RF TEST REPORT FOR FCC

RZBG(W)20200513001-2

Applicant : HANGZHOU KAITE ELECTRICAL APPLIANCE CO., LTD.
SANDU INDUSTRIAL ZONE, JIANDE CITY, ZHEJIAN PROVINCE
CHINA

Manufacture : Kingtec (vietnam) technologies co., ltd.
HAISHAN INDUSTRIAL ZONE, PINGQIAN VILLAGE, HEXIA,
DEHE COUNTY, Long An Province

Product Name : Smart plug

Type/Model : 30154

FCC ID : 2ACXG-30154

TEST RESULT : PASS

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 Sub-part C 15.247: Radio Frequency Device: Sub-part C;Intentional radiators.

ANSI C63.10 (2013)： American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Date of issue: 2020.07.03

Prepared by	Reviewed by:	Issued by：
Chao Hu (Project engineer)	Zhao Yang (Reviewer)	BingCai (General Manager)
Chao Hu	Zhao Yang	Bing Cai

Content

1. GENERAL INFORMATION OF EUT

1.1 Applicant information

Applicant	HANGZHOU KAITE ELECTRICAL APPLIANCE CO., LTD
Address	SANDU INDUSTRIAL ZONE, JIANDE CITY, ZHEJIANG PROVINCE, CHINA
Contact person	N/A
Phone number	N/A

1.2 Manufacture information

Manufacture	Kingtec (vietnam) technologies co., ltd
Address	HAISHAN INDUSTRIAL ZONE, PINGQIAN VILLAGE, HEXIA, DEHE COUNTY, Long An Province

1.3 General description for equipment under test(EUT)

EUT name	Smart Plug
Trade name	KMC
Under test mode name	30154
Series model name	N/A
Description of different model name	N/A
Hardware version	1.0
Software version	N/A
Network and Wireless connectivity	IEEE 802.11b/g/n（HT20/HT40）

1.4 Technical information of equipment under test (EUT)

Operate Freq. range	Frequency range (MHz)	Modulation	Channel bandwidth （MHz）	Date rate （Mbps）
IEEE 802.11b	2412-2462	DSSS/CCK	20	Up to 11
IEEE 802.11g	2412-2462	OFDM	20	Up to 54
IEEE 802.11n(20MHz)	2412-2462	OFDM	20	Up to 72.2
IEEE 802.11n(40MHz)	2422-2452	OFDM	40	Up to 150
Test channel	Low(2412 for 20MHz bandwidth,2422 for 40MHz bandwidth) Middle(2437 for 20MHz bandwidth,2437 for 40MHz bandwidth) High(2462 for 20MHz bandwidth,2452 for 40MHz bandwidth)			
Maximum RF Output Power(dBm)	IEEE 802.11b:13.29 IEEE 802.11g:16.02 IEEE 802.11n(20MHz):15.23 IEEE 802.11n(40MHz):14.66			
FCC ID	2ACXG-30154			
Equipment type	☒ Mobile ☐ Portable ☐ Fix Location			
About the Product	This wifi is used for data transmission			
Antenna Type	PCB Antenna			
Antenna Gain	-1dBi			
Note:The antenna gain was declared by the manufacture.				

The requirement for the following technical information of the EUT was tested in this report:

Support channel:

Note: the bold fonts channels are test low, middle and high channels.

Channel	Frequency	Channel	Frequency
1	**2412**	**7**	2442
2	2417	8	2447
3	**2422**	9	**2452**
4	2427	10	2457
5	2432	11	**2462**
6	**2437**		

Modulation technology	Modulation Type	Transfer Rate (Mbps)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/ 11
OFDM (802.11g)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n-20MHz)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11n-40MHz)	BPSK	13.5
	QPSK	27/40.5
	16QAM	54/81/108
	64QAM	121.5/135

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.
802.11b: 1Mbps
802.11g: 6Mbps
802.11n20 and 802. 11n20 (SISO): MCS0
802.11n40 and 802. 11n40 (SISO): MCS0

1.5 The mode of the EUT operation

Test Items	Mode	Data Rate	Channel	
Output Power	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
6dB Bandwidth	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Conducted Spurious Emission	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Duty cycle	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Radiated Spurious Emission	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Band Edge	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/11	3/9
Power spectral density (PSD)	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9

1.6 Additional instructions

EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

EUT Software Settings:

Power level setup in software			
Test Software Version	Wifi Test Tool V1.4.2		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	L540
Mode	Channel	Soft Set of power level	
802.11 b	All	11	
802.11 g	All	25	
802.11 n20	All	24	
802.11 n40	All	23	

Sample received date : 2020.05.13

Date of test : 2020.05.15 ~ 2020.06.12

2. DESCRIPTION OF TEST FACLITY

☒	Company Name	Hangzhou TDT Technologies Co., Ltd.
	Address	Room 101, Building 3, No. 12, Binwen Road, Xixing Street, Binjiang district, Hangzhou, Zhejiang, China
	Telephone	+86571-88317620
	Telefax	+86571-88316350
	Test Location	Hangzhou TDT Technologies Co., Ltd.
	Address	Room 101, Building 3, No. 12, Binwen Road, Xixing Street, Binjiang district, Hangzhou, Zhejiang, China
	Telephone	+86571-88317620
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	A2LA Certification number	4037.01
	CNAS Certification number	CNAS L7728
	VCCI Site registration number	C-14683, G-10832, R-14200, T-12223
	FCC Site registration number	645845
	IC Site registration number	12179A
	Designation number	CN1197

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2	The test report is invalid if not marked with the signatures of the persons responsible For preparing and approving the test report.
3	The test report is invalid if there is any evidence and/or falsification.
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8	This is the second version of the report, which replaces the previous one. See the revision history for details

3. SUMMARY OF TEST RESULT

3.1 Test standard

No.	Identify	Document title
1	47 CFR Part 15 Sub-part C	Miscellaneous Wireless Communications Services
2	KDB Publication 558074 D01v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
3	ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC PART No.	Test Result	Verdict
1	Antenna Requirement	15.203; 15.247(b)	N/A	Pass Note 1
2	Output Power	15.247(b)	ANNEX A.1	Pass
3	6dB Bandwidth	15.247(a)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247(d)	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	15.209; 15.247(d)	ANNEX A.4	Pass
6	Conducted Emission	15.207	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209; 15.247(d)	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209; 15.247(d)	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247(e)	ANNEX A.8	Pass
10	Receiver Spurious Emissions	N/A	N/A	N/A Note 2

Note 1: Please refer to section 5.1.
Note 2: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.
Note3: Because of the WLAN module is same to the equipment which FCC ID is 2ACXG-30153.so the conducted test data of 802.11g/n20/n40 is same to equipment which FCC ID is 2ACXG-30153.

4. GENERAL TEST CONFIGURATION

4.1 Test environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22℃ to +25℃
Working Voltage of the EUT	NV (Normal Voltage)	125V

4.2 Test Equipment

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period	Use
Spectrum Analyzer	R&S	FSV40	101015	9/11/2019	1 year	✓
Analog signal generator	Agilent	N5181A	MY47070359	11/14/2019	1 year	
Vector signal generator	Agilent	N5182A	MY47070411	11/30/2019	1 year	
Analog signal generator	Agilent	N5183A	MY50141794	11/14/2019	1 year	
Wireless connectivity tester	R&S	CMW500	160809	11/14/2019	1 year	
DC power supply	Agilent	E3634A	MY40002154	11/14/2019	1 year	
Automatic control unit	Tonscend	JS0806-2	T1326593	11/14/2019	1 year	✓
EMI Test receiver	R&S	ESR26	101617	11/14/2019	1 year	✓
PRE-AMPLIFIER (1-18GHz)	Connphy	CLN-1G18G-4060-S	718005	8/7/2019	1 year	✓
PRE-AMPLIFIER (18-40GHz)	CERNEX	CBL18404035	24496/24495	8/7/2019	1 year	✓
LOOP Antenna	Com-power	AL-130R	10160053	9/8/2019	1 year	✓
Bi-conical and log-periodic Antenna (30MHz-1GHz)	SCHWARZBECK	VULB 9168	796	8/14/2019	1 year	✓
HORN Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA 9120D	1935	12/26/2019	1 year	✓
HORN Antenna (18GHz-40GHz)	Com-power	AH-840	101076	12/26/2019	1 year	✓
EMI Test receiver	R&S	ESU26	100499	11/14/2019	1 year	✓

PRE-AMPLIFIER (1-18GHz)	Connphy	CLN-1G18G-4030-S	517002	8/7/2019	1 year	
TRLIOG Broad Band Antenna	SCHWARZBECK	VULB 9168	834	4/5/2019	1 year	
log-periodic Antenna (30MHz-1GHz)	SCHWARZBECK	VUSLP9120D	282	4/14/2019	1 year	
HORN Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA 9120D	1794	8/25/2019	1 year	
Shielded room	Albatross	5.8*3.9*3.0	22603	12/04/2017	3 year	✓
EMI Test receiver	R&S	ESI 7	838496/015	3/11/2020	1 year	
Artificial mains network	R&S	ENV216	101276	8/16/2019	1 year	
Artificial mains network	R&S	ENV4200	100263	8/16/2019	1 year	
Current sensor probe	TESEQ	CSP 9160A	76114	12/17/2019	1 year	
Decoupling Clamp	EM TEST	FTC 101	5050	NA	NA	
Decoupling Clamp	HP	NA	2170703	NA	NA	
LISN	R&S	ENY81	100183	11/14/2019	1 year	
LISN	R&S	ISN T8-Cat6	1#	12/17/2019	1 year	
Coaxial RF Cable	Hubersuhner	SUCOFLEX 104EA+SUCOFLEX 100	NA	8/02/2019	1 year	✓
	SCHWARZBECK	SA360-2.92M2.92M-11M-3#	NA	8/07/2019	1 year	✓
Coaxial RF Cable	Hubersuhner	SUCOFLEX 104EA+SUCOFLEX 100	02-1L	8/02/2019	1 year	✓
	Gore	3545-2.92J2.92J-8M-2#	02-2H	8/07/2019	1 year	✓
Coaxial cable	R&S	SPARE	1#	8/16/2019	1 year	✓

4.3 Measurement uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

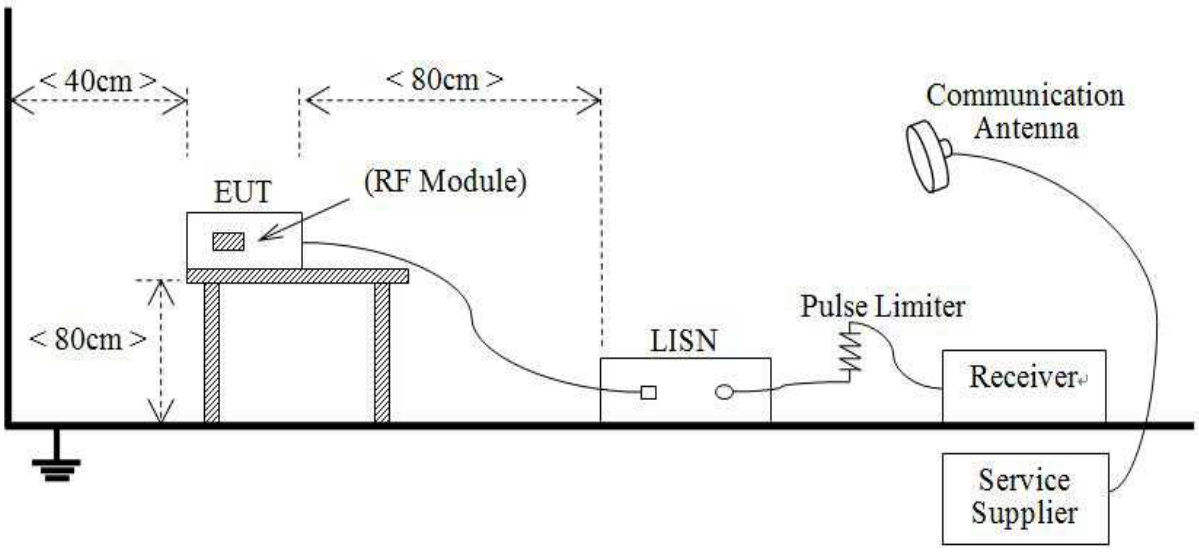
Measurement	Value
Occupied Channel Bandwidth	±1.32MHz
RF output power, conducted	±1.32 dB
Power Spectral Density, conducted	±1.34 dB
Unwanted Emissions, conducted （30MHz-1GHz）	±1.32 dB
Unwanted Emissions, conducted （above 1GHz）	±1.42 dB
All emissions, radiated	±5.4 dB
Temperature	±1 °C
Humidity	±4 %

4.4 Description of test setup

4.4.1 For conducted Test

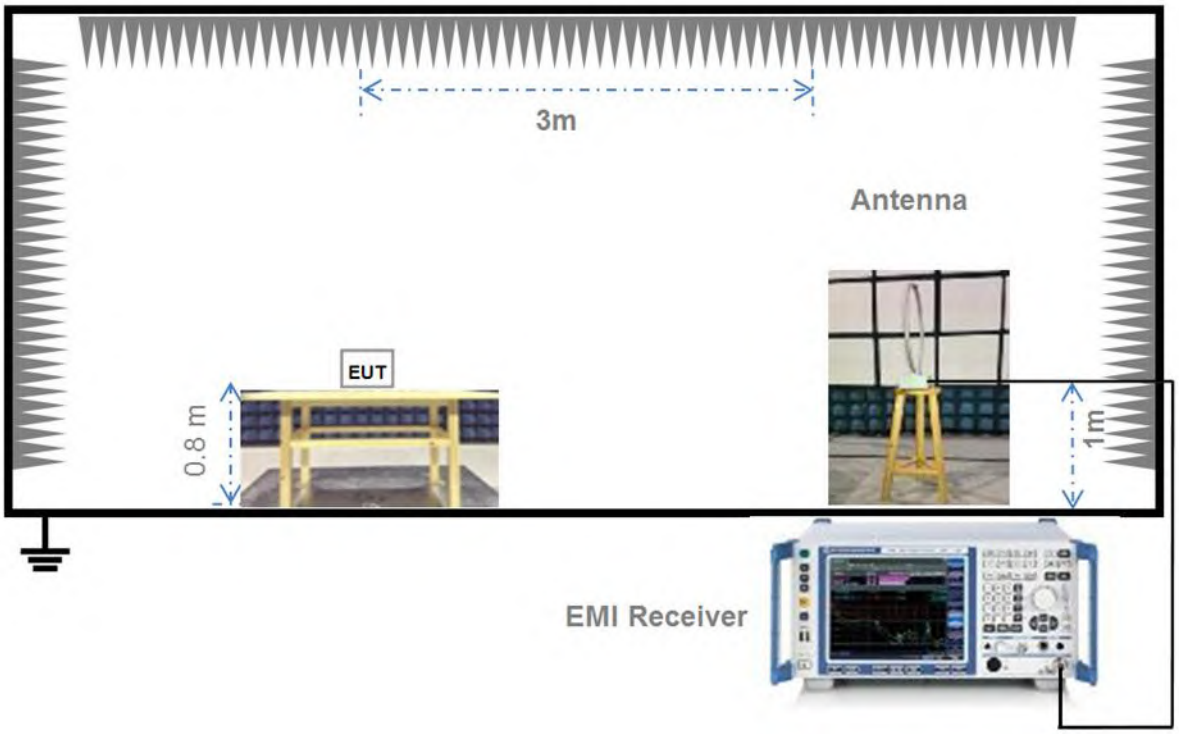
Conducted value (dBm) =Measurement value (dBm) + cable loss (dB)
For example: the measurement value is 10dBm and the cable 0.5dBm used, then the final result of EUT: Conducted value (dBm) = 10dBm + 0.5dB = 10.5dBm

4.4.2 For AC Power Supply port Test



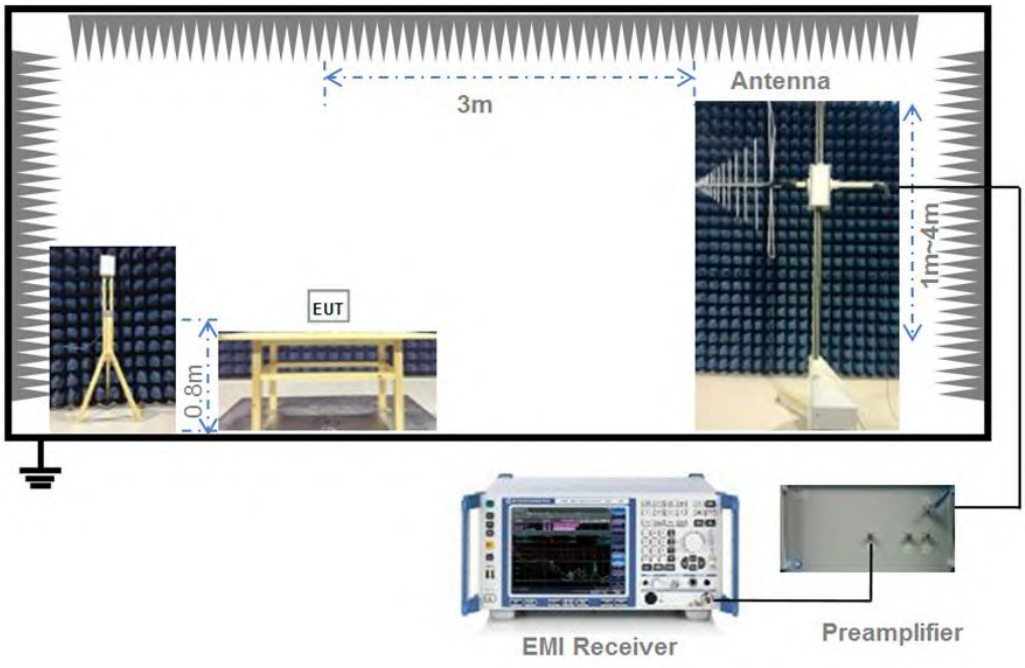
(Diagram 1)

4.4.3 For Radiated Test (Below 30 MHz)



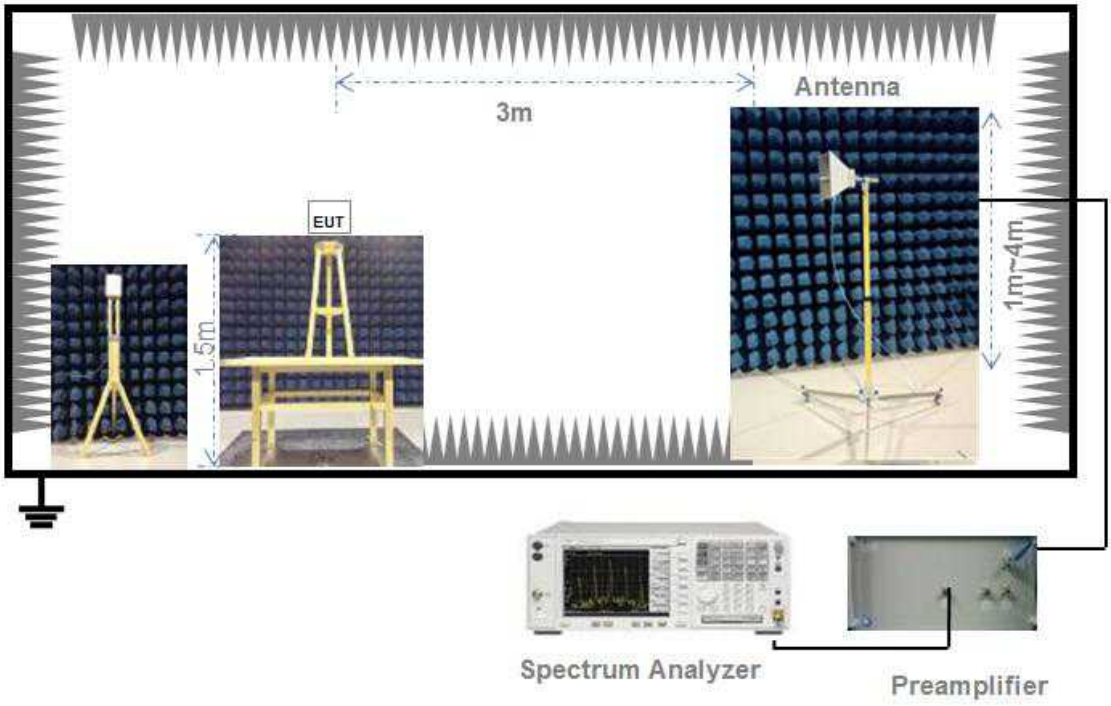
(Diagram 2)

4.4.4 For Radiated Test(30MHz-1GHz)



(Diagram 3)

4.4.5 For Radiated Test （Above 1 GHz）



(Diagram 4)

4.5 Measurement Results Explanation Example

4.5.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.

4.5.2 For radiated band edges and spurious emission test:

E = EIRP – 20log D + 104.8

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP= Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)

5. TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards
FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction
The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	The antennas of the product are permanently attached. There are no provisions for connection to an external antenna.

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

Antenna Gain
The antenna peak gain of EUT is -1dBi less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

5.2 Output Power

Limit

FCC § 15.247(b); RSS-247, 5.4 (4)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements.

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

Test Procedure

Maximum conducted(average) output power

Measurement using a spectrum analyzer(SA)

Method AVGSA-1

Method AVGSA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep.The procedure for this method is as follows:

a) Set span to at least 1.5 times the OBW.

b) Set RBW = 1% to 5% of the OBW, not to exceed 1MHz

c) Set VBW $\geqslant$ [3 $\times$ RBW].

d) Number of points in sweep $\geqslant$ [2 $\times$ span / RBW]. (This gives bin-to-bin spacing $\leqslant$ RBW / 2,

e) Sweep time = auto.

f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

g) If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle $\geqslant$ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”

h) Trace average at least 100 traces in power averaging (rms) mode.

i) Compute power by integrating the spectrum across the OBW of the signal using the

instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

Set VBW ≥ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

Test Result

Please refer to ANNEX A.1.

5.3 6dB Bandwidth

Limit

FCC §15.247(a); RSS-GEN, 6.6

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. The 6 dB bandwidth must be greater than 500 kHz.

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

Test Procedure

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW) $\geqslant$ 3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

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 relative to the maximum level measured in the fundamental emission.

Test Result

Please refer to ANNEX A.2.

5.4 Conducted Spurious Emission

Limit

FCC §15.247(d); RSS-247, 5.5

In any 100 kHz 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 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.

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

Test Procedure

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to $\geqslant$ 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW $\geqslant$ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Emission level measurement

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Set the RBW = 100 kHz.

Set the VBW $\geqslant$ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

Test Result

Please refer to ANNEX A.3

5.5 Band Edge (Authorized-band band-edge)

Limit

FCC §15.247(d); RSS-GEN, 8.9, RSS-247, 5.5

In any 100 kHz 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 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.

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B

Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle $\geqslant$ 98%). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW $\geqslant$ 3 x RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

Standard method(The 99% OBW of the fundamental emission is without 2 MHz of the authorized band):

Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.

Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

Attenuation: Auto (at least 10 dB preferred).

Sweep time: Coupled.

Resolution bandwidth: 100 kHz.

Video bandwidth: 300 kHz.

Detector: Peak.

Trace: Max hold.

Test Result

Please refer to ANNEX A.4.

5.6 Conducted Emission

Limit

FCC §15.207; RSS-GEN, 8.8

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

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56*	56 to 46*
0.50 - 5	56	46
5 - 30	60	50

Test Setup

See section 4.4.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Test Result

Please refer to ANNEX A.5.

5.7 Radiated Spurious Emission

Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

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

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

Note:

1. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)

c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

E = EIRP – 20log D + 104.8

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

f) Compare the resultant electric field strength level to the applicable limit.

g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

a) RBW = as specified in Table 1.

b) VBW ≥ 3 x RBW.

c) Detector = Peak.

d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.

c) RBW = 1 MHz (unless otherwise specified).

d) VBW ≥ 3 x RBW.

e) Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is 20 log(1/x), where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in

frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

Test Result

Please refer to ANNEX A.6.

5.8 Band Edge(Restricted-band band-edge)

Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B

Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

For transmitters operating above 1 GHz repeat the measurement with an average detector..

Test Result

Please refer to ANNEX A.7.

5.9 Power Spectral density(PSD)

Limit

FCC §15.247(d); RSS-247, 5.2 (2)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.

Set the VBW $\geqslant$ 3 RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Result

Please refer to ANNEX A.8.

Annex A TEST RESULT

A.1 Maximum conducted output power

Test Result:

Duty cycle:

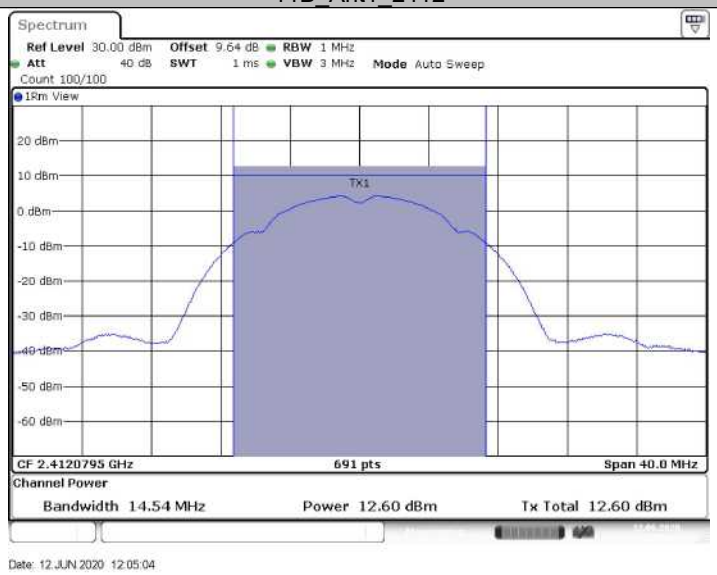
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	8.36	8.37	99.79
		2437	8.36	8.37	99.79
		2462	8.35	8.37	99.79
11G	Ant1	2412	1.38	1.40	98.93
		2437	1.38	1.40	98.84
		2462	1.38	1.40	98.84
11N20SISO	Ant1	2412	1.29	1.31	98.85
		2437	1.29	1.31	98.76
		2462	1.29	1.31	98.76
11N40SISO	Ant1	2422	0.63	0.64	98.25
		2437	0.63	0.64	98.25
		2452	0.63	0.64	98.25

Maximum conducted output power（Average）

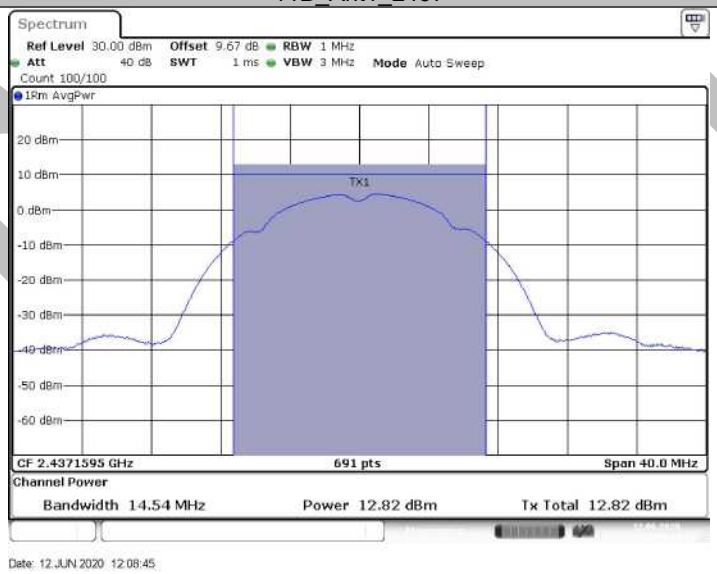
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	12.60	<=30	PASS
		2437	12.82	<=30	PASS
		2462	13.29	<=30	PASS
11G	Ant1	2412	15.78	<=30	PASS
		2437	15.27	<=30	PASS
		2462	16.02	<=30	PASS
11N20SISO	Ant1	2412	15.07	<=30	PASS
		2437	14.88	<=30	PASS
		2462	15.23	<=30	PASS
11N40SISO	Ant1	2422	14.30	<=30	PASS
		2437	14.34	<=30	PASS
		2452	14.66	<=30	PASS

Test Graphs

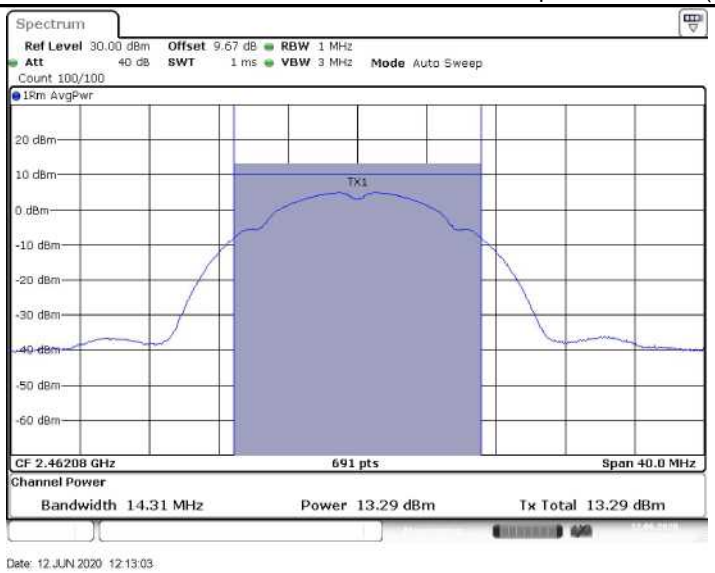
11B_Ant1_2412



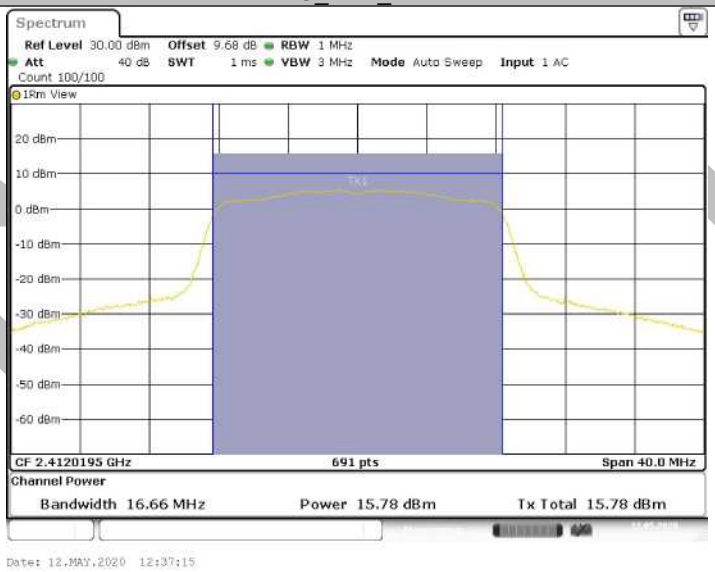
11B_Ant1_2437



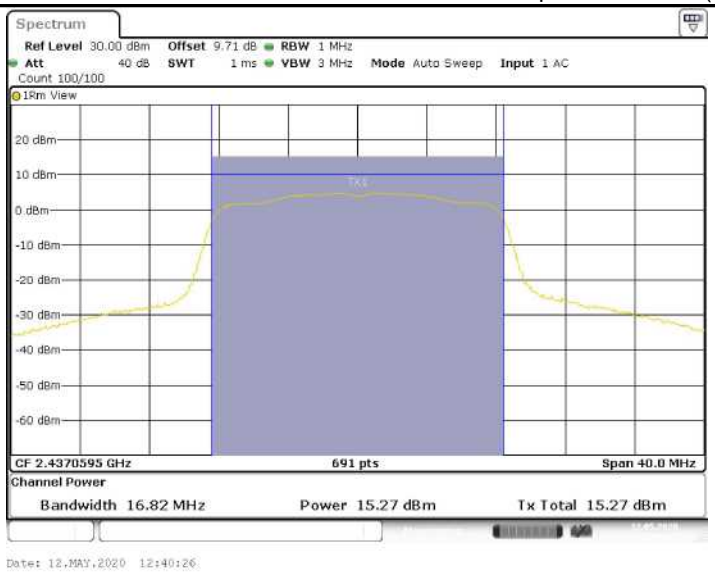
11B_Ant1_2462



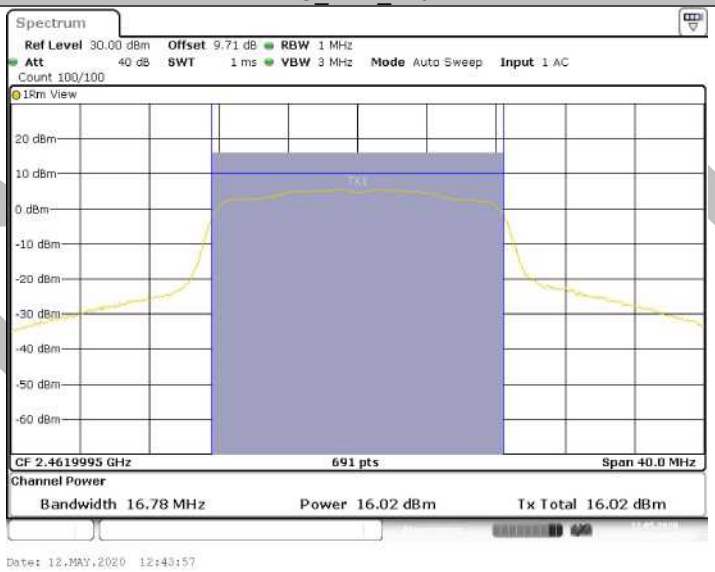
11G_Ant1_2412



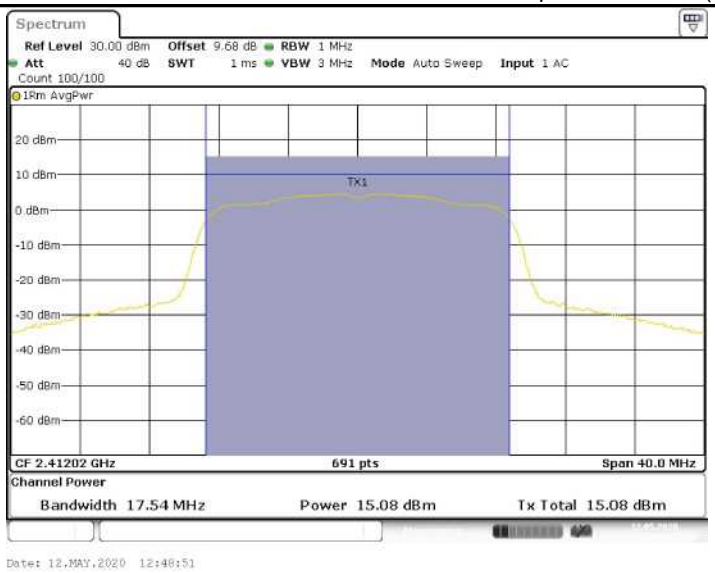
11G_Ant1_2437



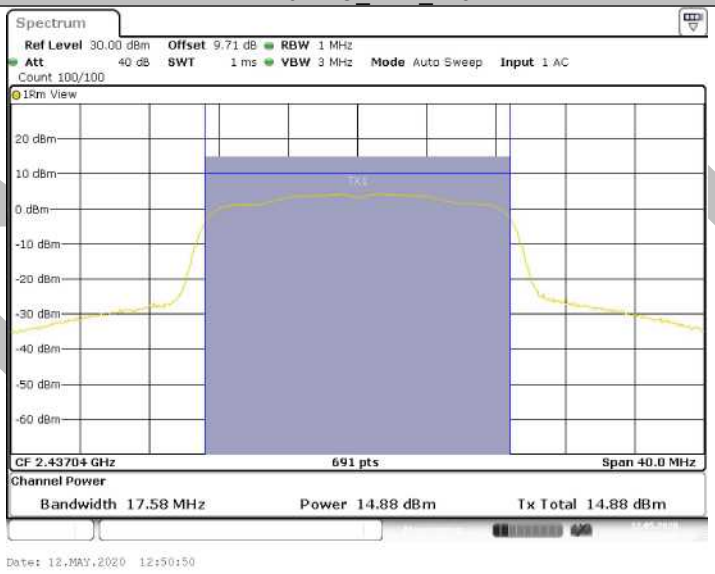
11G_Ant1_2462



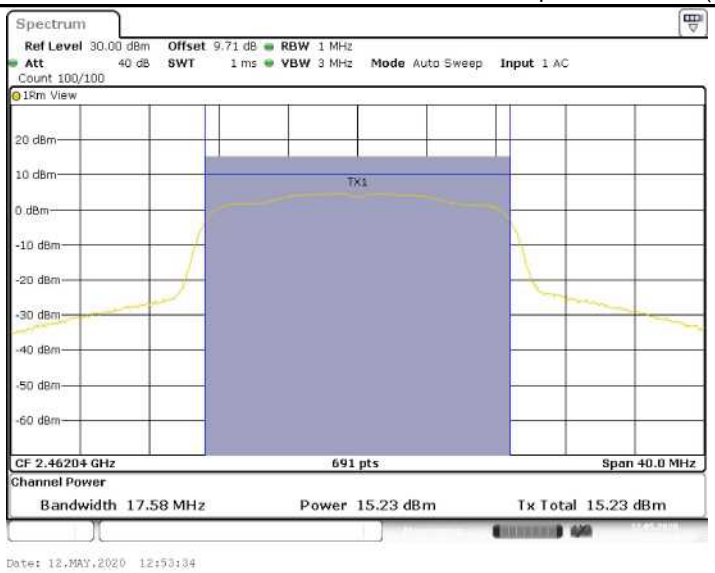
11N20SISO_Ant1_2412



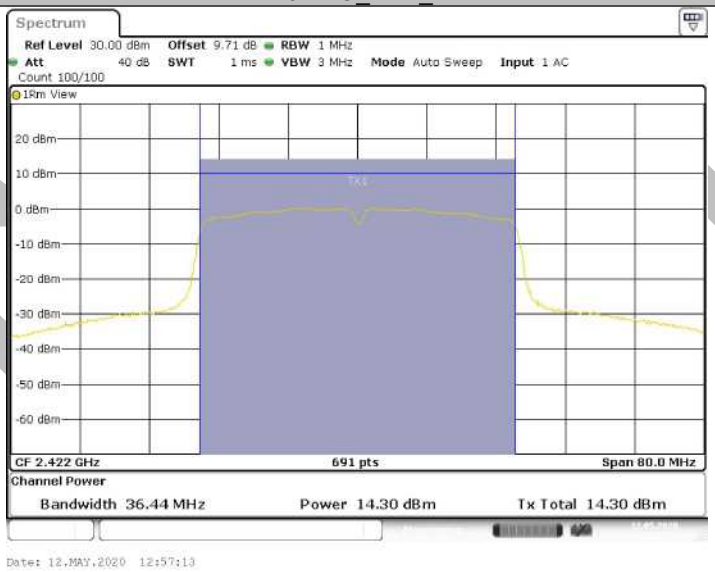
11N20SISO_Ant1_2437



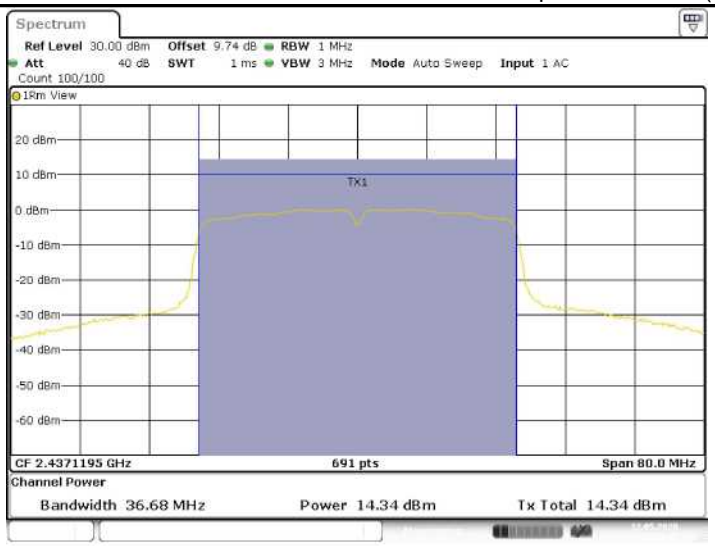
11N20SISO_Ant1_2462



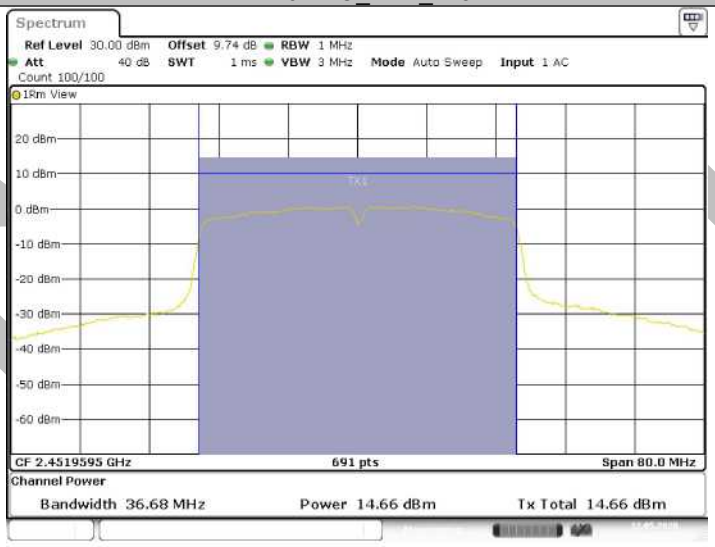
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



A.2 DTS Bandwidth and Occupied Channel Bandwidth

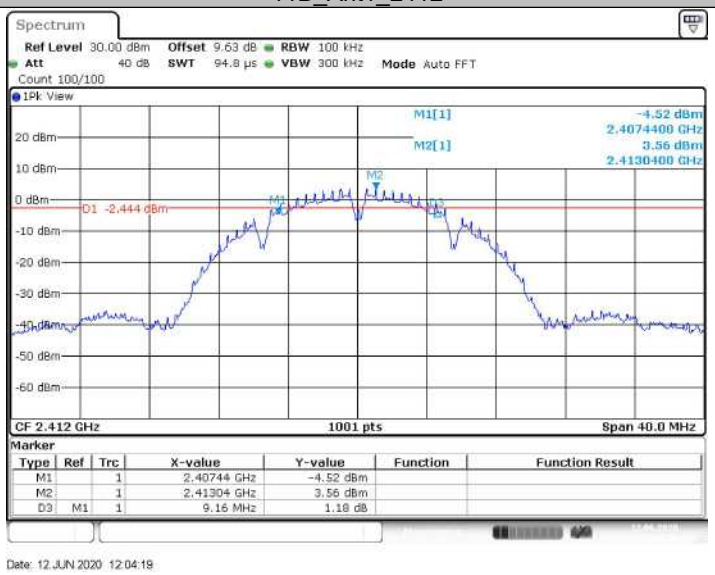
Test Result:

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.160	2407.440	2416.600	0.5	PASS
		2437	9.160	2432.440	2441.600	0.5	PASS
		2462	9.160	2457.440	2466.600	0.5	PASS
11G	Ant1	2412	15.200	2404.440	2419.640	0.5	PASS
		2437	15.200	2429.440	2444.640	0.5	PASS
		2462	15.200	2454.440	2469.640	0.5	PASS
11N20SISO	Ant1	2412	15.200	2404.440	2419.640	0.5	PASS
		2437	15.400	2429.440	2444.840	0.5	PASS
		2462	15.200	2454.440	2469.640	0.5	PASS
11N40SISO	Ant1	2422	35.280	2404.400	2439.680	0.5	PASS
		2437	35.280	2419.400	2454.680	0.5	PASS
		2452	35.280	2434.400	2469.680	0.5	PASS

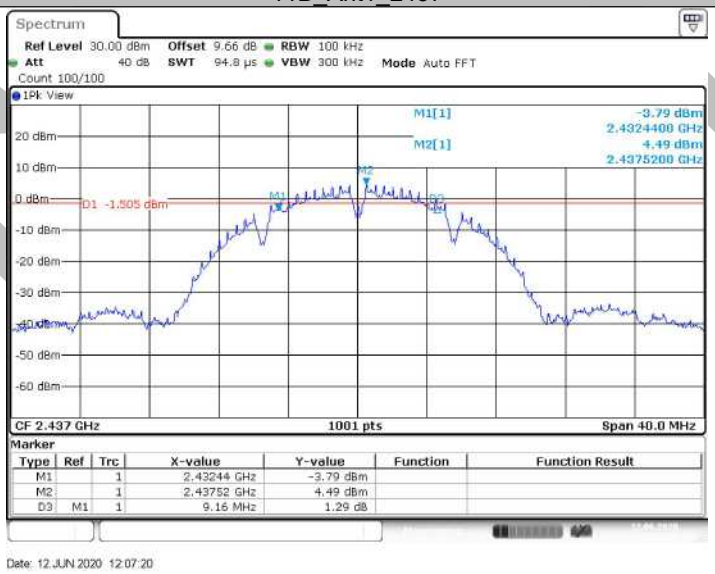
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.545	2404.807	2419.353	---	PASS
		2437	14.545	2429.887	2444.433	---	PASS
		2462	14.306	2454.927	2469.233	---	PASS
11G	Ant1	2412	16.663	2402.929	2420.671	---	PASS
		2437	16.823	2427.929	2445.671	---	PASS
		2462	16.783	2452.849	2470.631	---	PASS
11N20SISO	Ant1	2412	17.542	2402.649	2421.231	---	PASS
		2437	17.582	2427.649	2446.231	---	PASS
		2462	17.582	2452.609	2471.191	---	PASS
11N40SISO	Ant1	2422	36.444	2403.618	2440.462	---	PASS
		2437	36.683	2418.698	2455.462	---	PASS
		2452	36.683	2433.618	2470.462	---	PASS

Test Graphs(DTS Bandwidth):

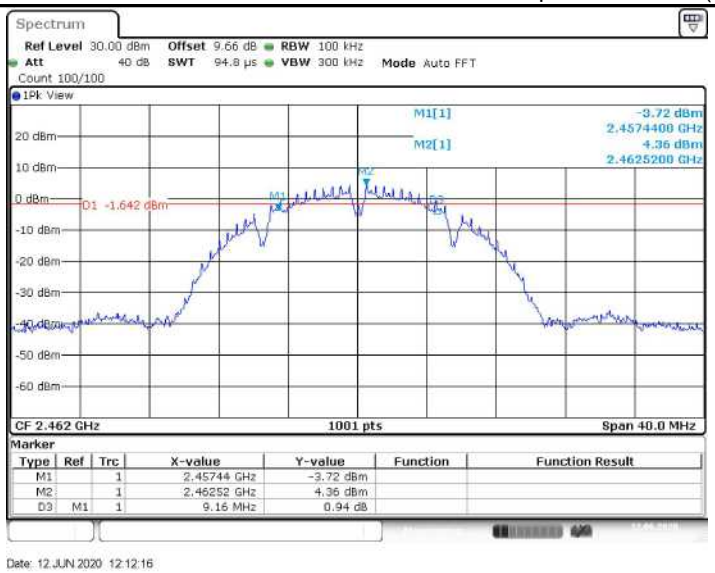
11B_Ant1_2412



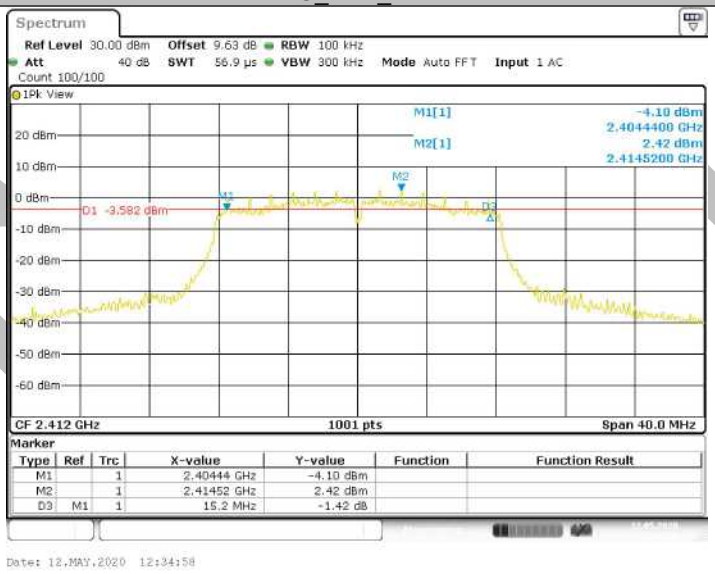
11B_Ant1_2437



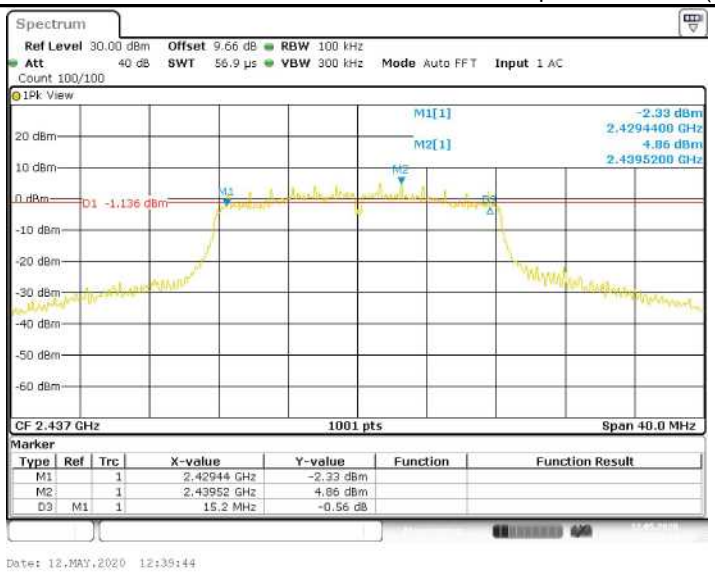
11B_Ant1_2462



11G_Ant1_2412



11G_Ant1_2437

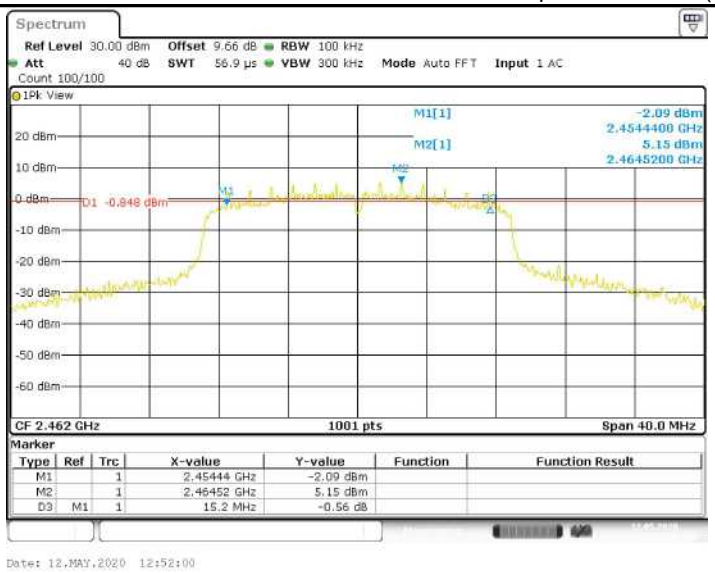


11G_Ant1_2462

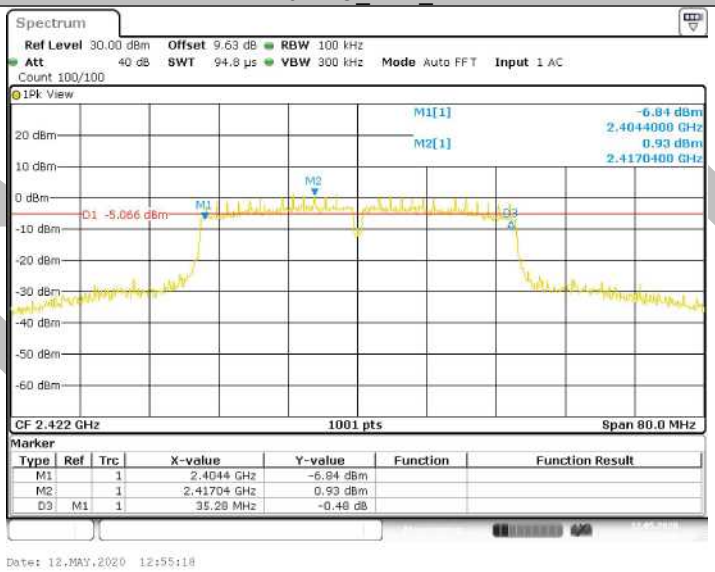
11N20SISO_Ant1_2412

11N20SISO_Ant1_2437

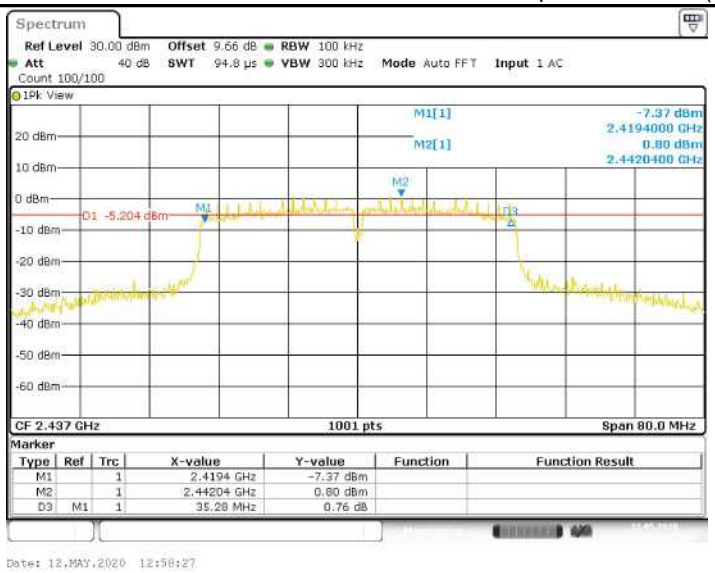
11N20SISO_Ant1_2462



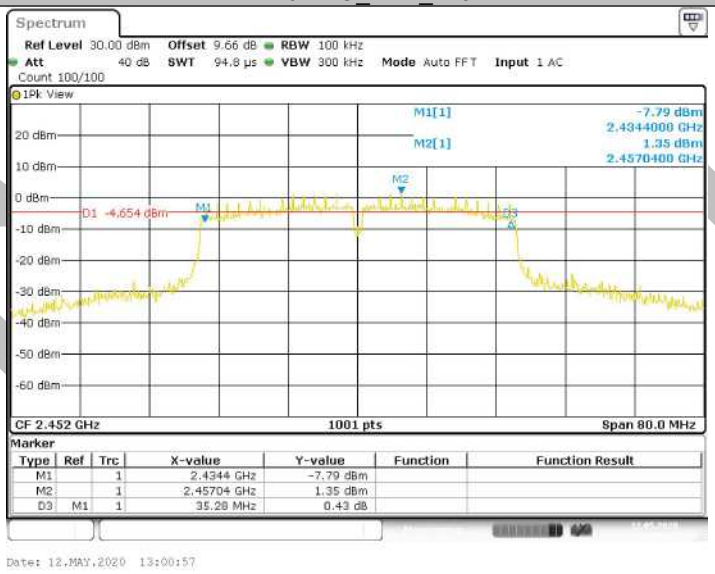
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



Test Graphs(OCB):

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

11G_Ant1_2412

11G_Ant1_2437

11G_Ant1_2462

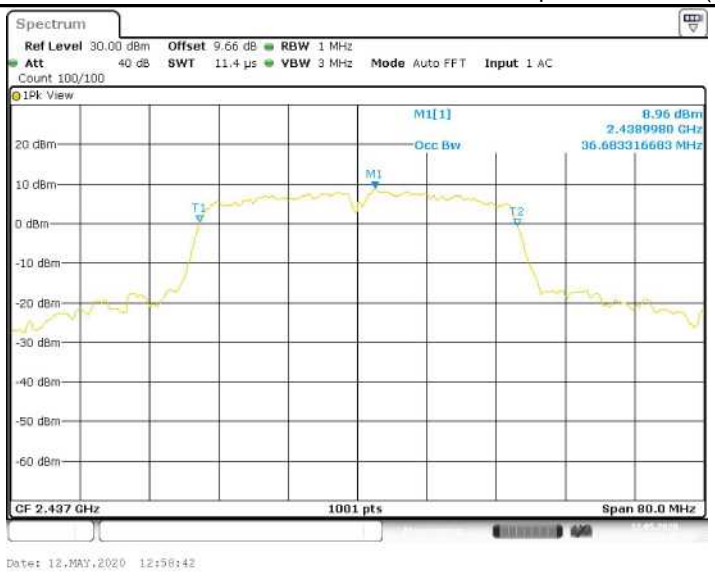
11N20SISO_Ant1_2412

11N20SISO_Ant1_2437

11N20SISO_Ant1_2462

11N40SISO_Ant1_2422

11N40SISO_Ant1_2437



11N40SISO_Ant1_2452

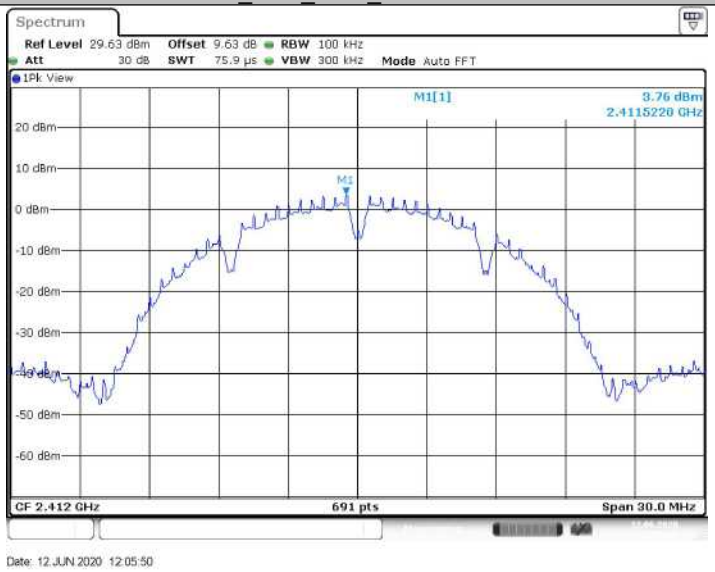
A.3 Conducted Spurious Emission

Test Result

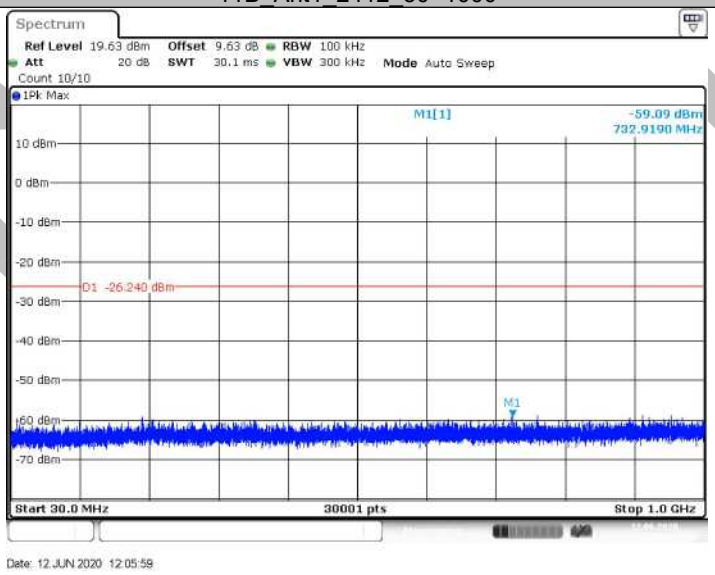
TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	3.76	3.76	---	PASS
			30~1000	30~1000	-59.09	<=-26.24	PASS
			1000~26500	1000~26500	-50.37	<=-26.24	PASS
		2437	Reference	3.42	3.42	---	PASS
			30~1000	30~1000	-58.72	<=-26.58	PASS
			1000~26500	1000~26500	-50.45	<=-26.58	PASS
		2462	Reference	4.14	4.14	---	PASS
			30~1000	30~1000	-58.5	<=-25.86	PASS
			1000~26500	1000~26500	-50.79	<=-25.86	PASS
11G	Ant1	2412	Reference	4.61	4.61	---	PASS
			30~1000	30~1000	-57.13	<=-25.39	PASS
			1000~26500	1000~26500	-47	<=-25.39	PASS
		2437	Reference	4.77	4.77	---	PASS
			30~1000	30~1000	-57.96	<=-25.23	PASS
			1000~26500	1000~26500	-49.4	<=-25.23	PASS
		2462	Reference	4.96	4.96	---	PASS
			30~1000	30~1000	-59.21	<=-25.04	PASS
			1000~26500	1000~26500	-49.73	<=-25.04	PASS
11N20SISO	Ant1	2412	Reference	4.74	4.74	---	PASS
			30~1000	30~1000	-58.03	<=-25.26	PASS
			1000~26500	1000~26500	-49.67	<=-25.26	PASS
		2437	Reference	4.23	4.23	---	PASS
			30~1000	30~1000	-57.82	<=-25.77	PASS
			1000~26500	1000~26500	-47.06	<=-25.77	PASS
		2462	Reference	4.91	4.91	---	PASS
			30~1000	30~1000	-57.9	<=-25.09	PASS
			1000~26500	1000~26500	-49.79	<=-25.09	PASS
11N40SISO	Ant1	2422	Reference	0.25	0.25	---	PASS
			30~1000	30~1000	-57.94	<=-29.75	PASS
			1000~26500	1000~26500	-48.29	<=-29.75	PASS
		2437	Reference	0.44	0.44	---	PASS
			30~1000	30~1000	-58.22	<=-29.56	PASS
			1000~26500	1000~26500	-49.86	<=-29.56	PASS
		2452	Reference	0.75	0.75	---	PASS
			30~1000	30~1000	-57.94	<=-29.25	PASS
			1000~26500	1000~26500	-46.68	<=-29.25	PASS

Test Graphs

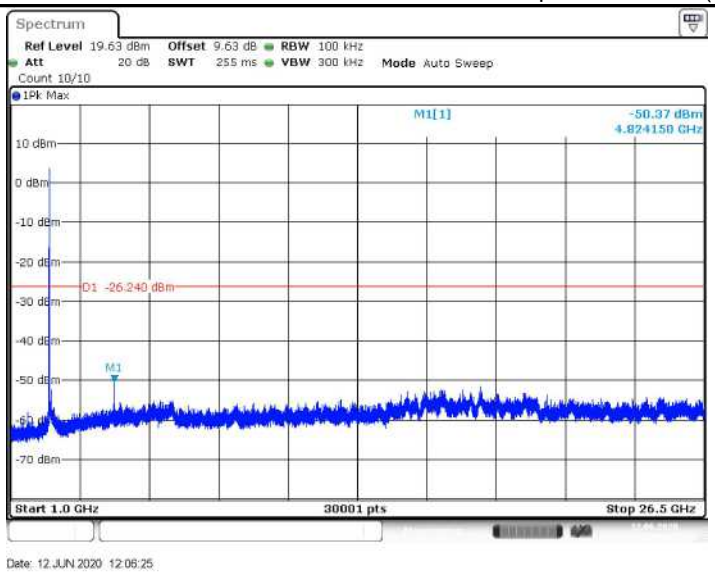
11B_Ant1_2412_0~Reference



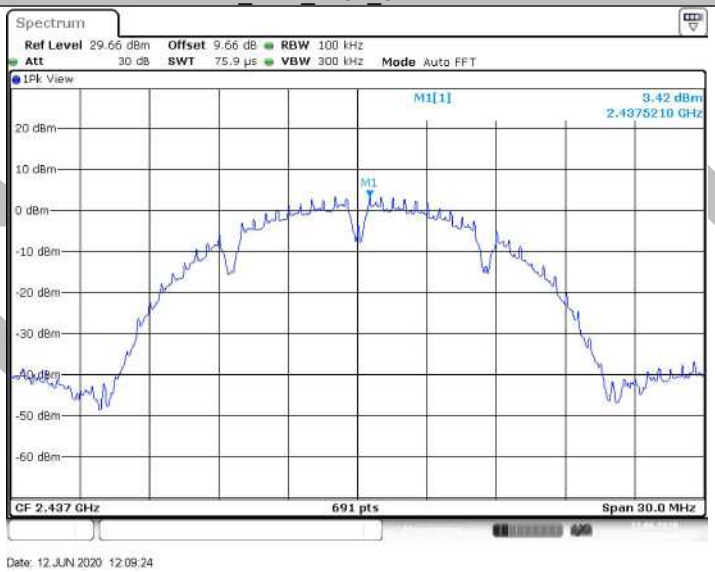
11B_Ant1_2412_30~1000



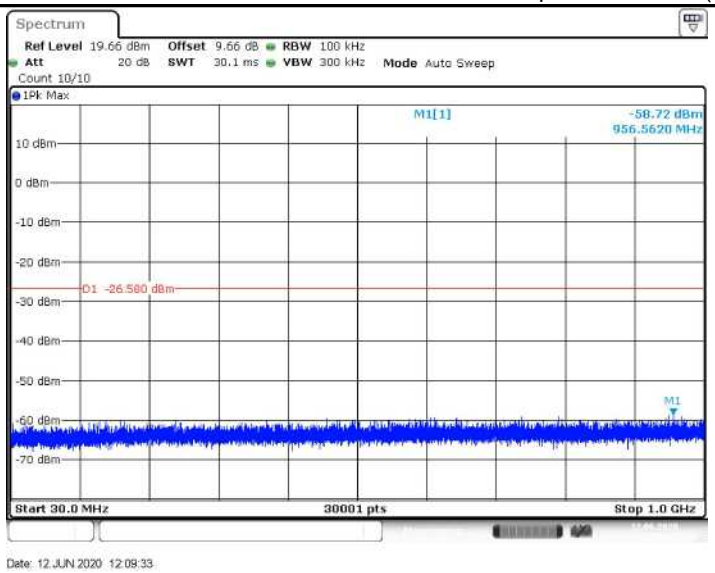
11B_Ant1_2412_1000~26500



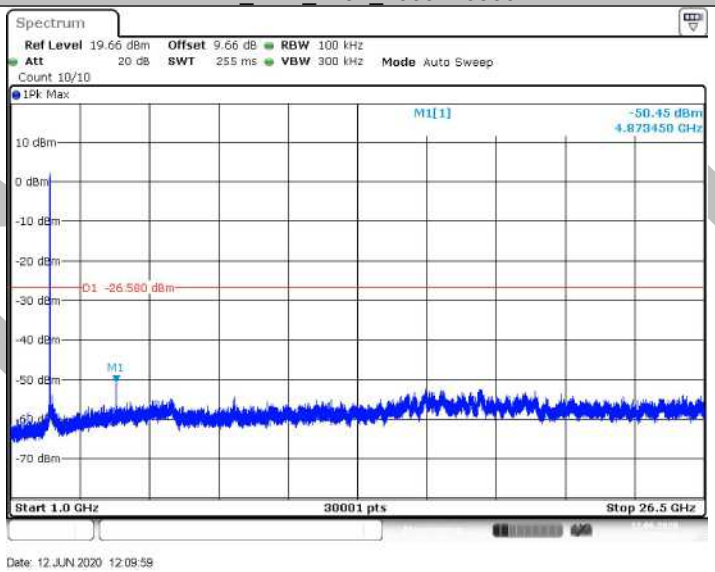
11B_Ant1_2437_0~Reference



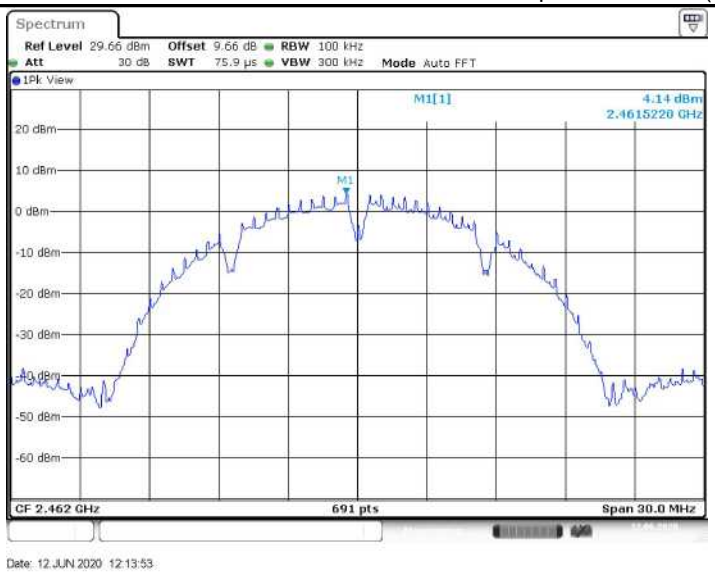
11B_Ant1_2437_30~1000



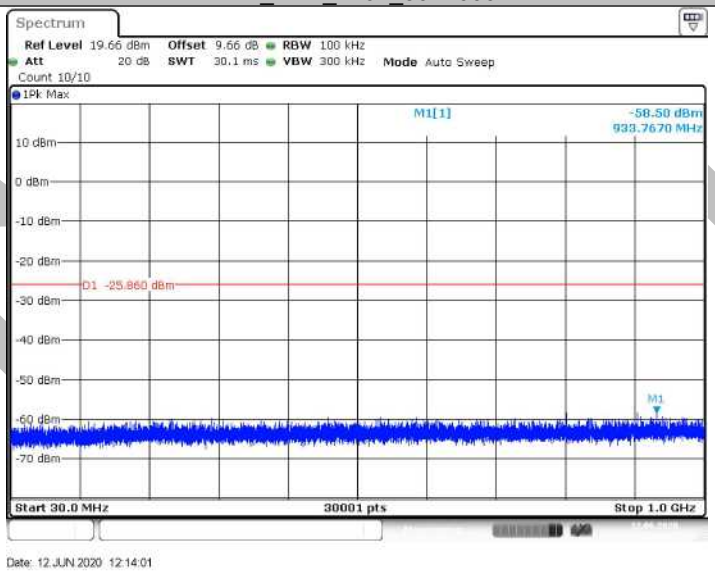
11B_Ant1_2437_1000~26500



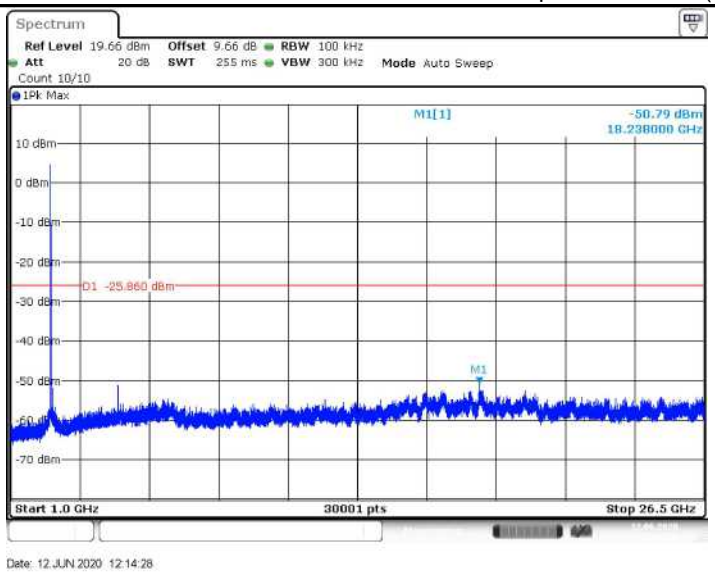
11B_Ant1_2462_0~Reference



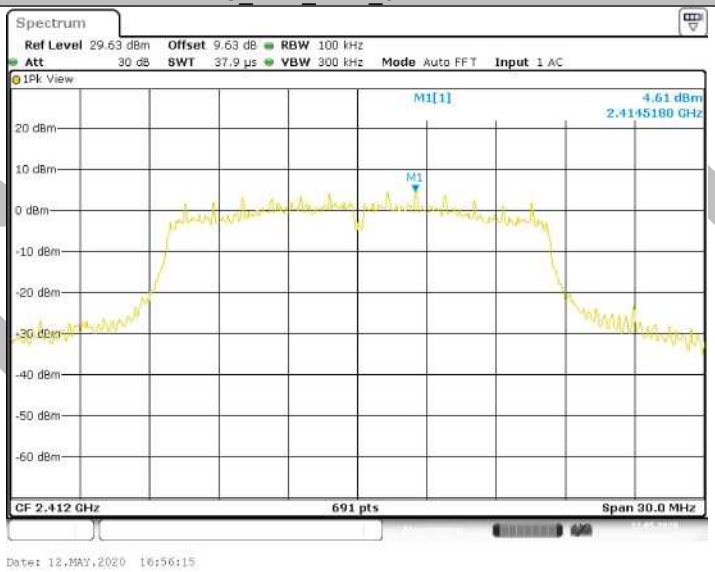
11B_Ant1_2462_30~1000



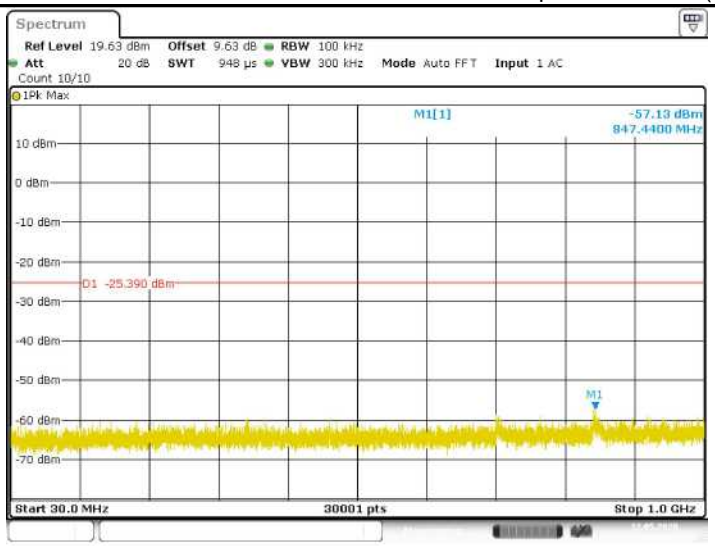
11B_Ant1_2462_1000~26500



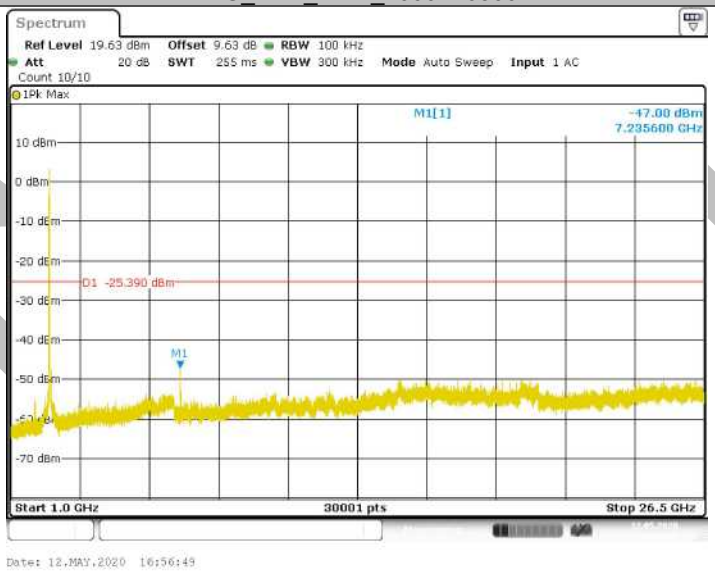
11G_Ant1_2412_0~Reference



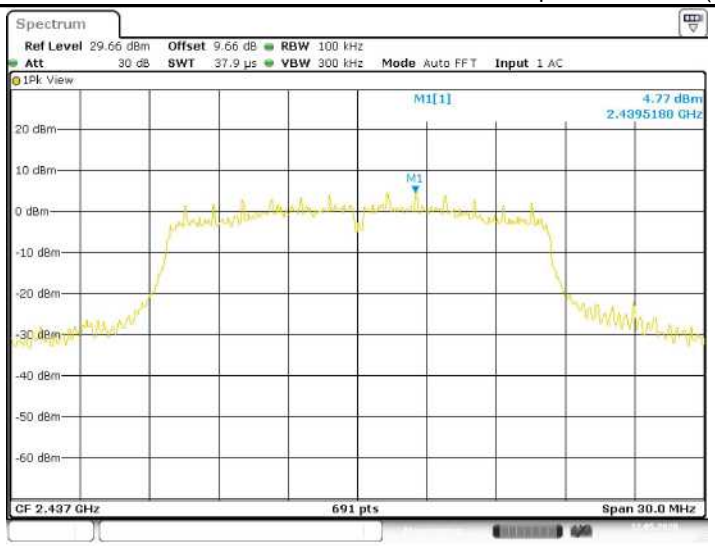
11G_Ant1_2412_30~1000



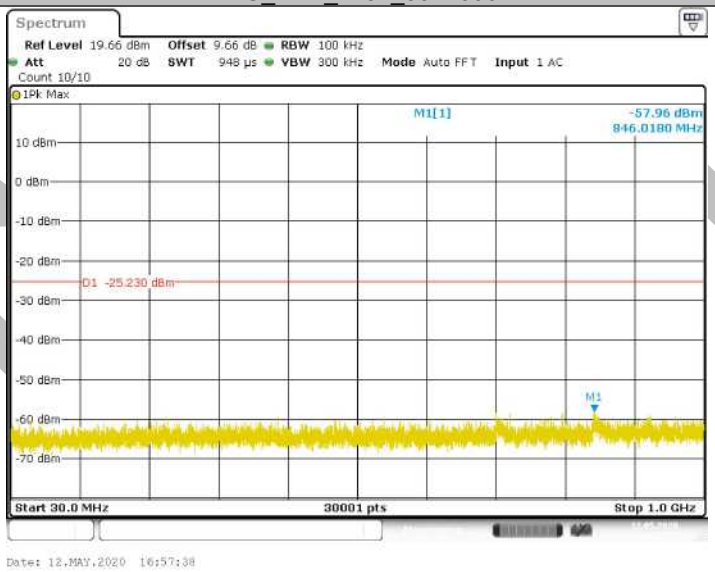
11G_Ant1_2412_1000~26500



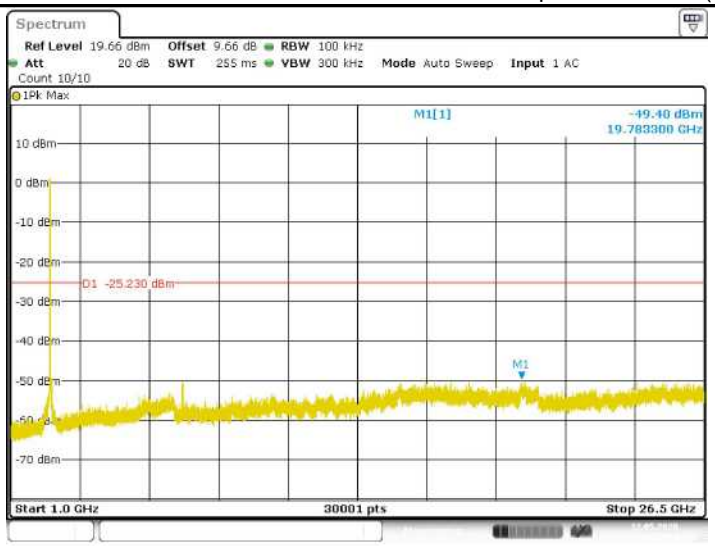
11G_Ant1_2437_0~Reference



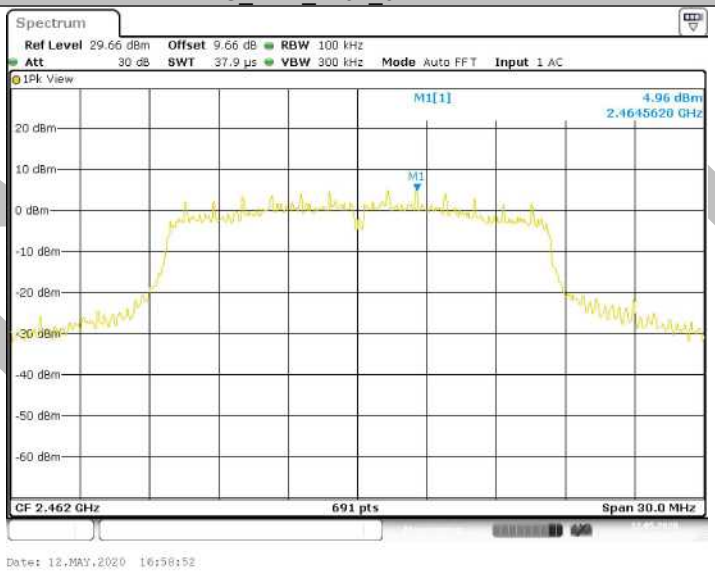
11G_Ant1_2437_30~1000



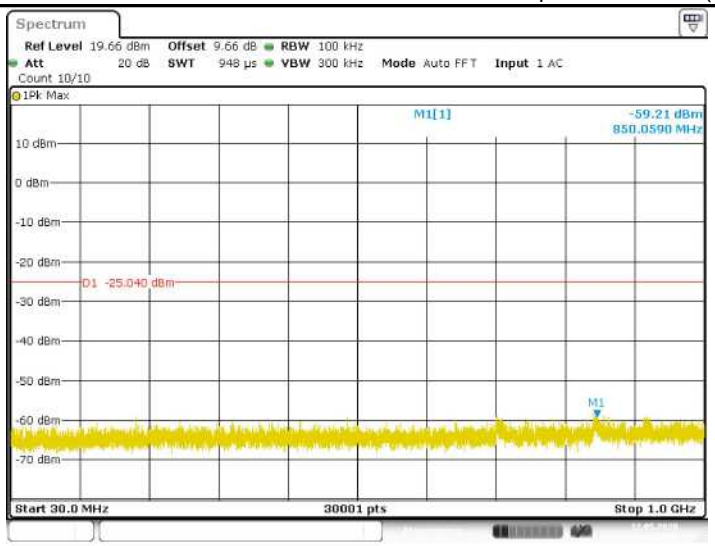
11G_Ant1_2437_1000~26500



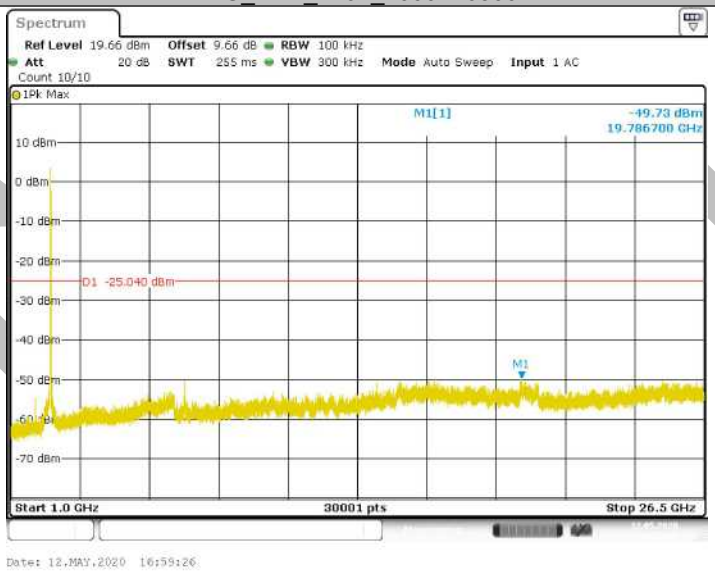
11G_Ant1_2462_0~Reference



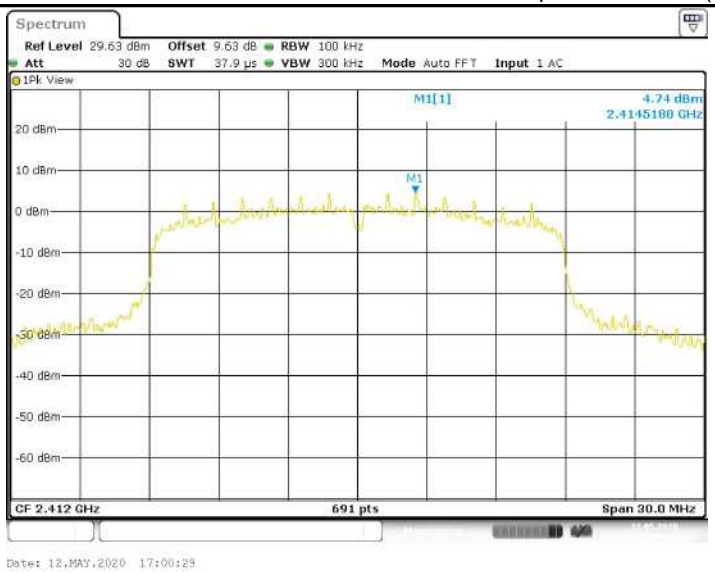
11G_Ant1_2462_30~1000



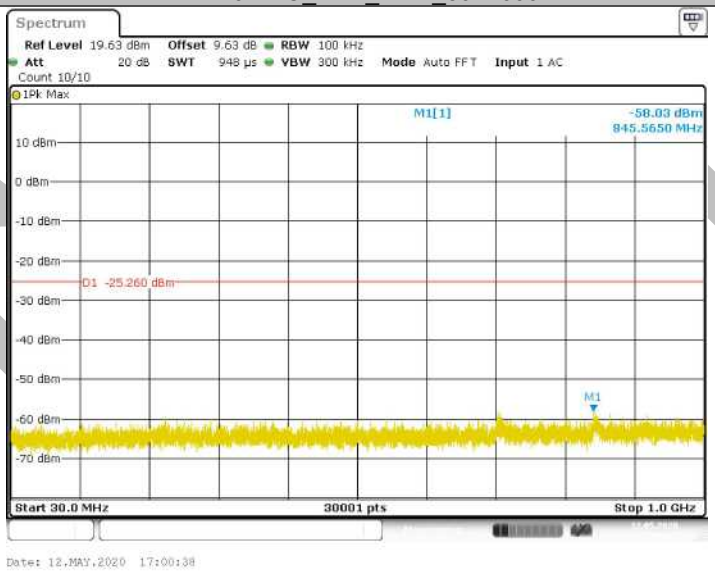
11G_Ant1_2462_1000~26500



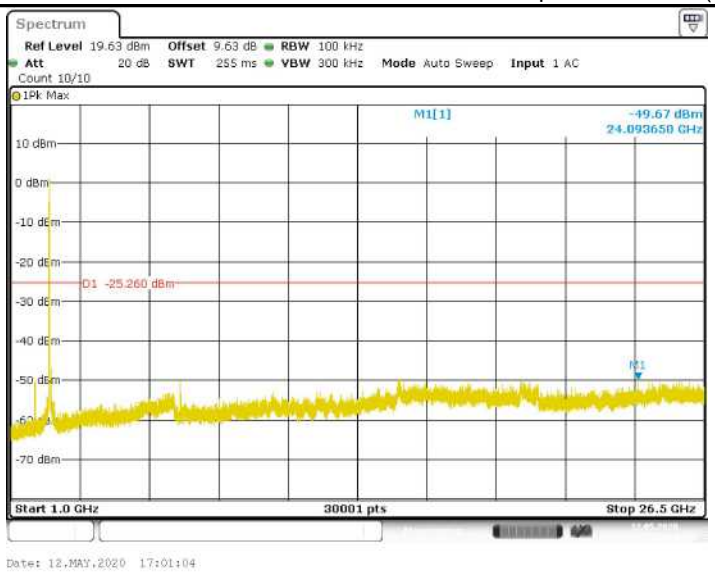
11N20SISO_Ant1_2412_0~Reference



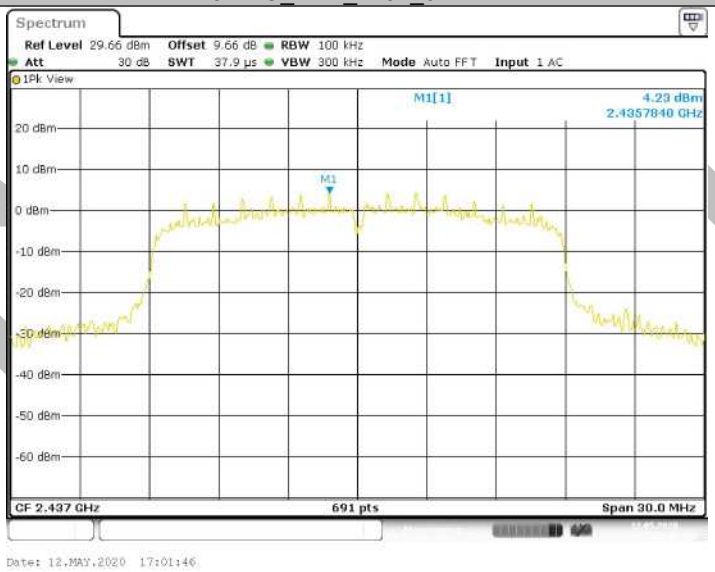
11N20SISO_Ant1_2412_30~1000



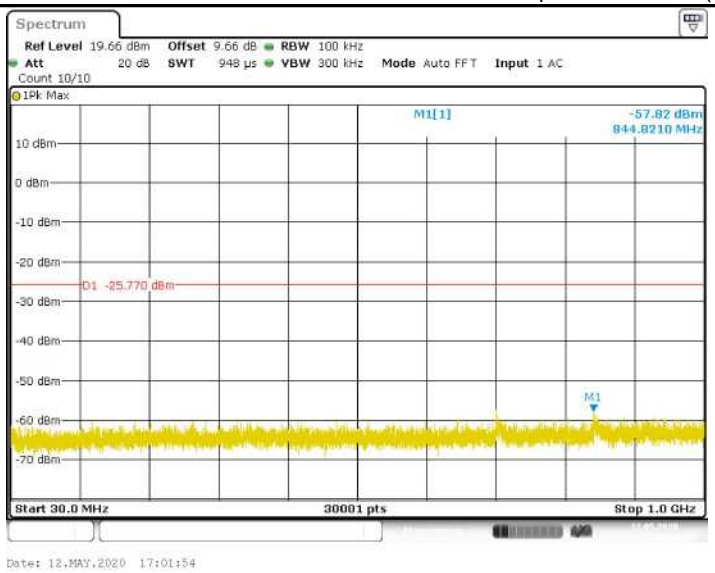
11N20SISO_Ant1_2412_1000~26500



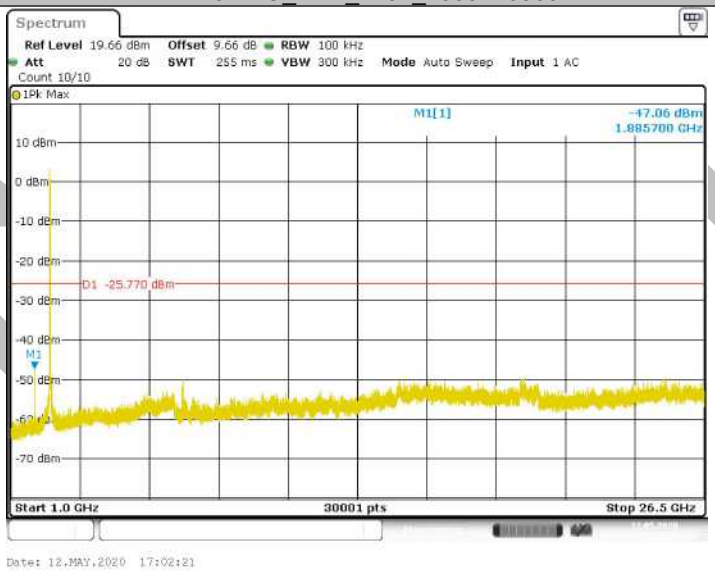
11N20SISO_Ant1_2437_0~Reference



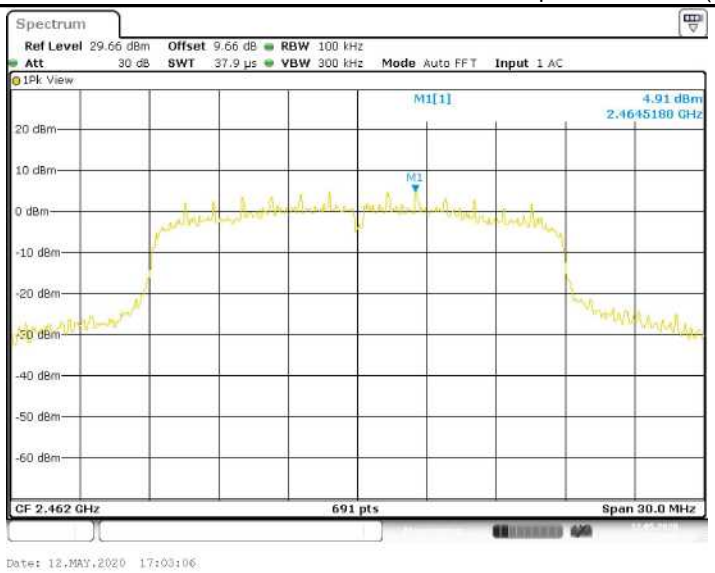
11N20SISO_Ant1_2437_30~1000



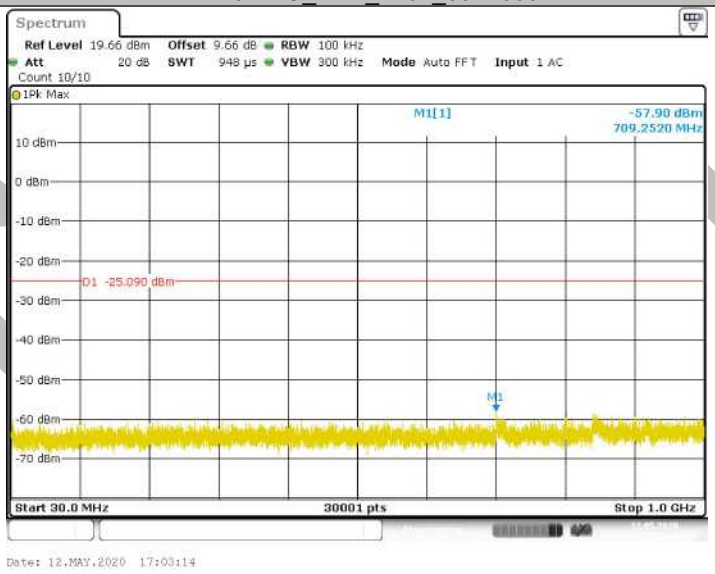
11N20SISO_Ant1_2437_1000~26500



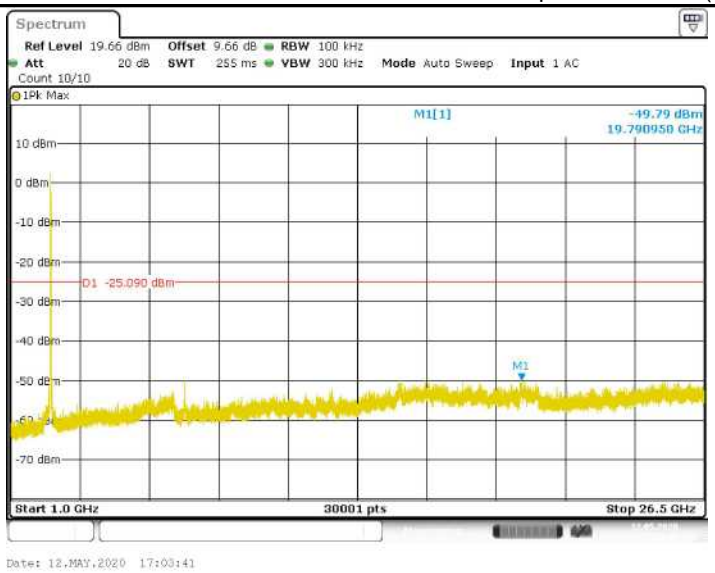
11N20SISO_Ant1_2462_0~Reference



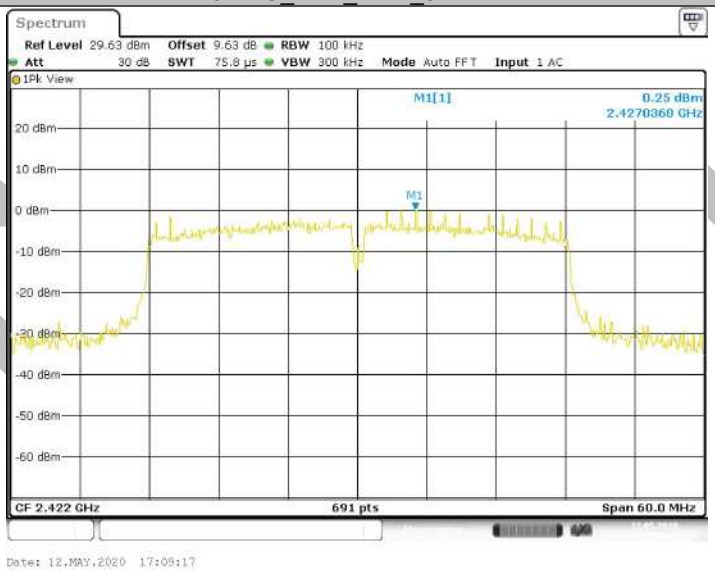
11N20SISO_Ant1_2462_30~1000



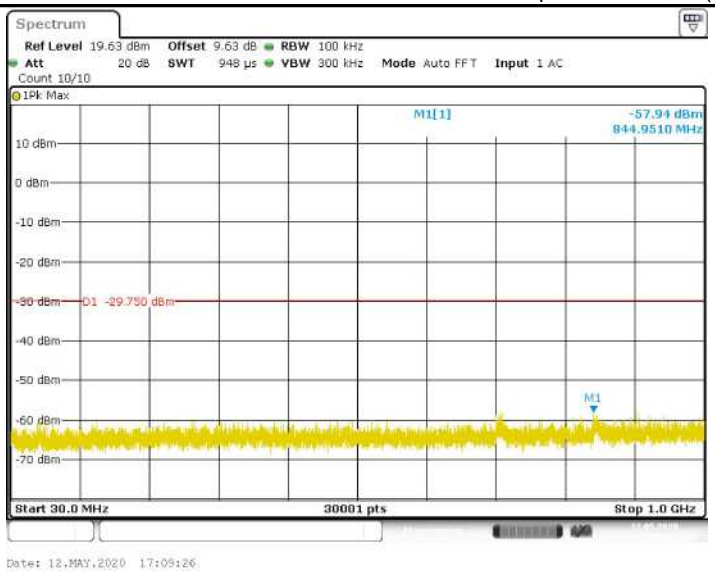
11N20SISO_Ant1_2462_1000~26500



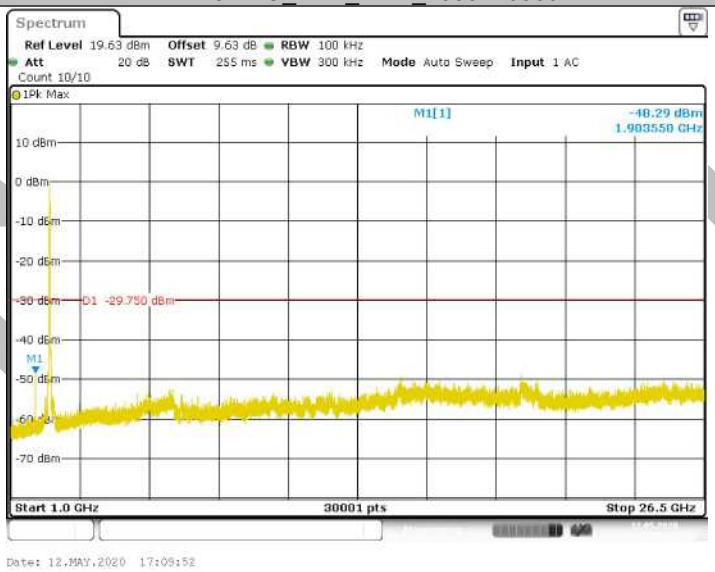
11N40SISO_Ant1_2422_0~Reference



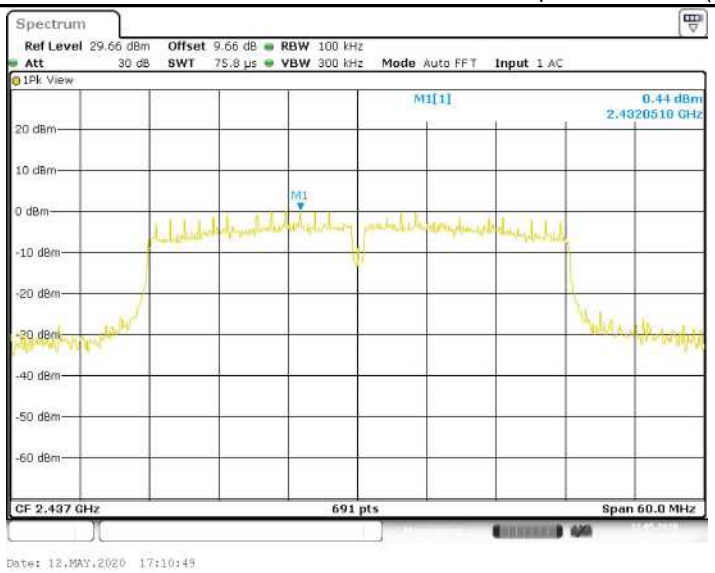
11N40SISO_Ant1_2422_30~1000



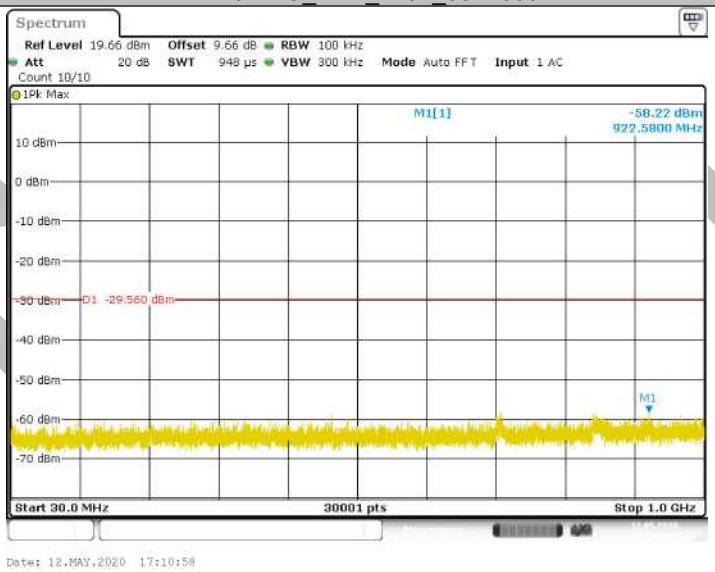
11N40SISO_Ant1_2422_1000~26500



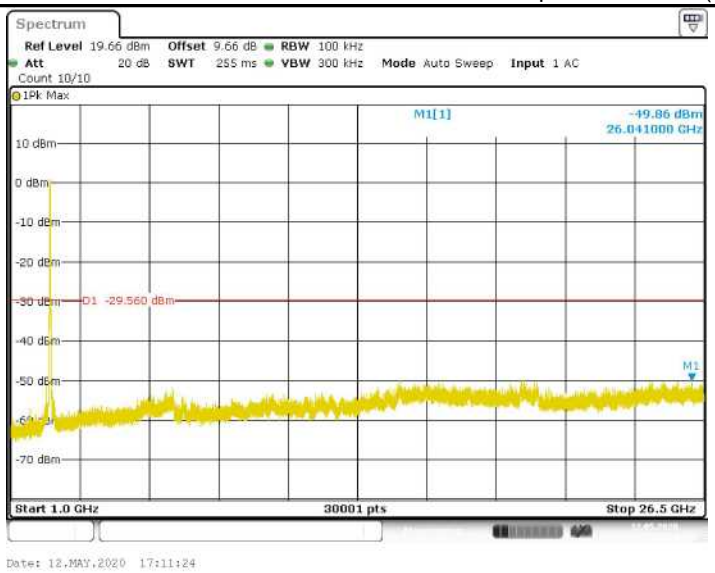
11N40SISO_Ant1_2437_0~Reference



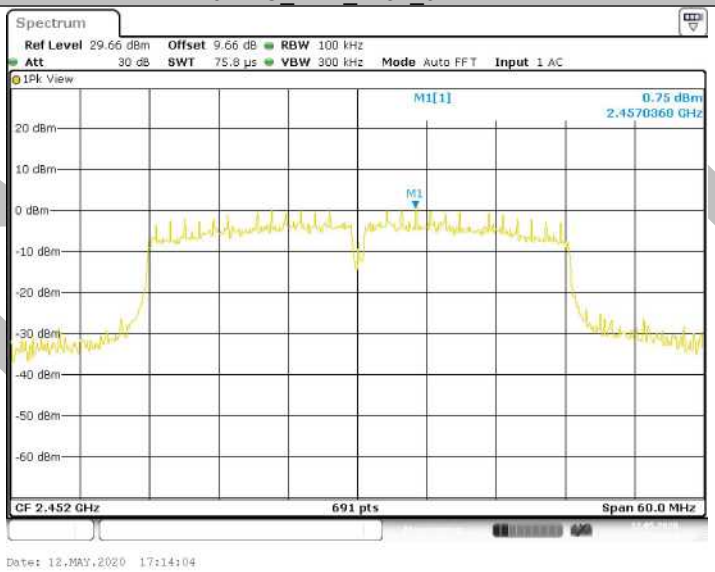
11N40SISO_Ant1_2437_30~1000



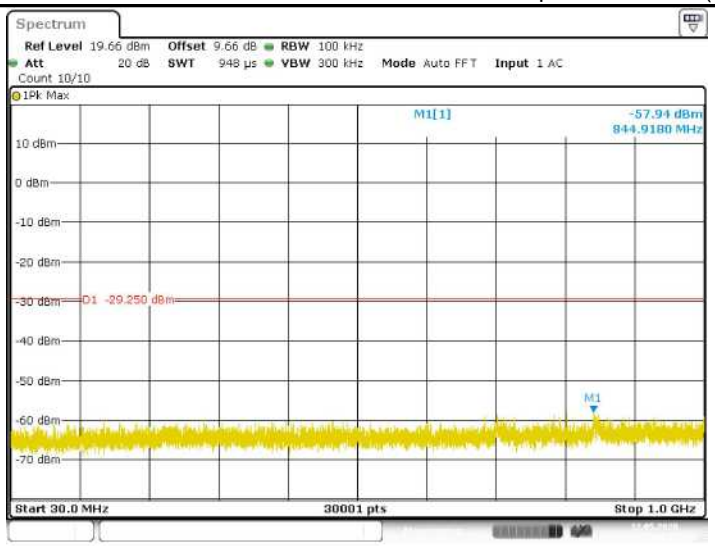
11N40SISO_Ant1_2437_1000~26500



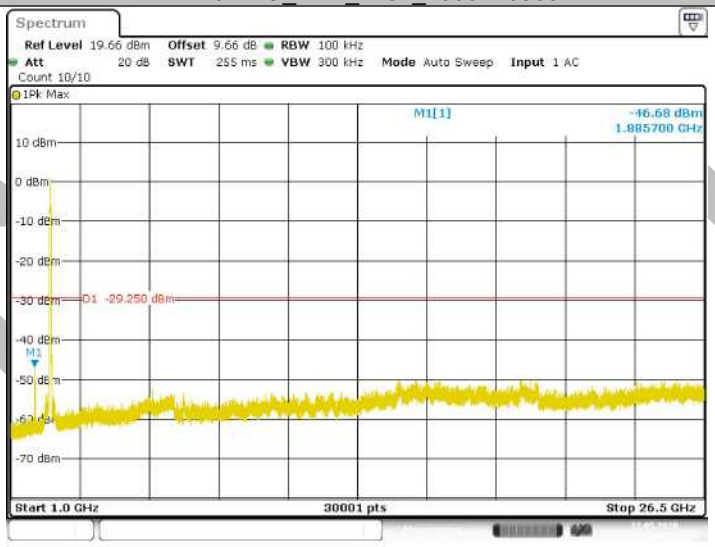
11N40SISO_Ant1_2452_0~Reference



11N40SISO_Ant1_2452_30~1000



11N40SISO_Ant1_2452_1000~26500



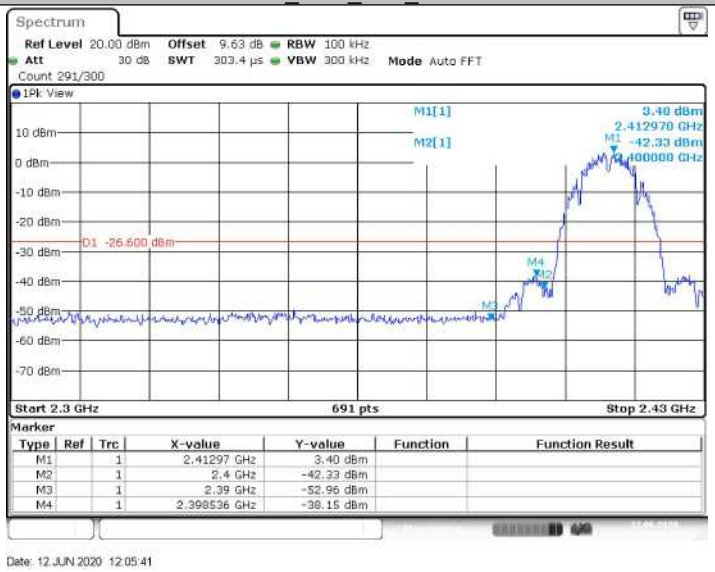
A.4 Band Edge (Authorize band-edge)

Test Result

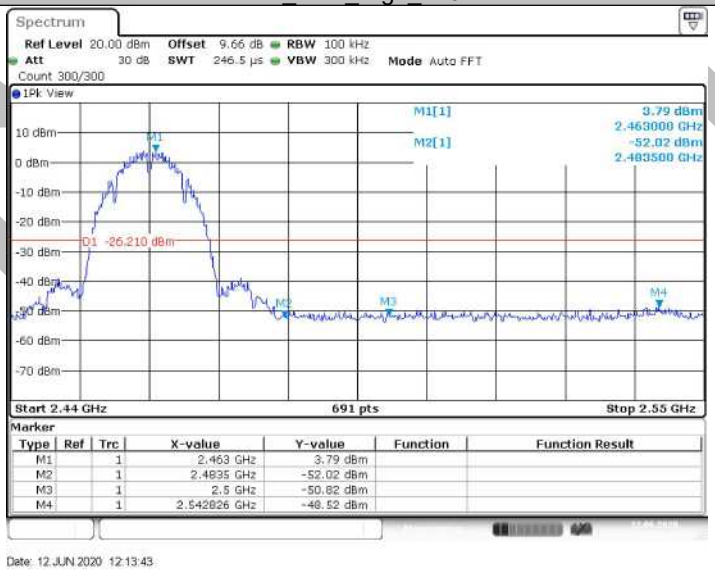
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	3.40	-38.15	<=-26.6	PASS
		High	2462	3.79	-48.52	<=-26.21	PASS
11G	Ant1	Low	2412	4.61	-26.62	<=-25.39	PASS
		High	2462	3.11	-40.21	<=-26.89	PASS
11N20SISO	Ant1	Low	2412	4.70	-26.88	<=-25.3	PASS
		High	2462	5.05	-38.57	<=-24.95	PASS
11N40SISO	Ant1	Low	2422	1.22	-29.94	<=-28.78	PASS
		High	2452	2.64	-31.27	<=-27.36	PASS

Test Graphs:

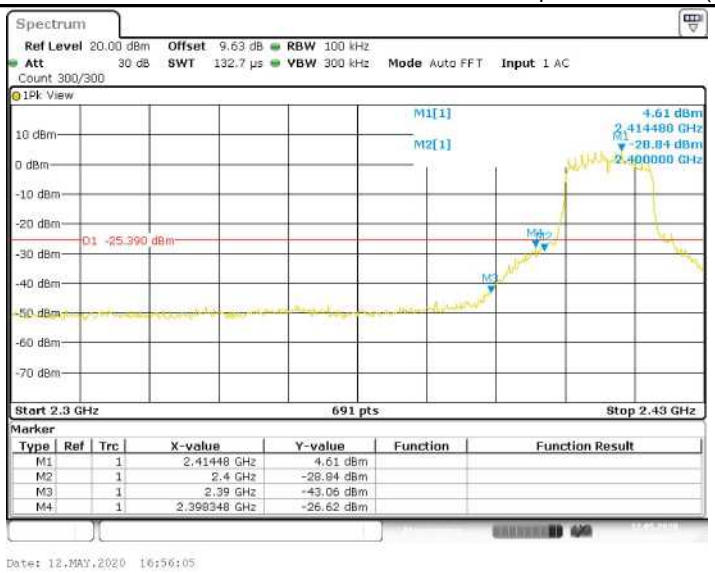
11B_Ant1_Low_2412



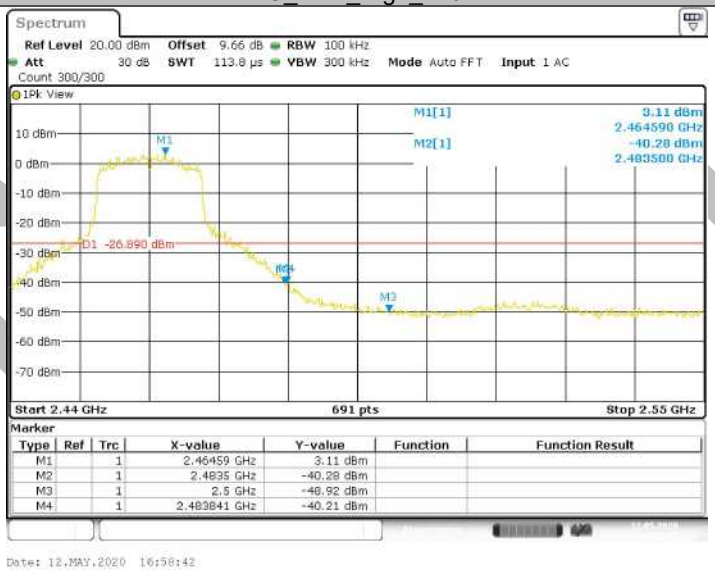
11B_Ant1_High_2462



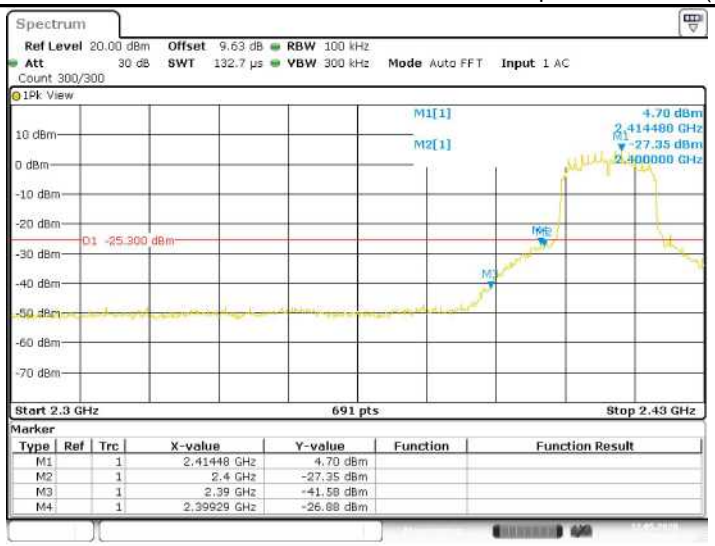
11G_Ant1_Low_2412



11G_Ant1_High_2462

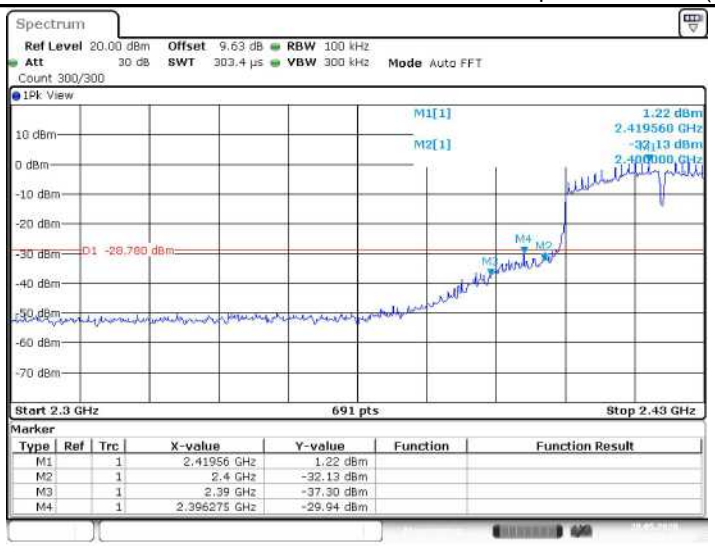


11N20SISO_Ant1_Low_2412

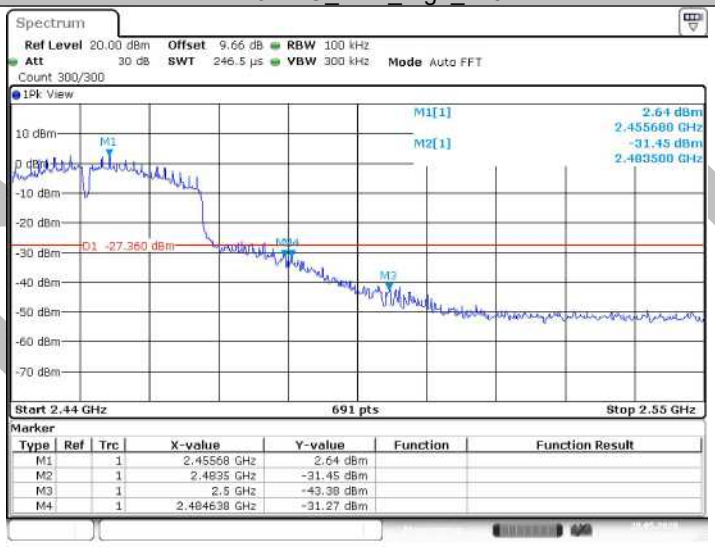


11N20SISO_Ant1_High_2462

11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452

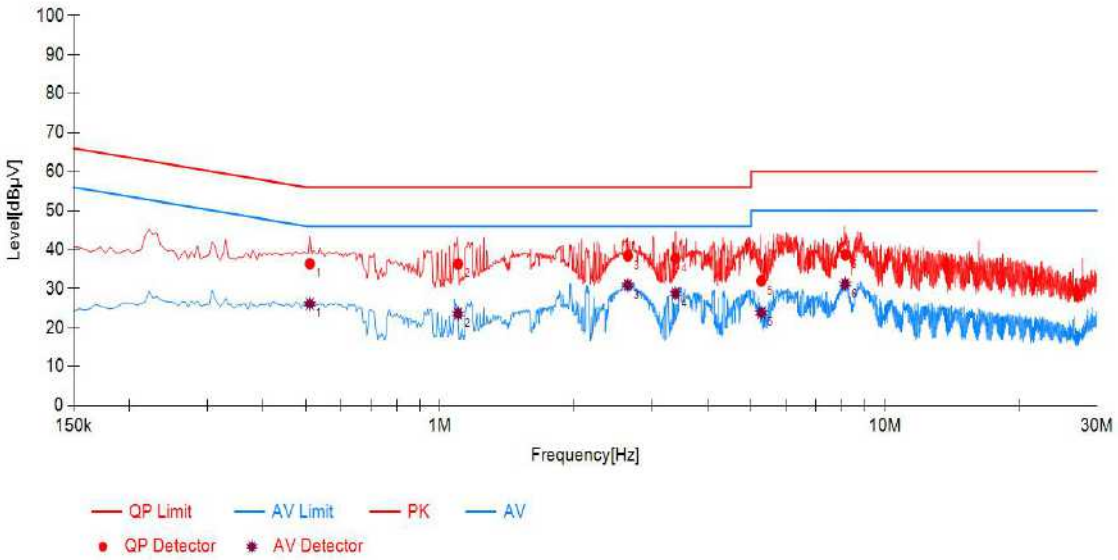


A.5 Conducted Emission

Note 1: The EUT is working in the Normal link mode.

Test Data and Plots：

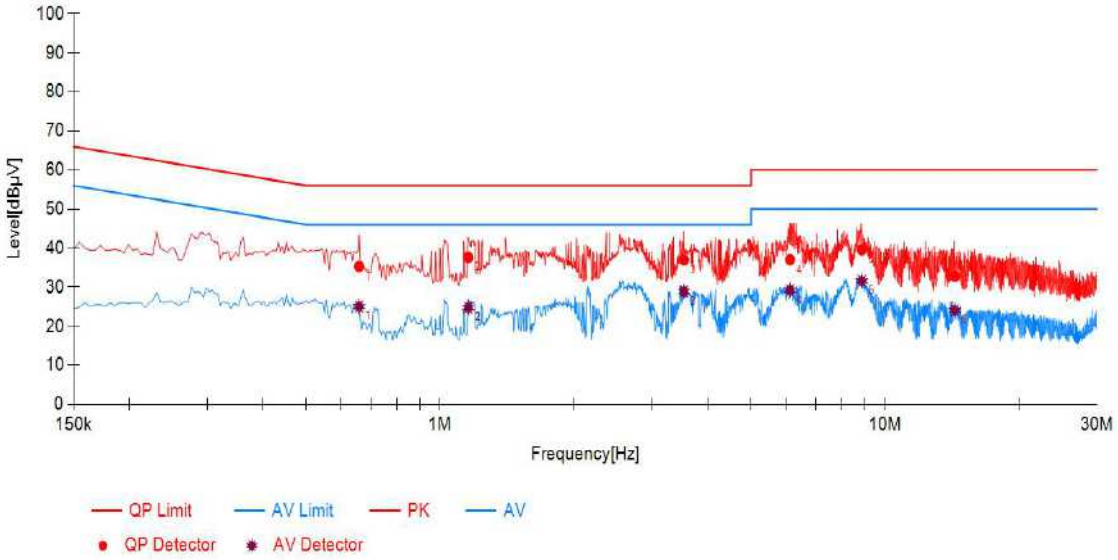
PHASE L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Result	Type
1	0.5096	19.60	16.78	36.38	56.00	19.62	6.48	26.08	46.00	19.92	PASS	L
2	1.0986	19.61	16.71	36.32	56.00	19.68	3.98	23.59	46.00	22.41	PASS	L
3	2.6418	19.80	18.62	38.42	56.00	17.58	11.08	30.88	46.00	15.12	PASS	L
4	3.3835	19.80	17.90	37.70	56.00	18.30	8.92	28.72	46.00	17.28	PASS	L
5	5.2742	19.80	12.16	31.96	60.00	28.04	3.98	23.78	50.00	26.22	PASS	L
6	8.1395	19.84	18.84	38.68	60.00	21.32	11.34	31.18	50.00	18.82	PASS	L

PHASE N



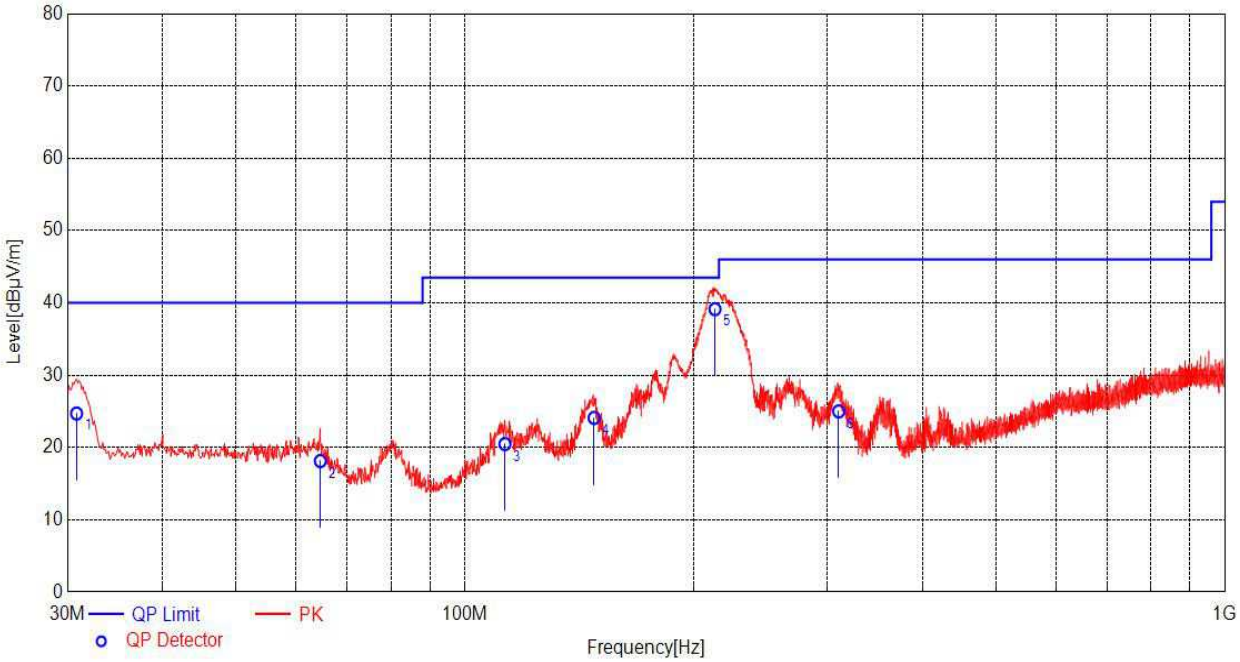
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Result	Type
1	0.6582	19.70	15.57	35.27	56.00	20.73	5.32	25.02	46.00	20.98	PASS	N
2	1.1583	19.70	17.90	37.60	56.00	18.40	5.06	24.76	46.00	21.24	PASS	N
3	3.5372	19.80	17.17	36.97	56.00	19.03	9.08	28.88	46.00	17.12	PASS	N
4	6.1240	19.80	17.23	37.03	60.00	22.97	9.40	29.20	50.00	20.80	PASS	N
5	8.8712	19.86	19.73	39.59	60.00	20.41	11.70	31.56	50.00	18.44	PASS	N
6	14.3516	20.07	12.71	32.78	60.00	27.22	3.98	24.05	50.00	25.95	PASS	N

A.6 Radiated Emission

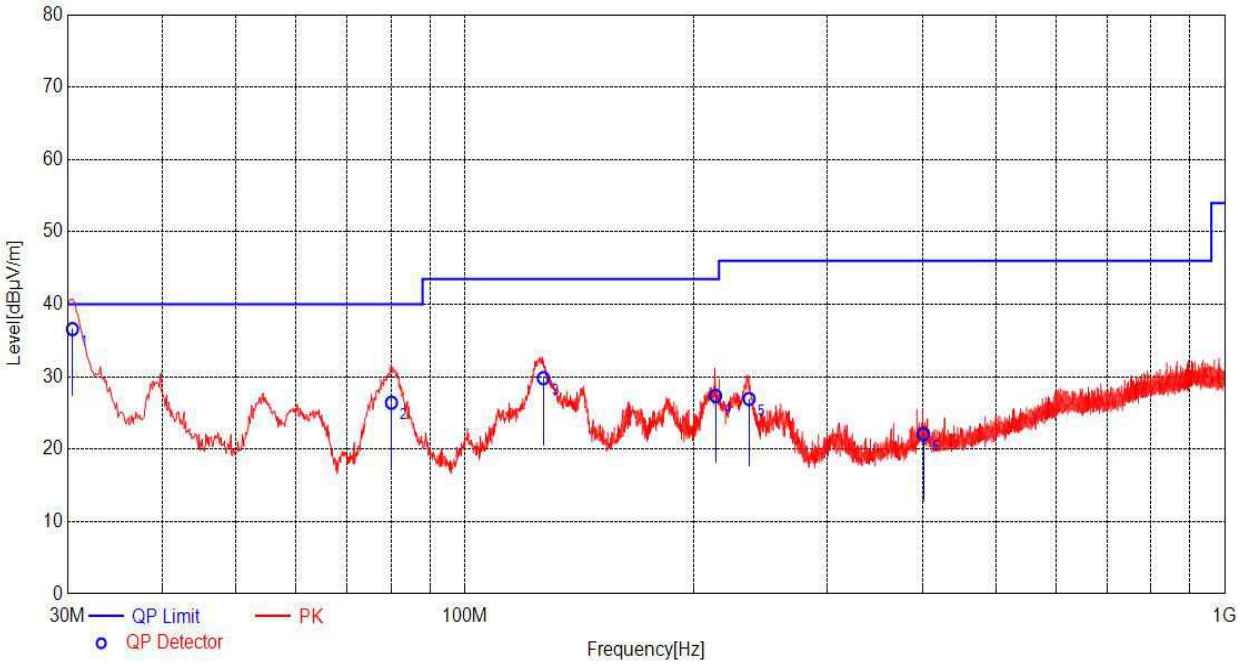
Note 1: The symbol of “--” in the table which means not application.
Note 2: For the test data above 1 GHz，According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.
Note 4: The EUT is working in the Normal link mode below 1 GHz.
Note 5: The emission in 1GHz-4GHz and 18GHz-25GHz only show the worst test data，because of they are noisy.
Test Data and Plots：

30 MHz to 1 GHz, ANT H



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.8488	14.97	24.71	40.00	15.29	100	318	Horizontal
2	64.5563	13.28	18.13	40.00	21.87	200	358	Horizontal
3	112.9350	14.51	20.48	43.50	23.02	200	353	Horizontal
4	147.9763	15.64	24.10	43.50	19.40	200	228	Horizontal
5	213.4112	12.50	39.14	43.50	4.36	125	192.9	Horizontal
6	310.4513	14.77	25.00	46.00	21.00	100	234	Horizontal

30 MHz to 1 GHz, ANT V



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.4696	14.94	36.58	40.00	3.42	101.5	294.7	Vertical
2	80.0763	10.80	26.42	40.00	13.58	100	79	Vertical
3	126.8788	14.58	29.81	43.50	13.69	100	287	Vertical
4	213.8150	12.50	27.36	43.50	16.14	100	191	Vertical
5	236.6100	13.01	26.94	46.00	19.06	100	164	Vertical
6	401.2675	16.34	22.08	46.00	23.92	200	195	Vertical

above 1GHz(4GHz-18GHz)：

802.11b CH1, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4320.639	-2.12	40.20	38.08	74.00	35.92	Peak	150	124
2	4824.235	-0.63	48.42	47.79	74.00	26.21	Peak	150	269
3	6713.687	5.33	37.61	42.94	74.00	31.06	Peak	100	0
4	7635.413	8.04	37.65	45.68	74.00	28.32	Peak	100	92
5	9769.498	11.64	35.02	46.65	74.00	27.35	Peak	150	0
6	11689.040	16.04	33.05	49.10	74.00	24.90	Peak	150	28

802.11b CH1, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4677.757	-1.15	39.34	38.19	74.00	35.81	Peak	100	257
2	4824.235	-0.63	51.42	50.79	74.00	23.21	Peak	150	31
3	7628.908	8.06	36.35	44.41	74.00	29.59	Peak	150	212
4	8006.274	8.86	37.71	46.57	74.00	27.43	Peak	150	332
5	10712.000	14.98	34.19	49.17	74.00	24.83	Peak	150	79
6	14494.720	19.12	32.08	51.20	74.00	22.80	Peak	100	233

802.11b CH6, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4874.318	0.08	49.03	49.11	74.00	24.89	Peak	200	240
2	5866.349	3.01	36.47	39.49	74.00	34.51	Peak	200	260
3	6829.795	5.78	37.50	43.27	74.00	30.73	Peak	150	158
4	7620.116	8.09	36.20	44.29	74.00	29.71	Peak	200	289
5	7989.033	8.82	36.43	45.25	74.00	28.75	Peak	100	123
6	11471.900	16.42	32.23	48.65	74.00	25.35	Peak	100	242

802.11b CH6, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4874.318	0.08	50.78	50.87	74.00	23.13	Peak	200	60
2	5820.354	2.39	37.36	39.75	74.00	34.25	Peak	200	40
3	6547.808	4.92	37.51	42.43	74.00	31.57	Peak	100	148
4	7981.026	8.79	35.99	44.78	74.00	29.22	Peak	150	14
5	9567.371	11.28	34.59	45.87	74.00	28.13	Peak	100	50
6	10691.080	14.97	32.45	47.42	74.00	26.58	Peak	150	231

802.11b CH11, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4923.934	0.58	50.75	51.33	74.00	22.67	Peak	150	211
2	6130.042	3.58	37.52	41.10	74.00	32.90	Peak	100	168
3	6960.463	6.10	36.87	42.97	74.00	31.03	Peak	200	316
4	7968.631	8.74	36.29	45.03	74.00	28.97	Peak	200	2
5	9399.537	10.61	34.80	45.41	74.00	28.59	Peak	100	40
6	11224.420	16.22	32.77	48.98	74.00	25.02	Peak	100	208

802.11b CH11, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4924.181	0.57	52.82	53.39	74.00	20.61	Peak	200	261
2	4924.181	0.57	51.63	52.20	54.00	1.80	Average	200	254
3	6565.560	4.94	36.55	41.48	74.00	32.52	Peak	200	251
4	7616.296	8.10	36.58	44.68	74.00	29.32	Peak	100	142
5	8137.391	8.59	36.60	45.19	74.00	28.81	Peak	150	286
6	11370.550	15.79	33.21	48.99	74.00	25.01	Peak	100	83
7	14479.470	19.04	31.72	50.76	74.00	23.24	Peak	100	113

802.11G CH1, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4829.317	-0.57	49.07	48.50	74.00	25.50	Peak	150	238
2	6109.792	3.41	36.45	39.87	74.00	34.13	Peak	100	180
3	6827.741	5.77	37.80	43.57	74.00	30.43	Peak	100	141
4	7972.627	8.75	35.85	44.61	74.00	29.39	Peak	100	357
5	9895.696	12.10	34.24	46.33	74.00	27.67	Peak	100	347
6	11204.180	16.26	32.59	48.85	74.00	25.15	Peak	150	169

802.11G CH1, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4827.623	-0.59	53.15	52.57	74.00	21.43	Peak	150	279
2	5321.036	1.30	39.27	40.57	74.00	33.43	Peak	100	326
3	6304.273	4.09	36.93	41.02	74.00	32.98	Peak	150	14
4	7230.073	6.71	40.45	47.16	74.00	26.84	Peak	150	268
5	8195.119	8.63	35.80	44.43	74.00	29.57	Peak	100	130
6	11211.480	16.25	31.84	48.09	74.00	25.91	Peak	150	63

802.11G CH6, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4872.364	0.05	52.68	52.73	74.00	21.27	Peak	150	198
2	6121.750	3.57	36.92	40.49	74.00	33.51	Peak	150	70
3	7314.294	6.41	40.68	47.08	74.00	26.92	Peak	100	132
4	7958.251	8.70	36.41	45.11	74.00	28.89	Peak	100	260
5	9750.415	11.58	35.58	47.16	74.00	26.84	Peak	100	329
6	11198.560	16.26	32.57	48.83	74.00	25.17	Peak	100	349

802.11G CH6, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4872.364	0.05	52.68	52.73	74.00	21.27	Peak	150	198
2	6121.750	3.57	36.92	40.49	74.00	33.51	Peak	150	70
3	7314.294	6.41	40.68	47.08	74.00	26.92	Peak	100	132
4	7958.251	8.70	36.41	45.11	74.00	28.89	Peak	100	260
5	9750.415	11.58	35.58	47.16	74.00	26.84	Peak	100	329
6	11198.560	16.26	32.57	48.83	74.00	25.17	Peak	100	349

802.11G CH11, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4923.687	0.58	57.14	57.72	74.00	16.28	Peak	150	198
2	4923.687	0.58	47.65	48.23	54.00	5.77	Average	150	164
3	6685.472	5.25	36.36	41.61	74.00	32.39	Peak	100	113
4	7393.192	7.29	40.53	47.82	74.00	26.18	Peak	150	208
5	9841.271	12.16	35.44	47.61	74.00	26.39	Peak	100	142
6	11177.250	16.13	33.25	49.37	74.00	24.63	Peak	100	74
7	14440.320	18.82	31.25	50.08	74.00	23.92	Peak	100	182

802.11G CH11, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4924.181	0.57	61.90	62.47	74.00	11.53	Peak	150	280
2	4924.181	0.57	48.04	48.61	54.00	5.39	Average	150	257
3	5782.252	2.04	37.76	39.80	74.00	34.20	Peak	100	178
4	6322.949	4.15	36.44	40.59	74.00	33.41	Peak	100	50
5	7384.671	7.19	41.79	48.98	74.00	25.02	Peak	150	251
6	9130.146	9.97	34.85	44.82	74.00	29.18	Peak	150	74
7	11285.360	15.82	32.39	48.21	74.00	25.79	Peak	100	100

802.11N20 CH1, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4829.560	-0.56	51.16	50.60	74.00	23.40	Peak	150	197
2	6533.708	4.90	36.35	41.25	74.00	32.75	Peak	150	227
3	7242.044	6.66	38.13	44.78	74.00	29.22	Peak	100	348
4	8000.256	8.86	36.55	45.42	74.00	28.58	Peak	150	148
5	9238.353	9.83	35.76	45.59	74.00	28.41	Peak	100	5
6	11191.820	16.22	31.94	48.16	74.00	25.84	Peak	100	280

802.11N20 CH1, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4827.623	-0.59	53.97	53.39	74.00	20.61	Peak	100	266
2	5520.219	2.43	37.35	39.78	74.00	34.22	Peak	150	222
3	6503.640	4.86	36.63	41.49	74.00	32.51	Peak	150	349
4	7246.040	6.62	38.93	45.55	74.00	28.45	Peak	150	251
5	9922.025	12.03	33.38	45.41	74.00	28.59	Peak	150	290
6	11222.170	16.24	32.41	48.64	74.00	25.36	Peak	100	128

802.11N20 CH6, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4878.964	0.16	56.27	56.42	74.00	17.58	Peak	150	198
2	4878.964	0.16	45.22	45.38	54.00	8.62	Average	150	198
3	5505.847	2.06	37.29	39.35	74.00	34.65	Peak	100	211
4	6563.256	4.95	37.48	42.43	74.00	31.57	Peak	150	218
5	7317.595	6.39	38.80	45.19	74.00	28.81	Peak	150	198
6	8295.155	8.21	35.61	43.82	74.00	30.18	Peak	150	80
7	11187.340	16.19	31.38	47.56	74.00	26.44	Peak	100	44

802.11N20 CH6, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4870.654	0.02	55.27	55.29	74.00	18.71	Peak	150	260
2	4870.654	0.02	48.63	48.65	54.00	5.35	Average	150	260
3	6106.117	3.32	36.86	40.18	74.00	33.82	Peak	100	346
4	6496.145	4.83	37.17	42.00	74.00	32.00	Peak	100	119
5	6831.165	5.78	36.61	42.40	74.00	31.60	Peak	150	93
6	7315.761	6.39	44.06	50.45	74.00	23.55	Peak	150	270
7	9348.311	10.38	35.08	45.46	74.00	28.54	Peak	100	40

802.11N20 CH11, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4920.232	0.61	54.20	54.81	74.00	19.19	Peak	150	198
2	4920.232	0.61	47.79	48.40	54.00	5.60	Average	150	219
3	6481.505	4.62	37.58	42.20	74.00	31.80	Peak	100	162
4	7393.192	7.29	38.49	45.78	74.00	28.22	Peak	100	24
5	8667.589	8.29	35.70	44.00	74.00	30.00	Peak	100	44
6	9847.194	12.21	34.57	46.78	74.00	27.22	Peak	150	128
7	11471.330	16.42	31.85	48.27	74.00	25.73	Peak	150	0

802.11N20 CH11, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4926.156	0.55	60.57	61.12	74.00	12.88	Peak	150	261
2	4926.156	0.55	49.78	50.33	54.00	3.67	Average	150	270
3	5852.835	2.82	37.11	39.93	74.00	34.07	Peak	150	14
4	6482.155	4.63	36.67	41.30	74.00	32.70	Peak	100	100
5	7393.563	7.29	40.69	47.98	74.00	26.02	Peak	100	267
6	8047.322	8.72	35.36	44.08	74.00	29.92	Peak	100	31
7	10845.480	15.01	32.30	47.31	74.00	26.69	Peak	150	64

802.11N40 CH3, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4841.681	-0.41	47.62	47.21	74.00	26.79	Peak	150	218
2	6175.388	3.52	36.69	40.21	74.00	33.79	Peak	150	316
3	7683.799	7.85	36.05	43.90	74.00	30.10	Peak	100	74
4	9226.780	9.92	34.25	44.17	74.00	29.83	Peak	100	260
5	11182.850	16.16	32.53	48.70	74.00	25.30	Peak	100	358
6	14232.600	18.56	31.18	49.74	74.00	24.26	Peak	100	103

802.11N40 CH3, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4844.595	-0.38	50.38	50.00	74.00	24.00	Peak	150	267
2	6519.310	4.88	36.20	41.08	74.00	32.92	Peak	100	69
3	7681.488	7.86	36.19	44.04	74.00	29.96	Peak	150	229
4	10071.880	12.58	34.22	46.79	74.00	27.21	Peak	150	82
5	13687.450	17.38	30.89	48.27	74.00	25.73	Peak	150	190
6	15297.370	16.73	31.28	48.01	74.00	25.99	Peak	100	50

802.11N40 CH6, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4894.890	0.41	47.17	47.57	74.00	26.43	Peak	150	198
2	5863.997	2.98	36.40	39.38	74.00	34.62	Peak	150	50
3	6681.786	5.21	36.21	41.42	74.00	32.58	Peak	100	180
4	7994.642	8.84	35.66	44.50	74.00	29.50	Peak	100	63
5	11205.860	16.26	32.07	48.33	74.00	25.67	Peak	150	0
6	14454.810	18.92	31.09	50.02	74.00	23.98	Peak	100	356

802.11N40 CH6, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4874.074	0.08	53.52	53.60	74.00	20.40	Peak	150	281
2	4874.074	0.08	42.52	42.60	54.00	11.40	Average	150	281
3	5660.065	2.10	36.46	38.56	74.00	35.44	Peak	100	296
4	7967.833	8.74	36.01	44.75	74.00	29.25	Peak	100	360
5	9379.766	10.59	35.51	46.10	74.00	27.90	Peak	150	94
6	11203.610	16.26	32.25	48.51	74.00	25.49	Peak	100	22

802.11N40 CH9, ANT V

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4901.520	0.51	50.61	51.12	74.00	22.88	Peak	150	217
2	5503.915	2.01	37.61	39.62	74.00	34.38	Peak	100	359
3	6817.138	5.73	36.85	42.58	74.00	31.42	Peak	150	0
4	8166.818	8.67	35.87	44.54	74.00	29.46	Peak	100	153
5	11152.060	15.98	31.95	47.92	74.00	26.08	Peak	150	90

802.11N40 CH9, ANT H

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	4901.766	0.51	53.03	53.54	74.00	20.46	Peak	150	271
2	4901.766	0.51	45.13	45.64	54.00	8.36	Average	150	271
3	5889.630	3.03	36.42	39.46	74.00	34.54	Peak	150	143
4	6511.797	4.87	37.23	42.11	74.00	31.89	Peak	150	281
5	8013.905	8.83	36.41	45.25	74.00	28.75	Peak	150	5
6	9244.376	9.79	34.21	44.00	74.00	30.00	Peak	150	360
7	11696.660	16.09	32.19	48.28	74.00	25.72	Peak	150	212

802.11b CH11, ANT V(1GHz-4GHz)

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	1131.471	-13.76	51.35	37.59	74.00	36.41	Peak	150	247
2	1197.811	-13.26	57.68	44.42	74.00	29.58	Peak	200	189
3	2258.555	-10.79	50.88	40.09	74.00	33.91	Peak	100	138

802.11b CH11, ANT H(1GHz-4GHz)

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	1198.807	-13.28	51.99	38.71	74.00	35.29	Peak	100	147
2	1429.390	-12.93	46.43	33.50	74.00	40.50	Peak	100	54
3	1886.092	-12.15	49.26	37.12	74.00	36.88	Peak	150	239

802.11b CH11, ANT V(18GHz-25GHz)

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	18729.380	-17.06	60.47	43.41	74.00	30.59	Peak	150	276
2	22070.450	-14.38	57.42	43.04	74.00	30.96	Peak	100	172
3	24819.390	-14.36	56.75	42.39	74.00	31.61	Peak	150	0

802.11b CH11, ANT H(18GHz-25GHz)

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	18396.250	-16.27	60.78	44.52	74.00	29.48	Peak	100	166
2	19531.320	-16.83	60.99	44.16	74.00	29.84	Peak	150	337
3	25297.190	-14.31	57.63	43.32	74.00	30.68	Peak	100	221

A.7 Band Edge (Restricted band-edge)

Test Result

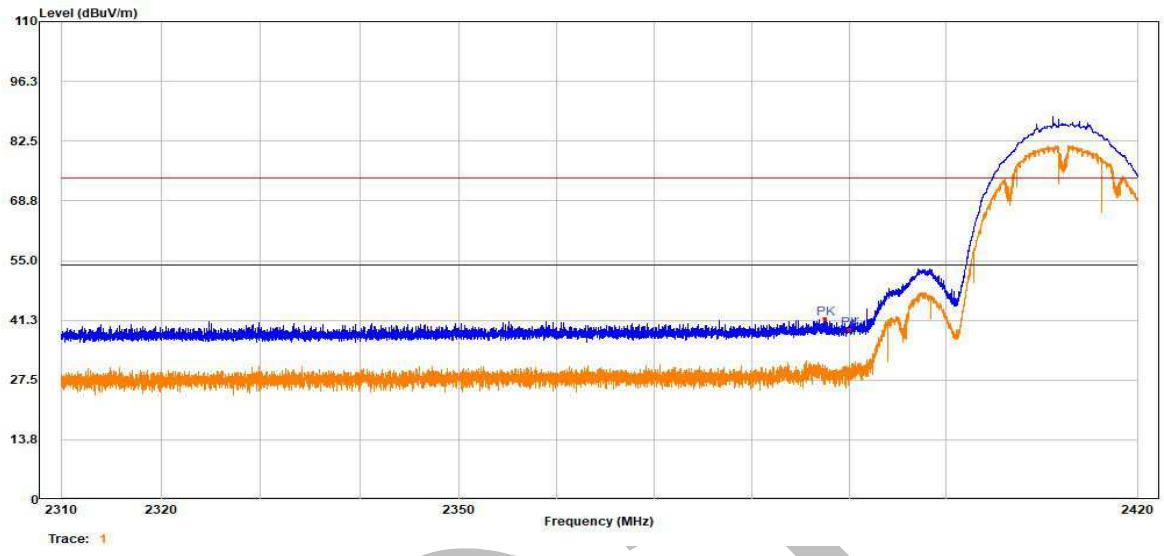
Note：

1. The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.
2. The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.
3. According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement

Test Mode	Test Channel	Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark	Verdict
802.11b	1	2387.495	41.67	74	32.33	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	N/A
	11	2496.105	51.89	74	22.11	PEAK	Pass
		2483.5	N/A	54	N/A	AVERAGE	N/A
802.11g	1	2389.838	41.99	74	32.01	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	N/A
	11	2499.215	52.55	74	21.45	PEAK	Pass
		2483.5	N/A	54	N/A	AVERAGE	N/A
802.11n20	1	2389.772	46.31	74	27.69	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	N/A
	11	2483.74	52.83	74	21.17	PEAK	Pass
		2483.5	N/A	54	N/A	AVERAGE	N/A
802.11n40	3	2388.155	54.09	74	19.91	PEAK	Pass
		2388.155	42.03	54	11.97	AVERAGE	Pass
	9	2484.945	59.25	74	14.75	PEAK	Pass
		2484.945	47.75	54	6.25	AVERAGE	Pass

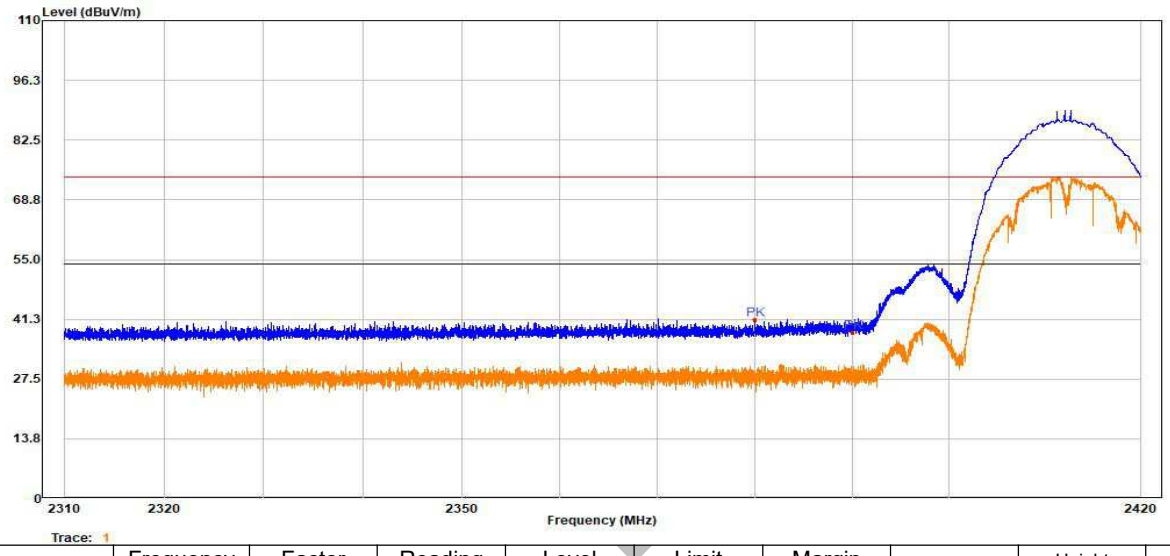
Test Graphs:

11B-2412-H



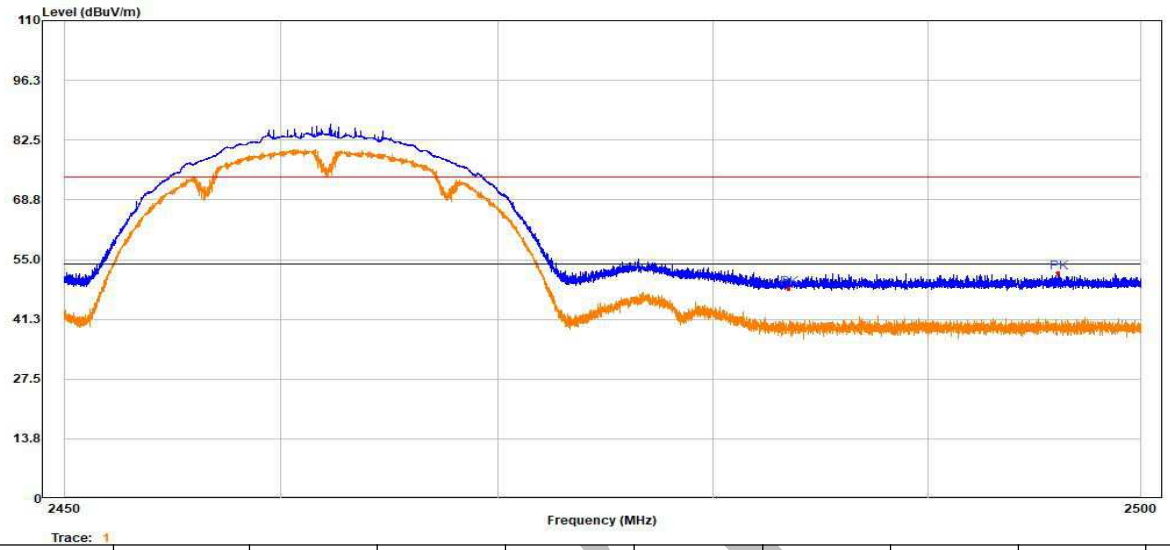
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2387.495	27.33	14.33	41.67	74.00	32.33	Peak	150	241
2	2390.003	27.34	11.81	39.15	74.00	34.85	Peak	150	26

11B-2412-V



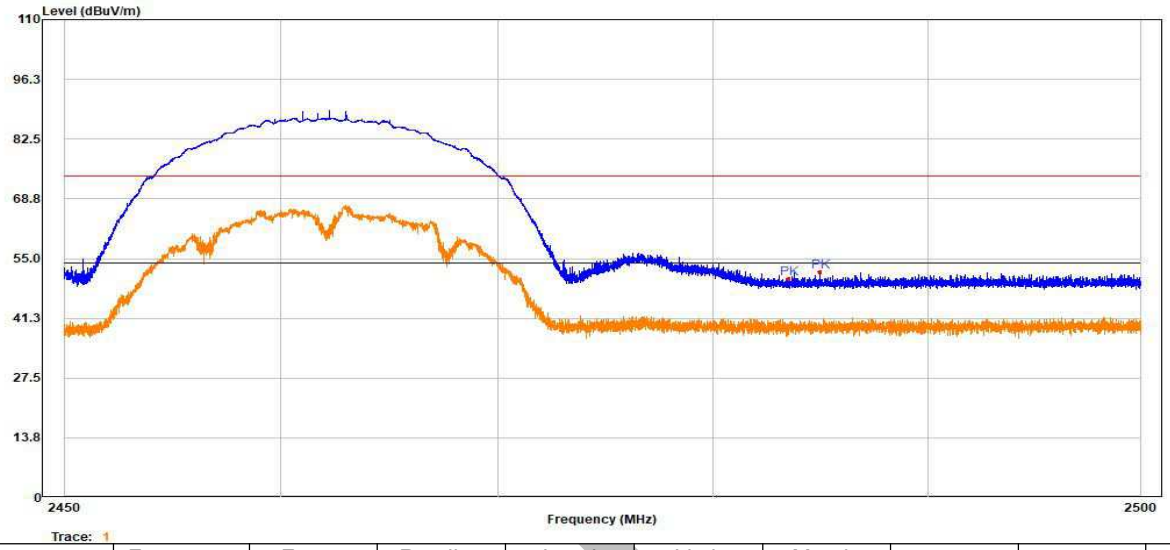
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2379.927	27.31	13.91	41.23	74.00	32.77	Peak	150	264
2	2390.003	27.34	10.88	38.21	74.00	35.79	Peak	150	224

11B-2462-H



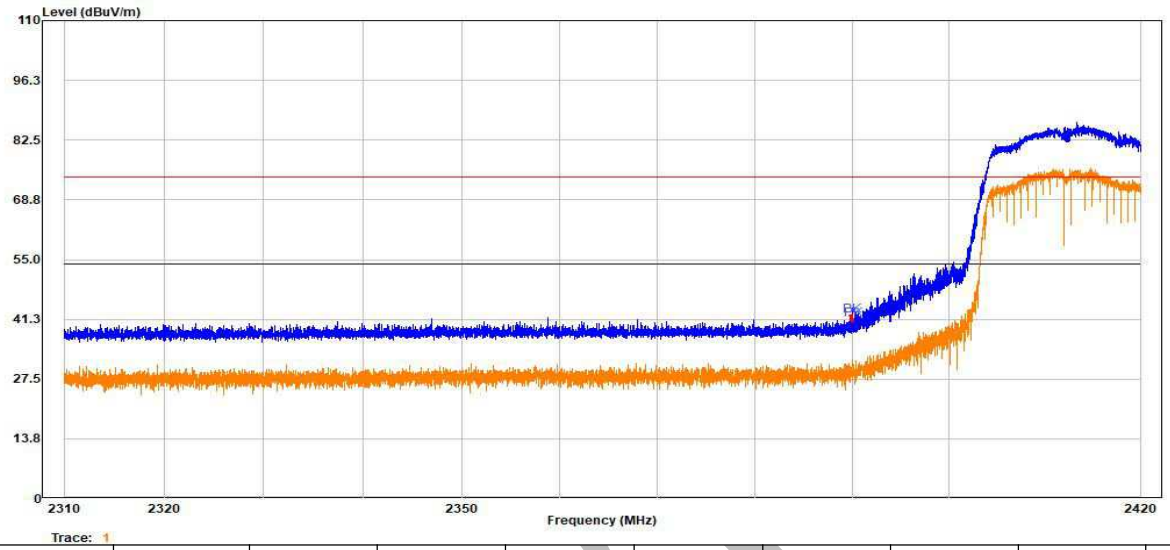
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	20.70	48.26	74.00	25.74	Peak	100	128
2	2496.105	27.59	24.30	51.89	74.00	22.11	Peak	200	78

11B-2462-V



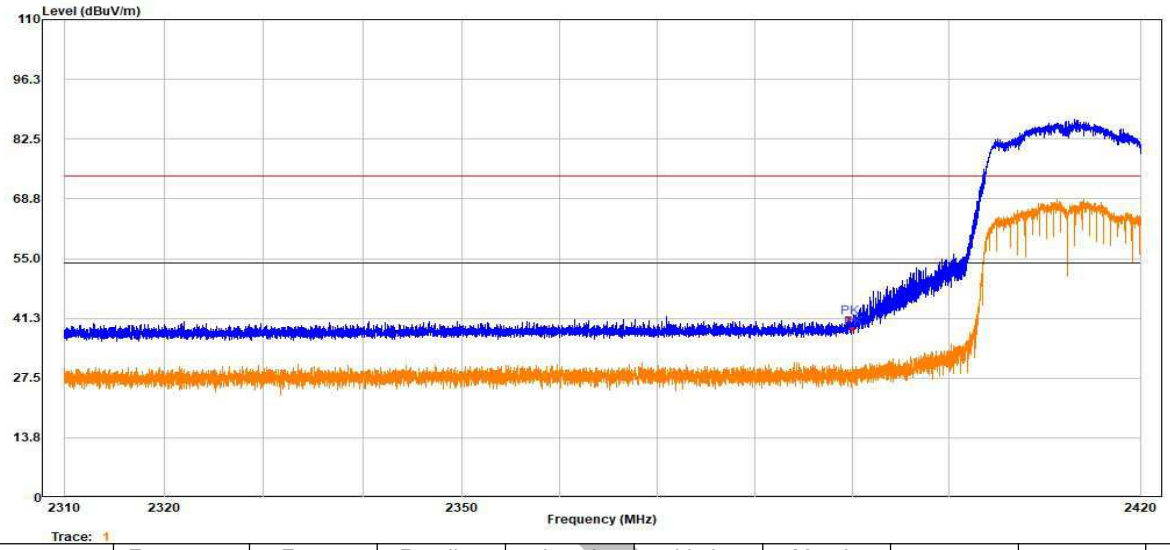
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	22.90	50.46	74.00	23.54	Peak	100	155
2	2484.975	27.56	24.32	51.89	74.00	22.11	Peak	200	256

11G-2412-H



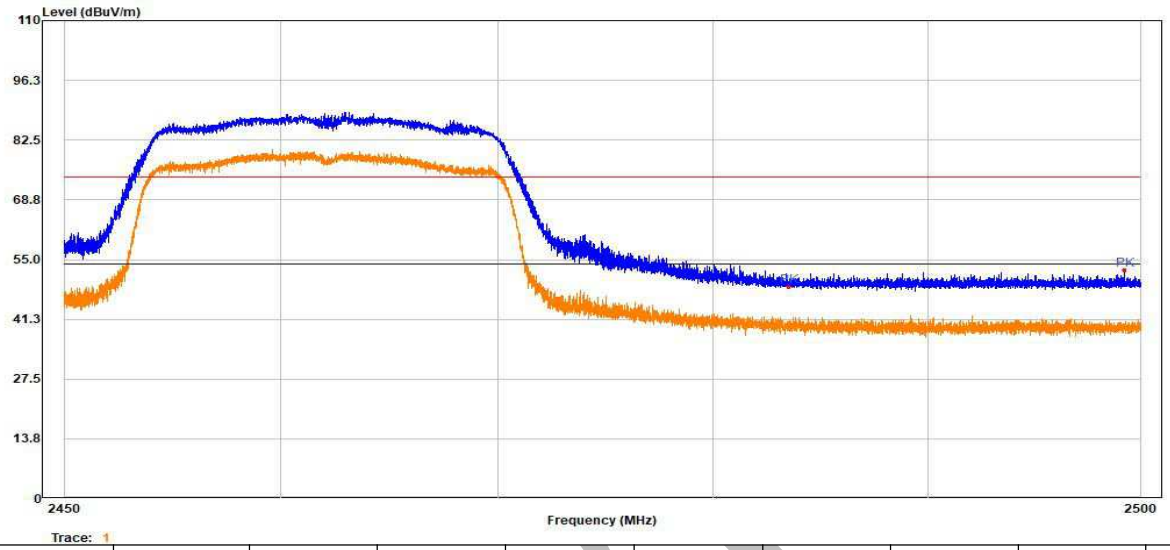
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2389.838	27.34	14.65	41.99	74.00	32.01	Peak	150	348
2	2390.003	27.34	13.86	41.20	74.00	32.80	Peak	150	135

11G-2412-V



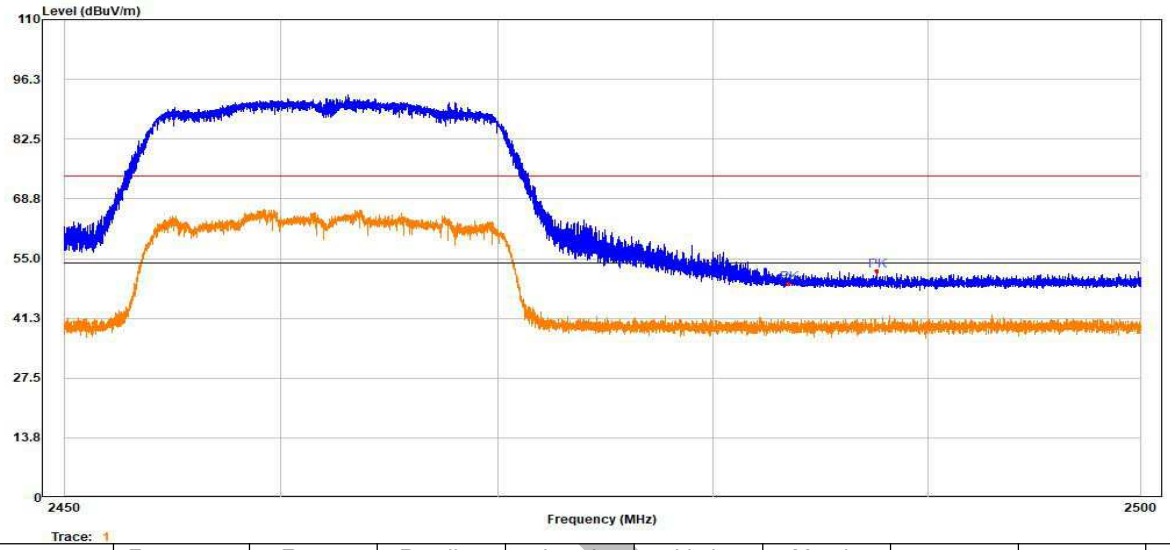
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2389.695	27.34	13.95	41.29	74.00	32.71	Peak	150	245
2	2390.003	27.34	11.62	38.96	74.00	35.04	Peak	150	226

11G-2462-H



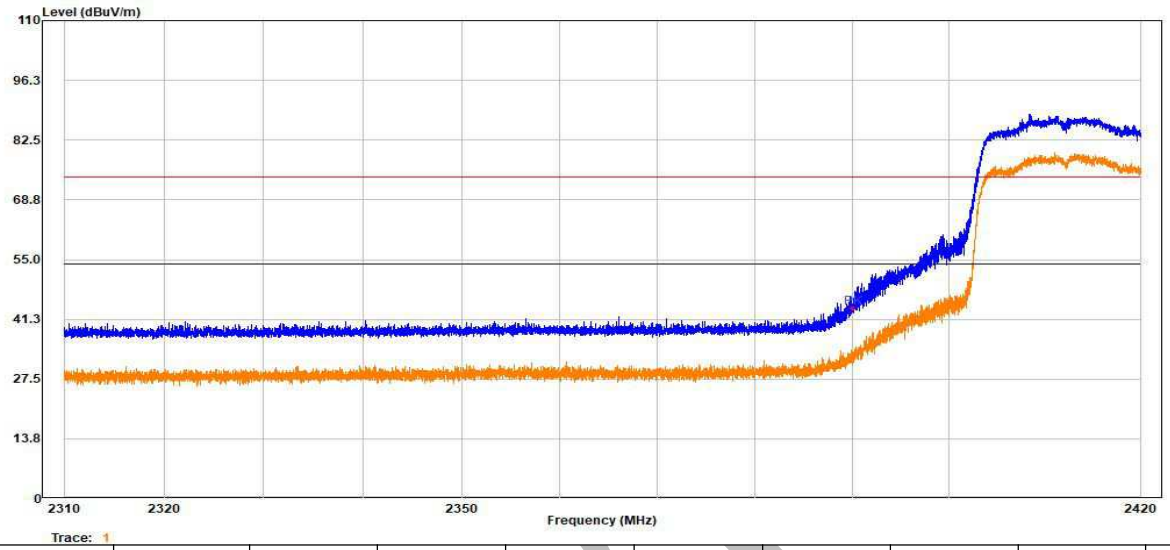
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	21.32	48.88	74.00	25.12	Peak	100	254
2	2499.215	27.60	24.96	52.55	74.00	21.45	Peak	150	272

11G-2462-V



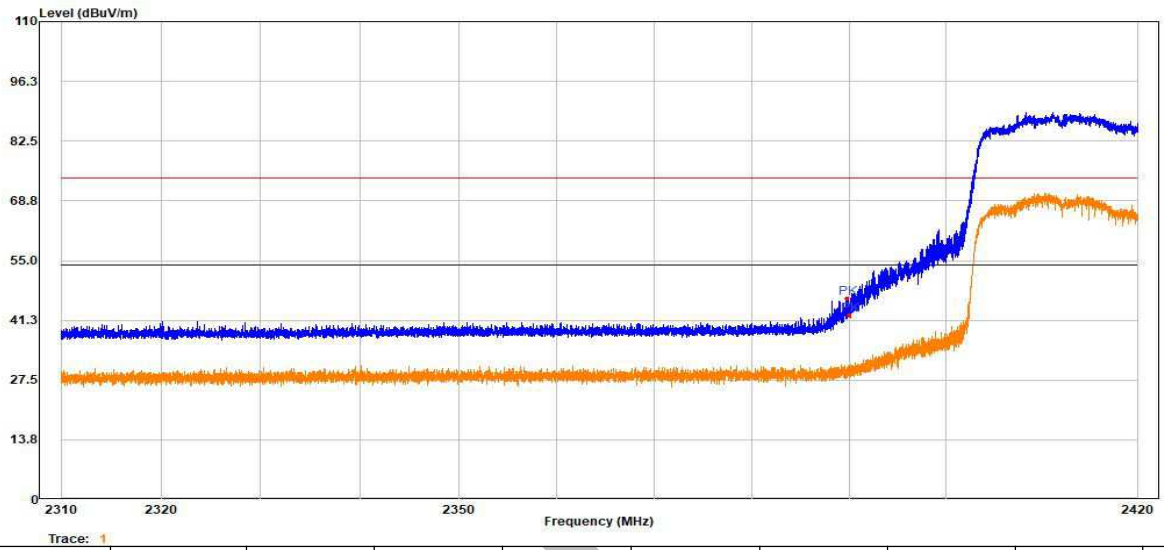
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	21.69	49.25	74.00	24.75	Peak	200	39
2	2487.635	27.57	24.60	52.17	74.00	21.83	Peak	100	198

11N20-2412-H



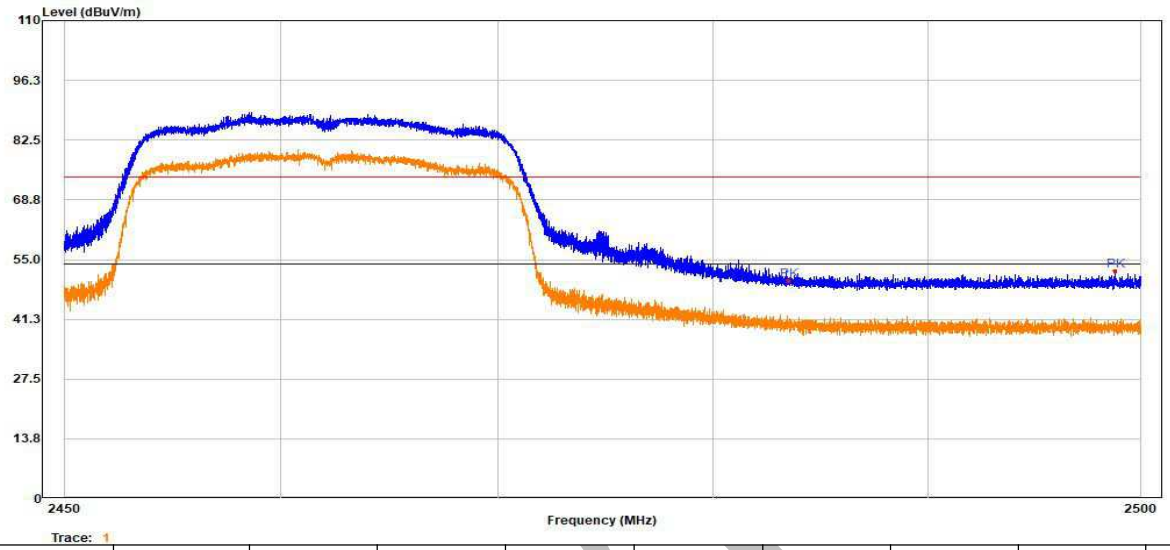
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2390.003	27.34	16.48	43.82	74.00	30.18	Peak	100	360

11N20-2412-V



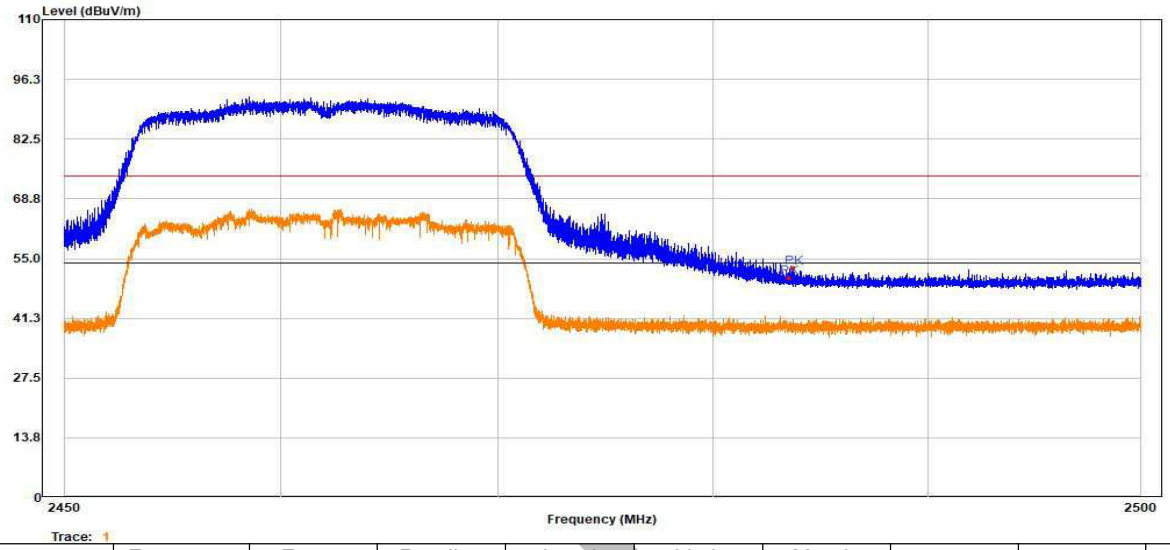
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2389.772	27.34	18.98	46.31	74.00	27.69	Peak	150	241
2	2390.003	27.34	15.28	42.62	74.00	31.38	Peak	200	222

11N20-2462-H



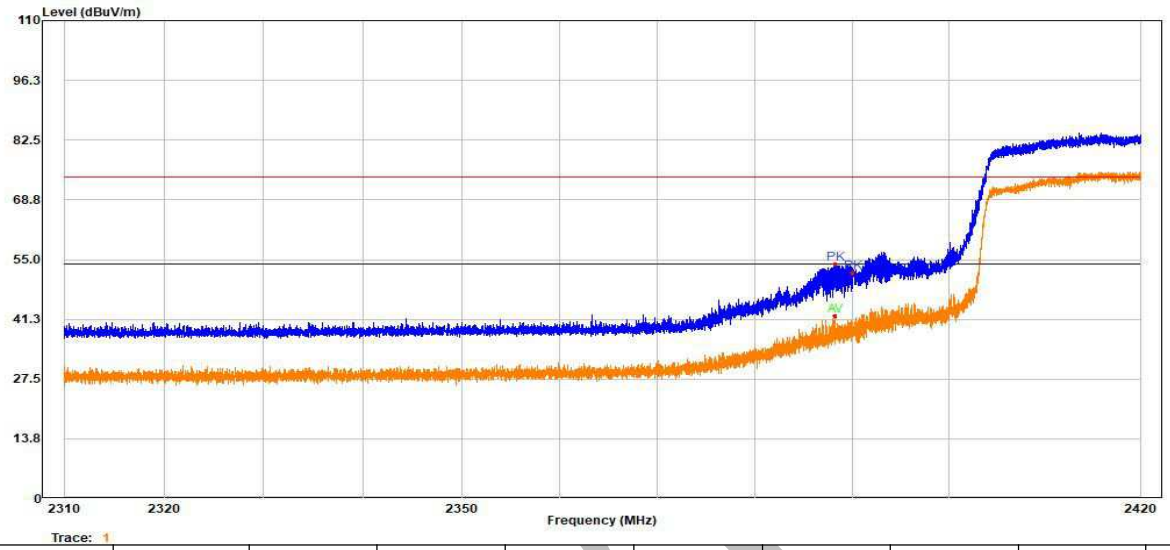
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	22.69	50.25	74.00	23.75	Peak	150	80
2	2498.750	27.60	24.71	52.31	74.00	21.69	Peak	150	88

11N20-2462-V



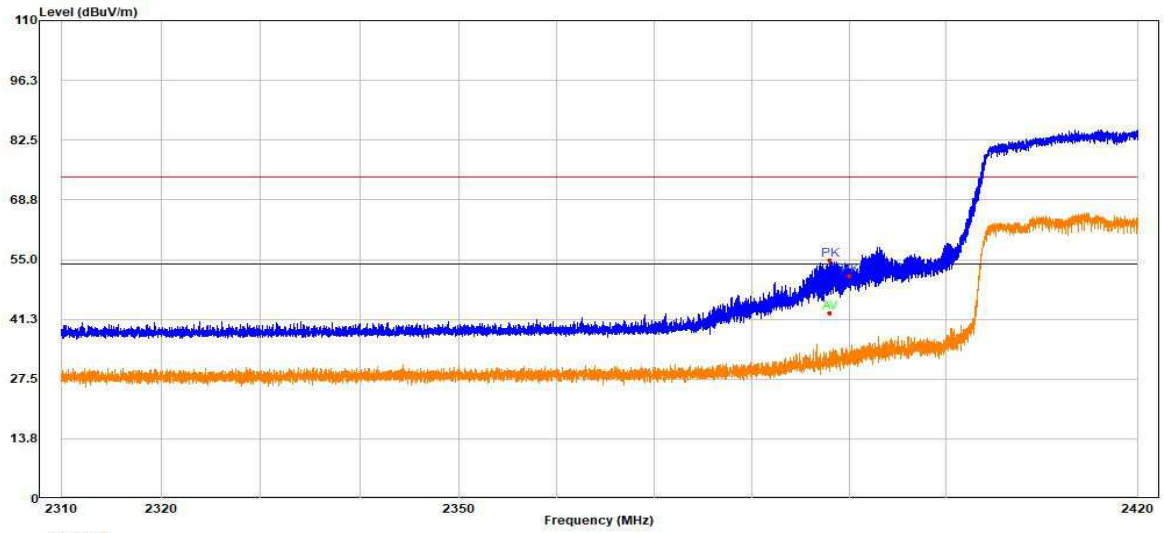
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	23.03	50.59	74.00	23.41	Peak	100	198
2	2483.740	27.56	25.27	52.83	74.00	21.17	Peak	100	207

11N40-2422-H



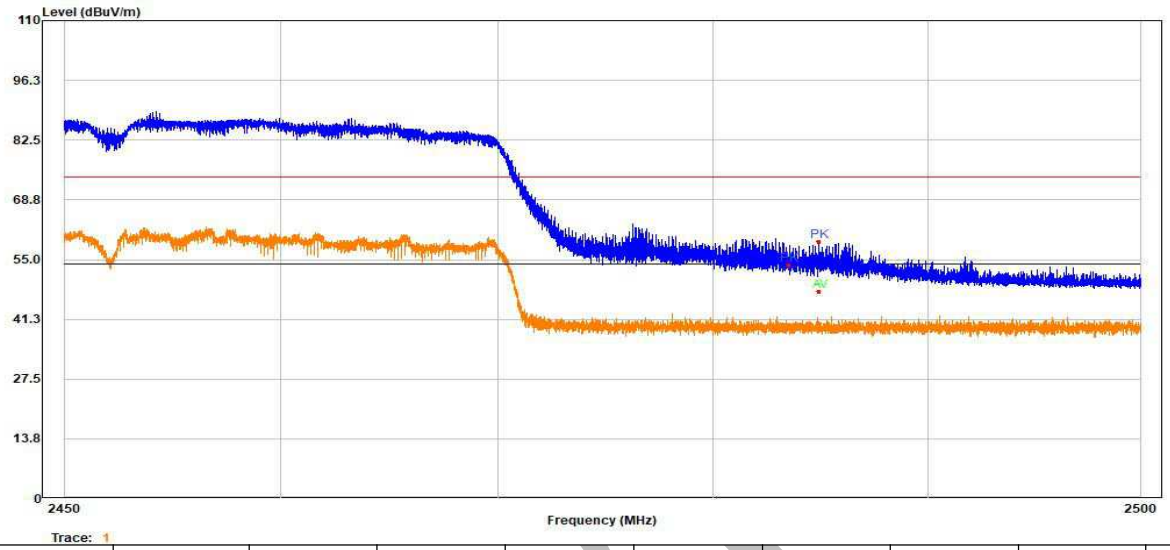
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2388.155	27.33	26.76	54.09	74.00	19.91	Peak	100	339
2	2388.155	27.33	14.70	42.03	54.00	11.97	Average	100	339
3	2390.003	27.34	24.66	52.00	74.00	22.00	Peak	150	1

11N40-2422-V



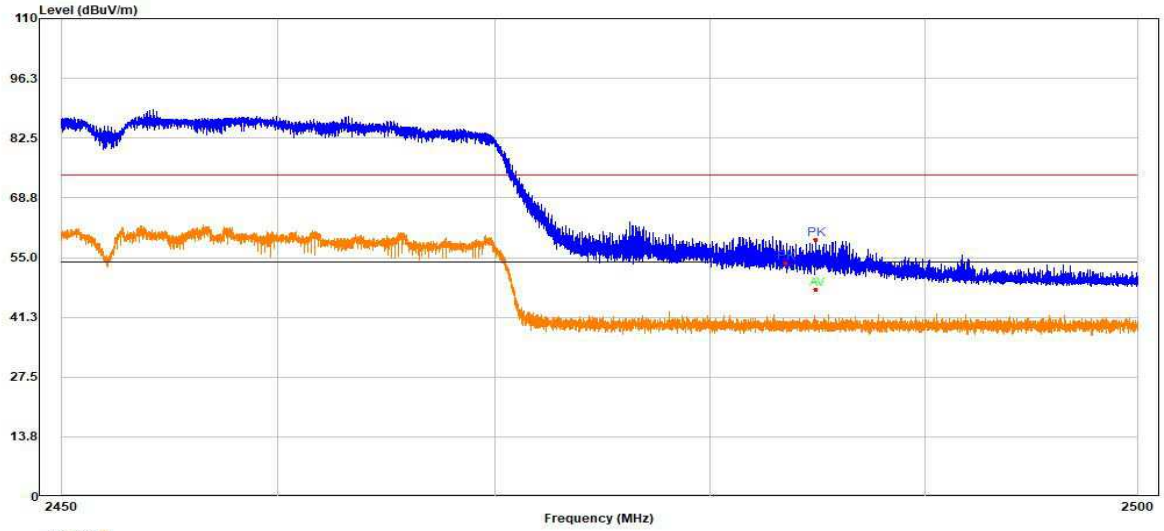
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2387.924	27.33	27.57	54.91	74.00	19.09	Peak	100	207
2	2387.924	27.33	15.51	42.84	54.00	11.16	Average	100	207
3	2390.003	27.34	23.90	51.24	74.00	22.76	Peak	100	232

11N40-2452-H



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	24.93	52.49	74.00	21.51	Peak	150	349
2	2486.240	27.57	29.06	56.63	74.00	17.37	Peak	150	64
3	2486.240	27.57	17.39	44.96	54.00	9.04	Average	150	64

11N40-2452-V



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)
1	2483.500	27.56	26.16	53.73	74.00	20.27	Peak	100	206
2	2484.945	27.56	31.68	59.25	74.00	14.75	Peak	100	206
3	2484.945	27.56	20.19	47.75	54.00	6.25	Average	100	206

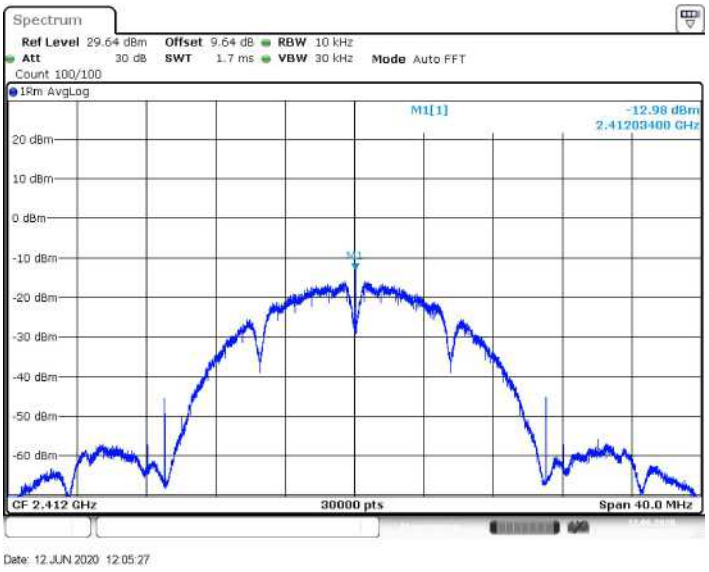
A.8 Power Spectral Density

Test Result:

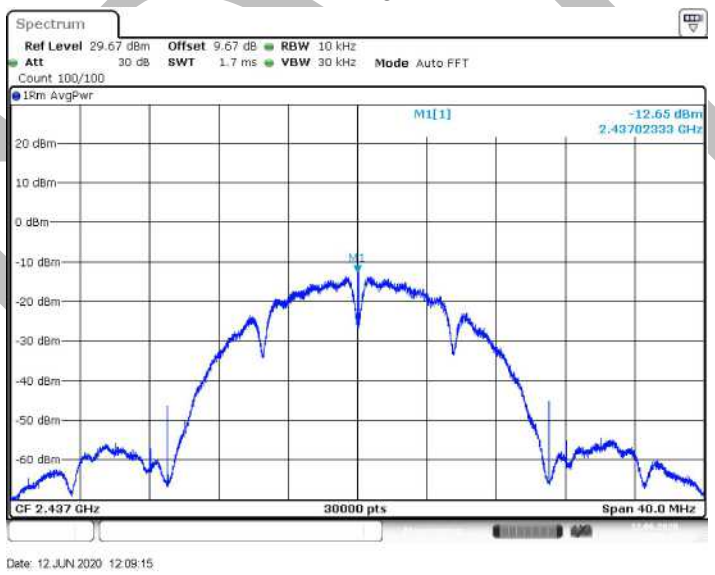
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-12.98	<=8	PASS
		2437	-12.65	<=8	PASS
		2462	-11.08	<=8	PASS
11G	Ant1	2412	-9.68	<=8	PASS
		2437	-9.26	<=8	PASS
		2462	-9.01	<=8	PASS
11N20SISO	Ant1	2412	-11.95	<=8	PASS
		2437	-11.66	<=8	PASS
		2462	-11.33	<=8	PASS
11N40SISO	Ant1	2422	-15.18	<=8	PASS
		2437	-18.64	<=8	PASS
		2452	-14.58	<=8	PASS

Test Graphs

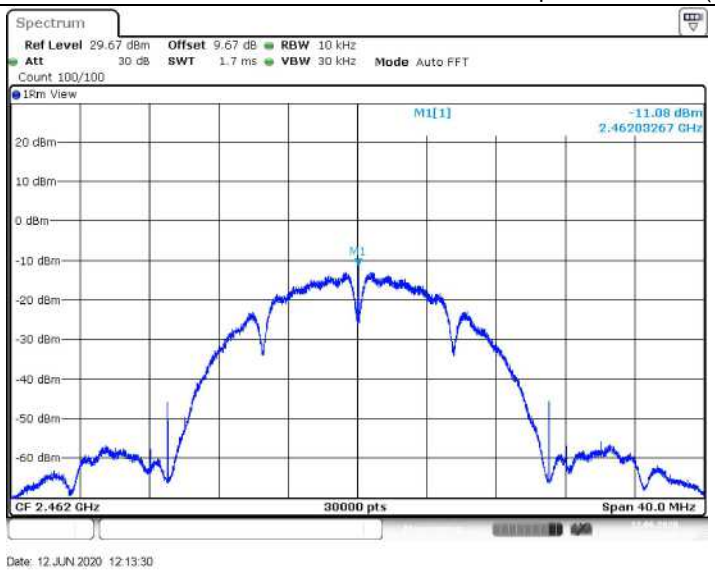
11B 2412



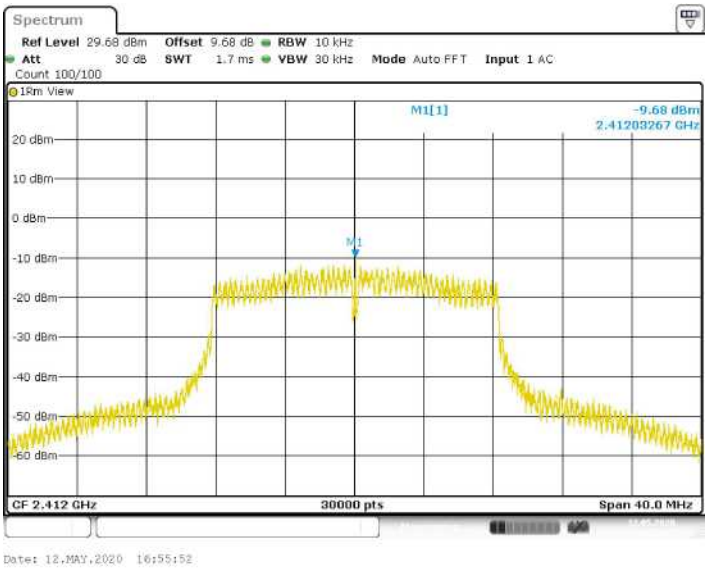
11B 2437



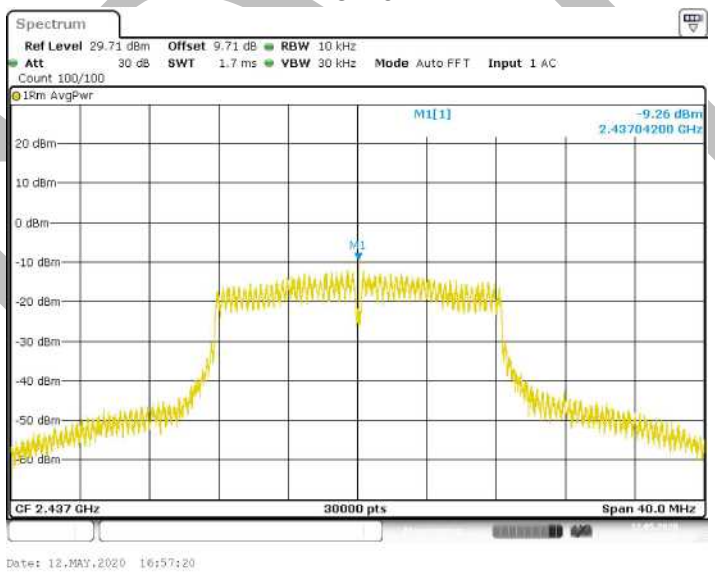
11B 2462


Spectrum
Ref Level 29.67 dBm Offset 9.67 dB RBW 10 kHz
Att 30 dB SWT 1.7 ms VBW 30 kHz Mode Auto FFT
Count 100/100
1Rm View
M1[1]
-11.08 dBm
2.46203267 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
CF 2.462 GHz
30000 pts
Span 40.0 MHz
Date: 12.JUN.2020 12:13:30

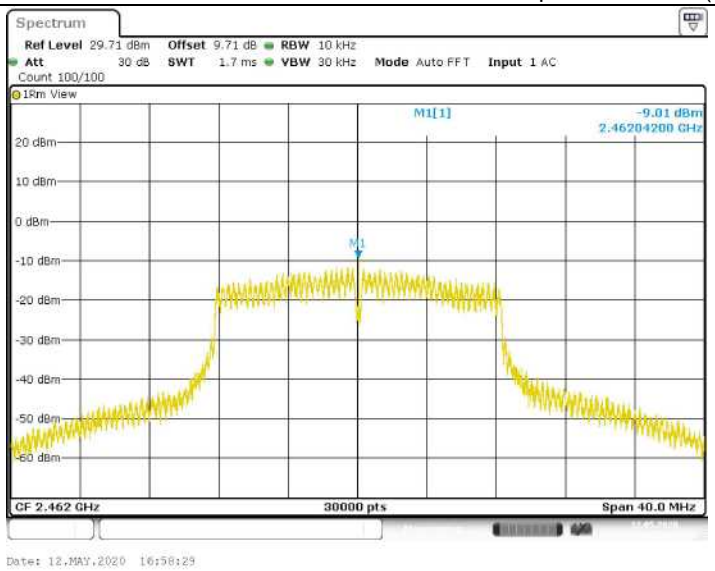
11G 2412



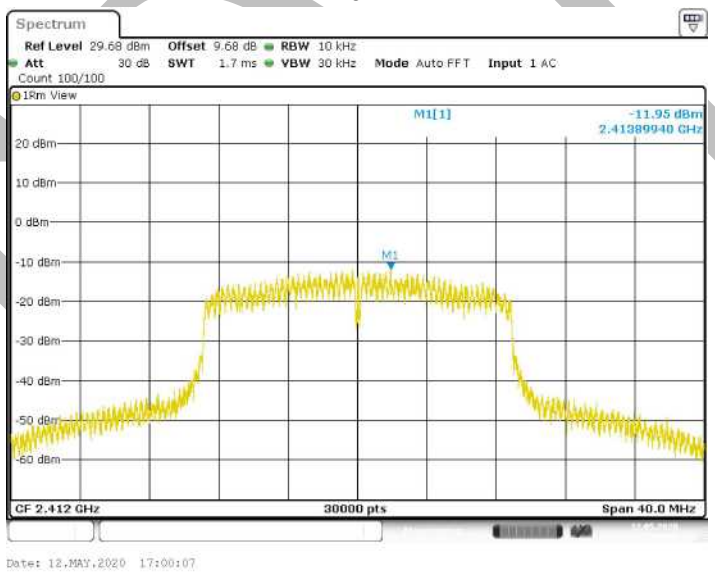
11G 2437



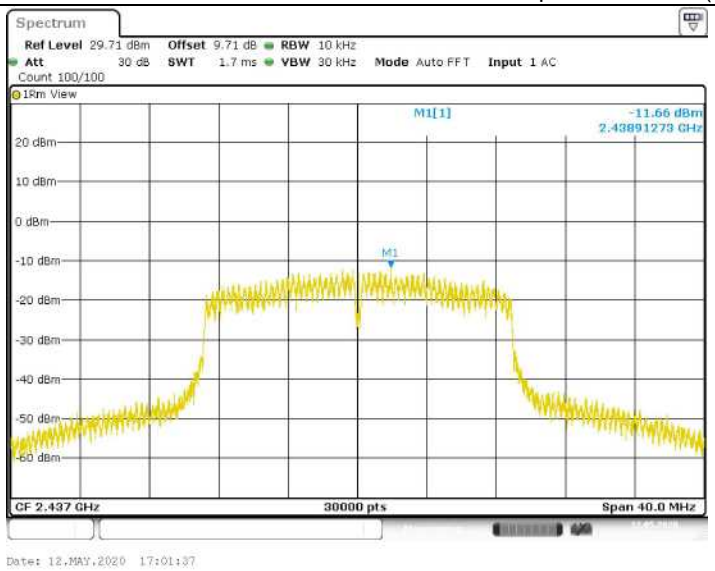
11G 2462



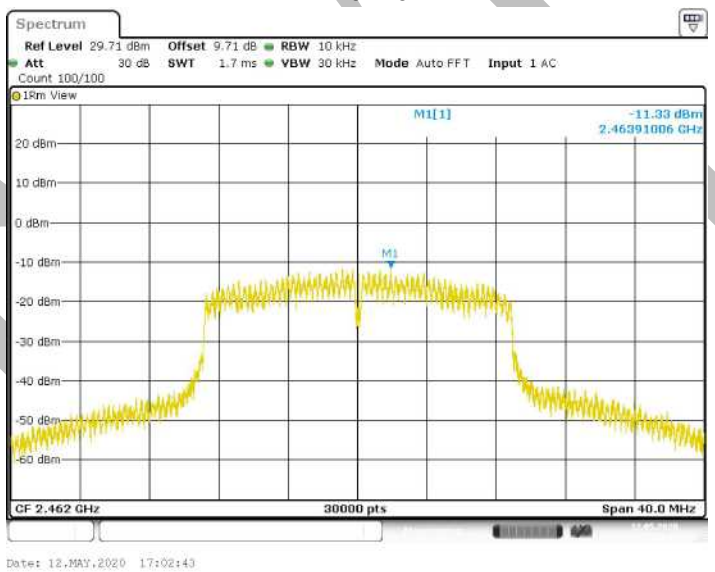
11N20 2412



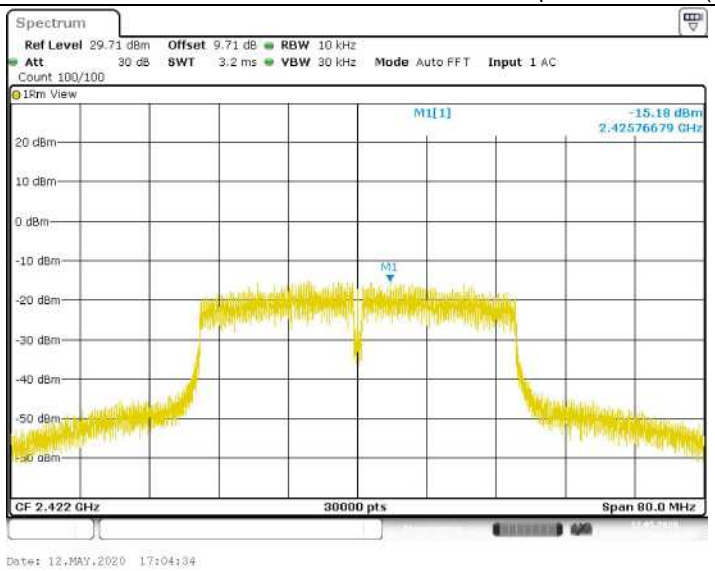
11N20 2437



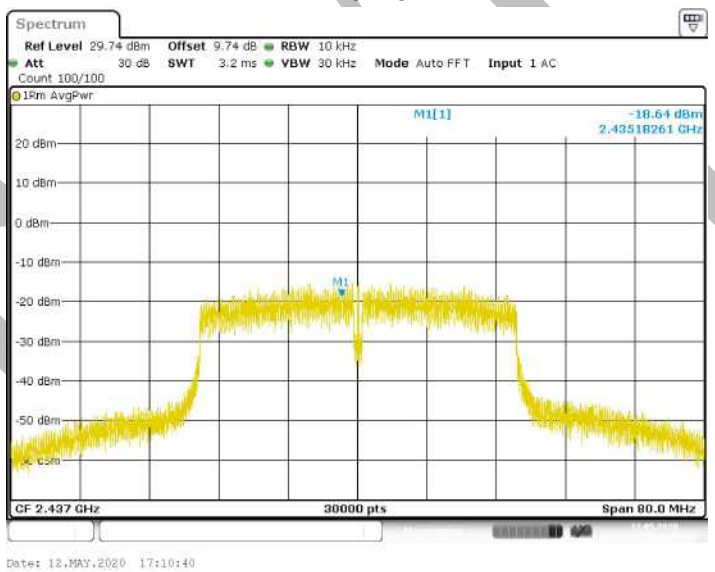
11N20 2462



11N40 2422



11N40 2437



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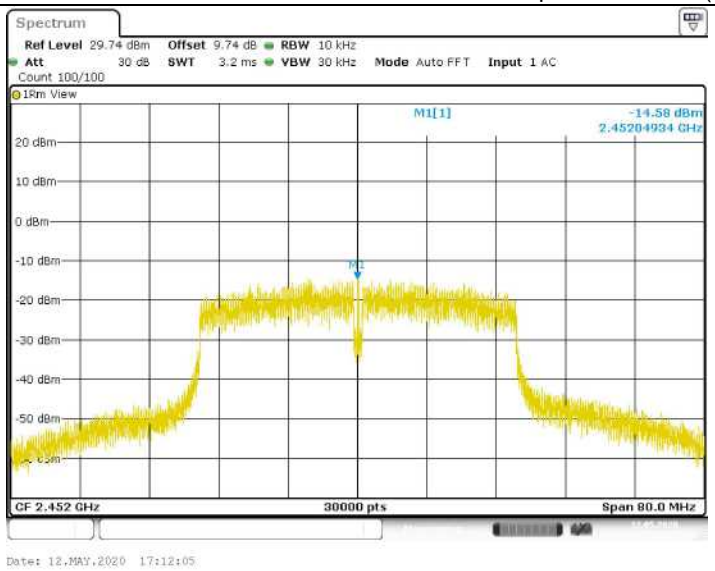
Spectrum
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Att 30 dB SWT 3.2 ms VBW 30 kHz Mode Auto FFT Input 1 AC
Count 100/100
1Rm View
M1[1]
-14.58 dBm
2.45204934 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
CF 2.452 GHz
30000 pts
Span 80.0 MHz
Date: 12.MAY.2020 17:12:05

Annex B Test Setup Photograph

Please refer the document “RZBG(W)20200513001-2 RF Test Setup Photos”pdf

Annex C External Photograph

Please refer the document “RZBG(W)20200513001-2 EUT External Photos”pdf

Annex D Internal Photograph

Please refer the document “RZBG(W)20200513001-2 EUT Internal Photos”pdf

Annex E Revision History

Version	Issue Date	Revisions Content
Rev.01	Jun.29.2020	Initial Issue
Rev.02	Jul.03.2020	1:reduce the file size of this report 2:list the designation number of test lab on page 8 3:revise the test procedure states of output power measurement on page 16 4:revise the test data on page 50 and 94

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