FCC Test Report

(Part 27 – Cat-M1 B4/B12/B13/B66/B85, NB-IoT B4/B12/B13/B66/B71/B85)

Report No.:	RFBBDJ-WTW-P23050444-2
FCC ID:	PPQ202005BG95M5
Test Model:	BG95-M5
Received Date:	May 17, 2023
Test Date:	May 27 ~ Jun. 06, 2023
Issued Date:	Jul. 20, 2023
Applicant:	LITE-ON Technology Corp.
Address:	Bldg. C, 90, Chien 1 Rd., Chung-Ho, New Taipei City 23585, Taiwan (R.O.C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003 281270 / TW0032

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Release Control Record

Issue No.	Description	Date Issued
RFBBDJ-WTW-P23050444-2	Original Release	Jul. 20, 2023

1 Certificate of Conformity

Product:	Quectel BG95-M5
Brand:	LITEON
Test Model:	BG95-M5
Sample Status:	Engineering Sample
Applicant:	LITE-ON Technology Corp.
Test Date:	May 27 ~ Jun. 06, 2023
Standards:	FCC Part 27, Subpart C, F, H, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Lena Wang , **Date:** Jul. 20, 2023

Lena Wang / Specialist

Approved by : Jeremy Lin , **Date:** Jul. 20, 2023

Jeremy Lin / Project Engineer

2 Summary of Test Results

For Cat-M1 Band 4 and NB-IoT Band 4

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (d)	Equivalent Isotropically radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53 (h)	Out of Band Emission Measurements	N/A	Refer to Note
27.50 (d)(5)	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53 (h)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53 (h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -15.74 dB at 32.91 MHz.

Note:

1. Only test item of Effective Isotropic Radiated Power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R4V1 and R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For Cat-M1 Band 12 and NB-IoT Band 12

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (c)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53 (g)	Out of Band Emission Measurements	N/A	Refer to Note
--	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53 (g)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53 (g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.92 dB at 43.58 MHz.

Note:

1. Only test item of Effective radiated power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R4V1 and R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For Cat-M1 Band 13 and NB-IoT Band 13

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (b)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53 (c)	Out of Band Emission Measurements	N/A	Refer to Note
--	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53 (c)(f)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53 (c)(f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.61 dB at 1564.00 MHz.

Note:

1. Only test item of Effective radiated power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R4V1 and R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For Cat-M1 Band 66 and NB-IoT Band 66

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)	Equivalent Isotropically radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53(h)	Out of Band Emission Measurements	N/A	Refer to Note
27.50(d)(5)	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53(h)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.32 dB at 31.94 MHz.

Note:

1. Only test item of Effective Isotropic Radiated Power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R4V1 and R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For NB-IoT Band 71

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(c)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049 27.53(g)	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53(g)	Out of Band Emission Measurements	N/A	Refer to Note
--	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53(g)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -20.53 dB at 36.79 MHz.

Note:

1. Only test item of Effective radiated power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For Cat-M1 Band 85 and NB-IoT Band 85

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (c)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Emission Bandwidth	N/A	Refer to Note
2.1051 27.53 (g)	Out of Band Emission Measurements	N/A	Refer to Note
--	Peak To Average Ratio	N/A	Refer to Note
2.1051 27.53 (g)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53 (g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.95 dB at 31.94 MHz.

Note:

1. Only test item of Effective radiated power & Radiated Emissions were performed for this report. Other testing data please refer to TA Technology (Shanghai) Co., Ltd. report no.: R2005A0283-R4V1 and R2005A0283-R7.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	N9038A	MY55420137	May 03, 2023	May 02, 2024
Spectrum Analyzer KEYSIGHT	N9020B	MY60110440	Mar. 16, 2023	Mar. 15, 2024
Loop Antenna TESEQ	HLA 6121	45745	Jul. 27, 2022	Jul. 26, 2023
BILOG Antenna SCHWARZBECK	VULB9168	1213	Oct. 20, 2022	Oct. 19, 2023
HORN Antenna RF SPIN	DRH18-E	210103A18E	Nov. 13, 2022	Nov. 12, 2023
HORN Antenna SCHWARZBECK	BBHA 9170	9170	Nov. 13, 2022	Nov. 12, 2023
Loop Antenna EMCI	EM-6879	269	Sep. 19, 2022	Sep. 18, 2023
Preamplifier EMCI	EMC330N	980782	Jan. 16, 2023	Jan. 15, 2024
Preamplifier EMCI	EMC118A45SE	980808	Dec. 29, 2022	Dec. 28, 2023
Preamplifier EMCI	EMC184045SE	980788	Jan. 16, 2023	Jan. 15, 2024
RF signal cable EMCI	EMC104-SM-SM-(9000+2000+1000)	201243+ 201231+ 210102	Jan. 16, 2023	Jan. 15, 2024
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+300+500)	201236+ 201235+ 201233	Jan. 16, 2023	Jan. 15, 2024
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201260+201257+201254	Jan. 16, 2023	Jan. 15, 2024
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 13, 2022	Jul. 12, 2023
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Mar. 03, 2023	Mar. 02, 2024

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 8.

3 General Information

3.1 General Description of EUT

Product	Quectel BG95-M5	
Brand	LITEON	
Test Model	BG95-M5	
Sample Status	Engineering Sample	
Power Supply Rating	208-240 Vac	
Modulation Type	Cat-M1: QPSK, 16QAM NB-IoT: BPSK, QPSK (Subcarrier Spacing: 3.75kHz,15kHz)	
Operating Frequency	Cat-M1	
	Cat-M1 Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7MHz ~ 1754.3MHz
	Cat-M1 Band 4 (Channel Bandwidth: 3 MHz)	1711.5MHz ~ 1753.5MHz
	Cat-M1 Band 4 (Channel Bandwidth: 5 MHz)	1712.5MHz ~ 1752.5MHz
	Cat-M1 Band 4 (Channel Bandwidth: 10 MHz)	1715.0MHz ~ 1750.0MHz
	Cat-M1 Band 4 (Channel Bandwidth: 15 MHz)	1717.5MHz ~ 1747.5MHz
	Cat-M1 Band 4 (Channel Bandwidth: 20 MHz)	1720.0MHz ~ 1745.0MHz
	Cat-M1 Band 12 (Channel Bandwidth: 1.4 MHz)	699.7MHz ~ 715.3MHz
	Cat-M1 Band 12 (Channel Bandwidth: 3 MHz)	700.5MHz ~ 714.5MHz
	Cat-M1 Band 12 (Channel Bandwidth: 5 MHz)	701.5MHz ~ 713.5MHz
	Cat-M1 Band 12 (Channel Bandwidth: 10 MHz)	704.0MHz ~ 711.0MHz
	Cat-M1 Band 13 (Channel Bandwidth: 5 MHz)	779.5MHz ~ 784.5MHz
	Cat-M1 Band 13 (Channel Bandwidth: 10 MHz)	782.0MHz
	Cat-M1 Band 66 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1779.3 MHz
	Cat-M1 Band 66 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1778.5 MHz
	Cat-M1 Band 66 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1777.5 MHz
	Cat-M1 Band 66 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1775.0 MHz
	Cat-M1 Band 66 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1772.5 MHz
	Cat-M1 Band 66 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1770.0 MHz
	Cat-M1 Band 85 (Channel Bandwidth: 5 MHz)	700.5MHz ~ 713.5MHz
	Cat-M1 Band 85 (Channel Bandwidth: 10 MHz)	703.0MHz ~ 711.0MHz
	NB-IoT Standalone	
	NB-IoT Band 4	1710.2MHz ~ 1754.8MHz
	NB-IoT Band 12	699.2MHz ~ 715.8MHz
	NB-IoT Band 13	777.2MHz ~ 786.8MHz
	NB-IoT Band 66	1710.2MHz ~ 1779.8MHz
	NB-IoT Band 71	663.2MHz ~ 697.8MHz
	NB-IoT Band 85	698.2MHz ~ 715.8MHz

Max. EIRP Power	Cat-M1		
		QPSK	16QAM
	Cat-M1 Band 4 (Channel Bandwidth: 1.4 MHz)	301.301mW (24.79dBm)	278.612mW (24.45dBm)
	Cat-M1 Band 4 (Channel Bandwidth: 3 MHz)	319.890mW (25.05dBm)	295.801mW (24.71dBm)
	Cat-M1 Band 4 (Channel Bandwidth: 5 MHz)	295.801mW (24.71dBm)	293.089mW (24.67dBm)
	Cat-M1 Band 4 (Channel Bandwidth: 10 MHz)	307.610mW (24.88dBm)	306.902mW (24.87dBm)
	Cat-M1 Band 4 (Channel Bandwidth: 15 MHz)	309.742mW (24.91dBm)	305.492mW (24.85dBm)
	Cat-M1 Band 4 (Channel Bandwidth: 20 MHz)	320.627mW (25.06dBm)	314.775mW (24.98dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 1.4 MHz)	291.743mW (24.65dBm)	256.448mW (24.09dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 3 MHz)	312.608mW (24.95dBm)	254.097mW (24.05dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 5 MHz)	294.442mW (24.69dBm)	287.740mW (24.59dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 10 MHz)	309.742mW (24.91dBm)	291.743mW (24.65dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 15 MHz)	285.102mW (24.55dBm)	280.543mW (24.48dBm)
	Cat-M1 Band 66 (Channel Bandwidth: 20 MHz)	275.423mW (24.40dBm)	274.789mW (24.39dBm)
	NB-IoT Standalone		
		BPSK	QPSK
	NB-IoT Band 4	169.044mW (22.28dBm)	167.880mW (22.25dBm)
	NB-IoT Band 66	297.852mW (24.74dBm)	295.801mW (24.71dBm)
Max. ERP Power	Cat-M1		
		QPSK	16QAM
	Cat-M1 Band 12 (Channel Bandwidth: 1.4 MHz)	158.125mW (21.99dBm)	135.831mW (21.33dBm)
	Cat-M1 Band 12 (Channel Bandwidth: 3 MHz)	163.305mW (22.13dBm)	140.281mW (21.47dBm)
	Cat-M1 Band 12 (Channel Bandwidth: 5 MHz)	157.036mW (21.96dBm)	149.624mW (21.75dBm)
	Cat-M1 Band 12 (Channel Bandwidth: 10 MHz)	155.239mW (21.91dBm)	148.936mW (21.73dBm)
	Cat-M1 Band 13 (Channel Bandwidth: 5 MHz)	146.555mW (21.66dBm)	145.881mW (21.64dBm)
	Cat-M1 Band 13 (Channel Bandwidth: 10 MHz)	149.279mW (21.74dBm)	144.544mW (21.60dBm)
	Cat-M1 Band 85 (Channel Bandwidth: 5 MHz)	153.815mW (21.87dBm)	148.936mW (21.73dBm)
	Cat-M1 Band 85 (Channel Bandwidth: 10 MHz)	159.221mW (22.02dBm)	150.314mW (21.77dBm)
	NB-IoT Standalone		
		BPSK	QPSK
	NB-IoT Band 12	151.705mW (21.81dBm)	147.517mW (21.69dBm)
	NB-IoT Band 13	152.055mW (21.82dBm)	148.936mW (21.73dBm)
	NB-IoT Band 71	157.761mW (21.98dBm)	157.036mW (21.96dBm)
	NB-IoT Band 85	138.357mW (21.41dBm)	133.660mW (21.26dBm)
Antenna Type	Refer to Note		
Antenna Connector	Refer to Note		
Accessory Device	Refer to Note		

Cable Supplied	N/A

Note:

1. The EUT is authorized for use in specific End-product. Please refer to below for more details. The model of 'EX-1193-MFD-80' was chosen for final test.

Brand	Model	WWAN	RFID	WIFI	Difference
LITEON	EX-1193-MFD-80	FCC ID: PPQ202005BG95M5	FCC ID: PPQRYORR2L	FCC ID: PPQLILYW131	The difference between EX-1193-MFD-80 and EX-1193-MFD-48 in the rated current (80A/48A)
	EX-1193-MFD-48				

2. The End-product contains following accessory devices.

Product	Brand	Model	Description
holster	Liteon	N/A	-

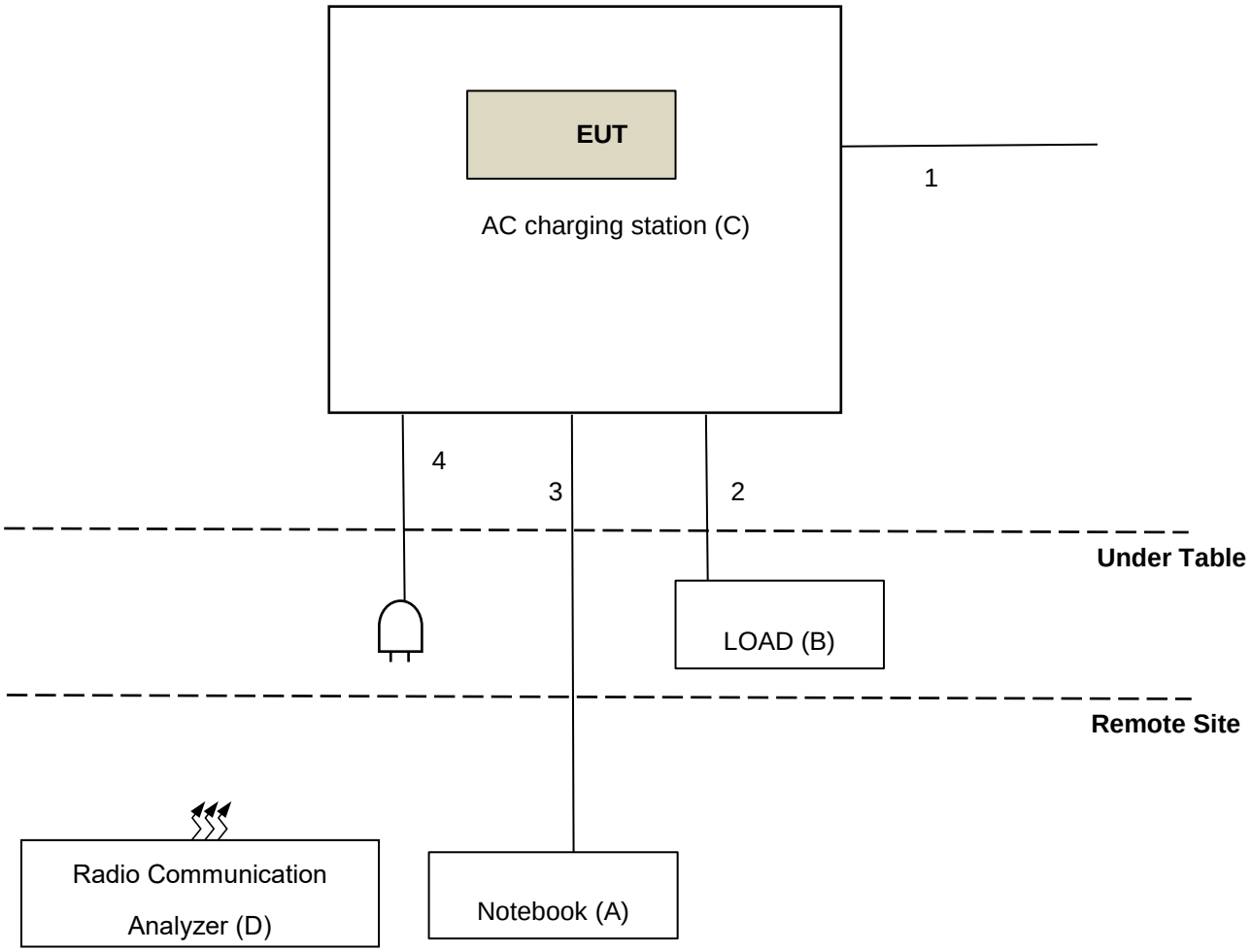
3. The antenna information for host is listed as below.

Type	Monopole Coupling											
Connector	ipex(MHF)											
Antenna gain (dBi)												
GSM 850	GSM 1900	Cat-M1 Band 26 (Part 22)	Cat-M1 Band 26 (Part 90)	NB-IoT Band 71	Cat-M1 / NB-IoT Band							
					2	4	5	12	13	25	66	85
1.9	1.7	1.9	1.1	1.3	1.7	1.5	1.9	1.1	0.7	1.7	1.5	1.1

* Detail antenna specification please refer to antenna datasheet or an antenna gain measurement report.

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
5. NB-IoT test method refers to 3GPP TS 36.521-1 V17.4.0 (2022-09) section 6.1. For NB-IoT tests in all operating frequency bands, standalone is used as the default operating mode unless otherwise specified by the test case.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Notebook	Lenovo	L440	R9-0GFJKK	N/A	Provided by Lab
B	LOAD	NA	NA	NA	N/A	Provided by Lab
C	AC charging station	LITEON	X-1193-MFD-80	NA	N/A	Provided by Client
D	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	POWER CABLE(DC out)	1	5	Y	0	Accessory of EUT
2	RJ-45 Cable	1	1.8	N	0	Provided by Lab
3	LAN Cable	1	10	N	0	Provided by Lab
4	POWER CABLE(AC in)	1	1.8	Y	0	Accessory of EUT

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.
The worst case was found when positioned on Z axis. Following channel(s) was (were) selected for the final test as listed below:

Cat-M1 Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	1 Full
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	1 Full
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	1 Full
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	1 Full
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	1 Full
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	1 Full
-	Radiated Emission Below 1GHz	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK	1
-	Radiated Emission Above 1GHz	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK	1

Note:
1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only EIRP had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emissions, select the worst channel with the maximum power for final testing.

Cat-M1 Band 12

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM	1 Full
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM	1 Full
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM	1 Full
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0 MHz)	10MHz	QPSK / 16QAM	1 Full
-	Radiated Emission Below 1GHz	23025 to 23165	23095 (707.5MHz),	3MHz	QPSK	1
-	Radiated Emission Above 1GHz	23025 to 23165	23095 (707.5MHz),	3MHz	QPSK	1

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emissions, select the worst channel with the maximum power for final testing.

Cat-M1 Band 13

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM	1 Full
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM	1 Full
-	Radiated Emission Below 1GHz	23230	23230 (782.0MHz)	10MHz	QPSK	1
-	Radiated Emission Above 1GHz	23230	23230 (782.0MHz)	10MHz	QPSK	1

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emissions, select the worst channel with the maximum power for final testing.

Cat-M1 Band 66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	131979 to 132665	131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz)	1.4MHz	QPSK / 16QAM	1 Full
		131987 to 132657	131987 (1711.5MHz), 132322 (1745.0MHz), 132657 (1778.5MHz)	3MHz	QPSK / 16QAM	1 Full
		131997 to 132647	131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz)	5MHz	QPSK / 16QAM	1 Full
		132022 to 132622	132022 (1715.0MHz), 132322 (1745.0MHz), 132622 (1775.0MHz)	10MHz	QPSK / 16QAM	1 Full
		132047 to 132597	132047 (1717.5MHz), 132322 (1745.0MHz), 132597 (1772.5MHz)	15MHz	QPSK / 16QAM	1 Full
		132072 to 132572	132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz)	20MHz	QPSK / 16QAM	1 Full
-	Radiated Emission Below 1GHz	131987 to 132657	132322 (1745.0MHz)	3MHz	QPSK	1
-	Radiated Emission Above 1GHz	131987 to 132657	132322 (1745.0MHz)	3MHz	QPSK	1

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only EIRP had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emissions, select the worst channel with the maximum power for final testing.

Cat-M1 Band 85

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	134027 to 134157	134027 (700.5MHz) 134092 (707.0MHz) 134157 (713.5MHz)	5MHz	QPSK / 16QAM	1 Full
		134052 to 134132	134052 (703.0MHz) 134092 (707.0MHz) 134132 (711.0MHz)	10MHz	QPSK / 16QAM	1 Full
-	Radiated Emission Below 1GHz	134052 to 134132	134092 (707.0MHz)	10MHz	QPSK	1
-	Radiated Emission Above 1GHz	134052 to 134132	134092 (707.0MHz)	10MHz	QPSK	1

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emissions, select the worst channel with the maximum power for final testing.

NB-IoT Band 4

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	EIRP	Standalone	19952 to 20398	19952 (1710.2MHz), 20175 (1732.5MHz), 20398 (1754.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	19952 to 20398	20175 (1732.5MHz)	-	15kHz	BPSK	1@11
-	Radiated Emission Above 1GHz	Standalone	19952 to 20398	20175 (1732.5MHz)	-	15kHz	BPSK	1@11

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

NB-IoT Band 12

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	ERP	Standalone	23012 to 23178	23012 (699.2MHz), 23095 (707.5MHz), 23178 (715.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	23012 to 23178	23095 (707.5MHz)	-	15kHz	BPSK	1@11
-	Radiated Emission Above 1GHz	Standalone	23012 to 23178	23095 (707.5MHz)	-	15kHz	BPSK	1@11

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

NB-IoT Band 13

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	ERP	Standalone	23182 to 23278	23182 (777.2MHz), 23230 (782.0MHz), 23278 (786.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	23182 to 23278	23230 (782.0MHz)	-	15kHz	BPSK	1@11
-	Radiated Emission Above 1GHz	Standalone	23182 to 23278	23230 (782.0MHz)	-	15kHz	BPSK	1@11

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

NB-IoT Band 66

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	EIRP	Standalone	131974 to 132670	131974 (1710.2MHz), 132322 (1745.0MHz), 132670 (1779.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	131974 to 132670	132322 (1745.0MHz)	-	15kHz	BPSK	1@0
-	Radiated Emission Above 1GHz	Standalone	131974 to 132670	132322 (1745.0MHz)	-	15kHz	BPSK	1@0

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

NB-IoT Band 71

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	ERP	Standalone	133124 to 133470	133124 (663.2MHz), 133297 (680.5MHz), 133470 (697.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	133124 to 133470	133297 (680.5MHz),	-	15kHz	BPSK	1@0
-	Radiated Emission Above 1GHz	Standalone	133124 to 133470	133297 (680.5MHz),	-	15kHz	BPSK	1@0

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

NB-IoT Band 85

EUT Configure Mode	Test item	Available channel		Tested Channel	Channel Bandwidth	Subcarrier Spacing	Modulation	Number of Subcarrier / Starting Subcarrier
-	ERP	Standalone	134004 to 134180	134004 (698.2MHz), 134092 (707.0MHz), 134180 (715.8MHz)	-	3.75kHz	BPSK	1@0 1@47
							QPSK	1@0 1@47
					-	15kHz	BPSK	1@0 1@11
							QPSK	1@0 1@11 12@0
-	Radiated Emission Below 1GHz	Standalone	134004 to 134180	134092 (707.0MHz)	-	15kHz	BPSK	1@0
-	Radiated Emission Above 1GHz	Standalone	134004 to 134180	134092 (707.0MHz)	-	15kHz	BPSK	1@0

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP/EIRP	22deg. C, 67%RH	120 Vac, 60 Hz	Noah CHANG
Radiated Emission Below 1GHz	22deg. C, 67%RH	120 Vac, 60 Hz	Greg Lin
Radiated Emission Above 1GHz	22deg. C, 67%RH	120 Vac, 60 Hz	Greg Lin

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and References:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

For Cat-M1 and NB-IoT Band 4, Cat-M1 and NB-IoT Band 66:
Mobile / Portable station are limited to 1 watts e.i.r.p.

For Cat-M1 and NB-IoT Band 12, Cat-M1 and NB-IoT Band 13, NB-IoT Band 71, Cat-M1 and NB-IoT Band 85:
Control and mobile stations in the 698-746 MHz, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 30 watts ERP.
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink, 746-757 MHz,787-788 MHz and 805-806 MHz band are limited to 3 watts ERP.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with NB-IoT and eMTC link data modulation and link up with simulator (Built-in power meter). Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator. The average (rms) power measurement was performed on emulator and power value was measured from power function on emulator. Power measurements use detector average (rms).

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is
given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

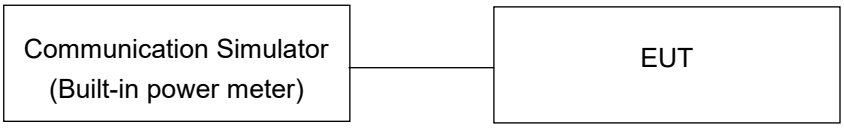
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

Cat-M1

Cat-M1 Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	23.48	**23.56**	23.44
		1	5	23.16	23.28	23.16
		6	0	23.12	23.25	23.17
	16QAM	1	0	23.35	23.48	23.38
		1	6	23.12	23.14	23.13
		6	0	22.19	22.39	22.69
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	23.30	23.41	23.36
		1	5	23.20	23.28	23.15
		6	0	23.15	23.25	23.20
	16QAM	1	0	23.29	23.35	23.30
		1	5	23.14	23.19	23.14
		6	0	22.16	22.30	22.41
BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	23.28	23.38	23.25
		1	5	23.09	23.15	23.08
		6	0	22.46	22.48	22.45
	16QAM	1	0	23.28	23.37	23.32
		1	6	23.04	23.07	23.02
		6	0	21.49	21.47	21.50
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	23.11	23.21	23.18
		1	5	23.12	23.15	23.10
		6	0	21.77	21.85	21.73
	16QAM	1	0	23.15	23.17	23.04
		1	5	23.06	23.10	23.00
		6	0	20.89	20.90	20.85

Cat-M1 Band 4						
BW	**MCS Index**	**Channel**		**19965**	**20175**	**20385**
		Frequency (MHz)		**1711.5**	**1732.5**	**1753.5**
3M	QPSK	1	0	23.42	23.55	23.52
		1	5	23.35	23.47	23.42
		6	0	21.81	21.86	21.78
	16QAM	1	0	23.14	23.21	23.13
		1	5	23.10	23.17	23.12
		6	0	20.82	20.90	20.91
BW	**MCS Index**	**Channel**		**19957**	**20175**	**20393**
		Frequency (MHz)		**1710.7**	**1732.5**	**1754.3**
1.4M	QPSK	1	0	23.26	23.29	23.18
		1	5	23.01	23.14	23.11
		6	0	21.72	21.81	21.75
	16QAM	1	0	22.79	22.83	22.81
		1	5	22.89	22.95	22.83
		6	0	20.71	20.85	20.83

Cat-M1 Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	22.92	22.96	22.85
		1	5	22.68	22.80	22.70
		6	0	21.78	21.83	21.70
	16QAM	1	0	22.70	22.78	22.76
		1	5	22.73	22.75	22.72
		6	0	20.80	20.82	20.75
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	22.95	23.01	22.91
		1	5	22.85	22.90	22.86
		6	0	21.96	22.07	22.01
	16QAM	1	0	22.78	22.80	22.74
		1	5	22.71	22.78	22.74
		6	0	20.94	21.09	21.06
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	23.14	**23.18**	23.07
		1	5	22.95	23.01	22.88
		6	0	21.03	21.06	21.04
	16QAM	1	0	22.40	22.52	22.48
		1	5	22.12	22.21	22.08
		6	0	20.09	20.15	20.08
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	22.91	23.04	22.96
		1	5	22.76	22.81	22.69
		6	0	20.95	21.08	20.99
	16QAM	1	0	22.34	22.38	22.25
		1	5	21.90	21.95	21.94
		6	0	20.08	20.15	20.05

Cat-M1 Band 13						
BW	MCS Index	RB Size	RB Offset	Mid		
		Channel		23230		
		Frequency (MHz)		782		
10M	QPSK	1	0	**23.19**		
		1	5	22.95		
		6	0	22.28		
	16QAM	1	0	23.05		
		1	5	22.91		
		6	0	21.30		
BW	MCS Index	Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	23.00	23.11	23.08
		1	5	22.96	23.03	22.91
		6	0	22.19	22.29	22.27
	16QAM	1	0	23.08	23.09	23.00
		1	5	22.90	23.01	22.91
		6	0	21.19	21.30	21.36

Cat-M1 Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	22.81	22.90	22.83
		1	6	22.68	22.78	22.69
		6	0	22.88	22.89	22.86
	16QAM	1	0	22.81	22.89	22.83
		1	6	22.62	22.72	22.68
		6	0	21.85	22.01	21.89
BW	MCS Index	Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	22.94	23.05	23.02
		1	6	22.94	22.96	22.84
		6	0	22.88	22.99	22.89
	16QAM	1	0	22.86	22.98	22.92
		1	6	22.84	22.88	22.86
		6	0	22.15	22.05	21.89

Cat-M1 Band 66						
BW	MCS Index	Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	23.31	23.41	23.33
		1	6	23.09	23.21	23.20
		6	0	22.10	22.12	22.01
	16QAM	1	0	23.03	23.11	23.09
		1	6	23.05	23.15	23.02
		6	0	21.49	21.35	21.09
BW	MCS Index	Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	23.09	23.19	23.07
		1	6	23.12	23.16	23.12
		6	0	22.17	22.23	22.21
	16QAM	1	0	22.98	23.09	23.03
		1	6	22.97	23.01	22.99
		6	0	21.15	21.38	21.39
BW	MCS Index	Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	23.42	**23.45**	23.32
		1	6	23.13	23.24	23.18
		6	0	21.20	21.26	21.15
	16QAM	1	0	22.52	22.55	22.50
		1	6	22.28	22.37	22.30
		6	0	20.49	20.35	20.19
BW	MCS Index	Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	23.09	23.11	23.00
		1	6	23.10	23.15	23.04
		6	0	21.11	21.20	21.18
	16QAM	1	0	22.56	22.59	22.51
		1	6	22.29	22.39	22.36
		6	0	20.15	20.39	20.35

Cat-M1 Band 85						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		134052	134092	134132
		Frequency (MHz)		703	707	713.5
10M	QPSK	1	0	23.04	**23.07**	23.06
		1	6	22.80	22.84	22.82
		6	0	22.05	22.08	22.03
	16QAM	1	0	22.77	22.82	22.77
		1	6	22.60	22.68	22.66
		6	0	21.09	21.09	20.99
BW	MCS Index	Channel		134027	134092	134157
		Frequency (MHz)		700.5	707	713.5
5M	QPSK	1	0	22.83	22.92	22.86
		1	6	22.85	22.89	22.79
		6	0	22.02	22.07	21.99
	16QAM	1	0	22.72	22.77	22.75
		1	6	22.70	22.78	22.74
		6	0	21.10	20.99	20.90

NB-IoT

NB-IoT Band 4

NB-IoT Band 4						
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**19952**	**20175**	**20398**
		Frequency (MHz)		**1710.2**	**1732.5**	**1754.8**
Stand-alone	3.75k BPSK	1	0	19.97	20.10	19.96
		1	47	20.35	20.50	20.36
	3.75k QPSK	1	0	20.12	20.27	20.14
		1	47	20.10	20.25	20.11
	15k BPSK	1	0	20.64	20.77	20.67
		1	11	20.64	**20.78**	20.64
	15k QPSK	1	0	20.62	20.75	20.64
		1	11	20.59	20.73	20.61
		12	0	18.74	18.88	18.76

NB-IoT Band 12

NB-IoT Band 12						
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**23012**	**23095**	**23178**
		Frequency (MHz)		**699.2**	**707.5**	**715.8**
Stand-alone	3.75k BPSK	1	0	21.12	21.18	21.13
		1	47	20.72	20.85	20.68
	3.75k QPSK	1	0	21.07	21.10	21.05
		1	47	20.78	20.81	20.74
	15k BPSK	1	0	22.73	22.77	22.73
		1	11	22.83	**22.86**	22.82
	15k QPSK	1	0	22.60	22.74	22.49
		1	11	22.61	22.68	22.56
		12	0	21.25	21.29	21.12

NB-IoT Band 13

NB-IoT Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23182	23230	23278
		Frequency (MHz)		777.2	782	786.8
Stand-alone	3.75k BPSK	1	0	21.34	21.38	21.35
		1	47	20.97	21.07	21.01
	3.75k QPSK	1	0	21.38	21.46	21.45
		1	47	20.94	21.06	21.02
	15k BPSK	1	0	23.21	23.25	23.10
		1	11	23.15	**23.27**	23.12
	15k QPSK	1	0	23.01	23.09	22.94
		1	11	23.13	23.18	23.03
		12	0	21.24	21.38	21.25

NB-IoT Band 66

NB-IoT Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131974	132322	132670
		Frequency (MHz)		1710.2	1745	1779.8
Stand-alone	3.75k BPSK	1	0	21.14	21.26	21.18
		1	47	20.60	20.70	20.65
	3.75k QPSK	1	0	21.11	21.13	21.05
		1	47	20.68	20.69	20.54
	15k BPSK	1	0	23.12	**23.24**	23.10
		1	11	23.13	23.17	23.14
	15k QPSK	1	0	23.19	23.21	23.11
		1	11	22.84	22.99	22.96
		12	0	21.08	21.13	21.06

NB-IoT Band 71

NB-IoT Band 71						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		133124	133297	133470
		Frequency (MHz)		663.2	680.5	697.8
Stand-alone	3.75k BPSK	1	0	20.98	20.99	20.88
		1	47	20.38	20.49	20.44
	3.75k QPSK	1	0	20.75	20.86	20.78
		1	47	20.34	20.48	20.37
	15k BPSK	1	0	22.70	**22.83**	22.80
		1	11	22.78	22.80	22.67
	15k QPSK	1	0	22.70	22.81	22.77
		1	11	22.58	22.62	22.49
		12	0	20.78	20.79	20.69

NB-IoT Band 85

NB-IoT Band 85						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		134004	134092	134180
		Frequency (MHz)		698.2	707	715.8
Stand-alone	3.75k BPSK	1	0	21.14	21.15	21.11
		1	47	20.67	20.75	20.71
	3.75k QPSK	1	0	21.05	21.10	21.03
		1	47	20.60	20.71	20.57
	15k BPSK	1	0	22.43	**22.46**	22.42
		1	11	22.30	22.41	22.35
	15k QPSK	1	0	22.24	22.31	22.24
		1	11	22.26	22.27	22.21
		12	0	20.41	20.49	20.47

EIRP / ERP Power (dBm)

Cat-M1

Cat-M1 Band 4						
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**20050**	**20175**	**20300**
		Frequency (MHz)		**1720**	**1732.5**	**1745**
20M	QPSK	1	0	24.98	**25.06**	24.94
		1	5	24.66	24.78	24.66
		6	0	24.62	24.75	24.67
	16QAM	1	0	24.85	24.98	24.88
		1	5	24.62	24.64	24.63
		6	0	23.69	23.89	24.19
BW	**MCS Index**	**Channel**		**20025**	**20175**	**20325**
		Frequency (MHz)		**1717.5**	**1732.5**	**1747.5**
15M	QPSK	1	0	24.80	24.91	24.86
		1	5	24.70	24.78	24.65
		6	0	24.65	24.75	24.70
	16QAM	1	0	24.79	24.85	24.80
		1	5	24.64	24.69	24.64
		6	0	23.66	23.80	23.91
BW	**MCS Index**	**Channel**		**20000**	**20175**	**20350**
		Frequency (MHz)		**1715**	**1732.5**	**1750**
10M	QPSK	1	0	24.78	24.88	24.75
		1	5	24.59	24.65	24.58
		6	0	23.96	23.98	23.95
	16QAM	1	0	24.78	24.87	24.82
		1	5	24.54	24.57	24.52
		6	0	22.99	22.97	23.00
BW	**MCS Index**	**Channel**		**19975**	**20175**	**20375**
		Frequency (MHz)		**1712.5**	**1732.5**	**1752.5**
5M	QPSK	1	0	24.61	24.71	24.68
		1	5	24.62	24.65	24.60
		6	0	23.27	23.35	23.23
	16QAM	1	0	24.65	24.67	24.54
		1	5	24.56	24.60	24.50
		6	0	22.39	22.40	22.35

Cat-M1 Band 4						
BW	**MCS Index**	**Channel**		**19965**	**20175**	**20385**
		Frequency (MHz)		**1711.5**	**1732.5**	**1753.5**
3M	QPSK	1	0	24.92	25.05	25.02
		1	5	24.85	24.97	24.92
		6	0	23.31	23.36	23.28
	16QAM	1	0	24.64	24.71	24.63
		1	5	24.60	24.67	24.62
		6	0	22.32	22.40	22.41
BW	**MCS Index**	**Channel**		**19957**	**20175**	**20393**
		Frequency (MHz)		**1710.7**	**1732.5**	**1754.3**
1.4M	QPSK	1	0	24.76	24.79	24.68
		1	5	24.51	24.64	24.61
		6	0	23.22	23.31	23.25
	16QAM	1	0	24.29	24.33	24.31
		1	5	24.39	24.45	24.33
		6	0	22.21	22.35	22.33

*EIRP = Conducted + antenna gain (1.5dBi)

Cat-M1 Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	21.87	21.91	21.80
		1	5	21.63	21.75	21.65
		6	0	20.73	20.78	20.65
	16QAM	1	0	21.65	21.73	21.71
		1	5	21.68	21.70	21.67
		6	0	19.75	19.77	19.70
BW	MCS Index	Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	21.90	21.96	21.86
		1	5	21.80	21.85	21.81
		6	0	20.91	21.02	20.96
	16QAM	1	0	21.73	21.75	21.69
		1	5	21.66	21.73	21.69
		6	0	19.89	20.04	20.01
BW	MCS Index	Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	22.09	**22.13**	22.02
		1	5	21.90	21.96	21.83
		6	0	19.98	20.01	19.99
	16QAM	1	0	21.35	21.47	21.43
		1	5	21.07	21.16	21.03
		6	0	19.04	19.10	19.03
BW	MCS Index	Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	21.86	21.99	21.91
		1	5	21.71	21.76	21.64
		6	0	19.90	20.03	19.94
	16QAM	1	0	21.29	21.33	21.20
		1	5	20.85	20.90	20.89
		6	0	19.03	19.10	19.00

*ERP = Conducted + antenna gain (1.1dBi) - 2.15

Cat-M1 Band 13						
BW	**MCS Index**	**RB Size**	**RB Offset**	**Mid**		
		Channel		**23230**		
		Frequency (MHz)		**782**		
10M	QPSK	1	0	**21.74**		
		1	5	21.50		
		6	0	20.83		
	16QAM	1	0	21.60		
		1	5	21.46		
		6	0	19.85		
BW	**MCS Index**	**Channel**		**23205**	**23230**	**23255**
		Frequency (MHz)		**779.5**	**782**	**784.5**
5M	QPSK	1	0	21.55	21.66	21.63
		1	5	21.51	21.58	21.46
		6	0	20.74	20.84	20.82
	16QAM	1	0	21.63	21.64	21.55
		1	5	21.45	21.56	21.46
		6	0	19.74	19.85	19.91

*ERP = Conducted + antenna gain (0.7dBi) - 2.15

Cat-M1 Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	24.31	24.40	24.33
		1	5	24.18	24.28	24.19
		6	0	24.38	24.39	24.36
	16QAM	1	0	24.31	24.39	24.33
		1	5	24.12	24.22	24.18
		6	0	23.35	23.51	23.39
BW	MCS Index	Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	24.44	24.55	24.52
		1	5	24.44	24.46	24.34
		6	0	24.38	24.49	24.39
	16QAM	1	0	24.36	24.48	24.42
		1	5	24.34	24.38	24.36
		6	0	23.65	23.55	23.39
BW	MCS Index	Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	24.81	24.91	24.83
		1	5	24.59	24.71	24.70
		6	0	23.60	23.62	23.51
	16QAM	1	0	24.53	24.61	24.59
		1	5	24.55	24.65	24.52
		6	0	22.99	22.85	22.59
BW	MCS Index	Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	24.59	24.69	24.57
		1	5	24.62	24.66	24.62
		6	0	23.67	23.73	23.71
	16QAM	1	0	24.48	24.59	24.53
		1	5	24.47	24.51	24.49
		6	0	22.65	22.88	22.89

*EIRP = Conducted + antenna gain (1.5dBi)

Cat-M1 Band 66						
BW	**MCS Index**	**Channel**		**131987**	**132322**	**132657**
		Frequency (MHz)		**1711.5**	**1745**	**1778.5**
3M	QPSK	1	0	24.92	**24.95**	24.82
		1	5	24.63	24.74	24.68
		6	0	22.70	22.76	22.65
	16QAM	1	0	24.02	24.05	24.00
		1	5	23.78	23.87	23.80
		6	0	21.99	21.85	21.69
BW	**MCS Index**	**Channel**		**131979**	**132322**	**132665**
		Frequency (MHz)		**1710.7**	**1745**	**1779.3**
1.4M	QPSK	1	0	24.59	24.61	24.50
		1	5	24.60	24.65	24.54
		6	0	22.61	22.70	22.68
	16QAM	1	0	24.06	24.09	24.01
		1	5	23.79	23.89	23.86
		6	0	21.65	21.89	21.85

*EIRP = Conducted + antenna gain (1.5dBi)

Cat-M1 Band 85						
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**134052**	**134092**	**134132**
		Frequency (MHz)		**703**	**707**	**711**
10M	QPSK	1	0	21.99	**22.02**	22.01
		1	5	21.75	21.79	21.77
		6	0	21.00	21.03	20.98
	16QAM	1	0	21.72	21.77	21.72
		1	5	21.55	21.63	21.61
		6	0	20.04	20.04	19.94
BW	**MCS Index**	**Channel**		**134027**	**134092**	**134157**
		Frequency (MHz)		**700.5**	**707**	**713.5**
5M	QPSK	1	0	21.78	21.87	21.81
		1	5	21.80	21.84	21.74
		6	0	20.97	21.02	20.94
	16QAM	1	0	21.67	21.72	21.70
		1	5	21.65	21.73	21.69
		6	0	20.05	19.94	19.85

*ERP = Conducted + antenna gain (1.1dBi) - 2.15

NB-IoT Band 4

NB-IoT Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19952	20175	20398
		Frequency (MHz)		1710.2	1732.5	1754.8
Stand-alone	3.75k BPSK	1	0	21.47	21.60	21.46
		1	47	21.85	22.00	21.86
	3.75k QPSK	1	0	21.62	21.77	21.64
		1	47	21.60	21.75	21.61
	15k BPSK	1	0	22.14	22.27	22.17
		1	11	22.14	22.28	22.14
	15k QPSK	1	0	22.12	22.25	22.14
		1	11	22.09	22.23	22.11
		12	0	20.24	20.38	20.26

*EIRP = Conducted + antenna gain (1.5dBi)

NB-IoT Band 12

NB-IoT Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23012	23095	23178
		Frequency (MHz)		699.2	707.5	715.8
Stand-alone	3.75k BPSK	1	0	20.07	20.13	20.08
		1	47	19.67	19.80	19.63
	3.75k QPSK	1	0	20.02	20.05	20.00
		1	47	19.73	19.76	19.69
	15k BPSK	1	0	21.68	21.72	21.68
		1	11	21.78	21.81	21.77
	15k QPSK	1	0	21.55	21.69	21.44
		1	11	21.56	21.63	21.51
		12	0	20.20	20.24	20.07

*ERP = Conducted + antenna gain (1.1dBi) - 2.15

NB-IoT Band 13

NB-IoT Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23182	23230	23278
		Frequency (MHz)		777.2	782	786.8
Stand-alone	3.75k BPSK	1	0	19.89	19.93	19.90
		1	47	19.52	19.62	19.56
	3.75k QPSK	1	0	19.93	20.01	20.00
		1	47	19.49	19.61	19.57
	15k BPSK	1	0	21.76	21.80	21.65
		1	11	21.70	21.82	21.67
	15k QPSK	1	0	21.56	21.64	21.49
		1	11	21.68	21.73	21.58
		12	0	19.79	19.93	19.80

*ERP = Conducted + antenna gain (0.7dBi) - 2.15

NB-IoT Band 66

NB-IoT Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131974	132322	132670
		Frequency (MHz)		1710.2	1745	1779.8
Stand-alone	3.75k BPSK	1	0	22.64	22.76	22.68
		1	47	22.10	22.20	22.15
	3.75k QPSK	1	0	22.61	22.63	22.55
		1	47	22.18	22.19	22.04
	15k BPSK	1	0	24.62	24.74	24.60
		1	11	24.63	24.67	24.64
	15k QPSK	1	0	24.69	24.71	24.61
		1	11	24.34	24.49	24.46
		12	0	22.58	22.63	22.56

*EIRP = Conducted + antenna gain (1.5dBi)

NB-IoT Band 71

NB-IoT Band 71						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		133124	133297	133470
		Frequency (MHz)		663.2	680.5	697.8
Stand-alone	3.75k BPSK	1	0	20.13	20.14	20.03
		1	47	19.53	19.64	19.59
	3.75k QPSK	1	0	19.90	20.01	19.93
		1	47	19.49	19.63	19.52
	15k BPSK	1	0	21.85	21.98	21.95
		1	11	21.93	21.95	21.82
	15k QPSK	1	0	21.85	21.96	21.92
		1	11	21.73	21.77	21.64
		12	0	19.93	19.94	19.84

*ERP = Conducted + antenna gain (1.3dBi) - 2.15

NB-IoT Band 85

NB-IoT Band 85						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		134004	134092	134180
		Frequency (MHz)		698.2	707	715.8
Stand-alone	3.75k BPSK	1	0	20.09	20.10	20.06
		1	47	19.62	19.70	19.66
	3.75k QPSK	1	0	20.00	20.05	19.98
		1	47	19.55	19.66	19.52
	15k BPSK	1	0	21.38	21.41	21.37
		1	11	21.25	21.36	21.30
	15k QPSK	1	0	21.19	21.26	21.19
		1	11	21.21	21.22	21.16
		12	0	19.36	19.44	19.42

*ERP = Conducted + antenna gain (1.1dBi) - 2.15

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

For Cat-M1 and NB-IoT Band 4, Cat-M1 and NB-IoT Band 66:
According to FCC 27.53(h) for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB.

For Cat-M1 and NB-IoT Band 12, NB-IoT Band 71, Cat-M1 and NB-IoT Band 85:
According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a 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, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

For Cat-M1 and NB-IoT Band 13:
According to FCC 27.53(c)(2) for 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.

According to FCC 27.53(f) for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm

4.2.2 Test Procedure

a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

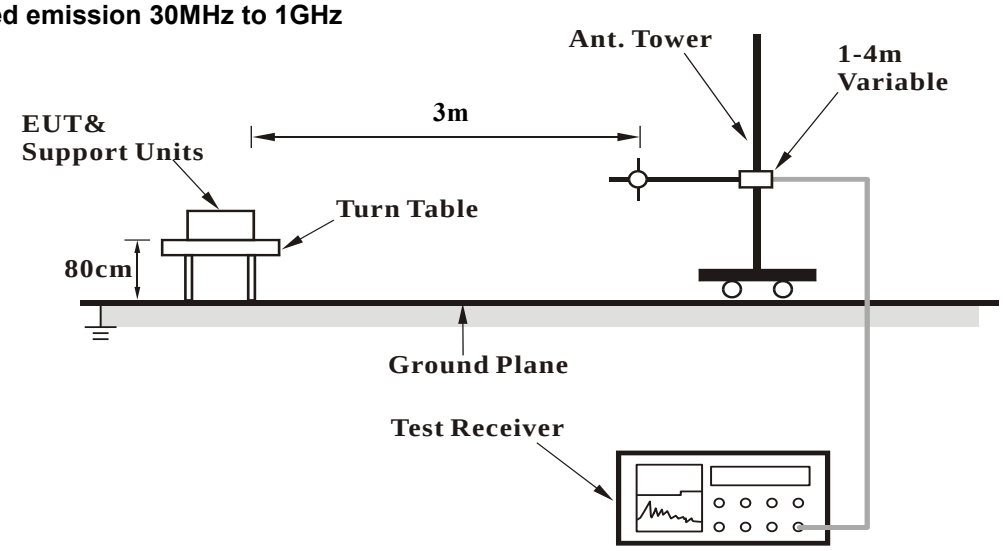
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz. Set detector = average.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.2.3 Deviation from Test Standard

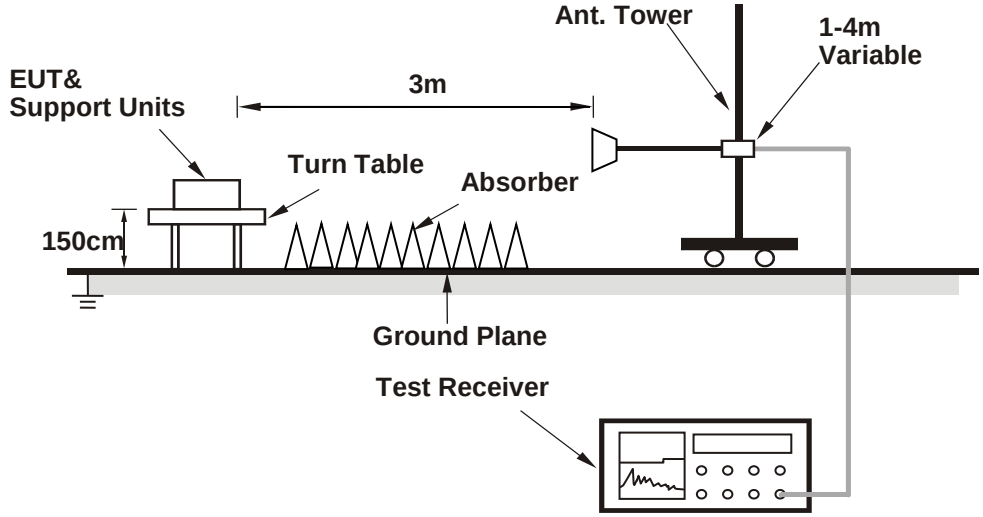
No deviation.

4.2.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.5 Test Results

Below 1GHz

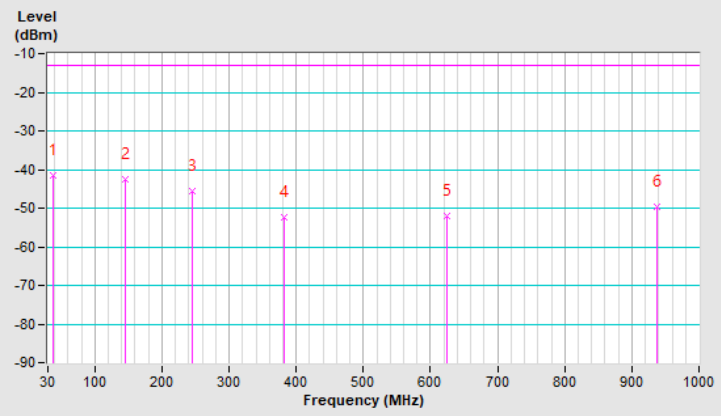
Cat-M1 Band 4, Channel Bandwidth 20MHz

RF Mode	TX Cat-M1 Band 4	Channel	CH 20175：1732.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	38.73	-41.68	-13.00	-28.68	1.25 H	197	67.27	-108.95
2	145.43	-42.59	-13.00	-29.59	1.00 H	350	65.86	-108.45
3	244.37	-45.70	-13.00	-32.70	1.50 H	2	64.24	-109.94
4	382.11	-52.26	-13.00	-39.26	1.00 H	274	53.71	-105.97
5	623.64	-51.92	-13.00	-38.92	1.00 H	40	48.62	-100.54
6	936.95	-49.56	-13.00	-36.56	1.50 H	222	46.54	-96.10

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

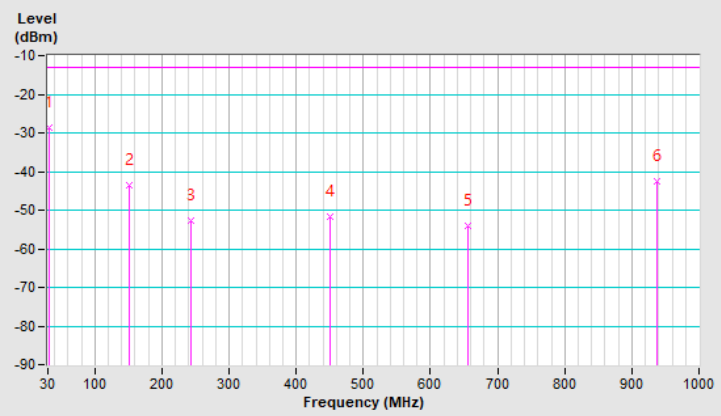


RF Mode	TX Cat-M1 Band 4	Channel	CH 20175：1732.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**32.91**	**-28.74**	**-13.00**	**-15.74**	**1.50 V**	**276**	**80.96**	**-109.70**
2	151.25	-43.46	-13.00	-30.46	1.00 V	140	64.84	-108.30
3	243.40	-52.86	-13.00	-39.86	2.00 V	267	57.11	-109.97
4	450.98	-51.62	-13.00	-38.62	1.25 V	276	52.30	-103.92
5	655.65	-54.00	-13.00	-41.00	1.00 V	345	46.04	-100.04
6	937.92	-42.46	-13.00	-29.46	1.50 V	3	53.63	-96.09

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



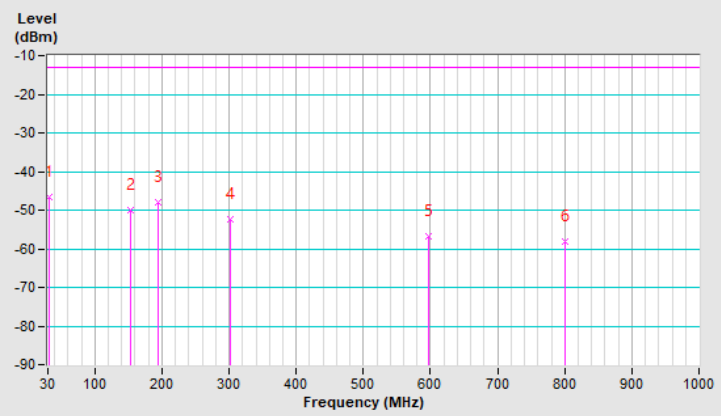
Cat-M1 Band 12, Channel Bandwidth 3MHz

RF Mode	TX Cat-M1 Band 12	Channel	CH 23095：707.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	-46.65	-13.00	-33.65	1.25 H	127	65.15	-111.80
2	154.16	-49.89	-13.00	-36.89	1.00 H	332	60.42	-110.31
3	193.93	-48.09	-13.00	-35.09	1.25 H	17	65.71	-113.80
4	302.57	-52.38	-13.00	-39.38	1.50 H	44	57.64	-110.02
5	596.48	-56.62	-13.00	-43.62	1.00 H	8	46.47	-103.09
6	800.18	-58.25	-13.00	-45.25	2.00 H	206	41.61	-99.86

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

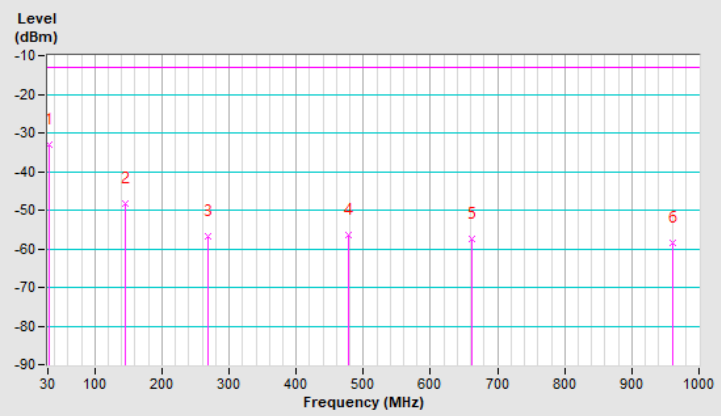


RF Mode	TX Cat-M1 Band 12	Channel	CH 23095：707.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	-33.03	-13.00	-20.03	1.25 V	340	78.77	-111.80
2	144.46	-48.29	-13.00	-35.29	1.00 V	2	62.38	-110.67
3	267.65	-56.78	-13.00	-43.78	1.50 V	34	54.49	-111.27
4	477.17	-56.48	-13.00	-43.48	2.00 V	16	49.15	-105.63
5	661.47	-57.41	-13.00	-44.41	1.25 V	308	44.73	-102.14
6	961.20	-58.64	-13.00	-45.64	1.00 V	193	39.19	-97.83

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



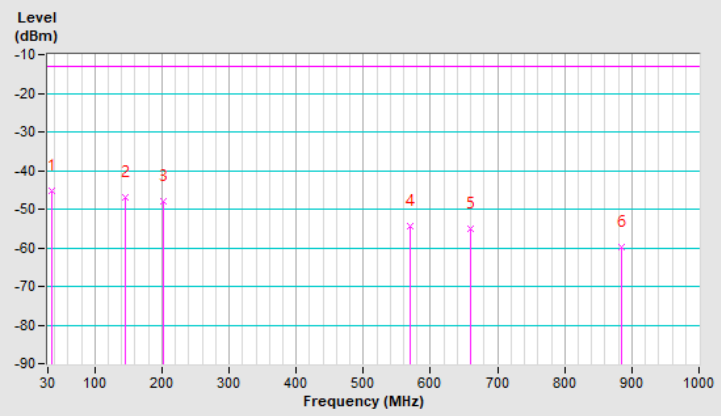
Cat-M1 Band 13, Channel Bandwidth 10MHz

RF Mode	TX Cat-M1 Band 13	Channel	CH 23230：782.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	-45.38	-13.00	-32.38	1.00 H	61	65.94	-111.32
2	145.43	-46.90	-13.00	-33.90	1.00 H	332	63.70	-110.60
3	201.69	-47.81	-13.00	-34.81	1.50 H	239	66.45	-114.26
4	569.32	-54.43	-13.00	-41.43	1.25 H	3	49.56	-103.99
5	660.50	-55.19	-13.00	-42.19	1.00 H	10	46.97	-102.16
6	885.54	-59.70	-13.00	-46.70	1.25 H	153	39.13	-98.83

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

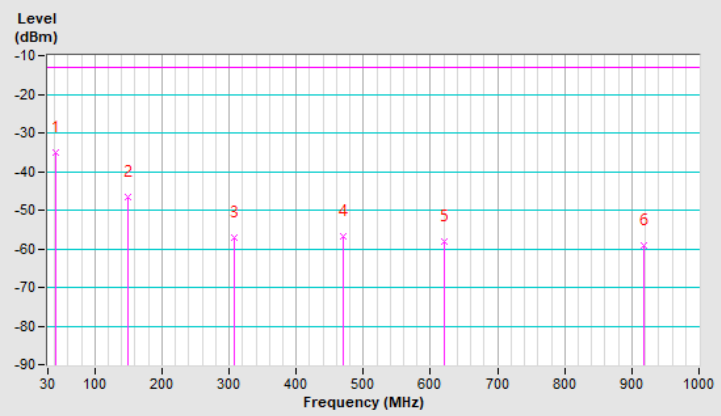


RF Mode	TX Cat-M1 Band 13	Channel	CH 23230：782.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.61	-34.97	-13.00	-21.97	1.25 V	127	75.84	-110.81
2	149.31	-46.54	-13.00	-33.54	1.00 V	53	63.93	-110.47
3	307.42	-57.04	-13.00	-44.04	1.00 V	167	52.85	-109.89
4	470.38	-56.91	-13.00	-43.91	1.50 V	28	48.86	-105.77
5	620.73	-58.04	-13.00	-45.04	1.00 V	17	44.67	-102.71
6	917.55	-59.23	-13.00	-46.23	1.25 V	340	39.28	-98.51

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



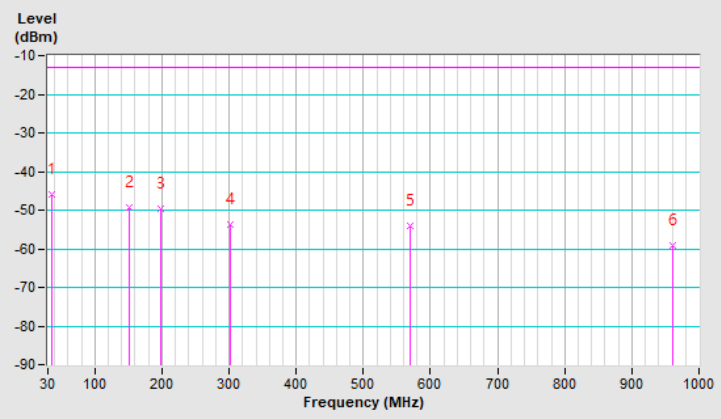
Cat-M1 Band 66, Channel Bandwidth 3MHz

RF Mode	TX Cat-M1 Band 66	Channel	CH 132322：1745.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.82	-45.96	-13.00	-32.96	1.25 H	110	63.37	-109.33
2	151.25	-49.20	-13.00	-36.20	1.00 H	2	59.10	-108.30
3	198.78	-49.71	-13.00	-36.71	1.50 H	243	62.35	-112.06
4	301.60	-53.76	-13.00	-40.76	1.00 H	19	54.14	-107.90
5	569.32	-54.17	-13.00	-41.17	1.25 H	2	47.67	-101.84
6	960.23	-59.15	-13.00	-46.15	1.25 H	222	36.55	-95.70

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

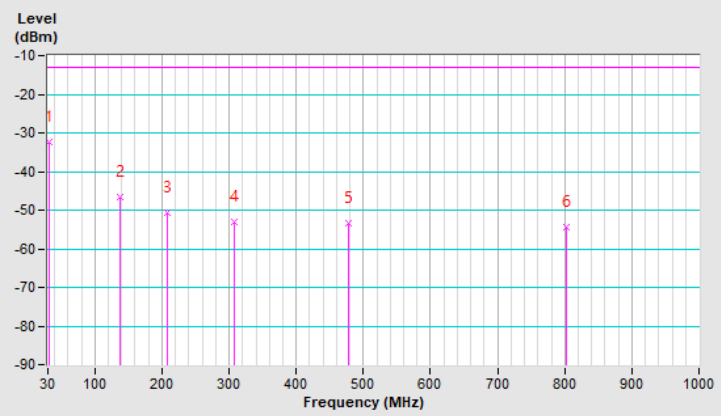


RF Mode	TX Cat-M1 Band 66	Channel	CH 132322：1745.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**31.94**	**-32.32**	**-13.00**	**-19.32**	**1.00 V**	**167**	**77.33**	**-109.65**
2	137.67	-46.76	-13.00	-33.76	1.50 V	18	62.19	-108.95
3	208.48	-50.73	-13.00	-37.73	1.25 V	139	61.42	-112.15
4	308.39	-53.06	-13.00	-40.06	1.00 V	180	54.64	-107.70
5	477.17	-53.40	-13.00	-40.40	1.25 V	26	50.08	-103.48
6	802.12	-54.31	-13.00	-41.31	1.00 V	82	43.39	-97.70

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



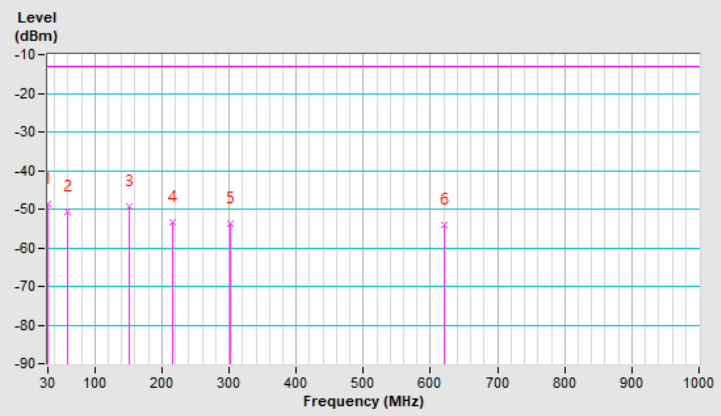
Cat-M1 Band 85, Channel Bandwidth 10MHz

RF Mode	TX Cat-M1 Band 85	Channel	CH 134092：707.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.97	-48.77	-13.00	-35.77	1.00 H	89	63.27	-112.04
2	60.07	-50.78	-13.00	-37.78	1.25 H	42	60.55	-111.33
3	152.22	-49.37	-13.00	-36.37	1.00 H	2	61.08	-110.45
4	216.24	-53.42	-13.00	-40.42	1.50 H	200	60.81	-114.23
5	301.60	-53.76	-13.00	-40.76	2.00 H	19	56.29	-110.05
6	620.73	-53.90	-13.00	-40.90	1.25 H	2	48.81	-102.71

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

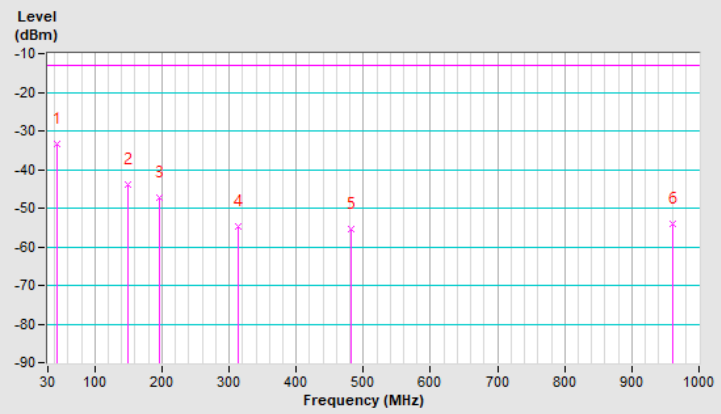


RF Mode	TX Cat-M1 Band 85	Channel	CH 134092：707.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	44.55	-33.38	-13.00	-20.38	1.00 V	119	77.32	-110.70
2	149.31	-43.95	-13.00	-30.95	1.25 V	20	66.52	-110.47
3	195.87	-47.42	-13.00	-34.42	1.50 V	139	66.60	-114.02
4	313.24	-54.86	-13.00	-41.86	1.00 V	174	54.81	-109.67
5	482.02	-55.59	-13.00	-42.59	1.00 V	20	49.97	-105.56
6	960.23	-54.10	-13.00	-41.10	1.25 V	170	43.75	-97.85

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



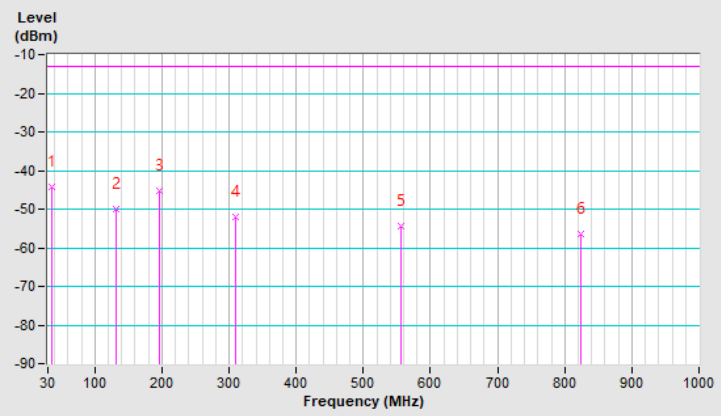
NB-IoT Band 4, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 4, Subcarrier Spacing 15kHz	Channel	CH 20175：1732.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.82	-44.07	-13.00	-31.07	1.00 H	149	65.26	-109.33
2	131.85	-49.99	-13.00	-36.99	1.50 H	187	59.62	-109.61
3	196.84	-45.33	-13.00	-32.33	1.25 H	230	66.62	-111.95
4	309.36	-51.87	-13.00	-38.87	1.50 H	75	55.80	-107.67
5	555.74	-54.54	-13.00	-41.54	1.00 H	19	47.58	-102.12
6	823.46	-56.48	-13.00	-43.48	2.00 H	25	40.94	-97.42

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

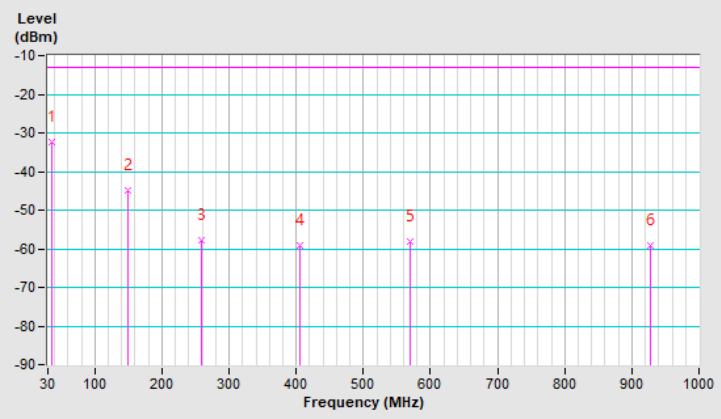


RF Mode	TX NB-IoT Band 4, Subcarrier Spacing 15kHz	Channel	CH 20175：1732.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	-32.53	-13.00	-19.53	1.25 V	155	76.64	-109.17
2	148.34	-45.06	-13.00	-32.06	1.50 V	39	63.34	-108.40
3	258.92	-57.87	-13.00	-44.87	1.00 V	45	51.68	-109.55
4	405.39	-59.21	-13.00	-46.21	1.50 V	340	46.23	-105.44
5	569.32	-58.23	-13.00	-45.23	1.00 V	100	43.61	-101.84
6	928.22	-59.01	-13.00	-46.01	1.25 V	2	37.19	-96.20

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



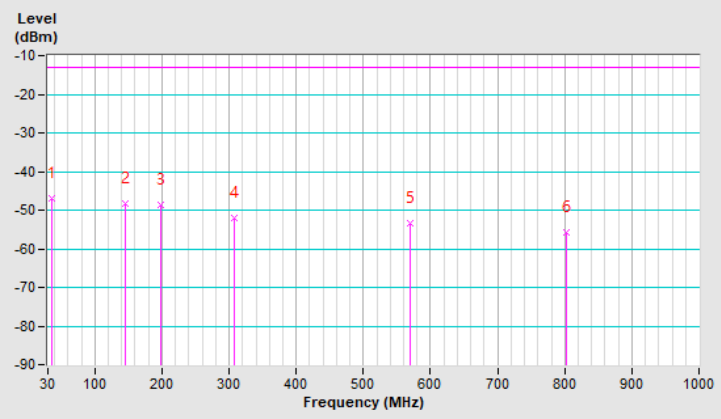
NB-IoT Band 12, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 12, Subcarrier Spacing 15kHz	Channel	CH 23095：707.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	-46.99	-13.00	-33.99	1.50 H	67	64.33	-111.32
2	144.46	-48.32	-13.00	-35.32	1.00 H	217	62.35	-110.67
3	198.78	-48.66	-13.00	-35.66	2.00 H	29	65.55	-114.21
4	308.39	-52.03	-13.00	-39.03	1.00 H	18	57.82	-109.85
5	569.32	-53.50	-13.00	-40.50	1.25 H	18	50.49	-103.99
6	802.12	-55.85	-13.00	-42.85	1.00 H	351	44.00	-99.85

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

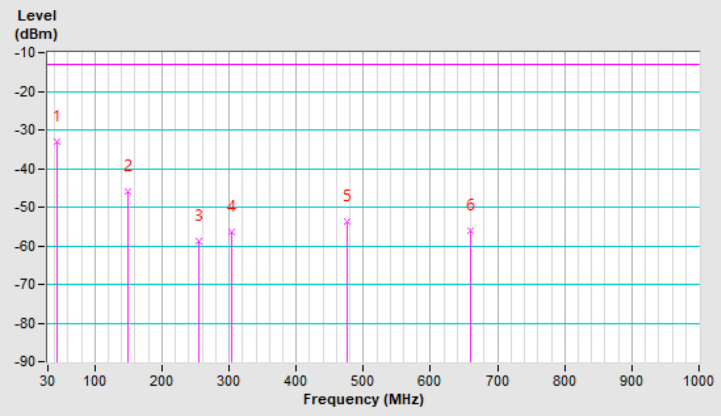


RF Mode	TX NB-IoT Band 12, Subcarrier Spacing 15kHz	Channel	CH 23095：707.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**43.58**	**-32.92**	**-13.00**	**-19.92**	**1.50 V**	**189**	**77.86**	**-110.78**
2	149.31	-45.89	-13.00	-32.89	1.25 V	2	64.58	-110.47
3	254.07	-58.94	-13.00	-45.94	1.00 V	58	52.94	-111.88
4	303.54	-56.32	-13.00	-43.32	2.00 V	202	53.68	-110.00
5	476.20	-53.76	-13.00	-40.76	1.00 V	19	51.89	-105.65
6	660.50	-56.03	-13.00	-43.03	1.25 V	118	46.13	-102.16

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



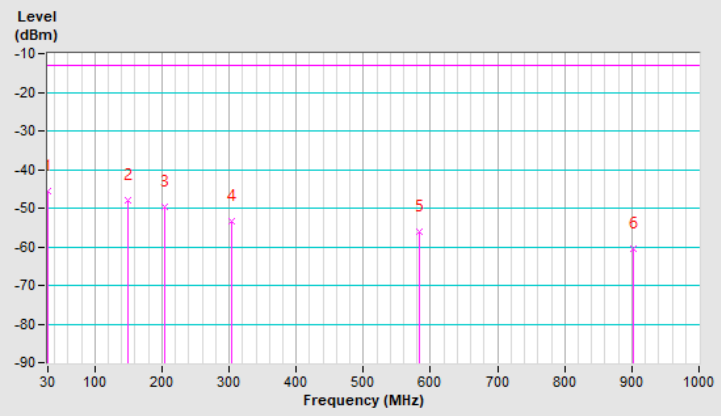
NB-IoT Band 13, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 13, Subcarrier Spacing 15kHz	Channel	CH 23230：782.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.97	-45.75	-13.00	-32.75	1.00 H	150	66.29	-112.04
2	148.34	-47.83	-13.00	-34.83	1.50 H	4	62.72	-110.55
3	203.63	-49.81	-13.00	-36.81	1.25 H	4	64.49	-114.30
4	303.54	-53.52	-13.00	-40.52	1.00 H	17	56.48	-110.00
5	582.90	-56.10	-13.00	-43.10	1.50 H	26	47.42	-103.52
6	903.00	-60.34	-13.00	-47.34	2.00 H	294	38.39	-98.73

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

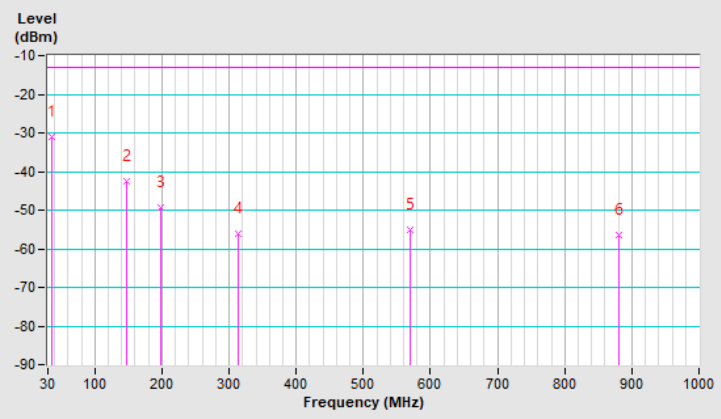


RF Mode	TX NB-IoT Band 13, Subcarrier Spacing 15kHz	Channel	CH 23230：782.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.82	-31.10	-13.00	-18.10	1.00 V	352	80.38	-111.48
2	146.40	-42.67	-13.00	-29.67	1.25 V	50	67.85	-110.52
3	197.81	-49.31	-13.00	-36.31	1.00 V	143	64.84	-114.15
4	313.24	-56.09	-13.00	-43.09	1.50 V	184	53.58	-109.67
5	569.32	-55.09	-13.00	-42.09	1.00 V	93	48.90	-103.99
6	880.69	-56.46	-13.00	-43.46	1.25 V	120	42.49	-98.95

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



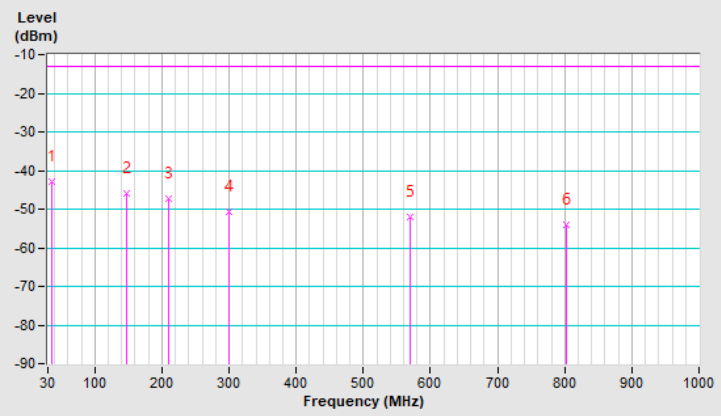
NB-IoT Band 66, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 66, Subcarrier Spacing 15kHz	Channel	CH 132322：1745.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	-43.05	-13.00	-30.05	1.25 H	18	66.12	-109.17
2	147.37	-45.87	-13.00	-32.87	2.00 H	333	62.48	-108.35
3	210.42	-47.40	-13.00	-34.40	1.50 H	227	64.75	-112.15
4	299.66	-50.77	-13.00	-37.77	1.00 H	18	57.18	-107.95
5	569.32	-51.93	-13.00	-38.93	1.50 H	3	49.91	-101.84
6	802.12	-53.95	-13.00	-40.95	1.25 H	348	43.75	-97.70

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

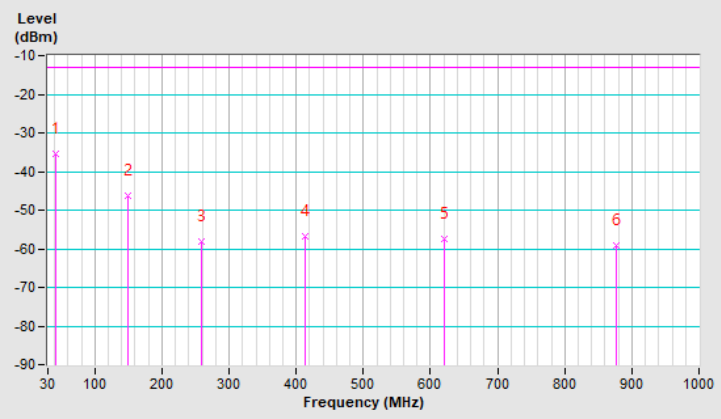


RF Mode	TX NB-IoT Band 66, Subcarrier Spacing 15kHz	Channel	CH 132322：1745.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.61	-35.36	-13.00	-22.36	1.00 V	51	73.30	-108.66
2	149.31	-46.17	-13.00	-33.17	1.25 V	67	62.15	-108.32
3	258.92	-58.21	-13.00	-45.21	1.50 V	56	51.34	-109.55
4	414.12	-56.81	-13.00	-43.81	1.25 V	360	48.44	-105.25
5	620.73	-57.47	-13.00	-44.47	1.00 V	13	43.09	-100.56
6	875.84	-59.23	-13.00	-46.23	1.50 V	26	37.64	-96.87

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



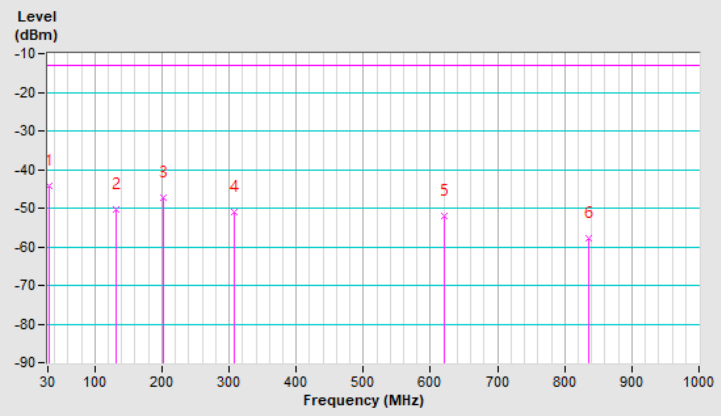
NB-IoT Band 71, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 71, Subcarrier Spacing 15kHz	Channel	CH 133297：680.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	-44.27	-13.00	-31.27	1.00 H	97	67.53	-111.80
2	131.85	-50.45	-13.00	-37.45	1.50 H	348	61.31	-111.76
3	201.69	-47.36	-13.00	-34.36	1.25 H	258	66.90	-114.26
4	307.42	-51.06	-13.00	-38.06	1.00 H	24	58.83	-109.89
5	620.73	-52.04	-13.00	-39.04	1.50 H	18	50.67	-102.71
6	836.07	-57.86	-13.00	-44.86	1.50 H	353	41.50	-99.36

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

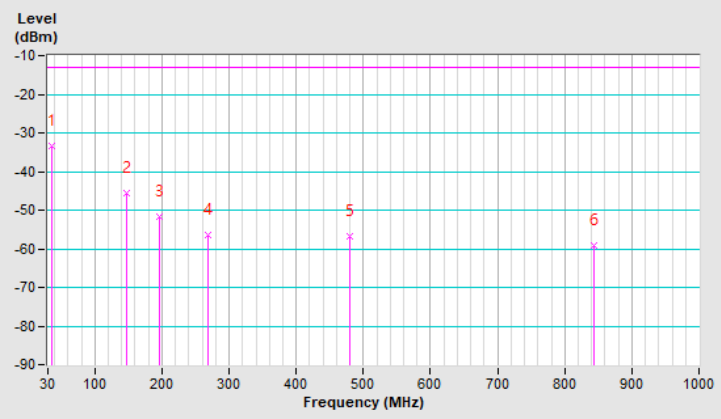


RF Mode	TX NB-IoT Band 71, Subcarrier Spacing 15kHz	Channel	CH 133297：680.5MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**36.79**	**-33.53**	**-13.00**	**-20.53**	**1.00 V**	**292**	**77.79**	**-111.32**
2	146.40	-45.46	-13.00	-32.46	1.25 V	4	65.06	-110.52
3	196.84	-51.83	-13.00	-38.83	1.00 V	152	62.27	-114.10
4	267.65	-56.61	-13.00	-43.61	1.50 V	70	54.66	-111.27
5	479.11	-56.89	-13.00	-43.89	1.00 V	17	48.72	-105.61
6	843.83	-59.08	-13.00	-46.08	1.25 V	34	40.25	-99.33

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



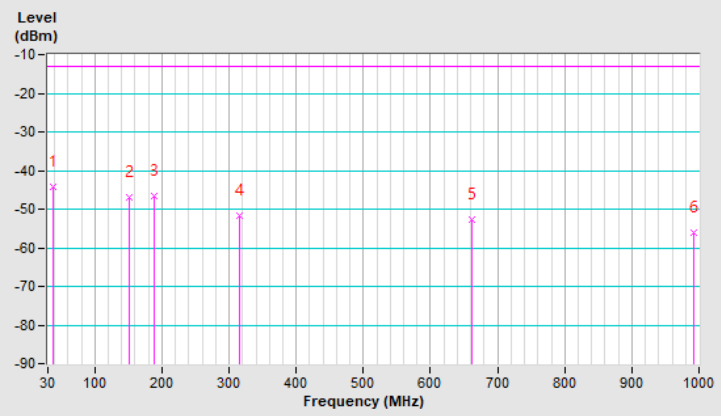
NB-IoT Band 85, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 85, Subcarrier Spacing 15kHz	Channel	CH 134092：707.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-44.34	-13.00	-31.34	1.25 H	18	66.91	-111.25
2	152.22	-47.08	-13.00	-34.08	1.50 H	348	63.37	-110.45
3	189.08	-46.54	-13.00	-33.54	1.00 H	258	66.78	-113.32
4	316.15	-51.63	-13.00	-38.63	1.50 H	69	57.95	-109.58
5	661.47	-52.69	-13.00	-39.69	1.00 H	7	49.45	-102.14
6	991.27	-56.06	-13.00	-43.06	2.00 H	303	41.40	-97.46

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

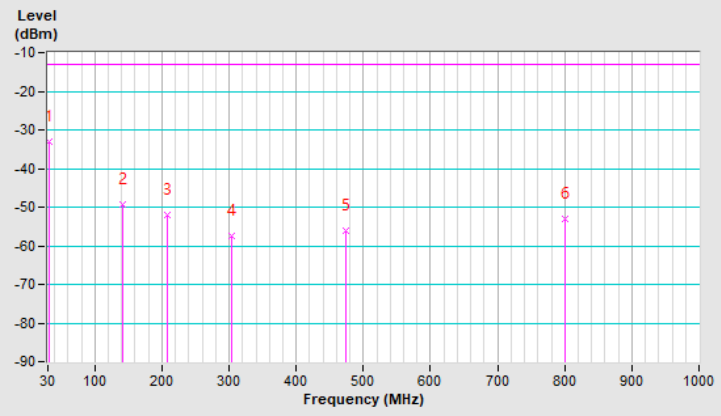


RF Mode	TX NB-IoT Band 85, Subcarrier Spacing 15kHz	Channel	CH 134092：707.0MHz MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**31.94**	**-32.95**	**-13.00**	**-19.95**	**1.50 V**	**64**	**78.85**	**-111.80**
2	141.55	-49.47	-13.00	-36.47	2.00 V	2	61.42	-110.89
3	207.51	-52.15	-13.00	-39.15	1.25 V	133	62.16	-114.31
4	303.54	-57.51	-13.00	-44.51	1.00 V	227	52.49	-110.00
5	473.29	-56.02	-13.00	-43.02	1.25 V	31	49.69	-105.71
6	801.15	-53.05	-13.00	-40.05	1.50 V	188	46.80	-99.85

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz

Cat-M1 Band 4, Channel Bandwidth 20MHz

RF Mode	TX Cat-M1 Band 4	Channel	CH 20175：1732.5MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-38.69	-13.00	-25.69	1.00 H	359	57.27	-95.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-42.35	-13.00	-29.35	1.03 V	64	53.61	-95.96

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Cat-M1 Band 12, Channel Bandwidth 3MHz

RF Mode	TX Cat-M1 Band 12	Channel	CH 23095：707.5MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-44.50	-13.00	-31.50	1.78 H	181	59.28	-103.78
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-43.59	-13.00	-30.59	2.45 V	112	60.19	-103.78

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Cat-M1 Band 13, Channel Bandwidth 10MHz

RF Mode	TX Cat-M1 Band 13	Channel	CH 23230：782.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**1564.00**	**-51.61**	**-40.00**	**-11.61**	**1.42 H**	**95**	**49.88**	**-101.49**
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-52.96	-40.00	-12.96	2.45 V	132	48.53	-101.49

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Cat-M1 Band 66, Channel Bandwidth 3MHz

RF Mode	TX Cat-M1 Band 66	Channel	CH 132322：1745.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-40.94	-13.00	-27.94	1.55 H	8	54.91	-95.85
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-43.09	-13.00	-30.09	2.03 V	338	52.76	-95.85

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Cat-M1 Band 85, Channel Bandwidth 10MHz

RF Mode	TX Cat-M1 Band 85	Channel	CH 134092：707.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1414.00	-41.64	-13.00	-28.64	1.46 H	285	62.14	-103.78
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1414.00	-41.41	-13.00	-28.41	2.83 V	85	62.37	-103.78

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

NB-IoT Band 4, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 4, Subcarrier Spacing 15kHz	Channel	CH 20175：1732.5MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-38.29	-13.00	-25.29	1.16 H	2	57.67	-95.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3465.00	-42.42	-13.00	-29.42	1.34 V	43	53.54	-95.96

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

NB-IoT Band 12, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 12, Subcarrier Spacing 15kHz	Channel	CH 23095：707.5MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-44.30	-13.00	-31.30	1.56 H	176	59.48	-103.78
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-43.32	-13.00	-30.32	2.38 V	106	60.46	-103.78

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

NB-IoT Band 13, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 13, Subcarrier Spacing 15kHz	Channel	CH 23230：782.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-54.71	-40.00	-14.71	3.07 H	38	46.78	-101.49
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-56.33	-40.00	-16.33	2.84 V	142	45.16	-101.49

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

NB-IoT Band 66, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 66, Subcarrier Spacing 15kHz	Channel	CH 132322：1745.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-40.59	-13.00	-27.59	1.63 H	9	55.26	-95.85
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-42.77	-13.00	-29.77	1.94 V	325	53.08	-95.85

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

NB-IoT Band 71, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 71, Subcarrier Spacing 15kHz	Channel	CH 133297：680.5MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1361.00	-40.51	-13.00	-27.51	1.37 H	292	63.42	-103.93
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1361.00	-40.07	-13.00	-27.07	2.67 V	74	63.86	-103.93

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

NB-IoT Band 85, Subcarrier Spacing 15kHz

RF Mode	TX NB-IoT Band 85, Subcarrier Spacing 15kHz	Channel	CH 134092：707.0MHz MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1414.00	-41.25	-13.00	-28.25	1.37 H	259	62.53	-103.78
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1414.00	-41.04	-13.00	-28.04	2.54 V	73	62.74	-103.78

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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