANT A+ANT B	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	8.94	10.17	--	3.48	4.47	--	30
CH06	2437	9.51	10.01	--	3.76	4.50	--	30
CH11	2462	9.42	10.74	--	3.67	4.47	--	30

TX 802.11n20 Mode								
Test Channel	Frequency	PK Power ANT A	PK Power ANT B	PK Power ANT A+ANT B	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	8.99	10.40	12.76	3.39	4.37	6.92	30
CH06	2437	9.24	9.97	12.63	3.65	4.36	7.03	30
CH11	2462	9.36	10.55	13.01	3.61	4.52	7.10	30



TX 802.11n40 Mode								
Test Channel	Frequency	PK Power ANT A	PK Power ANT B	PK Power ANT A+ANT B	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	dBm
CH03	2422	7.46	8.89	11.24	2.91	3.96	6.48	30
CH06	2437	8.13	8.31	11.23	3.23	3.84	6.56	30
CH09	2452	8.10	9.01	11.59	3.15	3.96	6.58	30





EIRP Power

TX 802.11b Mode

Test Channel	Frequency	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	Antenna Gain	EIRP Power ANT A	EIRP Power ANT B	EIRP Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	3.39	4.63	--	0.00	3.39	4.63	--	36.00
CH06	2437	3.59	4.48	--	0.00	3.59	4.48	--	36.00
CH11	2462	3.66	4.61	--	0.00	3.66	4.61	--	36.00

TX 802.11g Mode

Test Channel	Frequency	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	Antenna Gain	EIRP Power ANT A	EIRP Power ANT B	EIRP Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	3.48	4.47	--	0.00	3.48	4.47	--	36.00
CH06	2437	3.76	4.50	--	0.00	3.76	4.50	--	36.00
CH11	2462	3.67	4.47	--	0.00	3.67	4.47	--	36.00

TX 802.11n20 Mode

Test Channel	Frequency	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	Antenna Gain	EIRP Power ANT A	EIRP Power ANT B	EIRP Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dBm)	dBm
CH01	2412	3.39	4.37	6.92	0.00	3.39	4.37	6.92	36.00
CH06	2437	3.65	4.36	7.03	0.00	3.65	4.36	7.03	36.00
CH11	2462	3.61	4.52	7.10	0.00	3.61	4.52	7.10	36.00

TX 802.11n40 Mode

Test Channel	Frequency	AV Power ANT A	AV Power ANT B	AV Power ANT A+ANT B	Antenna Gain	EIRP Power ANT A	EIRP Power ANT B	AV Power ANT A+ANT B	LIMIT
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dBm)	dBm
CH03	2422	2.91	3.96	6.48	0.00	2.91	3.96	6.48	36.00
CH06	2437	3.23	3.84	6.56	0.00	3.23	3.84	6.56	36.00
CH09	2452	3.15	3.96	6.58	0.00	3.15	3.96	6.58	36.00



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 and RSS GEN requirement: For intentional device, according to 15.203 and RSS GEN: 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.

8.2 EUT ANTENNA

The EUT antenna is PIFA Antenna. It complies with the standard requirement.





9. FREQUENCY STABILITY

9.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.02\%$ of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees.

9.2 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at $+20$ degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

9.3 TEST RESULT

Channel 06 (2437MHz)

Voltage vs. Frequency Stability

Voltage(V)	Measurement Frequency(MHz)
8.51	2437.0028
7.4	2437.0024
6.29	2437.0027
Max.Deviation(MHz)	0.0028
Max.Deviation(ppm)	1.15

Rated working voltage: DC 7.4V

Temperature vs. Frequency Stability

Temperature($^{\circ}$ C)	Measurement Frequency(MHz)
-30	2437.0031
-20	2437.0029
-10	2437.0030
0	2437.0023
10	2437.0030
20	2437.0027
30	2437.0024
40	2437.0025
50	2437.0030
Max.Deviation(MHz)	0.0031
Max.Deviation(ppm)	1.27



APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※

