



REPORT No.: SZ23090025W01

TEST REPORT

APPLICANT : Ubiik Inc.

PRODUCT NAME : Nimbus 220

MODEL NAME : EDM-XNLTEG

BRAND NAME : UBIIK

FCC ID : 2AXTDEDMXNLTEG

STANDARD(S) : 47 CFR Part 2
47 CFR Part 27

RECEIPT DATE : 2023-09-04

TEST DATE : 2023-09-12 to 2023-10-07

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Edited by:

Li Huaijie

Li Huaijie (Rapporteur)

Approved by:

Shen Junsheng

Shen Junsheng (Supervisor)

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MORLAB

Shenzhen Morlab Communications Technology Co., Ltd.
FL1-1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





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Change History		
Version	Date	Reason for change
1.0	2023-10-09	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Ubiik Inc.
Applicant Address:	19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)
Manufacturer:	Ubiik Inc.
Manufacturer Address:	19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)

1.2. Equipment Under Test (EUT) Description

Product Name:	Nimbus 220			
Sample No.:	2#			
Hardware Version:	N/A			
Software Version:	N/A			
Modulation Type:	BPSK ,QPSK			
Operation Band:	NB-IOT Band13 /103			
Sub-carrier spacing	3.75KHz, 15KHz			
Frequency Range:	Band 13	Tx: 777MHz–787MHz		
		Rx: 746MHz–756MHz		
	Band 103	Tx: 787MHz–788MHz		
		Rx: 757MHz–758MHz		
Channel Bandwidth:	Band 13	200KHz		
	Band 103	200KHz		
Antenna Type:	Band	Panel Antenna	Fixed External Antenna	Fixed External Antenna
Antenna Gain:	Band 13	12dBi	3.22dBi	7.80dBi
	Band 103	12dBi	3.22dBi	7.80dBi

Note1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

Band 13	Maximum E.R.P./E.I.R.P. (W)		Emission Designator (99%OBW)
Sub-carrier spacing (KHz)	BPSK	QPSK	QPSK
3.75	2.371	2.399	N/A
15	2.630	2.742	186KG7D
Band 103	Maximum E.R.P./E.I.R.P. (W)		Emission Designator (99%OBW)
Sub-carrier spacing (KHz)	BPSK	QPSK	QPSK
3.75	2.344	2.427	N/A
15	2.489	2.667	190KG7D

1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2, Part 27 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 27	Miscellaneous Wireless Communications Services



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B13&B103			
Item	FCC Rule No.	Requirements	Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(b)(10)	ERP ≤3W	PASS
Peak-Average Ratio	N/A	N/A	N/A
Bandwidth	§2.1049	OBW: No limit EBW: No limit	PASS
Band Edges Compliance	§2.1051, §27.53(c)(2)	Refer to section 2.6	PASS
Spurious Emission at Antenna Terminals	§2.1051, §27.53(c)(2)	≤ -13 dBm/1MHz	PASS
Field Strength of Spurious Radiation	§2.1053, §27.53(c)(2)	≤ -13 dBm/1MHz	PASS
Frequency Stability	§2.1055, §27.54	No limit	N/A



Test detailed items/section required by FCC rules and results are as below:

Test Item	Test Date	Test Engineer	Result	Method Determination /Remark
Transmitter Conducted Output Power and E.R.P./E.I.R.P.	2023/09/15	Li Huaijie	PASS	No deviation
Occupied Bandwidth	2023/09/12-2023/09/13	Li Huaijie	PASS	No deviation
Frequency Stability	2023/09/13	Li Huaijie	PASS	No deviation
Conducted Spurious Emissions	2023/09/12-2023/09/13	Li Huaijie	PASS	No deviation
Band Edge	2023/09/13	Li Huaijie	PASS	No deviation
Radiated Spurious Emissions	2023/09/19-2023/10/07	Lin Jiayong	PASS	No deviation
Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 and ANSI/TIA-603-E-2016. Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table. Note 3: The declared of product specification for EUT presented in the report are provided by manufacturer and the test laboratory is not responsible for the accuracy of the information. Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.				

1.5. Environmental Conditions

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

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106

2. Summary Test Results And Description

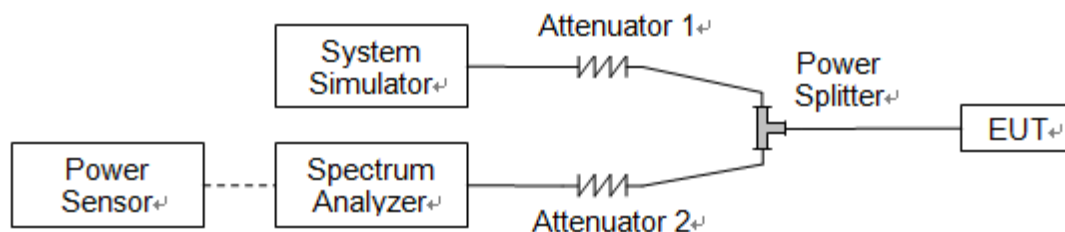
2.1. Transmitter Conducted Output Power and E.R.P./E.I.R.P.

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

According to FCC section 27.50 (b)(10) for LTE Band 13/103, Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts E.R.P.

2.1.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.3. Test Procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

$E.I.R.P. (dBm) = \text{Conducted Output Power (dBm)} + \text{Antenna Gain (dBi)}$

$E.R.P. (dBm) = E.I.R.P. (dBm) - 2.15$

**2.1.4. Result****Conducted Output Power**

LTE Band 13						
Sub-carrier Spacing (KHz)	Modulation	Tone Count	Tone Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				23181	23230	23279
Frequency (MHz)				777.1	782.0	786.9
15	QPSK	1	0	23.88	24.29	24.50
15	QPSK	1	11	23.86	24.15	24.53
15	QPSK	6	6	23.50	23.93	24.02
15	QPSK	12	0	22.51	23.01	22.90
15	BPSK	1	0	23.72	24.31	24.35
15	BPSK	1	11	23.65	24.10	24.24
Channel				23181	23230	23279
Frequency (MHz)				777.1	782.0	786.9
3.75	QPSK	1	0	23.50	23.88	23.95
3.75	QPSK	1	47	23.46	23.89	23.91
3.75	BPSK	1	0	23.28	23.66	23.90
3.75	BPSK	1	47	23.31	23.72	23.86



LTE Band 103						
Sub-carrier Spacing (KHz)	Modulation	Tone Count	Tone Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				134283	134287	134291
Frequency (MHz)				787.1	787.5	787.9
15	QPSK	1	0	24.30	24.41	24.23
15	QPSK	1	11	24.27	24.33	24.25
15	QPSK	6	6	23.51	23.37	23.95
15	QPSK	12	0	22.53	22.58	22.50
15	BPSK	1	0	24.02	24.07	24.00
15	BPSK	1	11	24.11	24.10	24.09
Channel				134283	134287	134291
Frequency (MHz)				787.1	787.5	787.9
3.75	QPSK	1	0	23.86	23.86	23.81
3.75	QPSK	1	47	23.87	24.00	23.87
3.75	BPSK	1	0	23.77	23.74	23.85
3.75	BPSK	1	47	23.76	23.68	23.77

**Effective Radiated Power and Effective Isotropic Radiated Power**

LTE Band 13				Measured E.R.P.					
Sub-carrier Spacing (KHz)	Modulation	Tone Count	Tone Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				23181		23230		23279	
Frequency (MHz)				777.1		782.0		786.9	
				dBm	W	dBm	W	dBm	W
15	QPSK	1	0	33.73	2.360	34.14	2.594	34.35	2.723
15	QPSK	1	11	33.71	2.350	34.00	2.512	34.38	2.742
15	QPSK	6	6	33.35	2.163	33.78	2.388	33.87	2.438
15	QPSK	12	0	32.36	1.722	32.86	1.932	32.75	1.884
15	BPSK	1	0	33.57	2.275	34.16	2.606	34.20	2.630
15	BPSK	1	11	33.50	2.239	33.95	2.483	34.09	2.564
Channel				23181		23230		23279	
Frequency (MHz)				777.1		782.0		786.9	
				dBm	W	dBm	W	dBm	W
3.75	QPSK	1	0	33.35	2.163	33.73	2.360	33.80	2.399
3.75	QPSK	1	47	33.31	2.143	33.74	2.366	33.76	2.377
3.75	BPSK	1	0	33.13	2.056	33.51	2.244	33.75	2.371
3.75	BPSK	1	47	33.16	2.070	33.57	2.275	33.71	2.350



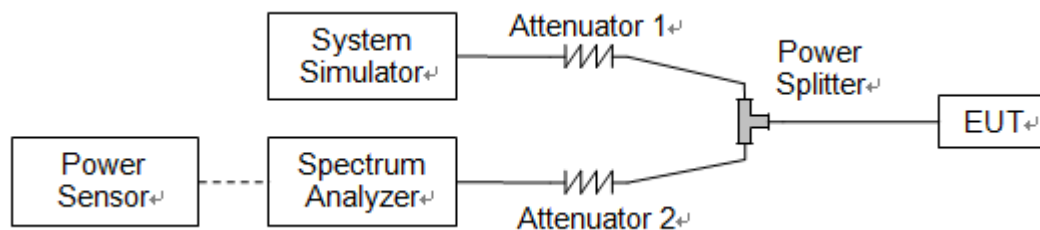
LTE Band 103				Measured E.R.P.					
Sub-carrier Spacing (KHz)	Modulation	Tone Count	Tone Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				134283		134287		134291	
Frequency (MHz)				787.1		787.5		787.9	
				dBm	W	dBm	W	dBm	W
15	QPSK	1	0	34.15	2.600	34.26	2.667	34.08	2.559
15	QPSK	1	11	34.12	2.582	34.18	2.618	34.10	2.570
15	QPSK	6	6	33.36	2.168	33.22	2.099	33.80	2.399
15	QPSK	12	0	32.38	1.730	32.43	1.750	32.35	1.718
15	BPSK	1	0	33.87	2.438	33.92	2.466	33.85	2.427
15	BPSK	1	11	33.96	2.489	33.95	2.483	33.94	2.477
Channel				134283		134287		134291	
Frequency (MHz)				787.1		787.5		787.9	
				dBm	W	dBm	W	dBm	W
3.75	QPSK	1	0	33.71	2.350	33.71	2.350	33.66	2.323
3.75	QPSK	1	47	33.72	2.355	33.85	2.427	33.72	2.355
3.75	BPSK	1	0	33.62	2.301	33.59	2.286	33.70	2.344
3.75	BPSK	1	47	33.61	2.296	33.53	2.254	33.62	2.301

2.2. Occupied Bandwidth

2.2.1. Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

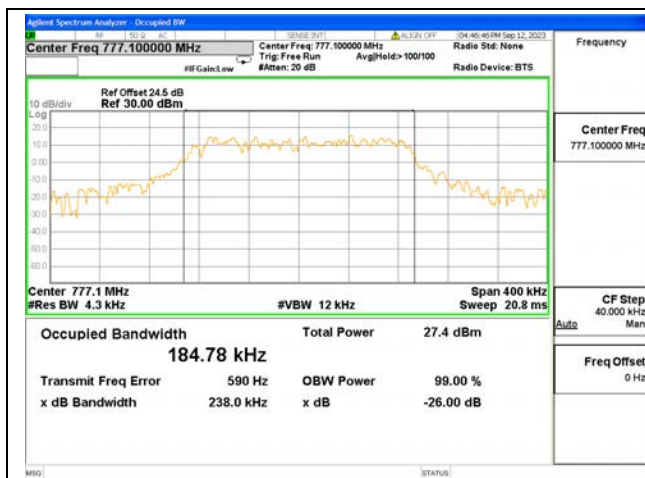
2.2.3. Test Procedure

KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

2.2.4. Test Result



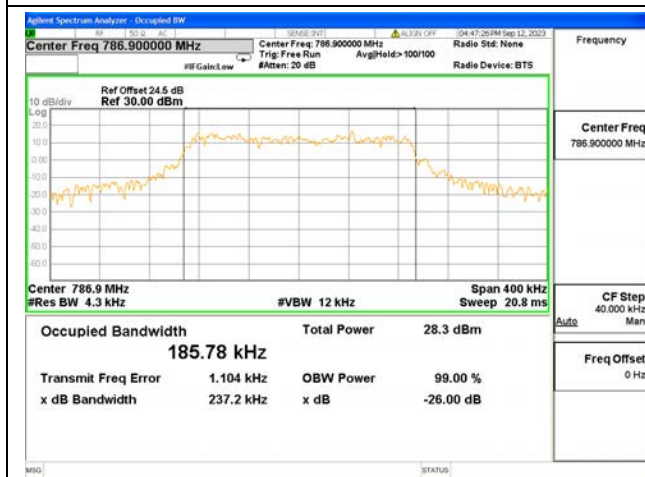
LTE Band	Subcarrier Space (KHz)	Channel Level	Channel	Frequency (MHz)	Modulation	99% BW (KHz)	26dB BW (KHz)	Verdict
B13	15	Low	23181	777.1	QPSK	184.78	238.0	PASS
B13	15	Mid	23230	782.0	QPSK	185.06	244.8	PASS
B13	15	High	23279	786.9	QPSK	185.78	237.2	PASS
B103	15	Low	134283	787.1	QPSK	189.84	228.7	PASS
B103	15	Mid	134287	787.5	QPSK	188.92	228.8	PASS
B103	15	High	134291	787.9	QPSK	189.92	223.6	PASS



B13 / 15KHz / QPSK/ Low CH



B13 / 15KHz / QPSK/ Mid CH



B13 / 15KHz / QPSK/ High CH

N/A



2.3. Frequency Stability

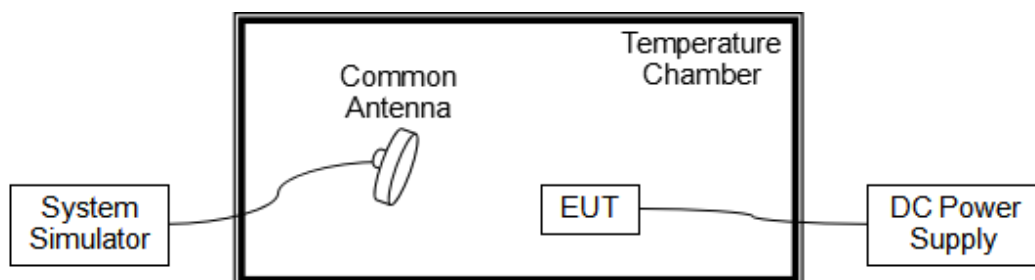
2.3.1. Requirement

According to FCC section 2.1055, 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

Note: The operating temperature of EUT is from -10°C to 55°C , which are specified by the applicant.

2.3.2. Test Description



The EUT which is powered by the DC Power Supply directly is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2.3.3. Test Procedure

KDB 971168 D01v03 Section 9.0 and ANSI/TIA-603-E-2016.



2.3.4. Test Result

The nominal, highest and lowest extreme voltages are separately 3.70V, 4.20V and 3.40V, which are specified by the applicant; the normal temperature here used is 20°C.

NB-IOT B13, 15KHz, Channel 23230, Frequency 782.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.30	+20(Ref)	14	0.018	PASS
Normal		-25	1	0.001	
Normal		-20	15	0.019	
Normal		-10	19	0.024	
Normal		0	-15	-0.019	
Normal		+10	2	0.003	
Normal		+20	15	0.019	
Normal		+30	18	0.023	
Normal		+40	-19	-0.024	
Normal		+50	23	0.029	
Normal		+60	10	0.013	
Normal		+70	16	0.020	
Normal		+75	-14	-0.018	
High	3.63	+20	-19	-0.024	
BATT.ENDPOINT	2.97	+20	15	0.019	



NB-IOT B103, 15KHz, Channel 134287, Frequency 787.5MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.30	+20(Ref)	13	0.017	PASS
Normal		-25	-14	-0.018	
Normal		-20	1	0.001	
Normal		-10	17	0.022	
Normal		0	20	0.025	
Normal		+10	18	0.023	
Normal		+20	20	0.025	
Normal		+30	8	0.010	
Normal		+40	19	0.024	
Normal		+50	18	0.023	
Normal		+60	17	0.022	
Normal		+70	13	0.017	
Normal		+75	-12	-0.015	
High	3.63	+20	16	0.020	
BATT.ENDPOINT	2.97	+20	-11	-0.014	

2.4. Conducted Spurious Emissions

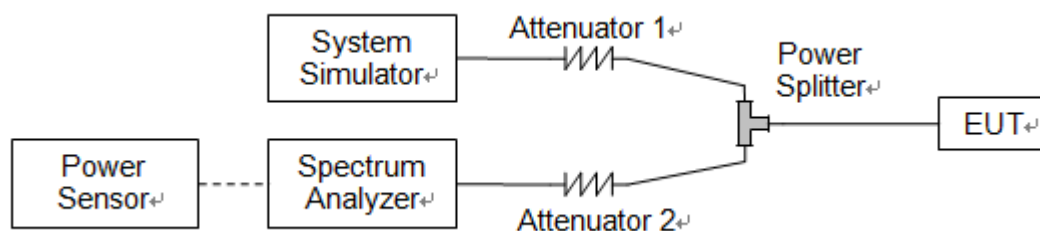
2.4.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10\log(P)$ dB. This calculated to be -13dBm.

Additional requirement for LTE Band 13/103

According to FCC section 27.53(c)(2), any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB in a 100kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. This calculated to be -13dBm.

2.4.2. Test Description



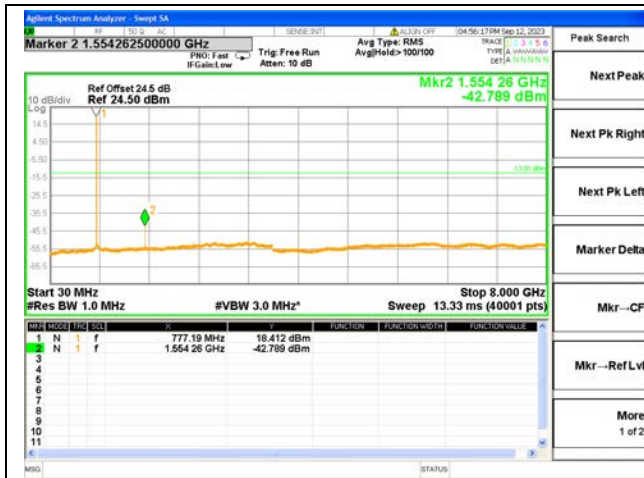
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.4.3. Test Procedure

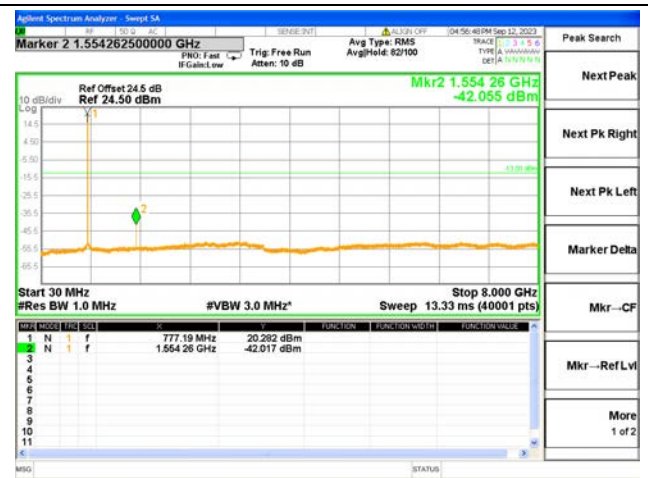
KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.



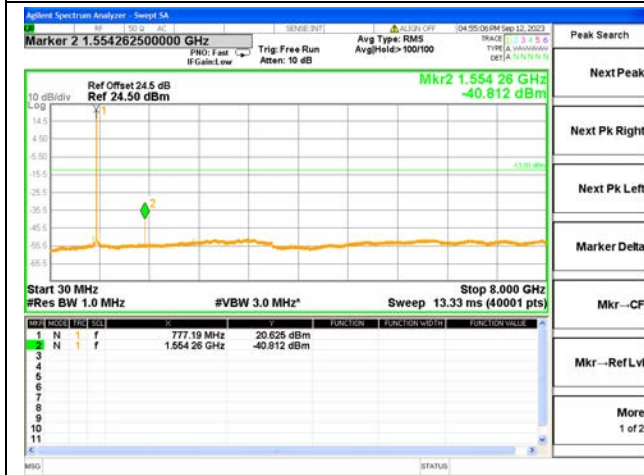
2.4.4. Test Result



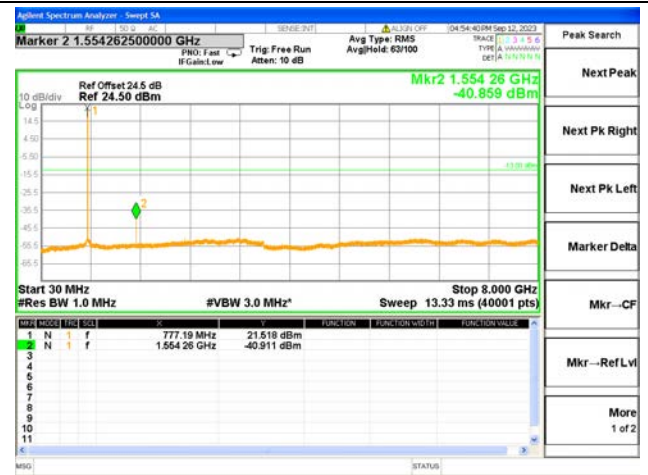
B13 / 15KHz / Low CH / QPSK / 1@0



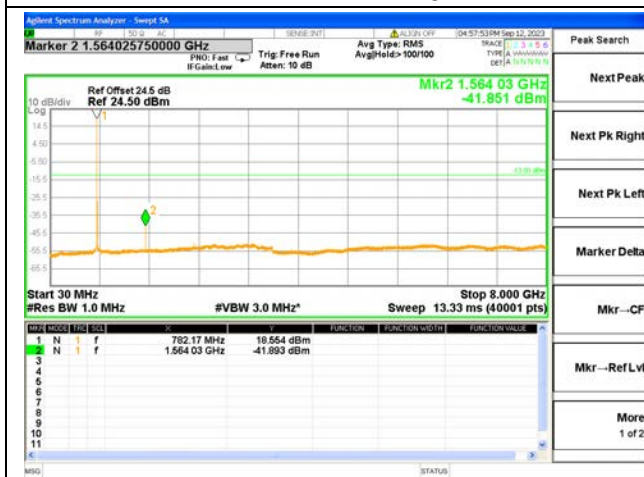
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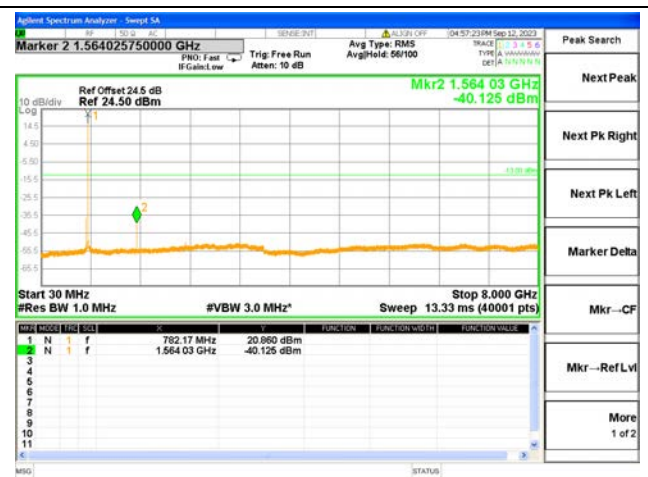
B13 / 3.75KHz / Low CH / QPSK / 1@0



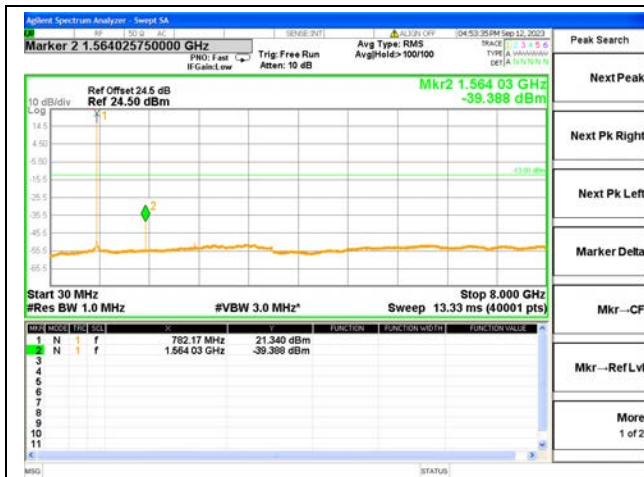
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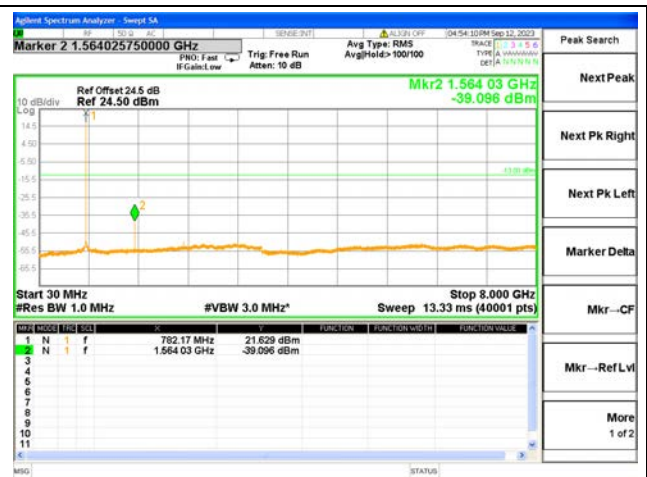
B13 / 15KHz / Mid CH / QPSK / 1@0



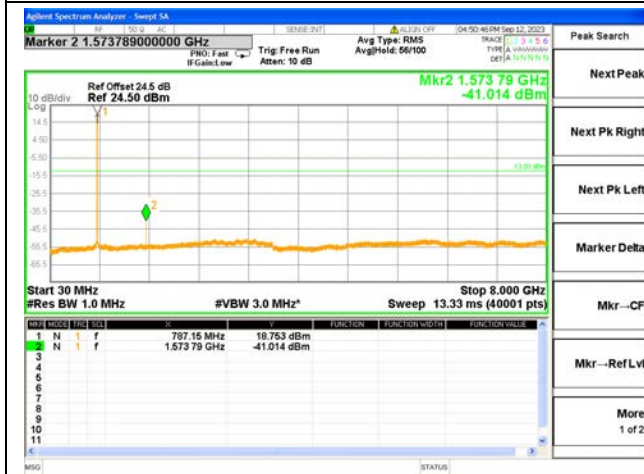
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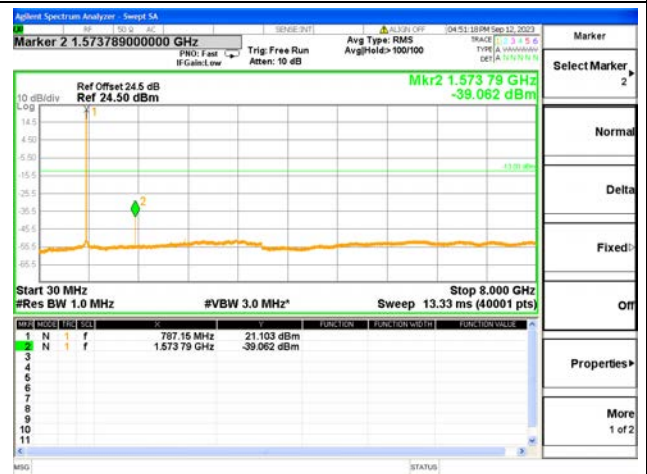
B13 / 3.75KHz / Mid CH / QPSK / 1@0



B13 / 3.75KHz / Mid CH / BPSK / 1@0



B13 / 15KHz / High CH / QPSK / 1@0



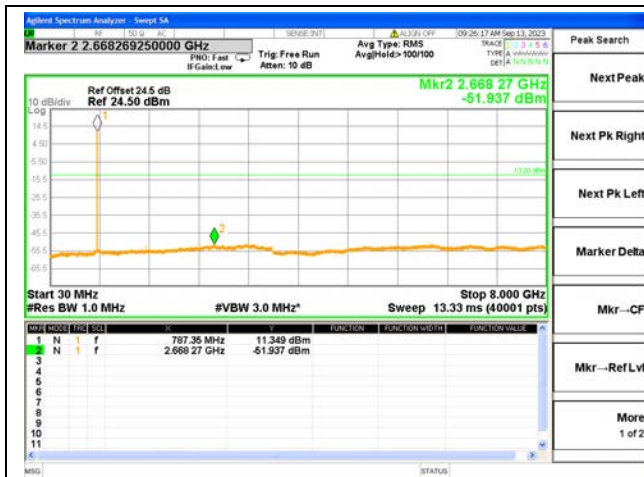
B13 / 15KHz / High CH / BPSK / 1@0



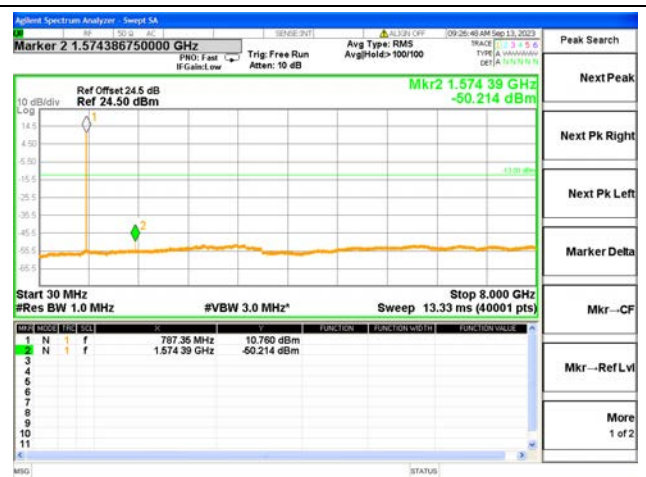
B13 / 3.75KHz / High CH / QPSK / 1@0



B13 / 3.75KHz / High CH / BPSK / 1@0



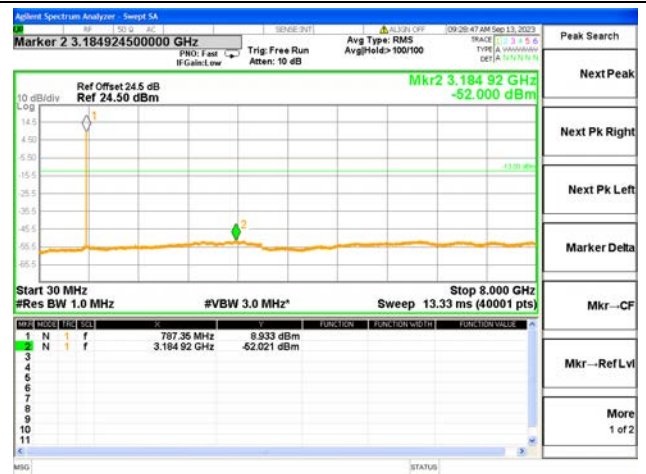
B103 / 15KHz / Low CH / QPSK / 1@0



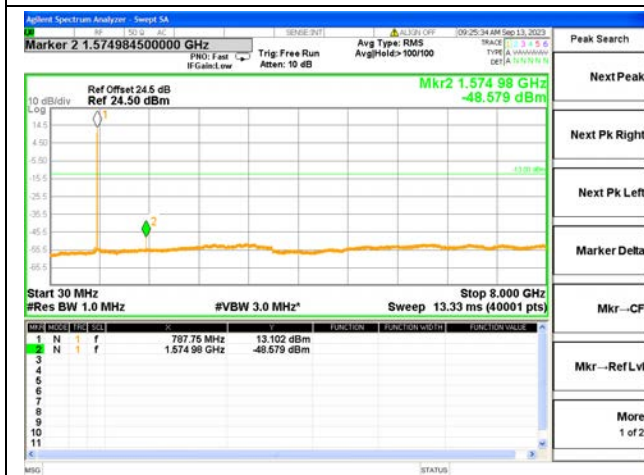
B103 / 15KHz / Low CH / BPSK / 1@0



B103 / 3.75KHz / Low CH / QPSK / 1@0



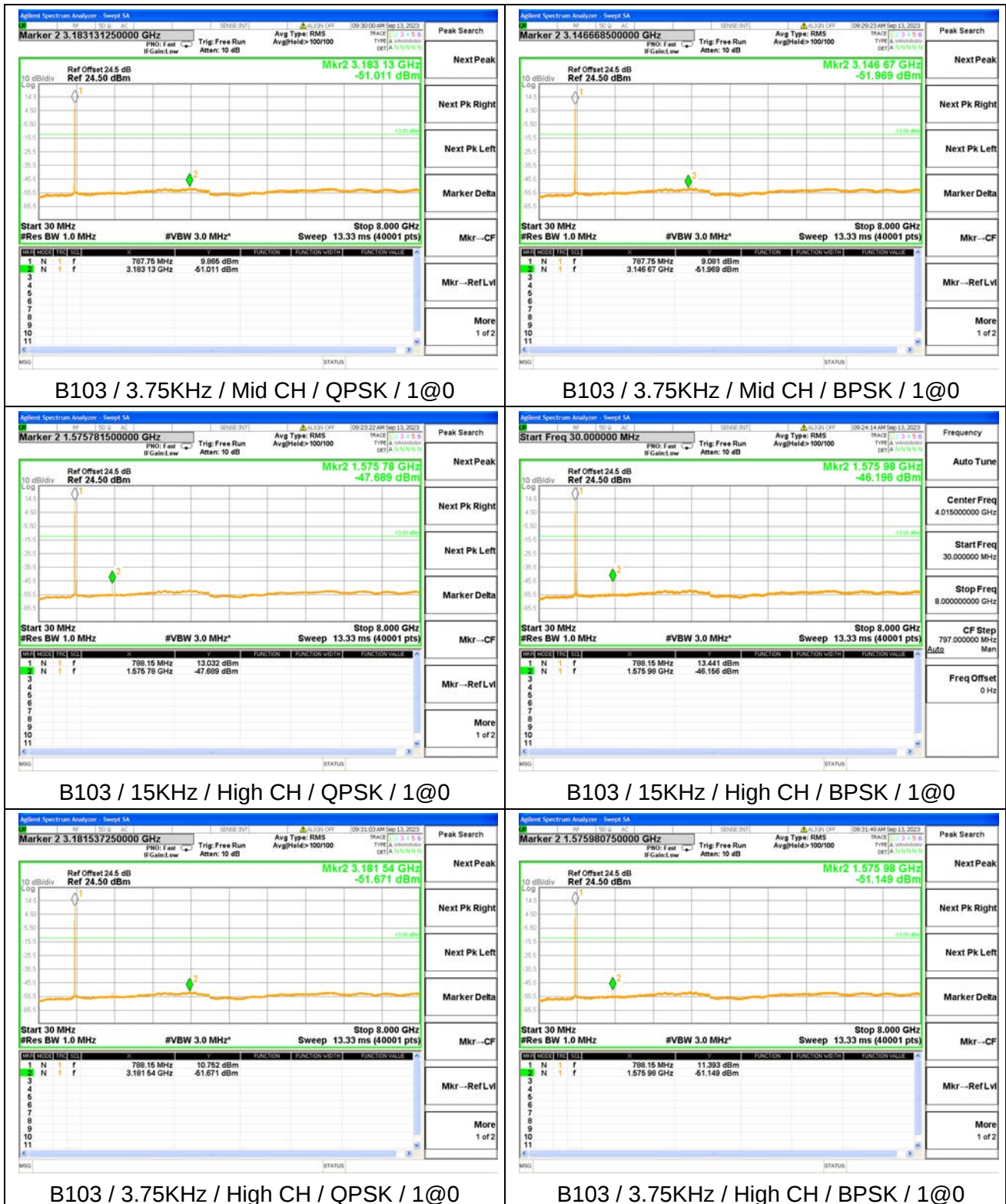
B103 / 3.75KHz / Low CH / BPSK / 1@0



B103 / 15KHz / Mid CH / QPSK / 1@0



B103 / 15KHz / Mid CH / BPSK / 1@0





2.5. Band Edge

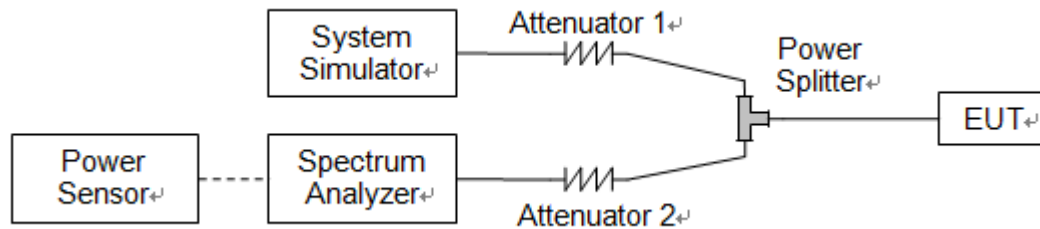
2.5.1. Requirement

Band 13/103

According to FCC section 27.53(c), for operations in the 776-788 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

2.5.2. Test Description



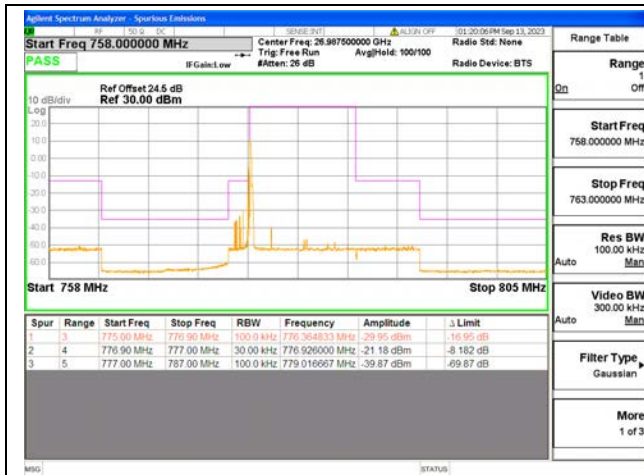
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.5.3. Test Procedure

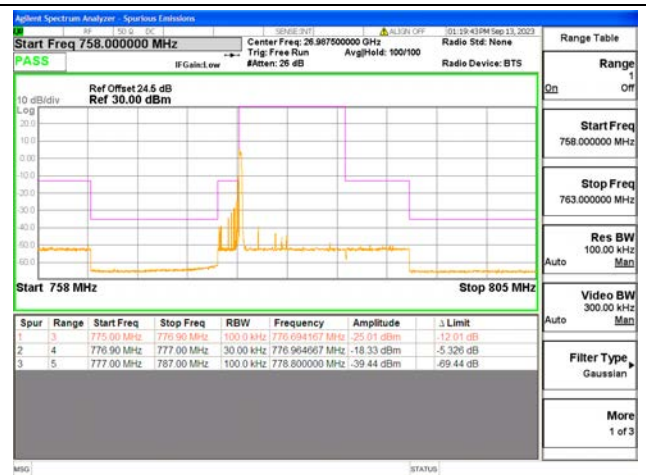
KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.



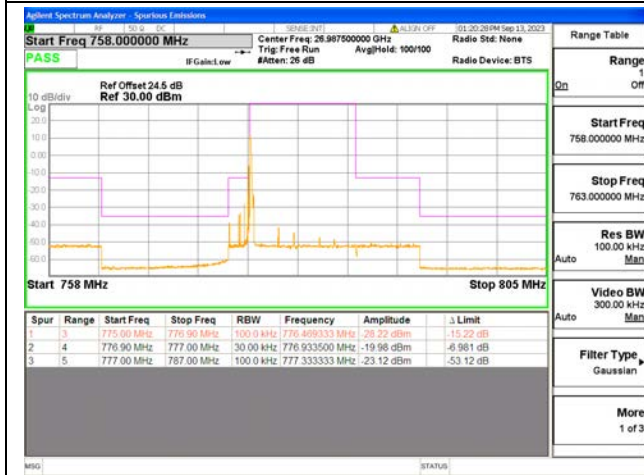
2.5.4. Test Result



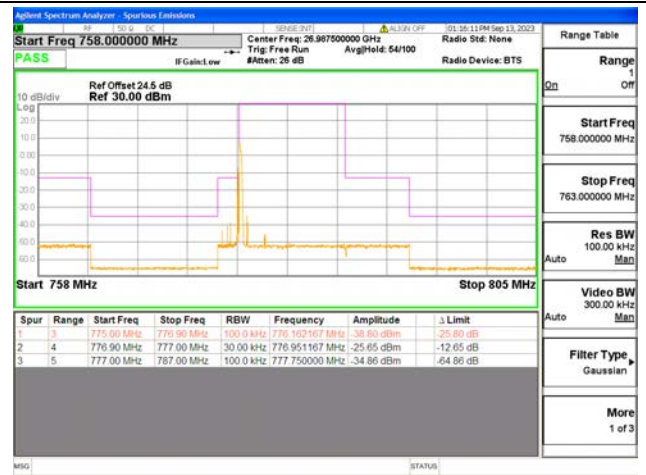
B13 / 15KHz / Low CH / QPSK / 1@0



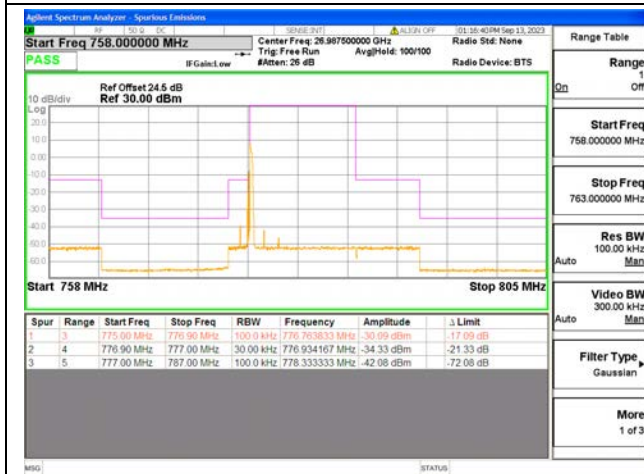
B13 / 15KHz / Low CH / QPSK / 12@0



B13 / 15KHz / Low CH / BPSK / 1@0

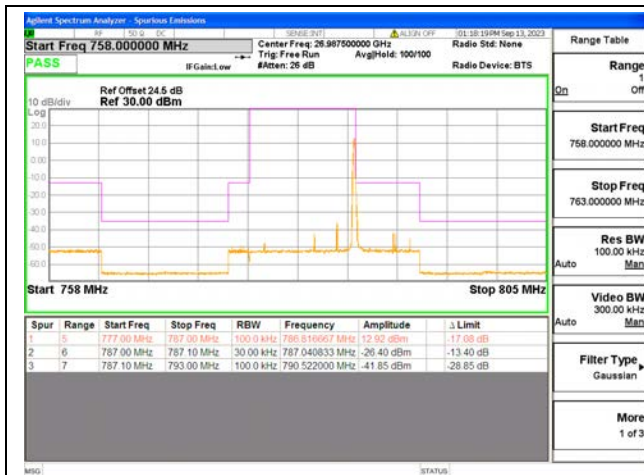


B13 / 3.75KHz / Low CH / QPSK / 1@0

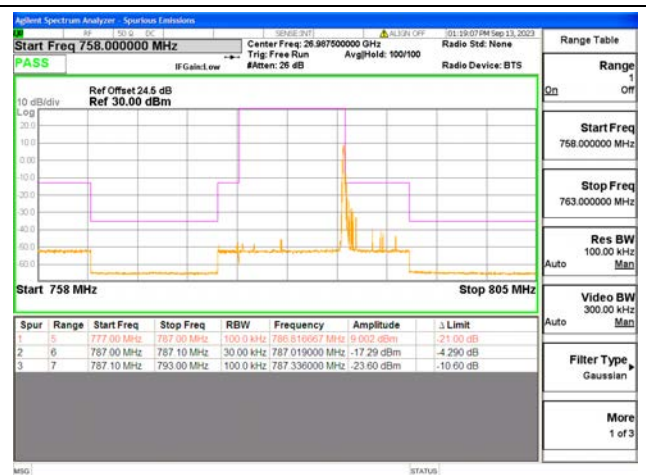


B13 / 3.75KHz / Low CH / BPSK / 1@0

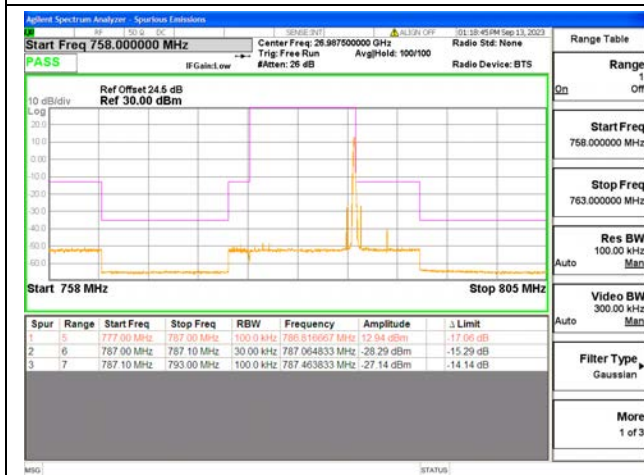
N/A



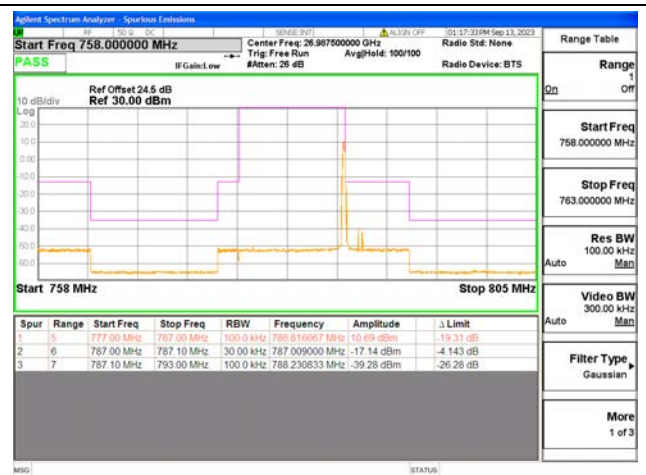
B13 / 15KHz / High CH / QPSK / 1@11



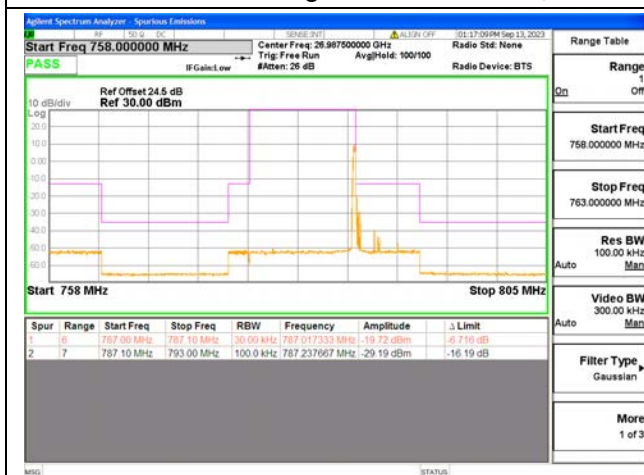
B13 / 15KHz / High CH / QPSK / 12@0



B13 / 15KHz / High CH / BPSK / 1@11

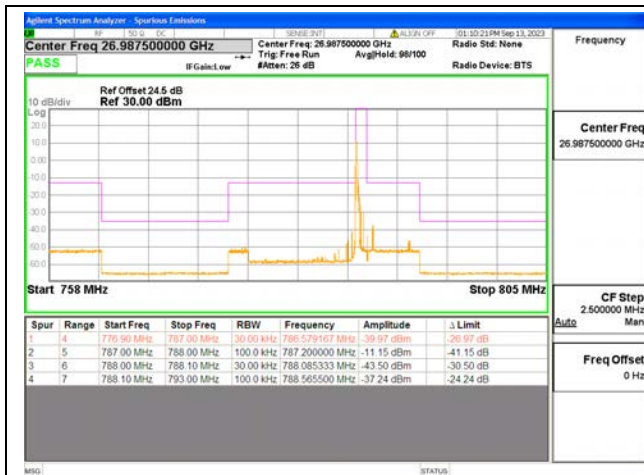


B13 / 3.75KHz / High CH / QPSK / 1@47

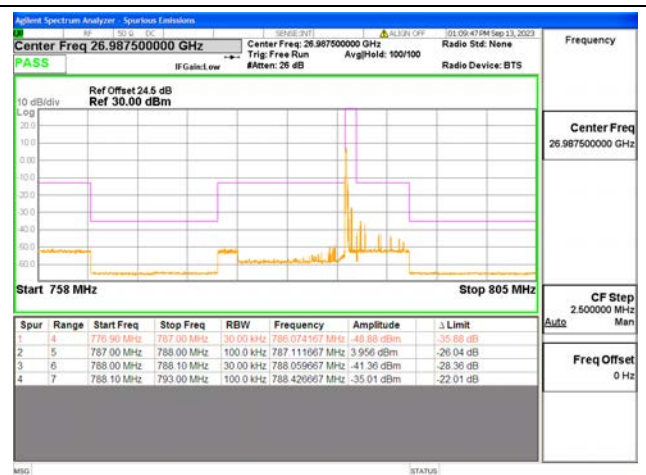


B13 / 3.75KHz / High CH / BPSK / 1@47

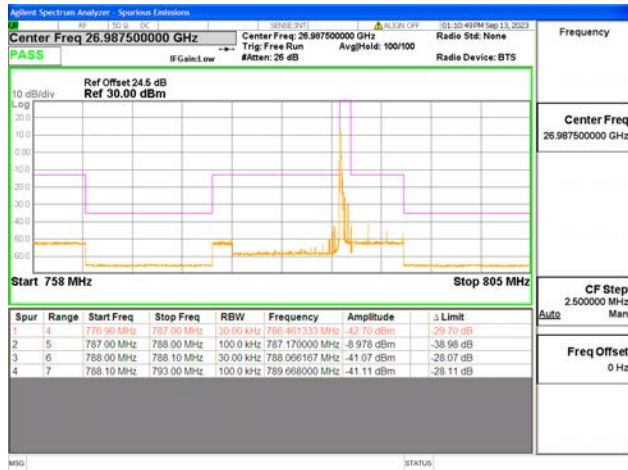
N/A



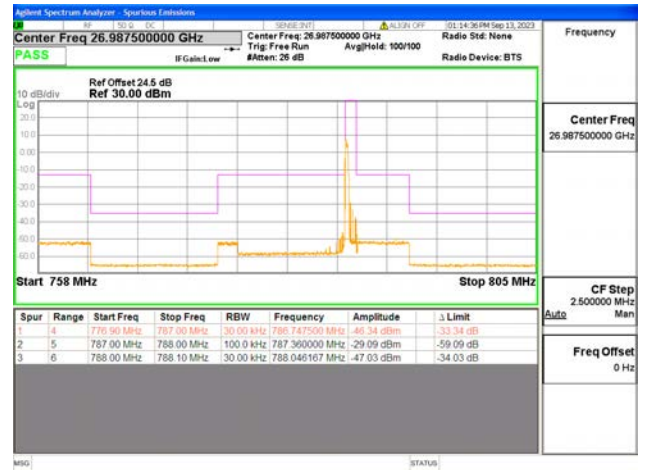
B103 / 15KHz / Low CH / QPSK / 1@0



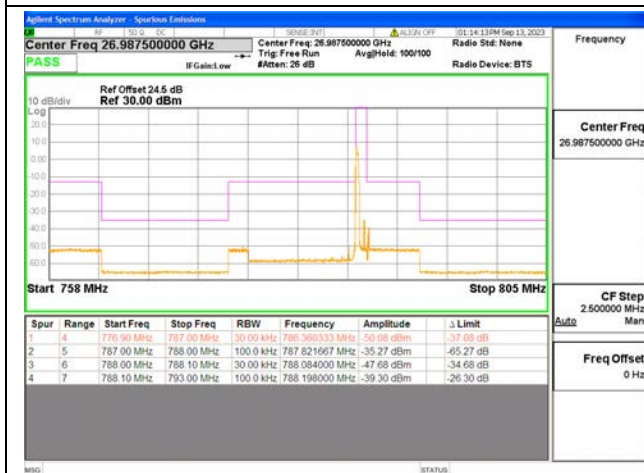
B103 / 15KHz / Low CH / QPSK / 12@0



B103 / 15KHz / Low CH / BPSK / 1@0

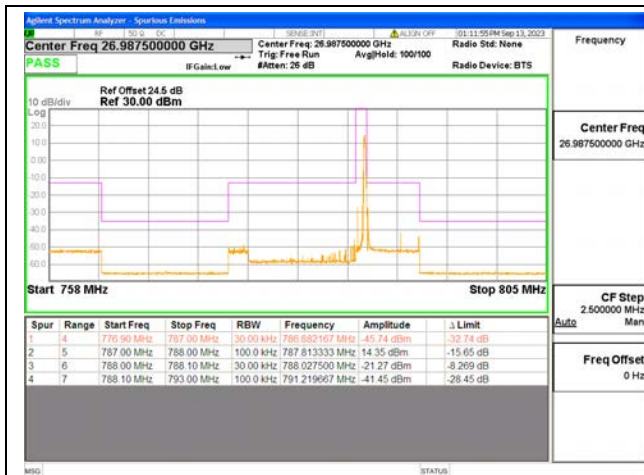


B103 / 3.75KHz / Low CH / QPSK / 1@0

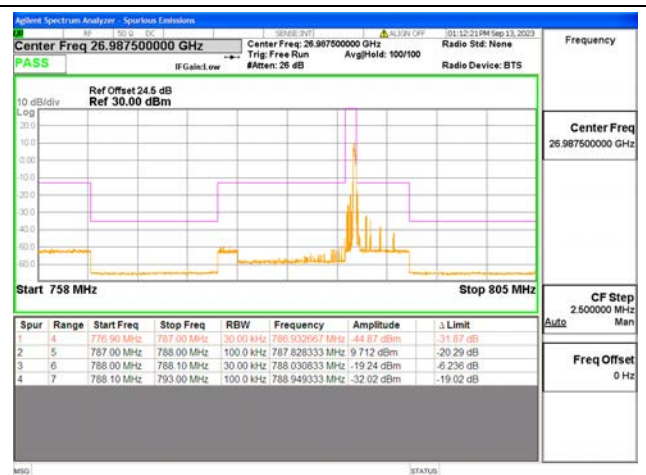


B103 / 3.75KHz / Low CH / BPSK / 1@0

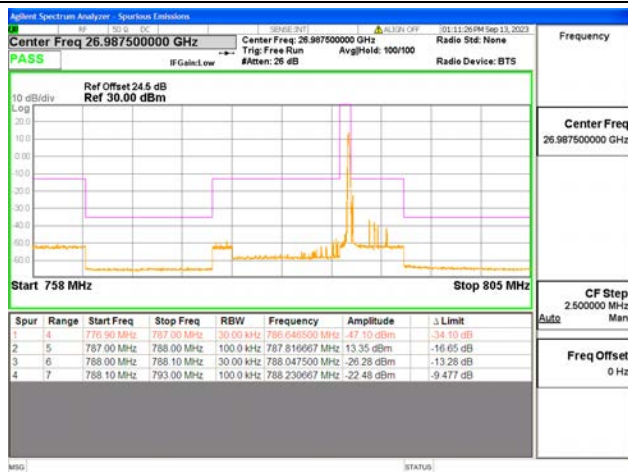
N/A



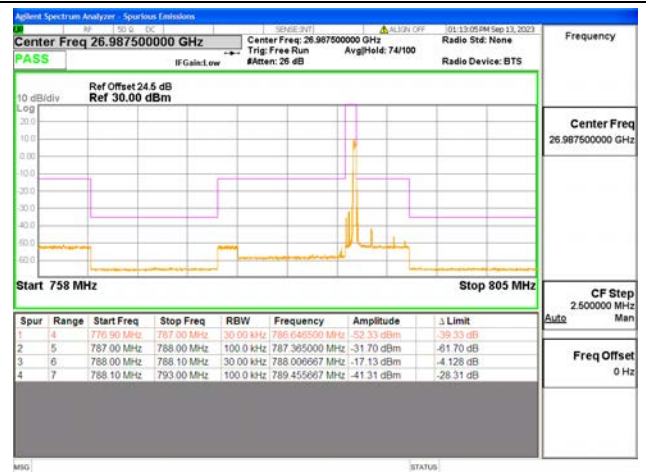
B103 / 15KHz / High CH / QPSK / 1@11



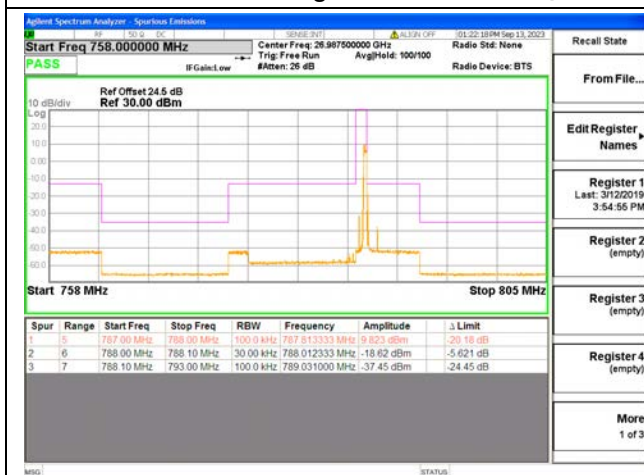
B103 / 15KHz / High CH / QPSK / 12@0



B103 / 15KHz / High CH / BPSK / 1@11



B103 / 3.75KHz / High CH / QPSK / 1@47



B103 / 3.75KHz / High CH / BPSK / 1@47

N/A

2.6. Radiated Spurious Emissions

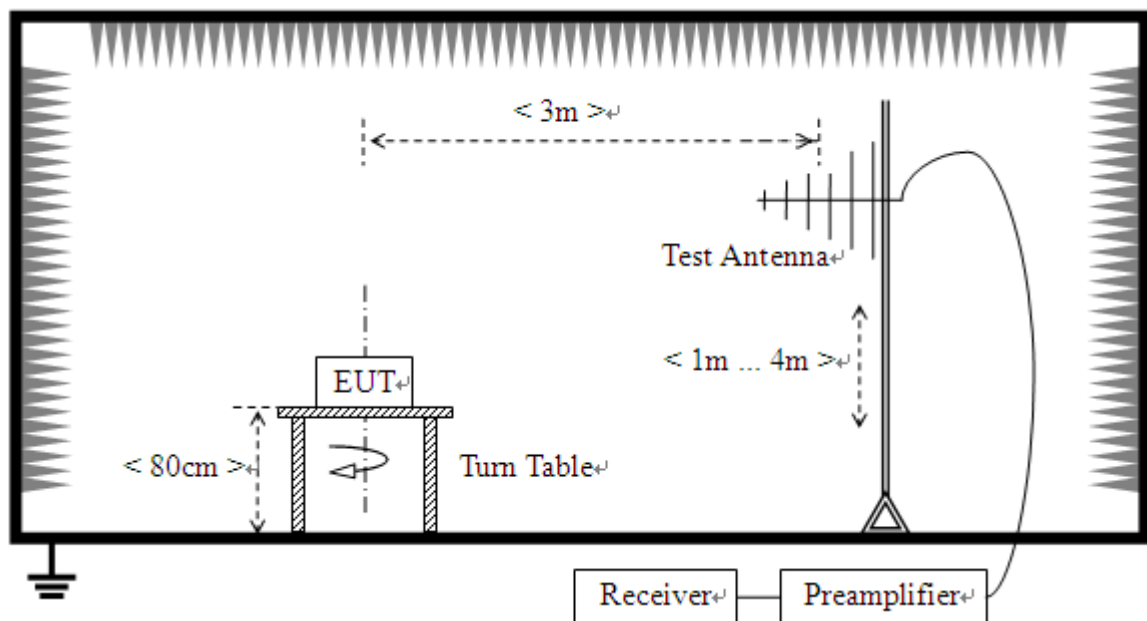
2.6.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

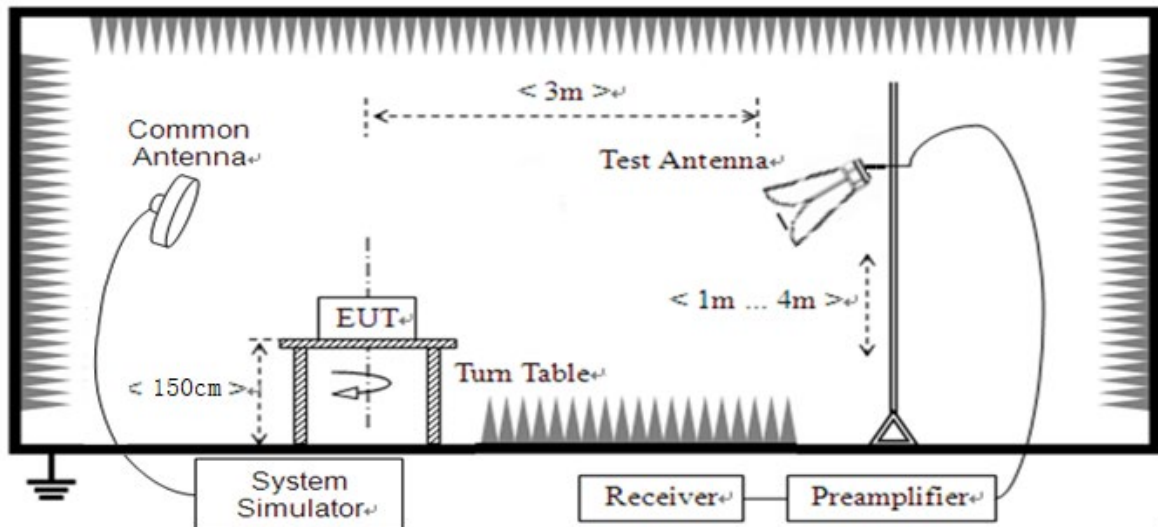
Additional requirement for LTE Band 13

According to FCC section 27.53(c)(2), any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB in a 100kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. This calculated to be -13dBm.

2.6.2. Test Description



(For the test frequency from 30MHz to 1GHz)



(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading. A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360° to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.

Note: When doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.6.3. Test Procedure

KDB 971168 D01v03 Section 5.8 and ANSI/TIA-603-E-2016.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements.

For measurements above 1GHz (exclude 1559-1610 MHz) the resolution bandwidth is set to 1MHz, the video bandwidths set to 3MHz for peak measurements.

2.6.4. Test Result

The measurement frequency range is from 30MHz 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. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$$A_{\text{SUBST}} = P_{\text{SUBST_TX}} - P_{\text{SUBST_RX}} - L_{\text{SUBST_CABLES}} + G_{\text{SUBST_TX_ANT}}$$

$$A_{\text{TOT}} = L_{\text{CABLES}} + A_{\text{SUBST}}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

$P_{\text{SUBST_TX}}$ is signal generator level,

$P_{\text{SUBST_RX}}$ is receiver level,

$L_{\text{SUBST_CABLES}}$ is cable losses including TX cable,

$G_{\text{SUBST_TX_ANT}}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT} .

Note 1: The power of the EUT transmitting frequency should be ignored.

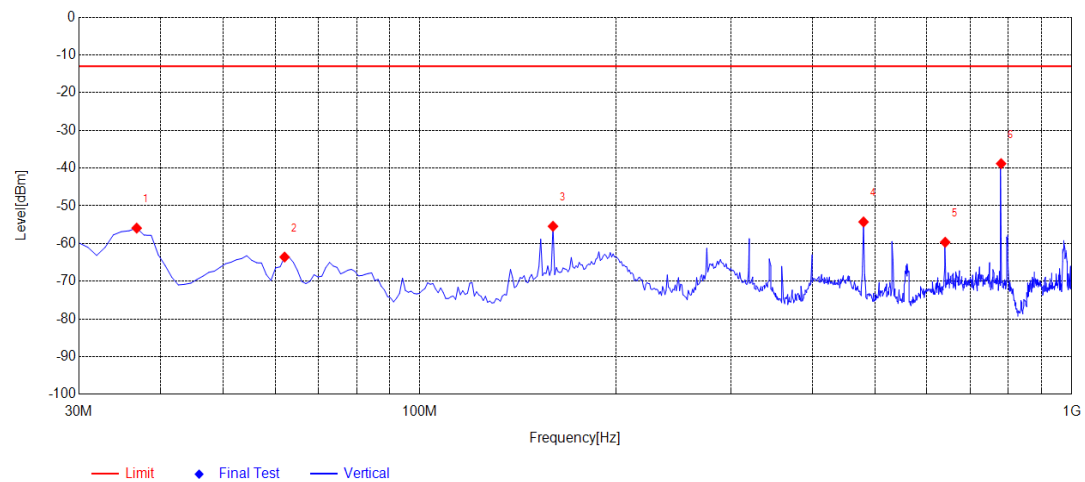
Note 2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note 3: All bandwidth and modulation were considered and evaluated respectively by performing full test for each band; only the worst cases (Max Bandwidth and QPSK mode) were recorded in this test report.

Note 4: N/A means the frequency is the basic frequency or the base station frequency; they are no need to verdict.

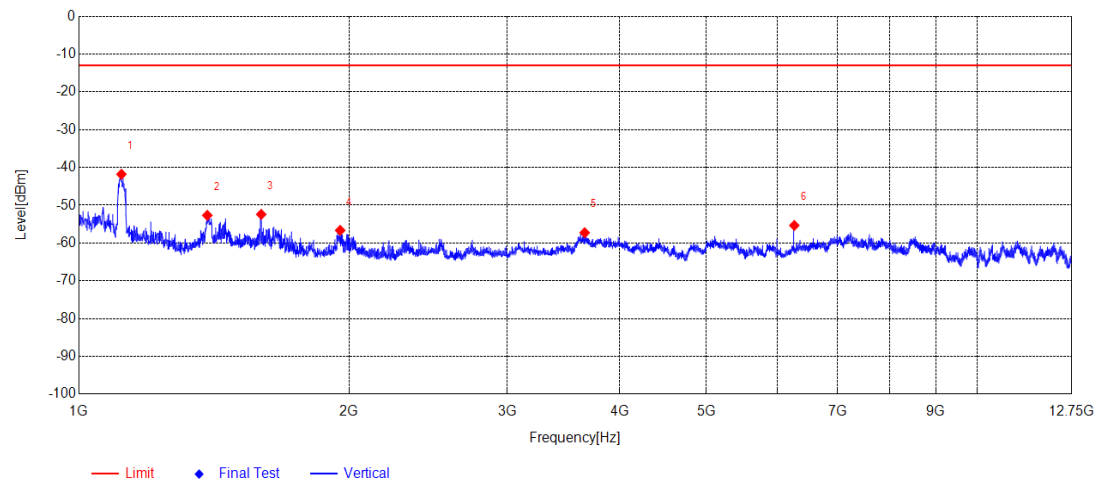


Panel Antenna



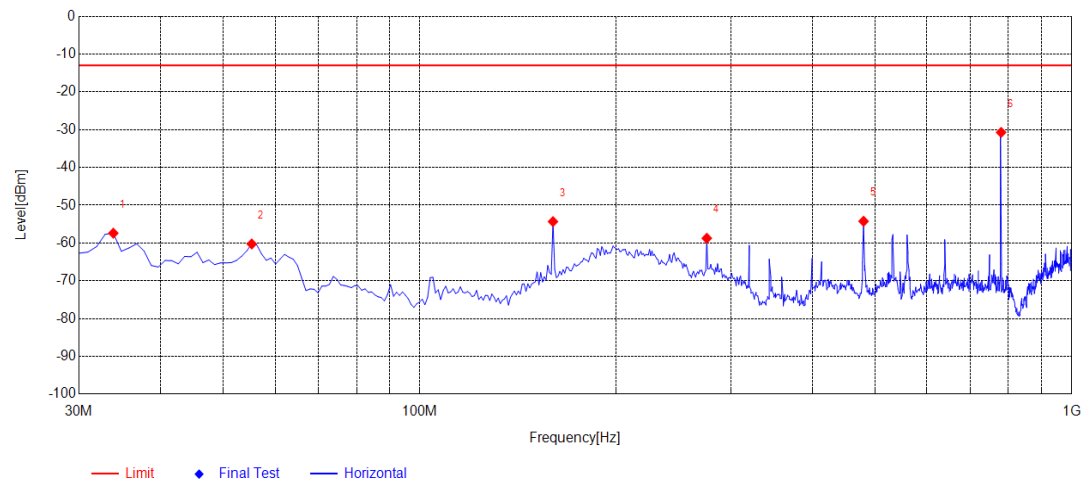
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	36.7968	-39.17	-55.90	-13.00	42.90	-16.73	Vertical
2	62.0420	-44.76	-63.58	-13.00	50.58	-18.82	Vertical
3	160.1101	-37.02	-55.42	-13.00	42.42	-18.40	Vertical
4	479.5596	-41.92	-54.27	-13.00	41.27	-12.35	Vertical
5	639.7698	-49.16	-59.66	-13.00	46.66	-10.50	Vertical
6	779.5896	-30.02	-38.81	-13.00	25.81	-8.79	N/A

NB-IOT Band 13 Low Channel QPSK 30M-1G v

**Suspected Data List**

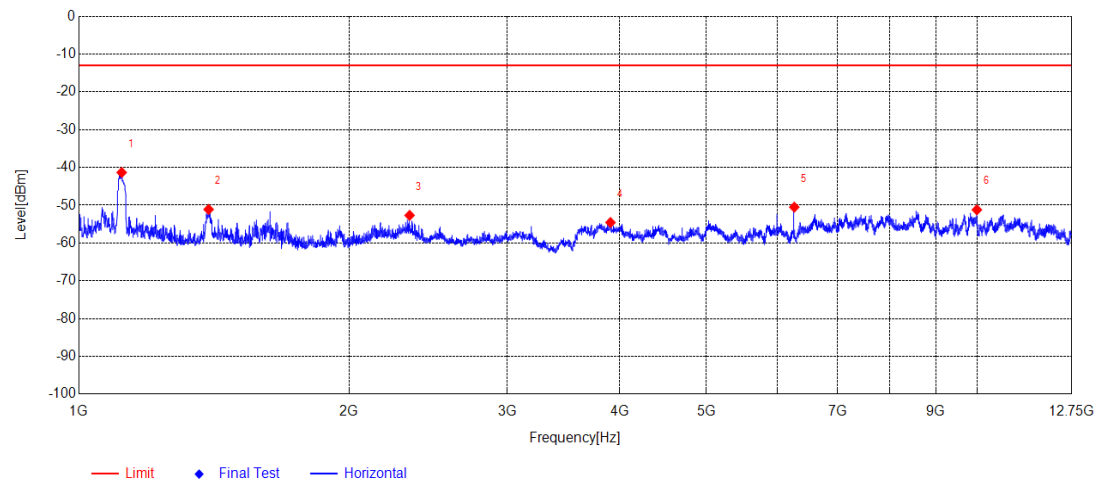
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1115.3718	-28.07	-41.79	-13.00	28.79	-13.72	Vertical
2	1390.1300	-40.18	-52.67	-13.00	39.67	-12.49	Vertical
3	1596.1987	-38.06	-52.41	-13.00	39.41	-14.35	Vertical
4	1954.3181	-43.32	-56.64	-13.00	43.64	-13.32	Vertical
5	3658.2347	-47.81	-57.26	-13.00	44.26	-9.45	Vertical
6	6261.9187	-46.26	-55.33	-13.00	42.33	-9.07	Vertical

NB-IOT Band 13 Low Channel QPSK 1G-12.75G V

**Suspected Data List**

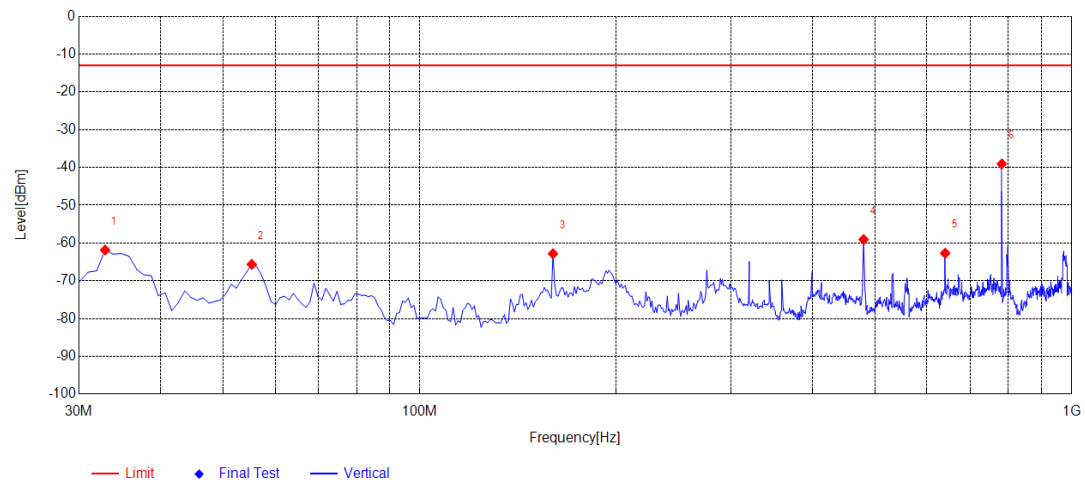
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	33.8839	-47.43	-57.38	-13.00	44.38	-9.95	Horizontal
2	55.2452	-50.73	-60.24	-13.00	47.24	-9.51	Horizontal
3	160.1101	-33.25	-54.31	-13.00	41.31	-21.06	Horizontal
4	275.6557	-44.17	-58.73	-13.00	45.73	-14.56	Horizontal
5	479.5596	-41.97	-54.23	-13.00	41.23	-12.26	Horizontal
6	779.5896	-21.99	-30.71	-13.00	17.71	-8.72	N/A

NB-IOT Band 13 Low Channel QPSK 30M-1G H

**Suspected Data List**

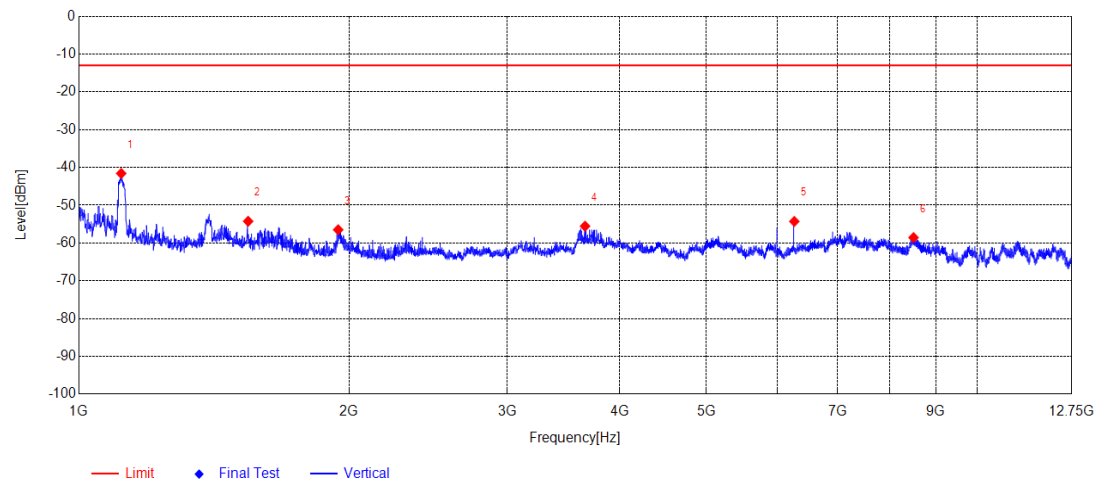
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1116.0387	-28.68	-41.33	-13.00	28.33	-12.65	Horizontal
2	1394.7983	-40.28	-51.10	-13.00	38.10	-10.82	Horizontal
3	2335.1117	-44.32	-52.67	-13.00	39.67	-8.35	Horizontal
4	3908.5264	-48.86	-54.56	-13.00	41.56	-5.70	Horizontal
5	6261.9187	-45.48	-50.50	-13.00	37.50	-5.02	Horizontal
6	10000.0417	-51.86	-51.20	-13.00	38.20	0.66	Horizontal

NB-IOT Band 13 Low Channel QPSK 1G-12.75G H

**Suspected Data List**

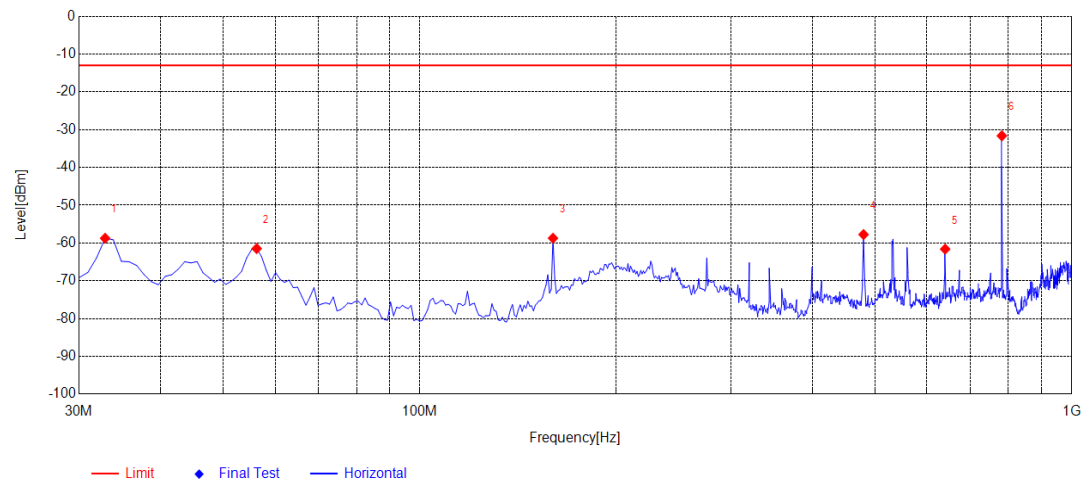
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	32.9129	-44.89	-61.84	-13.00	48.84	-16.95	Vertical
2	55.2452	-48.36	-65.64	-13.00	52.64	-17.28	Vertical
3	160.1101	-44.41	-62.81	-13.00	49.81	-18.40	Vertical
4	479.5596	-46.72	-59.07	-13.00	46.07	-12.35	Vertical
5	639.7698	-52.19	-62.69	-13.00	49.69	-10.50	Vertical
6	781.5315	-30.20	-39.05	-13.00	26.05	-8.85	N/A

NB-IOT Band 13 Mid Channel QPSK 30M-1G v



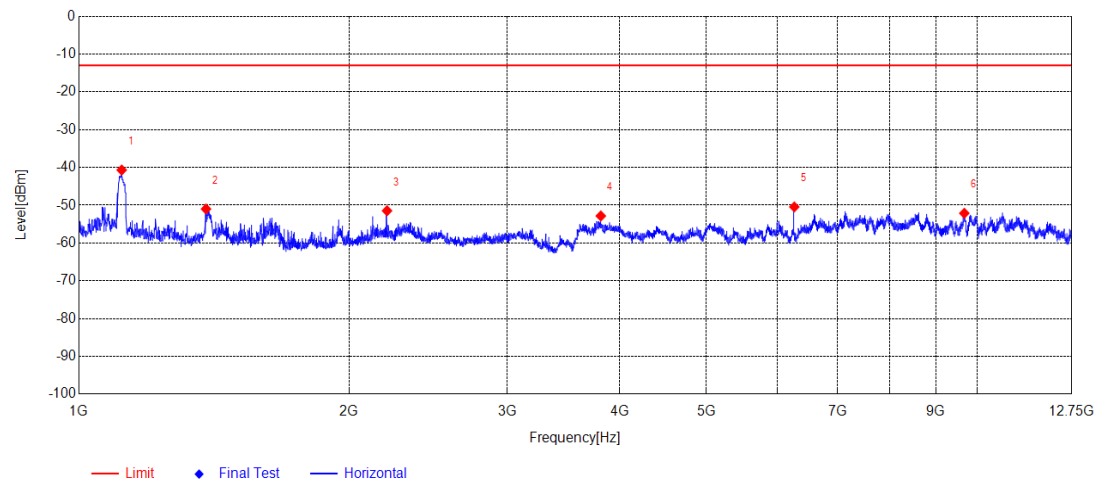
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1114.7049	-27.86	-41.57	-13.00	28.57	-13.71	Vertical
2	1543.5145	-40.12	-54.24	-13.00	41.24	-14.12	Vertical
3	1944.3148	-43.01	-56.48	-13.00	43.48	-13.47	Vertical
4	3661.4852	-46.08	-55.54	-13.00	42.54	-9.46	Vertical
5	6261.9187	-45.20	-54.27	-13.00	41.27	-9.07	Vertical
6	8501.5419	-52.12	-58.55	-13.00	45.55	-6.43	Vertical

NB-IOT Band 13 Mid Channel QPSK 1G-12.75G V

**Suspected Data List**

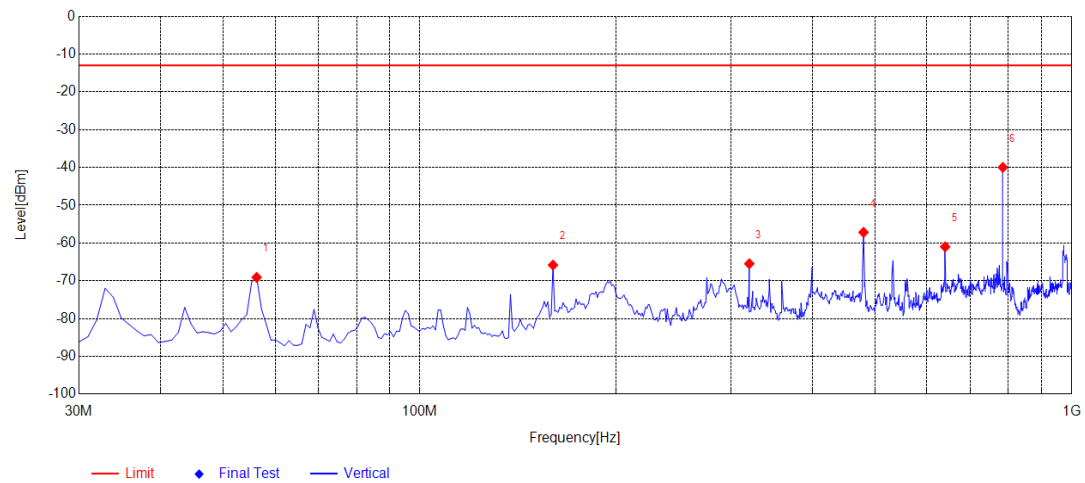
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	32.9129	-48.36	-58.73	-13.00	45.73	-10.37	Horizontal
2	56.2162	-51.56	-61.46	-13.00	48.46	-9.90	Horizontal
3	160.1101	-37.65	-58.71	-13.00	45.71	-21.06	Horizontal
4	479.5596	-45.49	-57.75	-13.00	44.75	-12.26	Horizontal
5	639.7698	-50.79	-61.59	-13.00	48.59	-10.80	Horizontal
6	781.5315	-22.87	-31.62	-13.00	18.62	-8.75	N/A

NB-IOT Band 13 Mid Channel QPSK 30M-1G H



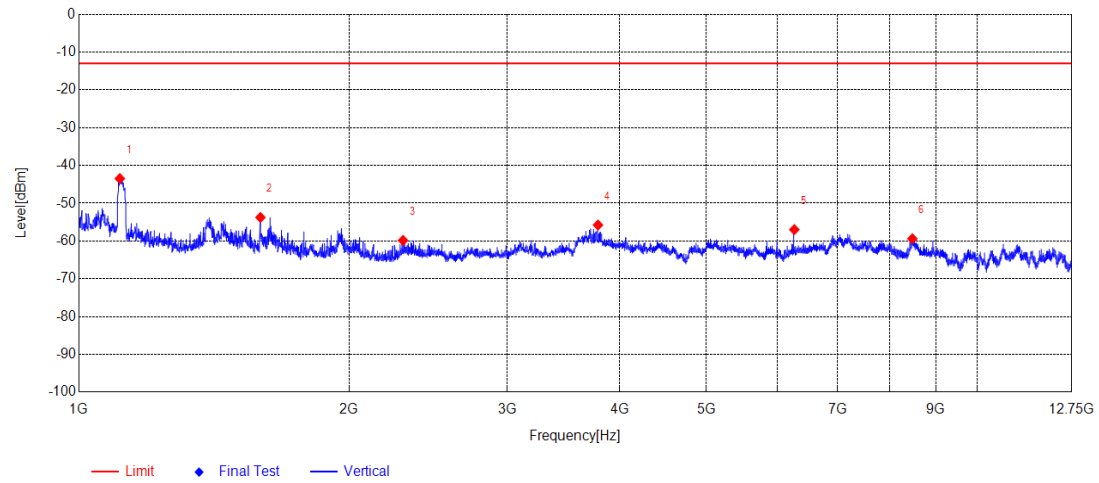
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1116.0387	-28.03	-40.68	-13.00	27.68	-12.65	Horizontal
2	1385.4618	-39.85	-50.98	-13.00	37.98	-11.13	Horizontal
3	2203.7346	-42.38	-51.46	-13.00	38.46	-9.08	Horizontal
4	3812.6354	-47.28	-52.83	-13.00	39.83	-5.55	Horizontal
5	6261.9187	-45.42	-50.44	-13.00	37.44	-5.02	Horizontal
6	9683.1139	-53.08	-52.11	-13.00	39.11	0.97	Horizontal

NB-IOT Band 13 Mid Channel QPSK 1G-12.75G H

**Suspected Data List**

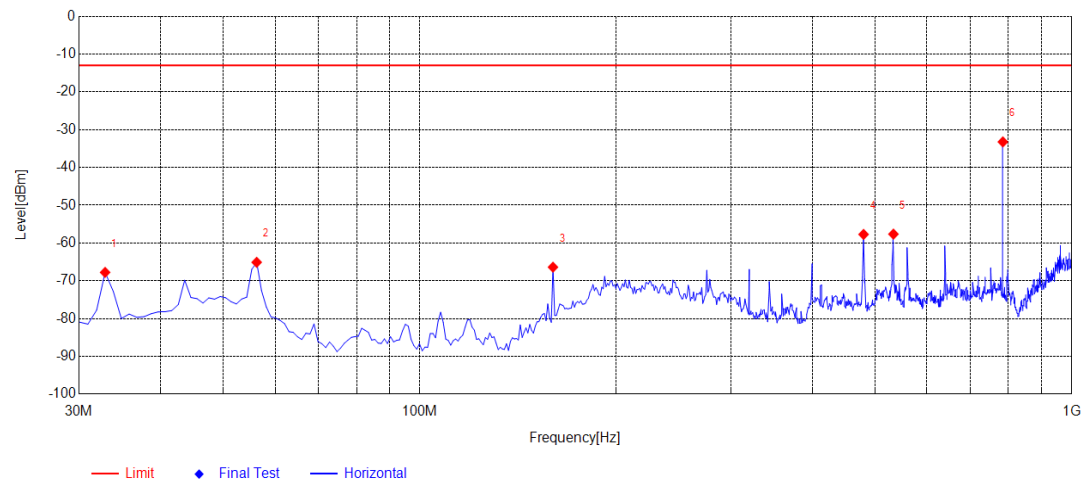
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	56.2162	-51.50	-69.09	-13.00	56.09	-17.59	Vertical
2	160.1101	-47.42	-65.82	-13.00	52.82	-18.40	Vertical
3	320.3203	-51.21	-65.47	-13.00	52.47	-14.26	Vertical
4	479.5596	-44.81	-57.16	-13.00	44.16	-12.35	Vertical
5	639.7698	-50.49	-60.99	-13.00	47.99	-10.50	Vertical
6	784.4444	-31.06	-39.97	-13.00	26.97	-8.91	N/A

NB-IOT Band 13 High Channel QPSK 30M-1G V

**Suspected Data List**

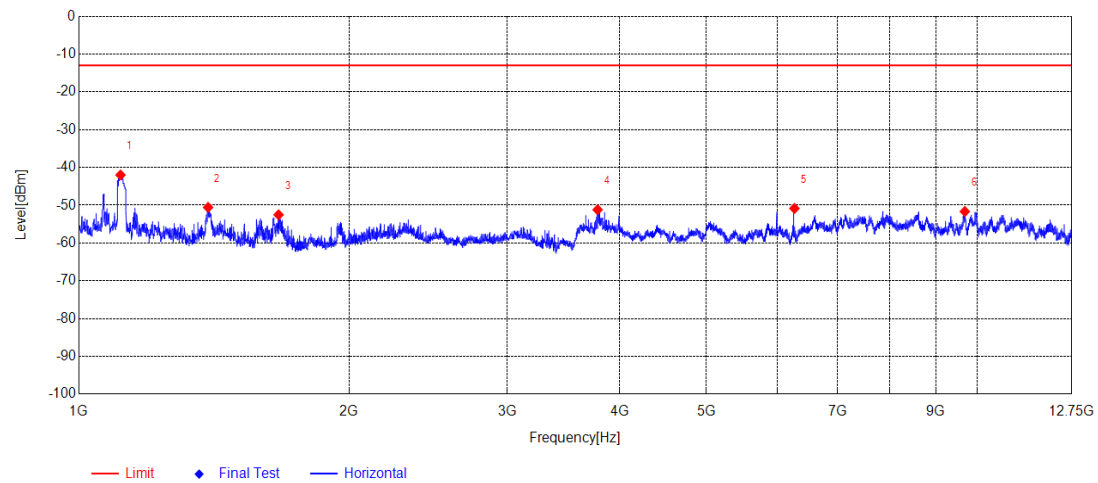
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1110.7036	-29.79	-43.46	-13.00	30.46	-13.67	Vertical
2	1592.8643	-39.40	-53.75	-13.00	40.75	-14.35	Vertical
3	2295.7653	-46.16	-59.83	-13.00	46.83	-13.67	Vertical
4	3785.0058	-46.01	-55.76	-13.00	42.76	-9.75	Vertical
5	6261.9187	-47.90	-56.97	-13.00	43.97	-9.07	Vertical
6	8475.5376	-52.67	-59.37	-13.00	46.37	-6.70	Vertical

NB-IOT Band 13 High Channel QPSK 1G-12.75G V

**Suspected Data List**

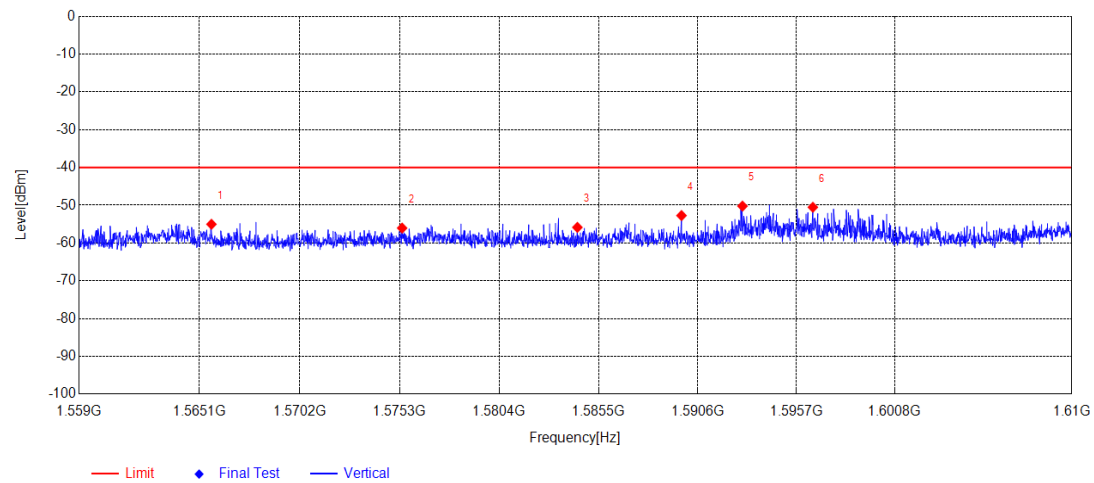
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	32.9129	-57.39	-67.76	-13.00	54.76	-10.37	Horizontal
2	56.2162	-55.19	-65.09	-13.00	52.09	-9.90	Horizontal
3	160.1101	-45.32	-66.38	-13.00	53.38	-21.06	Horizontal
4	479.5596	-45.45	-57.71	-13.00	44.71	-12.26	Horizontal
5	532.9630	-46.45	-57.63	-13.00	44.63	-11.18	Horizontal
6	784.4444	-24.44	-33.22	-13.00	20.22	-8.78	N/A

NB-IOT Band 13 High Channel QPSK 30M-1G H

**Suspected Data List**

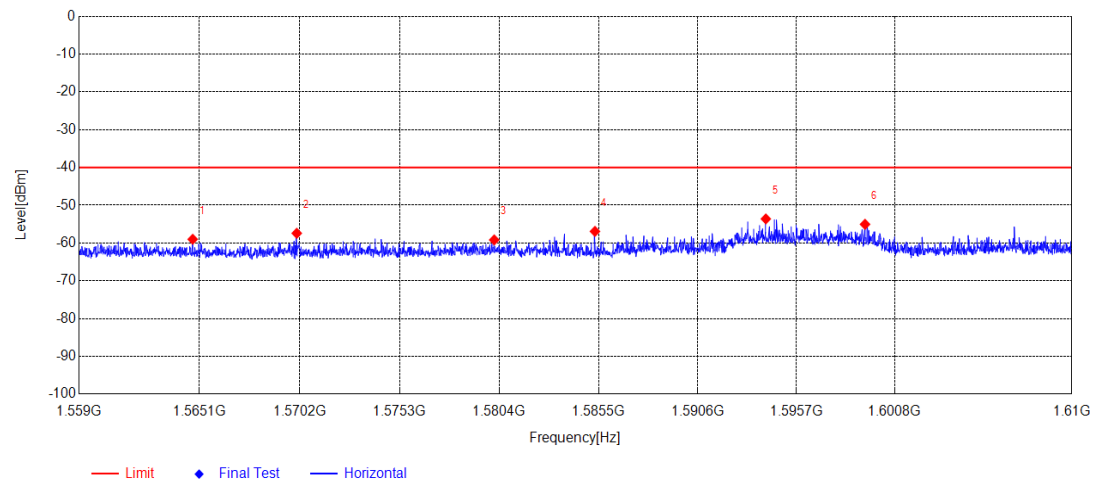
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1112.7042	-29.37	-41.99	-13.00	28.99	-12.62	Horizontal
2	1392.7976	-39.67	-50.56	-13.00	37.56	-10.89	Horizontal
3	1668.8896	-39.62	-52.52	-13.00	39.52	-12.90	Horizontal
4	3781.7553	-44.88	-51.18	-13.00	38.18	-6.30	Horizontal
5	6263.5439	-45.75	-50.83	-13.00	37.83	-5.08	Horizontal
6	9696.1160	-53.27	-51.65	-13.00	38.65	1.62	Horizontal

NB-IOT Band 13 High Channel QPSK 1G-12.75G H

**Suspected Data List**

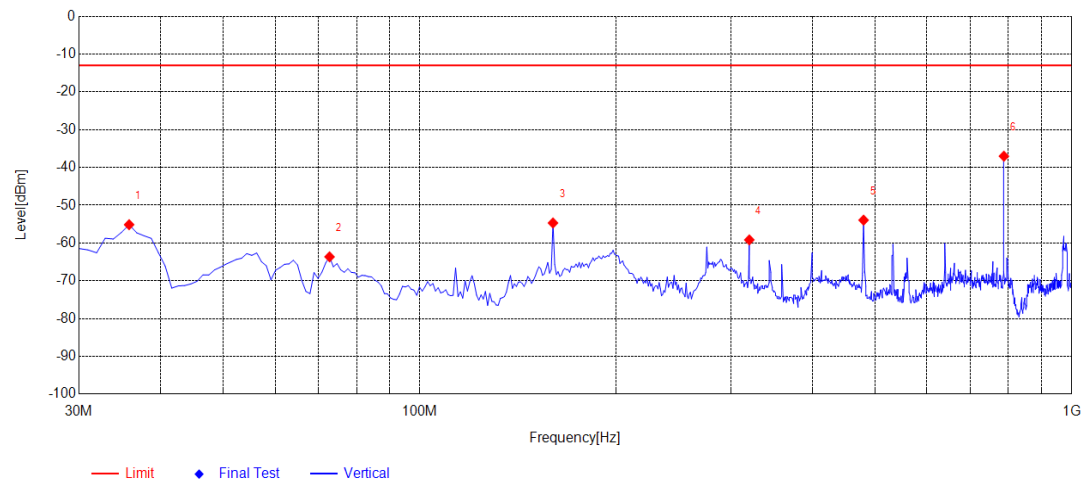
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1565.7172	-40.95	-55.02	-40.00	15.02	-14.07	Vertical
2	1575.4275	-41.92	-56.03	-40.00	16.03	-14.11	Vertical
3	1584.4065	-41.71	-55.85	-40.00	15.85	-14.14	Vertical
4	1589.7633	-38.57	-52.73	-40.00	12.73	-14.16	Vertical
5	1592.9093	-36.05	-50.22	-40.00	10.22	-14.17	Vertical
6	1596.5485	-36.34	-50.52	-40.00	10.52	-14.18	Vertical

NB-IOT Band 13 Mid Channel QPSK 1559MHz-1610MHz V

**Suspected Data List**

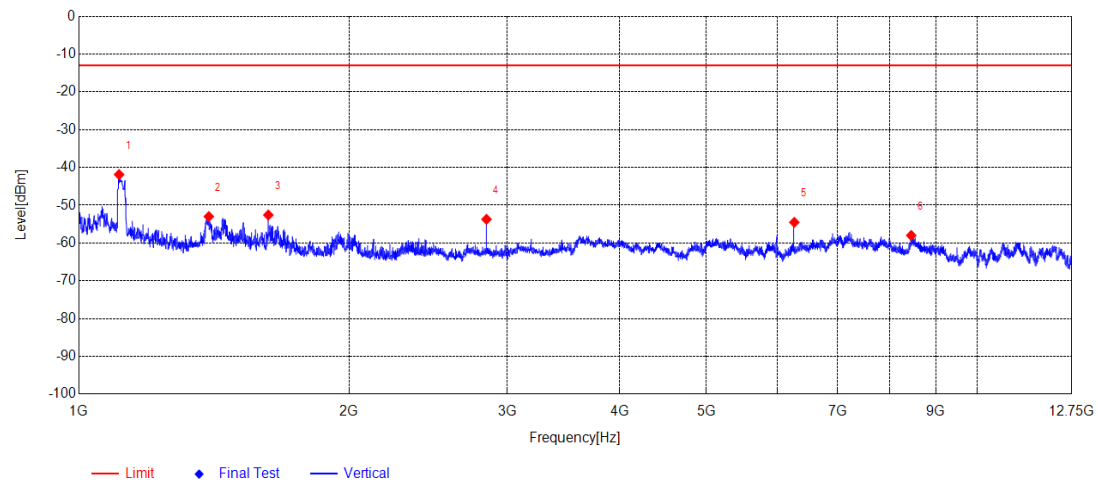
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1564.7649	-44.65	-59.00	-40.00	19.00	-14.35	Horizontal
2	1570.0537	-43.10	-57.41	-40.00	17.41	-14.31	Horizontal
3	1580.1380	-44.94	-59.17	-40.00	19.17	-14.23	Horizontal
4	1585.3078	-42.72	-56.91	-40.00	16.91	-14.19	Horizontal
5	1594.1167	-39.48	-53.61	-40.00	13.61	-14.13	Horizontal
6	1599.2524	-40.95	-55.04	-40.00	15.04	-14.09	Horizontal

NB-IOT Band 13 Mid Channel QPSK 1559MHz-1610MHz H

**Suspected Data List**

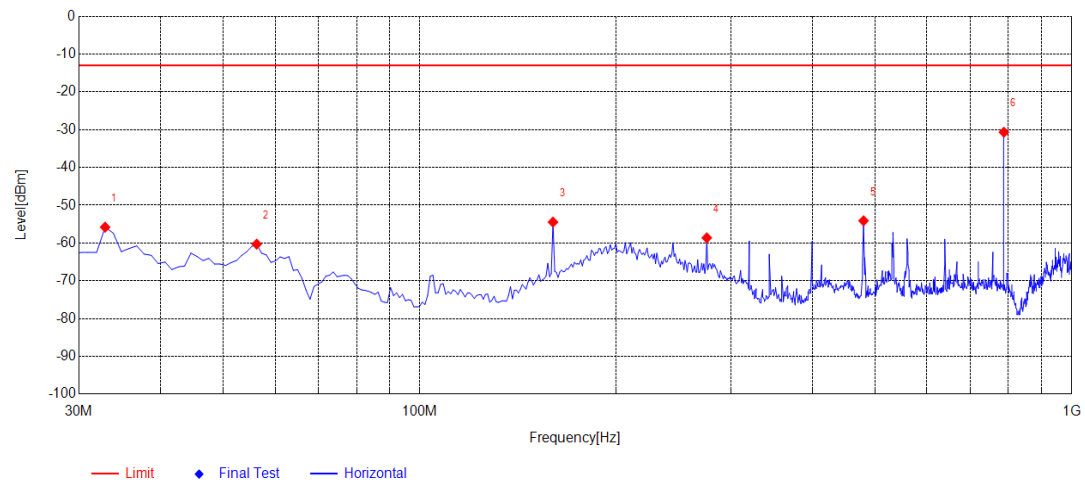
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	35.8258	-38.36	-55.14	-13.00	42.14	-16.78	Vertical
2	72.7227	-44.21	-63.65	-13.00	50.65	-19.44	Vertical
3	160.1101	-36.28	-54.68	-13.00	41.68	-18.40	Vertical
4	320.3203	-44.90	-59.16	-13.00	46.16	-14.26	Vertical
5	479.5596	-41.58	-53.93	-13.00	40.93	-12.35	Vertical
6	787.3574	-28.03	-37.01	-13.00	24.01	-8.98	N/A

NB-IOT Band 103 Mid Channel QPSK 30M-1G V

**Suspected Data List**

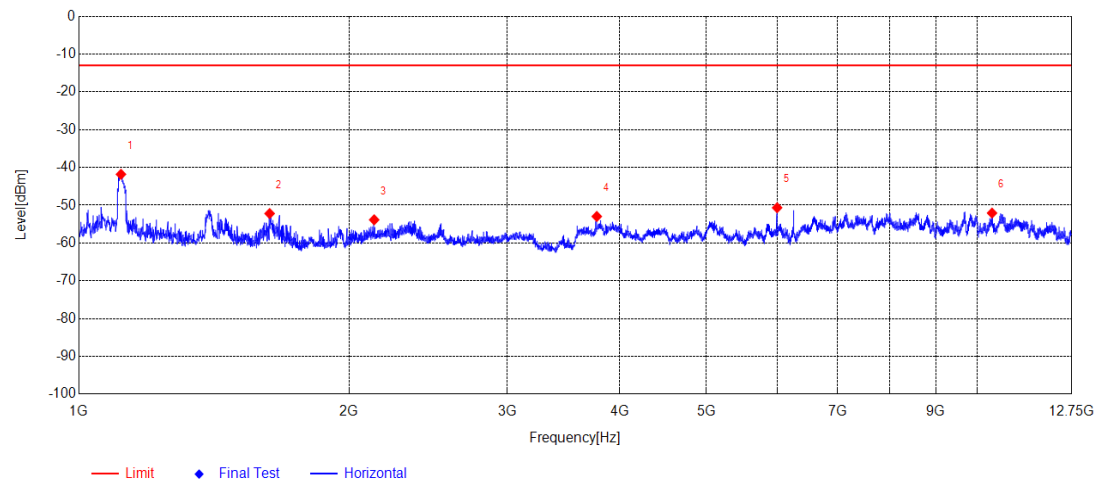
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1108.7029	-28.21	-41.87	-13.00	28.87	-13.66	Vertical
2	1395.4652	-40.60	-52.99	-13.00	39.99	-12.39	Vertical
3	1625.5418	-38.36	-52.57	-13.00	39.57	-14.21	Vertical
4	2843.9480	-40.70	-53.71	-13.00	40.71	-13.01	Vertical
5	6261.9187	-45.44	-54.51	-13.00	41.51	-9.07	Vertical
6	8451.1585	-51.00	-57.99	-13.00	44.99	-6.99	Vertical

NB-IOT Band 103 Mid Channel QPSK 1G-12.75G V

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	32.9129	-45.43	-55.80	-13.00	42.80	-10.37	Horizontal
2	56.2162	-50.38	-60.28	-13.00	47.28	-9.90	Horizontal
3	160.1101	-33.39	-54.45	-13.00	41.45	-21.06	Horizontal
4	275.6557	-44.05	-58.61	-13.00	45.61	-14.56	Horizontal
5	479.5596	-41.84	-54.10	-13.00	41.10	-12.26	Horizontal
6	787.3574	-21.86	-30.67	-13.00	17.67	-8.81	N/A

NB-IOT Band 103 Mid Channel QPSK 30M-1G H

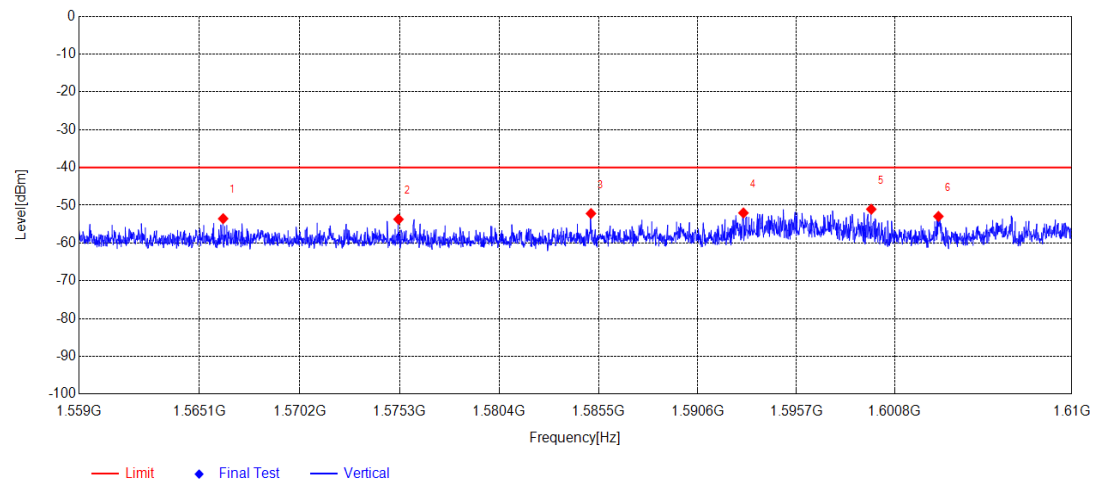


Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1114.0380	-29.17	-41.80	-13.00	28.80	-12.63	Horizontal
2	1630.8770	-39.60	-52.19	-13.00	39.19	-12.59	Horizontal
3	2132.3775	-43.96	-53.84	-13.00	40.84	-9.88	Horizontal
4	3773.6289	-46.22	-52.96	-13.00	39.96	-6.74	Horizontal
5	5992.1237	-45.52	-50.65	-13.00	37.65	-5.13	Horizontal
6	10396.6078	-53.31	-52.06	-13.00	39.06	1.25	Horizontal

NB-IOT Band 103 Mid Channel QPSK 1G-12.75G H

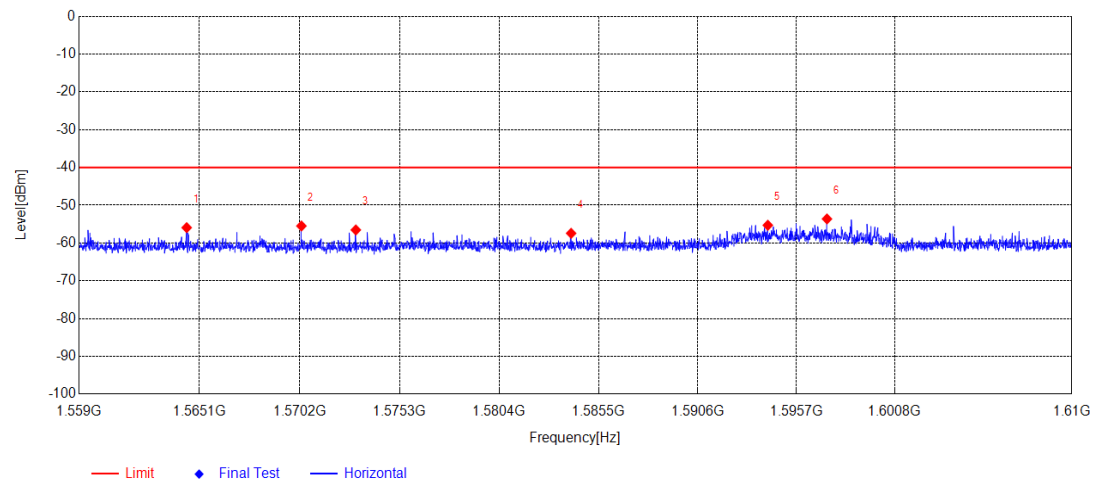


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Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1566.3124	-39.46	-53.54	-40.00	13.54	-14.08	Vertical
2	1575.2404	-39.59	-53.70	-40.00	13.70	-14.11	Vertical
3	1585.1037	-38.04	-52.18	-40.00	12.18	-14.14	Vertical
4	1592.9603	-37.86	-52.03	-40.00	12.03	-14.17	Vertical
5	1599.5755	-36.86	-51.05	-40.00	11.05	-14.19	Vertical
6	1603.0617	-38.78	-52.94	-40.00	12.94	-14.16	Vertical

NB-IOT Band 103 Mid Channel QPSK 1559MHz-1610MHz V

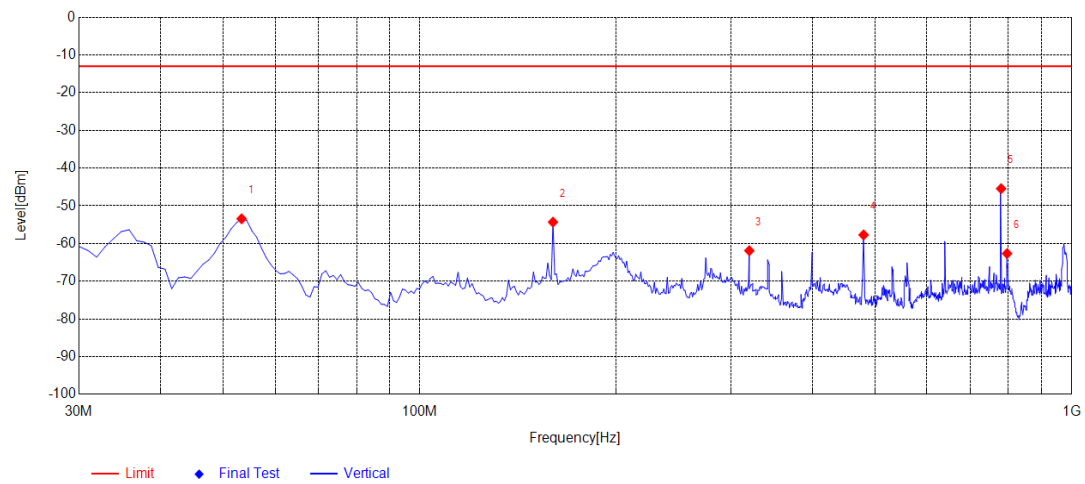
**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1564.4588	-41.57	-55.93	-40.00	15.93	-14.36	Horizontal
2	1570.2918	-41.17	-55.48	-40.00	15.48	-14.31	Horizontal
3	1573.0637	-42.24	-56.53	-40.00	16.53	-14.29	Horizontal
4	1584.0834	-43.22	-57.42	-40.00	17.42	-14.20	Horizontal
5	1594.2187	-41.16	-55.29	-40.00	15.29	-14.13	Horizontal
6	1597.2798	-39.52	-53.62	-40.00	13.62	-14.10	Horizontal

NB-IOT Band 103 Mid Channel QPSK 1559MHz-1610MHz H

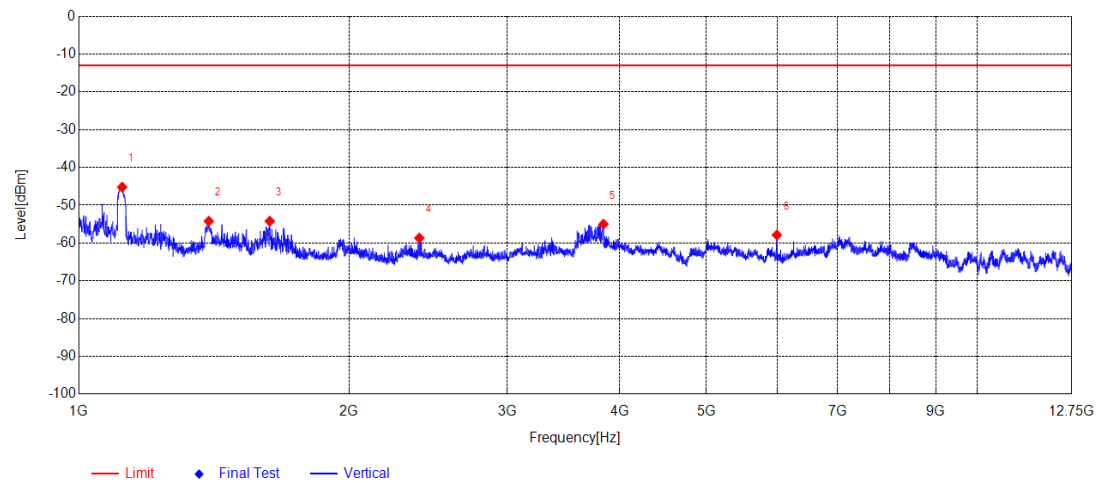


Fixed External Antenna



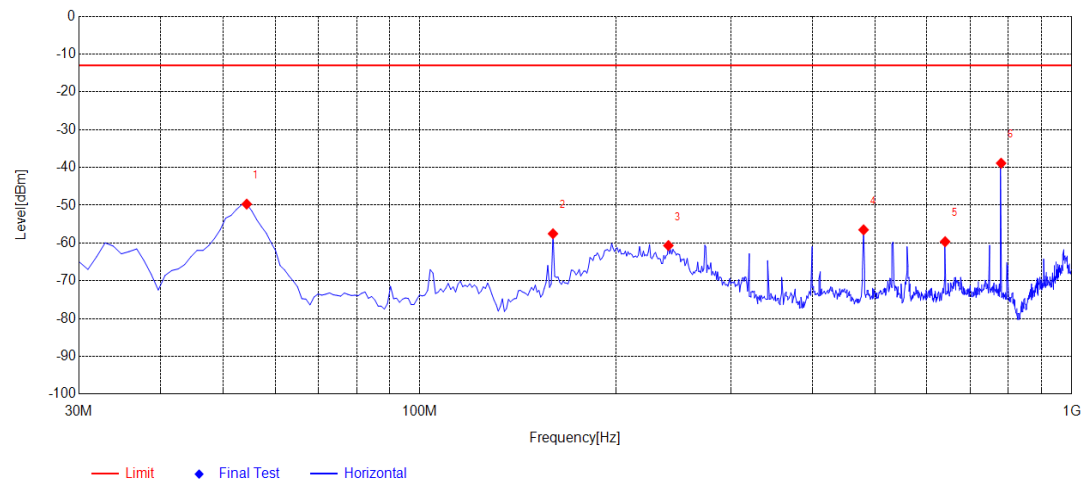
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.3033	-36.79	-53.44	-13.00	40.44	-16.65	Vertical
2	160.1101	-35.92	-54.32	-13.00	41.32	-18.40	Vertical
3	320.3203	-47.63	-61.89	-13.00	48.89	-14.26	Vertical
4	479.5596	-45.36	-57.71	-13.00	44.71	-12.35	Vertical
5	779.5896	-36.66	-45.45	-13.00	32.45	-8.79	N/A
6	796.0961	-53.53	-62.65	-13.00	49.65	-9.12	N/A

NB-IOT Band 13 Low Channel QPSK 30M-1G V

**Suspected Data List**

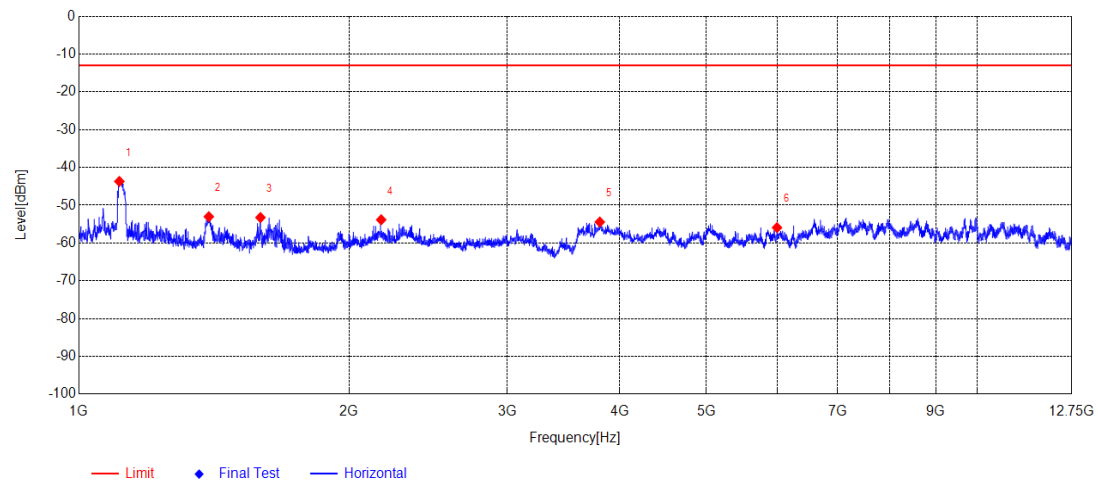
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1117.3725	-31.47	-45.20	-13.00	32.20	-13.73	Vertical
2	1395.4652	-41.83	-54.22	-13.00	41.22	-12.39	Vertical
3	1631.5438	-40.05	-54.22	-13.00	41.22	-14.17	Vertical
4	2393.7979	-44.81	-58.67	-13.00	45.67	-13.86	Vertical
5	3838.6398	-44.91	-55.00	-13.00	42.00	-10.09	Vertical
6	5988.8731	-47.49	-57.87	-13.00	44.87	-10.38	Vertical

NB-IOT Band 13 Low Channel QPSK 1G-12.75G V

**Suspected Data List**

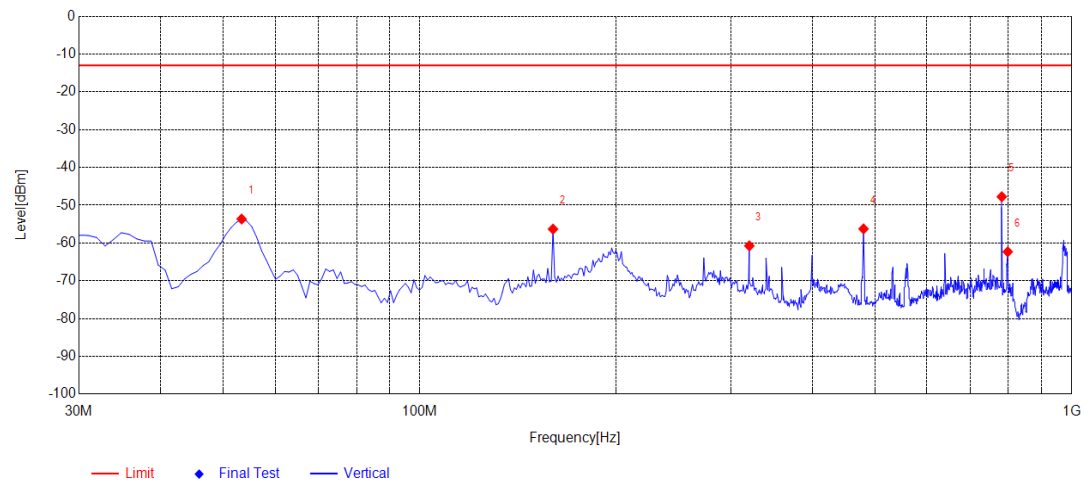
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	54.2743	-40.58	-49.69	-13.00	36.69	-9.11	Horizontal
2	160.1101	-36.47	-57.53	-13.00	44.53	-21.06	Horizontal
3	240.7007	-47.42	-60.65	-13.00	47.65	-13.23	Horizontal
4	479.5596	-44.24	-56.50	-13.00	43.50	-12.26	Horizontal
5	639.7698	-48.84	-59.64	-13.00	46.64	-10.80	Horizontal
6	779.5896	-30.15	-38.87	-13.00	25.87	-8.72	N/A

NB-IOT Band 13 Low Channel QPSK 30M-1G H



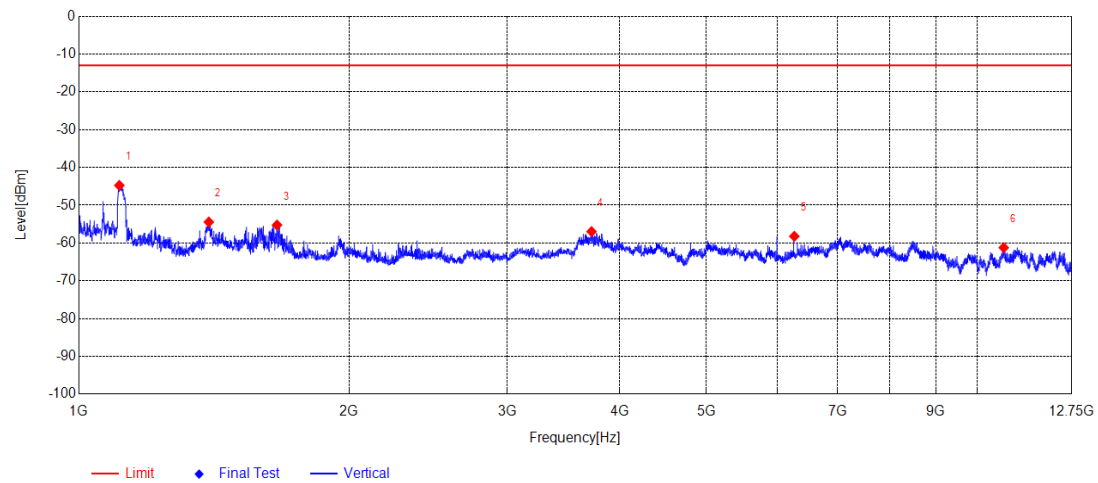
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1109.3698	-31.08	-43.68	-13.00	30.68	-12.60	Horizontal
2	1395.4652	-42.22	-53.02	-13.00	40.02	-10.80	Horizontal
3	1592.8643	-40.13	-53.24	-13.00	40.24	-13.11	Horizontal
4	2171.0570	-44.54	-53.83	-13.00	40.83	-9.29	Horizontal
5	3802.8838	-49.06	-54.43	-13.00	41.43	-5.37	Horizontal
6	5990.4984	-50.78	-55.92	-13.00	42.92	-5.14	Horizontal

NB-IOT Band 13 Low Channel QPSK 1G-12.75G H

**Suspected Data List**

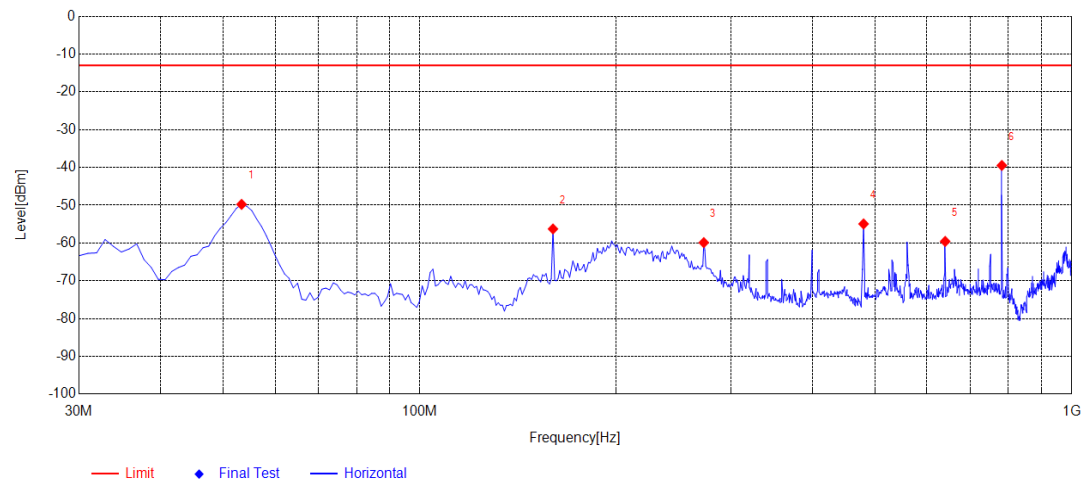
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.3033	-36.99	-53.64	-13.00	40.64	-16.65	Vertical
2	160.1101	-37.91	-56.31	-13.00	43.31	-18.40	Vertical
3	320.3203	-46.47	-60.73	-13.00	47.73	-14.26	Vertical
4	479.5596	-43.90	-56.25	-13.00	43.25	-12.35	Vertical
5	781.5315	-38.89	-47.74	-13.00	34.74	-8.85	N/A
6	798.0380	-53.16	-62.31	-13.00	49.31	-9.15	N/A

NB-IOT Band 13 Mid Channel QPSK 30M-1G v



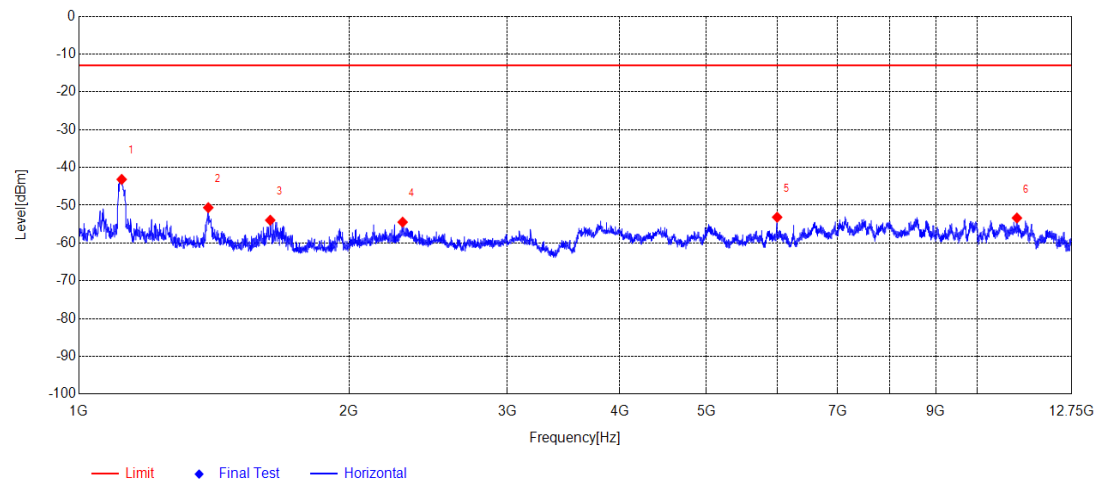
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1109.3698	-31.08	-44.74	-13.00	31.74	-13.66	Vertical
2	1395.4652	-42.04	-54.43	-13.00	41.43	-12.39	Vertical
3	1662.2207	-41.07	-55.23	-13.00	42.23	-14.16	Vertical
4	3723.2455	-46.82	-56.96	-13.00	43.96	-10.14	Vertical
5	6261.9187	-49.14	-58.21	-13.00	45.21	-9.07	Vertical
6	10713.5356	-54.68	-61.21	-13.00	48.21	-6.53	Vertical

NB-IOT Band 13 Mid Channel QPSK 1G-12.75G V

**Suspected Data List**

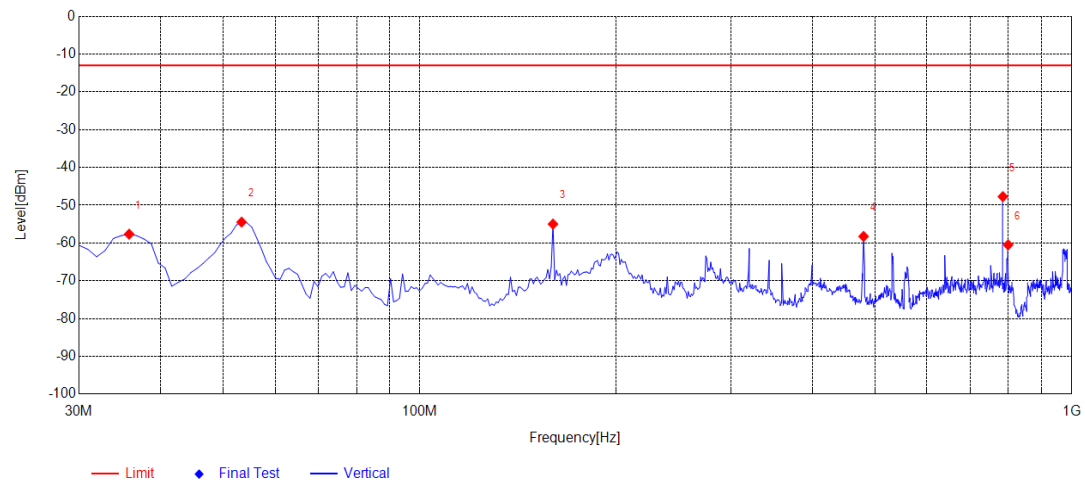
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.3033	-41.04	-49.76	-13.00	36.76	-8.72	Horizontal
2	160.1101	-35.21	-56.27	-13.00	43.27	-21.06	Horizontal
3	272.7427	-45.31	-59.88	-13.00	46.88	-14.57	Horizontal
4	479.5596	-42.67	-54.93	-13.00	41.93	-12.26	Horizontal
5	639.7698	-48.76	-59.56	-13.00	46.56	-10.80	Horizontal
6	781.5315	-30.71	-39.46	-13.00	26.46	-8.75	N/A

NB-IOT Band 13 Mid Channel QPSK 30M-1G H

**Suspected Data List**

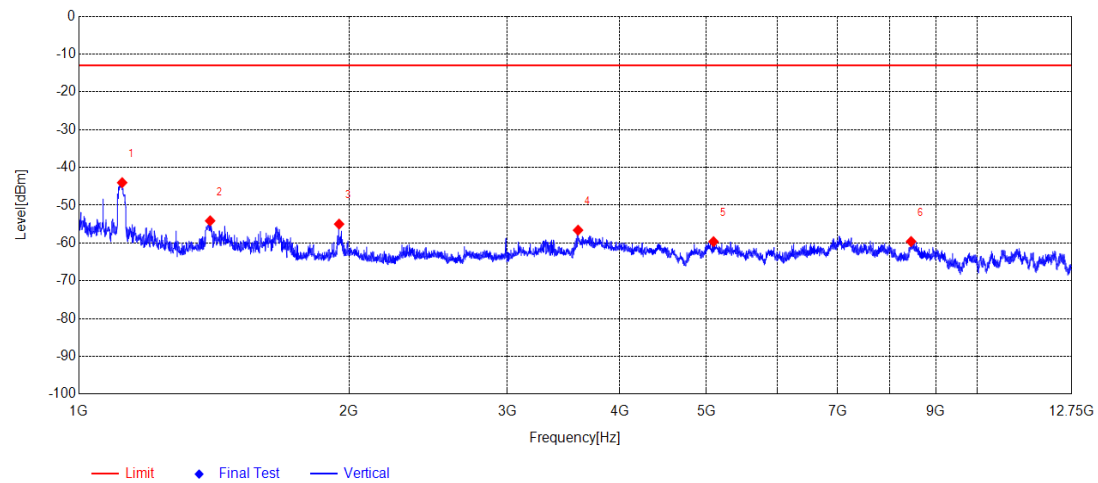
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1116.0387	-30.50	-43.15	-13.00	30.15	-12.65	Horizontal
2	1393.4645	-39.76	-50.63	-13.00	37.63	-10.87	Horizontal
3	1633.5445	-41.40	-53.95	-13.00	40.95	-12.55	Horizontal
4	2293.7646	-46.07	-54.46	-13.00	41.46	-8.39	Horizontal
5	5992.1237	-48.04	-53.17	-13.00	40.17	-5.13	Horizontal
6	11082.4721	-53.82	-53.37	-13.00	40.37	0.45	Horizontal

NB-IOT Band 13 Mid Channel QPSK 1G-12.75G H

**Suspected Data List**

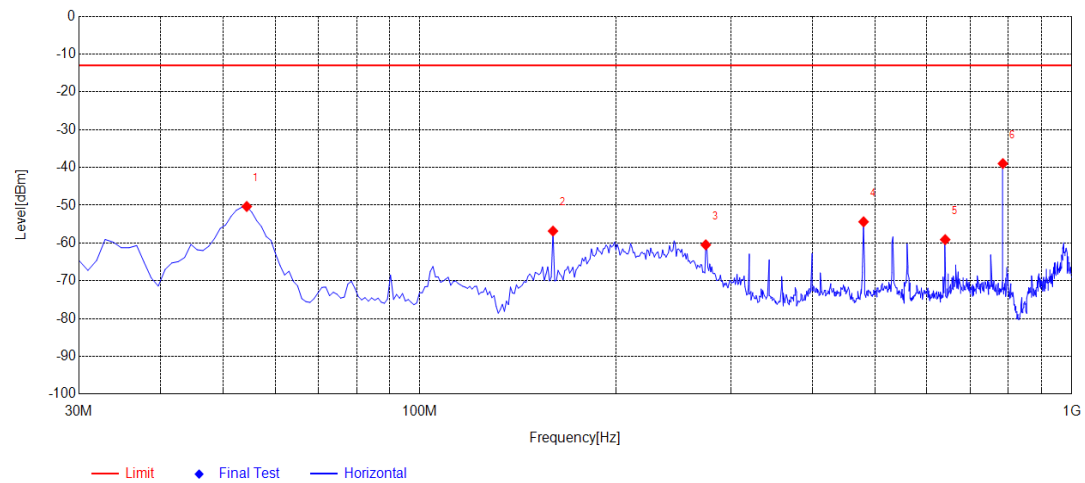
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	35.8258	-40.87	-57.65	-13.00	44.65	-16.78	Vertical
2	53.3033	-37.81	-54.46	-13.00	41.46	-16.65	Vertical
3	160.1101	-36.58	-54.98	-13.00	41.98	-18.40	Vertical
4	479.5596	-45.89	-58.24	-13.00	45.24	-12.35	Vertical
5	784.4444	-38.80	-47.71	-13.00	34.71	-8.91	N/A
6	799.0090	-51.31	-60.48	-13.00	47.48	-9.17	N/A

NB-IOT Band 13 High Channel QPSK 30M-1G V

**Suspected Data List**

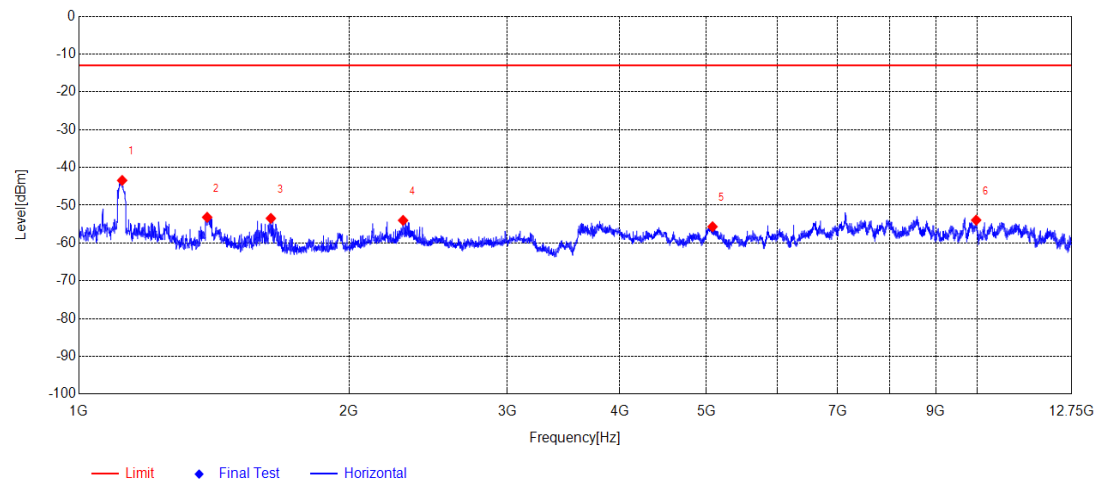
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1117.3725	-30.28	-44.01	-13.00	31.01	-13.73	Vertical
2	1400.1334	-41.81	-54.12	-13.00	41.12	-12.31	Vertical
3	1948.9830	-41.60	-54.98	-13.00	41.98	-13.38	Vertical
4	3596.4744	-47.13	-56.59	-13.00	43.59	-9.46	Vertical
5	5090.0984	-50.62	-59.63	-13.00	46.63	-9.01	Vertical
6	8447.9080	-52.52	-59.59	-13.00	46.59	-7.07	Vertical

NB-IOT Band 13 High Channel QPSK 1G-12.75G V

**Suspected Data List**

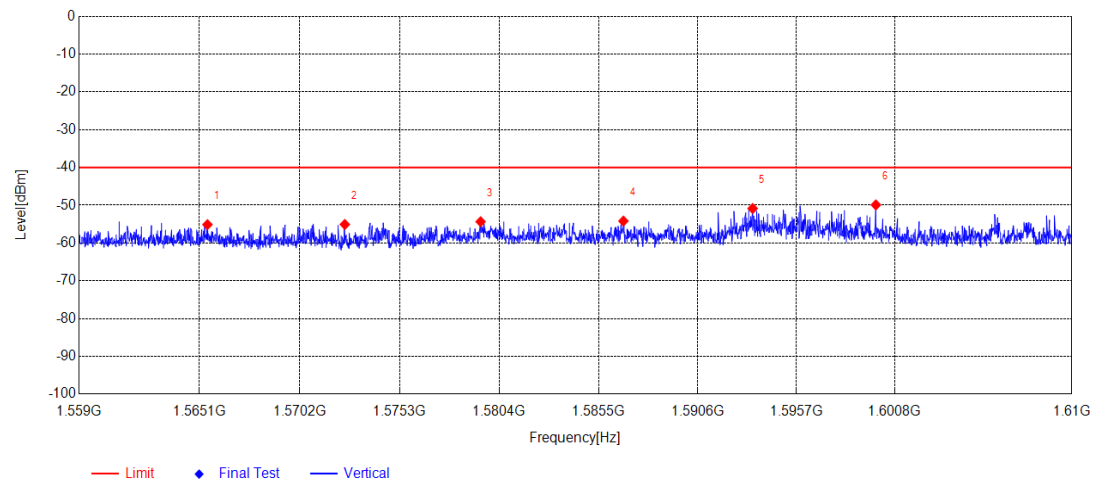
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	54.2743	-41.21	-50.32	-13.00	37.32	-9.11	Horizontal
2	160.1101	-35.77	-56.83	-13.00	43.83	-21.06	Horizontal
3	274.6847	-45.91	-60.47	-13.00	47.47	-14.56	Horizontal
4	479.5596	-42.11	-54.37	-13.00	41.37	-12.26	Horizontal
5	639.7698	-48.29	-59.09	-13.00	46.09	-10.80	Horizontal
6	784.4444	-30.18	-38.96	-13.00	25.96	-8.78	N/A

NB-IOT Band 13 High Channel QPSK 30M-1G H

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1117.3725	-30.76	-43.42	-13.00	30.42	-12.66	Horizontal
2	1389.4632	-42.18	-53.18	-13.00	40.18	-11.00	Horizontal
3	1636.2121	-40.95	-53.47	-13.00	40.47	-12.52	Horizontal
4	2296.4321	-45.71	-54.00	-13.00	41.00	-8.29	Horizontal
5	5077.0962	-51.17	-55.68	-13.00	42.68	-4.51	Horizontal
6	9982.1637	-54.05	-53.94	-13.00	40.94	0.11	Horizontal

NB-IOT Band 13 High Channel QPSK 1G-12.75G H

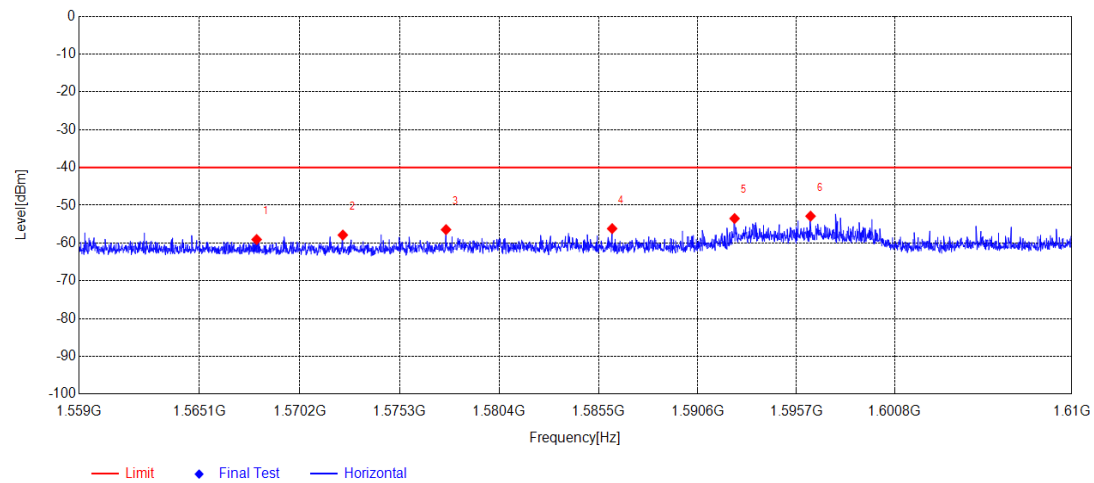


Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1565.5132	-41.05	-55.12	-40.00	15.12	-14.07	Vertical
2	1572.5025	-40.98	-55.08	-40.00	15.08	-14.10	Vertical
3	1579.4408	-40.22	-54.34	-40.00	14.34	-14.12	Vertical
4	1586.7703	-40.03	-54.18	-40.00	14.18	-14.15	Vertical
5	1593.4365	-36.68	-50.85	-40.00	10.85	-14.17	Vertical
6	1599.8136	-35.72	-49.91	-40.00	9.91	-14.19	Vertical

NB-IOT Band 13 Mid Channel QPSK 1559MHz-1610MHz V



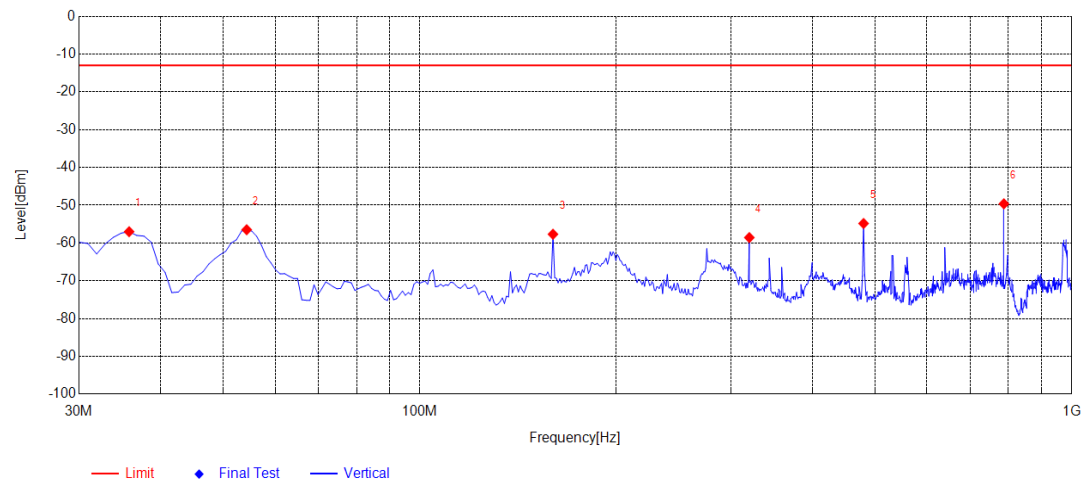
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Suspected Data List

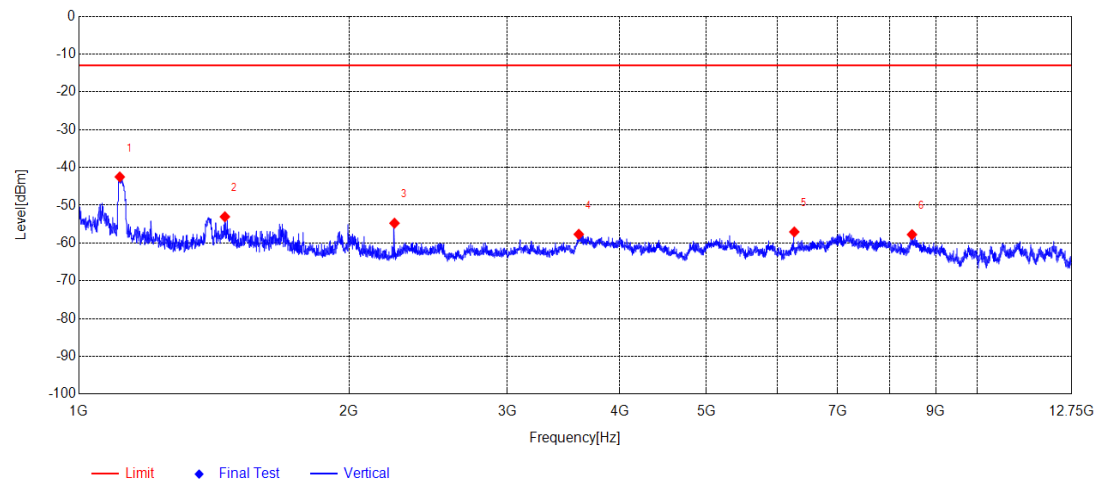
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1568.0130	-44.73	-59.06	-40.00	19.06	-14.33	Horizontal
2	1572.4005	-43.58	-57.88	-40.00	17.88	-14.30	Horizontal
3	1577.6722	-42.20	-56.45	-40.00	16.45	-14.25	Horizontal
4	1586.1921	-41.99	-56.18	-40.00	16.18	-14.19	Horizontal
5	1592.5012	-39.36	-53.50	-40.00	13.50	-14.14	Horizontal
6	1596.4295	-38.78	-52.89	-40.00	12.89	-14.11	Horizontal

NB-IOT Band 13 Mid Channel QPSK 1559MHz-1610MHz H

**Suspected Data List**

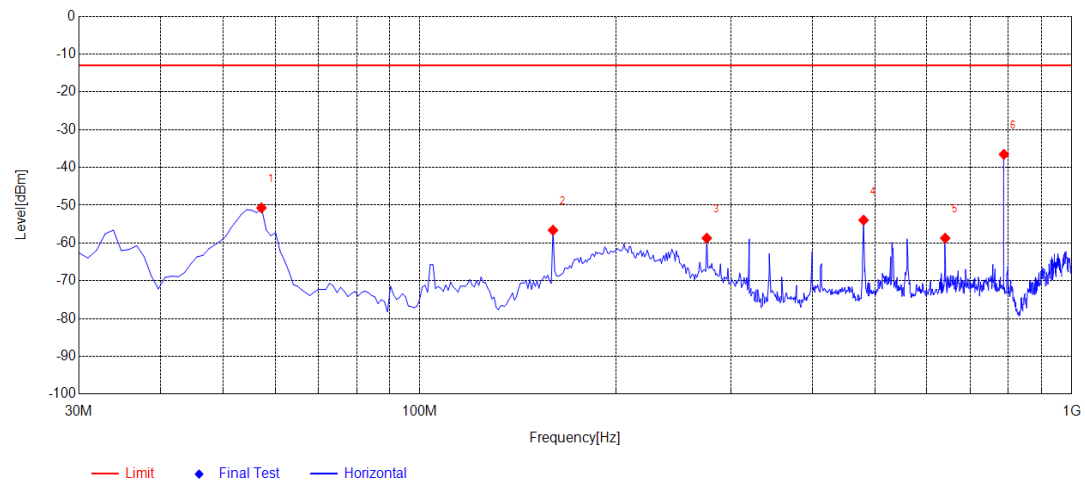
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	35.8258	-40.21	-56.99	-13.00	43.99	-16.78	Vertical
2	54.2743	-39.51	-56.47	-13.00	43.47	-16.96	Vertical
3	160.1101	-39.27	-57.67	-13.00	44.67	-18.40	Vertical
4	320.3203	-44.29	-58.55	-13.00	45.55	-14.26	Vertical
5	479.5596	-42.47	-54.82	-13.00	41.82	-12.35	Vertical
6	787.3574	-40.63	-49.61	-13.00	36.61	-8.98	N/A

NB-IOT Band 103 Mid Channel QPSK 30M-1G V

**Suspected Data List**

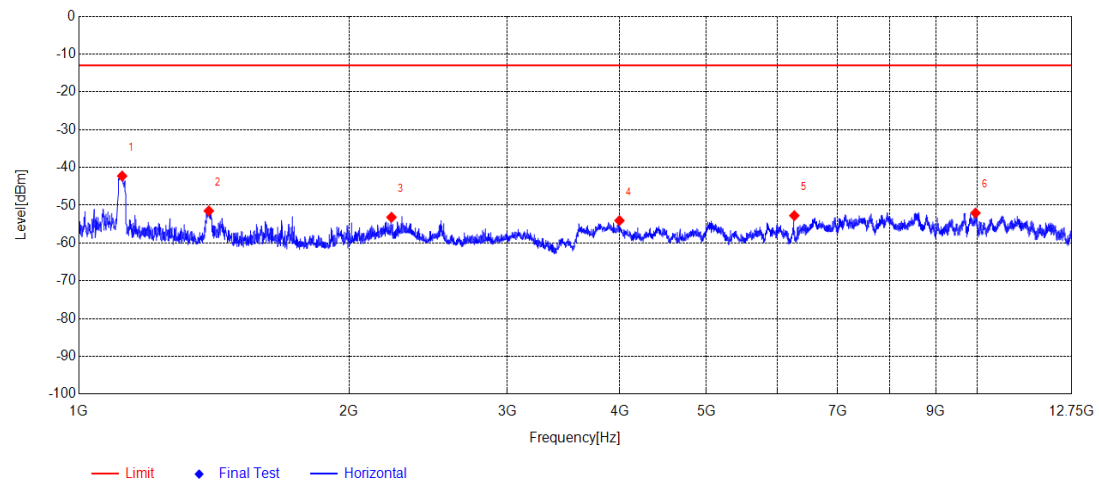
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1110.7036	-28.83	-42.50	-13.00	29.50	-13.67	Vertical
2	1454.1514	-40.67	-53.04	-13.00	40.04	-12.37	Vertical
3	2246.4155	-39.44	-54.74	-13.00	41.74	-15.30	Vertical
4	3602.9755	-48.40	-57.68	-13.00	44.68	-9.28	Vertical
5	6261.9187	-47.97	-57.04	-13.00	44.04	-9.07	Vertical
6	8467.4112	-50.96	-57.76	-13.00	44.76	-6.80	Vertical

NB-IOT Band 103 Mid Channel QPSK 1G-12.75G V

**Suspected Data List**

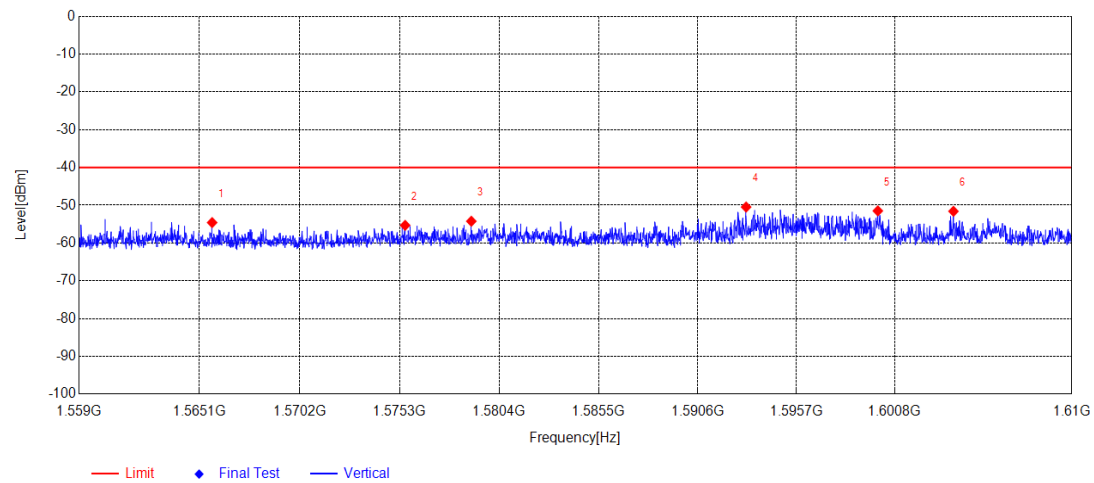
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	57.1872	-40.40	-50.69	-13.00	37.69	-10.29	Horizontal
2	160.1101	-35.54	-56.60	-13.00	43.60	-21.06	Horizontal
3	275.6557	-44.15	-58.71	-13.00	45.71	-14.56	Horizontal
4	479.5596	-41.67	-53.93	-13.00	40.93	-12.26	Horizontal
5	639.7698	-47.91	-58.71	-13.00	45.71	-10.80	Horizontal
6	787.3574	-27.72	-36.53	-13.00	23.53	-8.81	N/A

NB-IOT Band 103 Mid Channel QPSK 30M-1G H



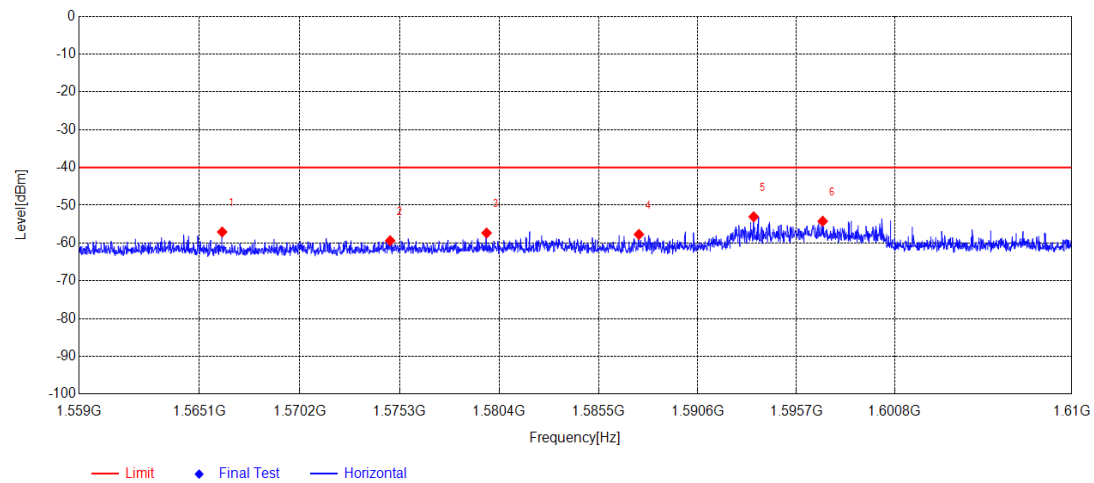
Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1117.3725	-29.60	-42.26	-13.00	29.26	-12.66	Horizontal
2	1395.4652	-40.68	-51.48	-13.00	38.48	-10.80	Horizontal
3	2229.0764	-43.59	-53.18	-13.00	40.18	-9.59	Horizontal
4	3999.5416	-47.85	-54.05	-13.00	41.05	-6.20	Horizontal
5	6261.9187	-47.72	-52.74	-13.00	39.74	-5.02	Horizontal
6	9964.2857	-51.59	-52.04	-13.00	39.04	-0.45	Horizontal

NB-IOT Band 103 Mid Channel QPSK 1G-12.75G H



Suspected Data List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1565.7513	-40.51	-54.58	-40.00	14.58	-14.07	Vertical
2	1575.5805	-41.20	-55.31	-40.00	15.31	-14.11	Vertical
3	1578.9647	-40.11	-54.23	-40.00	14.23	-14.12	Vertical
4	1593.0964	-36.30	-50.47	-40.00	10.47	-14.17	Vertical
5	1599.9156	-37.29	-51.48	-40.00	11.48	-14.19	Vertical
6	1603.8439	-37.44	-51.59	-40.00	11.59	-14.15	Vertical

NB-IOT Band 103 Mid Channel QPSK 1559MHz-1610MHz V

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	1566.2614	-42.72	-57.06	-40.00	17.06	-14.34	Horizontal
2	1574.8153	-45.09	-59.37	-40.00	19.37	-14.28	Horizontal
3	1579.7469	-43.10	-57.34	-40.00	17.34	-14.24	Horizontal
4	1587.5695	-43.53	-57.71	-40.00	17.71	-14.18	Horizontal
5	1593.4875	-38.92	-53.05	-40.00	13.05	-14.13	Horizontal
6	1597.0587	-40.13	-54.23	-40.00	14.23	-14.10	Horizontal

NB-IOT Band 103 Mid Channel QPSK 1559MHz-1610MHz H



Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Output Power	± 2.22 dB
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	± 2.77 dB
Band Edge	± 2.77 dB
Equivalent Isotropic Radiated Power	± 2.22 dB
Radiated Spurious Emissions	± 6 dB

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



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



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4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analyzer	MY51511149	N9020A	Agilent	2023.06.21	2024.06.20
Communication Test Station	6261830572	MT8821C	Anritsu	2023.02.09	2024.02.08
Temperature Chamber	S022177101 00089002	KMT-36LF1A0	KOMEG	2022.11.18	2023.11.17

4.2 List of Software Used

Description	Manufacturer	Software Version
TS+ -[JS36-RSE]	DongSheng	2.0.1.3



4.3 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Loop Antenna	1519-022	FMZB 1519	SCHWARZBECK	2023.06.26	2024.06.25
Bi-Log Antenna	9163-274	VULB 9163	SCHWARZBECK	2023.06.27	2024.06.26
Bi-Log Antenna	9163-519	VULB 9163	SCHWARZBECK	2023.07.01	2024.06.30
Horn Antenna	9120D-963	BBHA 9120D	SCHWARZBECK	2023.06.27	2024.06.26
Horn Antenna	01774	BBHA 9120D	SCHWARZBECK	2023.07.01	2024.06.30
Horn Antenna	BBHA9170#773	BBHA9170	SCHWARZBECK	2023.07.01	2024.06.30
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
Receiver	MY56400093	N9038A	KEYSIGHT	2023.02.09	2024.02.08
Receiver	595WX11007	PMM 9010	PMM	2023.02.09	2024.02.08
Receiver	001WX1100	PMM 9060	PMM	2023.02.09	2024.02.08
Signal Analyzer	MY56060145	N9020A	Agilent	2023.06.21	2024.06.20
6db Attenuator	E191001	BW-N6W5+	Mini-circuits	2022.10.11	2023.10.10
				2023.09.19	2024.09.18
Preamplifier (2GHz-18GHz)	61171.61172	S020180L3203	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.07.4	2024.07.03
System Simulator	152038	CMW500	R&S	2022.10.11	2023.10.10
				2023.09.19	2024.09.18
System Simulator	MY48364176	8960-E5515C	Agilent	2023.02.27	2024.02.26
System Simulator	6262148249	MT8000A	anritsu	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26



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Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-K K-0.5	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-K KF-2	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-18GHz)	22120181	QA500-18-N N-5	Qualwave	2023.07.04	2024.07.03

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