



TEST REPORT

Applicant Name : Shenzhen Youmi Intelligent Technology Co., Ltd.
Address : 406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China
Report Number : RA230324-14508E-RF-00A
FCC ID: 2ATZ4-G3MECHA

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type: Smart phone
Test Model No.: G3 Mecha
Multiple Model(s) No.: N/A
Trade Mark: UMIDIGI
Date Received: 2023/03/24
Report Date: 2023/05/05

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger Ling

Roger Ling
EMC Engineer

Approved By:

Candy Li

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86 755-26503290

Fax: +86-755-26503290

Web: www.atc-lab.com

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Page 1 of 95

FCC -2G,3G,4G

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	3
GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY	6
SYSTEM TEST CONFIGURATION.....	7
DESCRIPTION OF TEST CONFIGURATION	7
EQUIPMENT MODIFICATIONS	7
SUPPORT EQUIPMENT LIST AND DETAILS	8
SUPPORT CABLE DESCRIPTION	8
BLOCK DIAGRAM OF TEST SETUP	8
SUMMARY OF TEST RESULTS	9
TEST EQUIPMENT LIST	10
FCC §1.1307(B)&§2.1093 - RF EXPOSURE INFORMATION.....	12
FCC§2.1047 - MODULATION CHARACTERISTIC	13
FCC § 2.1046,§ 22.913 (A)&§ 24.232 (C); §27.50 (C)(H)- RF OUTPUT POWER AND PEAK-TO-AVERAGE POWER RATIO (PAPR).....	14
APPLICABLE STANDARD	14
TEST PROCEDURE	14
TEST DATA	14
FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH	31
APPLICABLE STANDARD	31
TEST PROCEDURE	31
TEST DATA	31
FCC §2.1051, §22.917(A) & §24.238(A)& §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS ...	59
APPLICABLE STANDARD	59
TEST PROCEDURE	59
TEST DATA	59
FCC § 2.1053; § 22.917 (A);§ 24.238 (A); §27.53 - SPURIOUS RADIATED EMISSIONS.....	70
APPLICABLE STANDARD	70
TEST PROCEDURE	70
TEST DATA	70
FCC§ 22.917 (A);§ 24.238 (A); §27.53 (H)(M) - BAND EDGES	77
APPLICABLE STANDARD	77
TEST PROCEDURE	77
TEST DATA	78
FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY	87
APPLICABLE STANDARD	87
TEST PROCEDURE	87
TEST DATA	88

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230324-14508E-RF-00A	Original Report	2023/05/05

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 7: 2500-2570MHz(TX), 2620-2690MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 41: 2545-2655MHz(TX/RX)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA 850/LTE B5: -1.15Bi WCDMA 1900/PCS1900/LTE B2: 0.91dBi LTE B12: -1.85dBi, LTE B7: 1.78dBi ,LTE B41: 1.79dBi (provided by the applicant)
Voltage Range	DC 3.87V from battery or DC 5V from adapter
Sample serial number	RE&CE: 23MG-2 RF: 23N5-2 (Assigned by ATC)
Sample/EUT Status	Good condition
Normal/Extreme Condition	L.V.: Low Voltage 3.5V _{DC} N.V.: Normal Voltage 3.87V _{DC} H.V.: High Voltage 4.35V _{DC}
Adapter 1 information	Model: HJ-0502000W2-US Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 2A
Adapter 2 information	Model: HF-0502000U Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2A

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
 Part 24 Subpart E - Personal Communication Services
 Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.
 Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Harmonic Current		0.512%, k=2
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions	9k-30MHz	2.74dB, k=2
	150kHz-30MHz	2.92dB, k=2
Audio Frequency Response		0.1dB
Low Pass Filter Response		1.2dB
Modulation Limiting		1%
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.6	848.8
PCS1900	0.25	1850.2	1880	1909.8
WCDMA B2	4.2	1852.4	1880	1907.6
WCDMA B5	4.2	826.4	836.6	846.6
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704.0	707.5	711.0
LTE B41	5	2547.5	2600	2652.5
	10	2550	2600	2650
	15	2552.5	2600	2647.5
	20	2555	2600	2645

Equipment Modifications

No modification was made to the EUT.

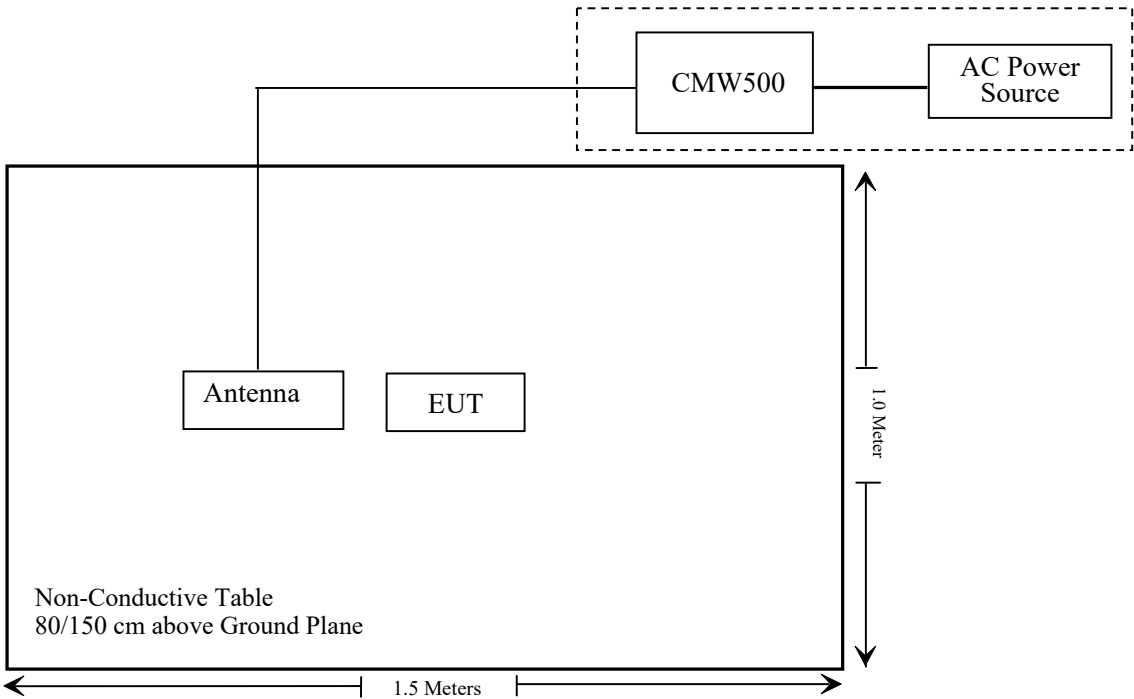
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606

Support Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded Un-detachable AC cable	1.2	AC Power	CMW500

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 ,§2.1093	RF Exposure (SAR)	Compliant
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (b) (c) (h);	RF Output Power and peak-to-average power ratio (PAPR)	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; §22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (c) (h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2023/02/14	2026/02/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2022/12/26	2025/12/25
Schwarzbeck	Horn Antenna	BBHA9120D	837	2023/02/22	2026/02/21
PASTERNAK	Horn Antenna	PE9852/2F-20	1120 (ATC-BA-024-1)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenna	PE9852/2F-20	1120 (ATC-BA-025-1)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenna	PE9850/2F-20	720 (ATC-BA-024)	2023/01/04	2026/01/03
PASTERNAK	Horn Antenna	PE9850/2F-20	720 (ATC-BA-025)	2023/01/04	2026/01/03
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF824-862MS-1147	ATCE-141	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF1850-1910MS-1148	ATCE-142	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF2495-2570MS-1152	ATCE-146	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF700-800MS-1153	ATCE-147	2022/11/25	2023/11/24

Unknown	RFCoaxialCable	No.16	N200	2022/11/25	2023/11/24
Agilent	Signal Generator	N5183A	MY51040755	2022/11/25	2023/11/24
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSU26	200982	2022/07/04	2023/07/03
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2022/11/25	2023/11/24
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2022/11/25	2023/11/24
WEINSCHTEL	10dB Attenuator	5324	AU 3842	2022/11/25	2023/11/24
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2022/11/25	2023/11/24
BACL	Temp. & Humid. Chamber	BTH-150-40	30192	2023/02/09	2024/02/08
Fluke	Multi Meter	45	7664009	2022/11/23	2023/11/22
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b)&§2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RA230324-14508E-20A.

FCC§2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046,§ 22.913 (a)&§ 24.232 (c); §27.50 (c)(h)- RF OUTPUT POWER AND PEAK-TO-AVERAGE POWER RATIO (PAPR)

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

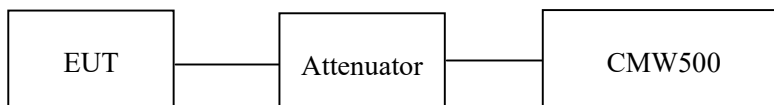
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



ANSI C63.26-2015 Section 5.5.

Test Data

Environmental Conditions

Temperature:	24~27 °C
Relative Humidity:	52~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2023-04-09 to 2023-04-15.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	33.20	29.40	38.45
	190	836.6	33.40	29.60	38.45
	251	848.8	33.30	29.50	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.60	31.44	29.33	27.10	29.80	27.64	25.53	23.30	38.45
	190	836.6	33.79	31.46	29.45	27.16	29.99	27.66	25.65	23.36	38.45
	251	848.8	33.70	31.34	29.26	27.07	29.90	27.54	25.46	23.27	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		22.65	22.34	22.89	18.85	18.54	19.09
	HSDPA	1	22.03	21.51	22.50	18.23	17.71	18.70
		2	22.14	21.38	22.57	18.34	17.58	18.77
		3	22.37	21.47	22.96	18.57	17.67	19.16
		4	22.54	21.65	22.04	18.74	17.85	18.24
	HSUPA	1	21.92	21.47	22.46	18.12	17.67	18.66
		2	21.85	21.35	22.38	18.05	17.55	18.58
		3	21.64	21.64	22.69	17.84	17.84	18.89
		4	21.38	21.24	22.40	17.58	17.44	18.60
		5	21.67	21.95	22.39	17.87	18.15	18.59
	HSPA+	1	21.64	21.37	22.74	17.84	17.57	18.94

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)

For GSM850 / WCDMA Band5: Antenna Gain = -1.15dBi = -3.30dBd (0dBd=2.15dBi)

Cable Loss=0.5dB* (provided by the applicant)

Limit: ERP≤38.45dBm

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	29.80	30.71	33
	661	1880.0	30.00	30.91	33
	810	1909.8	30.30	31.21	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	30.47	28.15	26.44	24.41	31.38	29.06	27.35	25.32	33
	661	1880.0	30.64	28.08	26.45	24.27	31.55	28.99	27.36	25.18	33
	810	1909.8	30.80	27.86	26.22	24.10	31.71	28.77	27.13	25.01	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.87	22.93	23.02	23.78	23.84	23.93
	HSDPA	1	21.98	22.00	21.91	22.89	22.91	22.82
		2	21.84	22.34	21.38	22.75	23.25	22.29
		3	21.64	22.68	21.54	22.55	23.59	22.45
		4	21.38	22.48	21.67	22.29	23.39	22.58
	HSUPA	1	21.94	22.00	22.00	22.85	22.91	22.91
		2	21.68	22.34	22.31	22.59	23.25	23.22
		3	21.97	22.64	22.15	22.88	23.55	23.06
		4	21.58	22.38	22.04	22.49	23.29	22.95
		5	21.34	22.18	22.68	22.25	23.09	23.59
	HSPA+	1	21.05	22.59	22.34	21.96	23.50	23.25

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For PCS1900 / WCDMA Band2: Antenna Gain = 0.91dBi

Limit: EIRP ≤ 33dBm

LTE Band 2

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.85	22.99	23.13	23.76	23.90	24.04
		RB1#3	22.86	22.94	23.09	23.77	23.85	24.00
		RB1#5	22.89	22.95	23.08	23.80	23.86	23.99
		RB3#0	22.97	23.10	23.26	23.88	24.01	24.17
		RB3#3	22.93	23.07	23.23	23.84	23.98	24.14
		RB6#0	21.86	22.12	22.18	22.77	23.03	23.09
	16QAM	RB1#0	22.62	22.55	21.97	23.53	23.46	22.88
		RB1#3	22.61	22.47	21.96	23.52	23.38	22.87
		RB1#5	22.60	22.56	22.01	23.51	23.47	22.92
		RB3#0	21.96	21.98	22.32	22.87	22.89	23.23
		RB3#3	21.96	22.01	22.32	22.87	22.92	23.23
		RB6#0	21.30	21.20	21.44	22.21	22.11	22.35
3.0	QPSK	RB1#0	22.92	23.00	23.06	23.83	23.91	23.97
		RB1#8	22.93	23.00	23.11	23.84	23.91	24.02
		RB1#14	22.96	22.92	23.09	23.87	23.83	24.00
		RB6#0	21.91	22.02	22.17	22.82	22.93	23.08
		RB6#9	21.98	22.01	22.11	22.89	22.92	23.02
		RB15#0	21.90	22.03	22.13	22.81	22.94	23.04
	16QAM	RB1#0	22.63	21.72	22.38	23.54	22.63	23.29
		RB1#8	22.57	21.73	22.37	23.48	22.64	23.28
		RB1#14	22.66	21.70	22.40	23.57	22.61	23.31
		RB6#0	21.02	21.00	21.37	21.93	21.91	22.28
		RB6#9	21.09	21.03	21.42	22.00	21.94	22.33
		RB15#0	20.94	21.23	21.30	21.85	22.14	22.21

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.93	22.87	23.03	23.84	23.78	23.94
		RB1#13	22.93	22.87	23.01	23.84	23.78	23.92
		RB1#24	23.07	22.92	23.06	23.98	23.83	23.97
		RB15#0	21.87	22.15	22.17	22.78	23.06	23.08
		RB15#10	21.94	22.14	22.17	22.85	23.05	23.08
		RB25#0	21.97	22.12	22.19	22.88	23.03	23.10
	16QAM	RB1#0	22.05	22.08	21.32	22.96	22.99	22.23
		RB1#13	22.09	22.10	21.37	23.00	23.01	22.28
		RB1#24	22.07	22.13	21.36	22.98	23.04	22.27
		RB15#0	20.82	21.10	21.31	21.73	22.01	22.22
		RB15#10	20.92	21.12	21.32	21.83	22.03	22.23
		RB25#0	21.03	21.22	21.34	21.94	22.13	22.25
10.0	QPSK	RB1#0	23.05	22.82	23.03	23.96	23.73	23.94
		RB1#25	23.01	22.95	23.03	23.92	23.86	23.94
		RB1#49	23.06	22.90	23.20	23.97	23.81	24.11
		RB25#0	21.92	22.10	22.20	22.83	23.01	23.11
		RB25#25	21.85	22.16	22.14	22.76	23.07	23.05
		RB50#0	22.02	22.08	22.19	22.93	22.99	23.10
	16QAM	RB1#0	22.05	21.81	22.49	22.96	22.72	23.40
		RB1#25	22.14	21.79	22.59	23.05	22.70	23.50
		RB1#49	22.22	21.8	22.57	23.13	22.71	23.48
		RB25#0	21.15	21.28	21.25	22.06	22.19	22.16
		RB25#25	21.07	21.30	21.24	21.98	22.21	22.15
		RB50#0	21.07	21.14	21.20	21.98	22.05	22.11

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.07	22.82	22.99	23.98	23.73	23.90
		RB1#38	23.06	22.90	23.10	23.97	23.81	24.01
		RB1#74	23.12	22.9	23.12	24.03	23.81	24.03
		RB36#0	21.93	22.08	22.06	22.84	22.99	22.97
		RB36#39	21.93	21.99	22.21	22.84	22.90	23.12
		RB75#0	22.00	22.04	22.11	22.91	22.95	23.02
	16QAM	RB1#0	22.05	22.12	22.53	22.96	23.03	23.44
		RB1#38	22.02	22.19	22.56	22.93	23.10	23.47
		RB1#74	22.15	22.18	22.67	23.06	23.09	23.58
		RB36#0	21.10	21.18	21.13	22.01	22.09	22.04
		RB36#39	21.11	21.14	21.19	22.02	22.05	22.10
		RB75#0	21.03	21.06	21.20	21.94	21.97	22.11
20.0	QPSK	RB1#0	22.92	23.02	23.10	23.83	23.93	24.01
		RB1#50	22.88	23.06	23.19	23.79	23.97	24.10
		RB1#99	23.08	23.17	23.26	23.99	24.08	24.17
		RB50#0	21.96	22.01	22.20	22.87	22.92	23.11
		RB50#50	22.07	22.07	22.08	22.98	22.98	22.99
		RB100#0	22.01	22.17	22.13	22.92	23.08	23.04
	16QAM	RB1#0	22.21	22.80	22.23	23.12	23.71	23.14
		RB1#50	22.33	22.82	22.22	23.24	23.73	23.13
		RB1#99	22.31	22.90	22.35	23.22	23.81	23.26
		RB50#0	21.09	21.07	21.23	22.00	21.98	22.14
		RB50#50	21.17	21.11	21.30	22.08	22.02	22.21
		RB100#0	21.03	21.18	21.21	21.94	22.09	22.12

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band2: Antenna Gain = 0.91dBi

Limit: EIRP ≤ 33dBm

LTE Band 5

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.94	22.86	22.89	19.14	19.06	19.09
		RB1#3	22.95	22.81	22.91	19.15	19.01	19.11
		RB1#5	22.92	22.83	22.95	19.12	19.03	19.15
		RB3#0	23.06	22.99	22.84	19.26	19.19	19.04
		RB3#3	22.98	22.94	22.94	19.18	19.14	19.14
		RB6#0	22.00	21.80	21.89	18.20	18.00	18.09
	16QAM	RB1#0	22.58	21.45	21.56	18.78	17.65	17.76
		RB1#3	22.61	21.52	21.65	18.81	17.72	17.85
		RB1#5	22.62	21.51	21.67	18.82	17.71	17.87
		RB3#0	21.80	21.97	21.96	18.00	18.17	18.16
		RB3#3	21.82	21.90	21.98	18.02	18.10	18.18
		RB6#0	21.06	21.11	21.07	17.26	17.31	17.27
3.0	QPSK	RB1#0	23.00	22.86	22.79	19.20	19.06	18.99
		RB1#8	22.96	22.82	22.73	19.16	19.02	18.93
		RB1#14	22.84	22.8	22.78	19.04	19.00	18.98
		RB6#0	21.96	21.86	21.77	18.16	18.06	17.97
		RB6#9	21.89	21.85	21.80	18.09	18.05	18.00
		RB15#0	21.90	21.96	21.72	18.10	18.16	17.92
	16QAM	RB1#0	22.61	21.31	22.05	18.81	17.51	18.25
		RB1#8	22.61	21.37	21.95	18.81	17.57	18.15
		RB1#14	22.51	21.39	22.07	18.71	17.59	18.27
		RB6#0	20.97	20.94	20.97	17.17	17.14	17.17
		RB6#9	20.98	20.91	21.06	17.18	17.11	17.26
		RB15#0	20.87	20.95	20.84	17.07	17.15	17.04

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.08	22.71	22.76	19.28	18.91	18.96
		RB1#13	22.93	22.7	22.66	19.13	18.90	18.86
		RB1#24	22.94	22.76	22.67	19.14	18.96	18.87
		RB15#0	21.96	21.87	21.84	18.16	18.07	18.04
		RB15#10	21.88	21.86	21.82	18.08	18.06	18.02
		RB25#0	21.84	21.89	21.74	18.04	18.09	17.94
	16QAM	RB1#0	22.04	21.80	21.06	18.24	18.00	17.26
		RB1#13	21.97	21.86	21.00	18.17	18.06	17.20
		RB1#24	22.05	21.90	21.01	18.25	18.10	17.21
		RB15#0	20.81	20.77	20.85	17.01	16.97	17.05
		RB15#10	20.86	20.84	20.86	17.06	17.04	17.06
		RB25#0	20.94	20.99	20.82	17.14	17.19	17.02
10.0	QPSK	RB1#0	23.04	22.84	22.79	19.24	19.04	18.99
		RB1#25	22.97	22.69	22.76	19.17	18.89	18.96
		RB1#49	22.94	22.71	22.82	19.14	18.91	19.02
		RB25#0	21.87	21.87	21.89	18.07	18.07	18.09
		RB25#25	21.89	21.83	21.85	18.09	18.03	18.05
		RB50#0	21.88	21.85	21.82	18.08	18.05	18.02
	16QAM	RB1#0	22.09	21.64	22.31	18.29	17.84	18.51
		RB1#25	21.98	21.59	22.23	18.18	17.79	18.43
		RB1#49	21.97	21.55	22.25	18.17	17.75	18.45
		RB25#0	21.01	21.12	20.82	17.21	17.32	17.02
		RB25#25	20.86	21.12	20.79	17.06	17.32	16.99
		RB50#0	21.00	20.94	20.88	17.20	17.14	17.08

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)

For GSM850 / WCDMA Band5: Antenna Gain = -1.15dBi = -3.30dBd (0dBd=2.15dBi)

Cable Loss=0.5dB* (provided by the applicant)

Limit: ERP≤38.45dBm

LTE Band 12

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.65	22.49	22.54	18.15	17.99	18.04
		RB1#3	22.53	22.40	22.56	18.03	17.90	18.06
		RB1#5	22.56	22.40	22.44	18.06	17.90	17.94
		RB3#0	22.63	22.49	22.65	18.13	17.99	18.15
		RB3#3	22.65	22.60	22.69	18.15	18.10	18.19
		RB6#0	21.41	21.48	21.54	16.91	16.98	17.04
	16QAM	RB1#0	21.01	21.16	21.87	16.51	16.66	17.37
		RB1#3	21.07	21.20	21.94	16.57	16.70	17.44
		RB1#5	21.11	21.16	21.98	16.61	16.66	17.48
		RB3#0	21.46	21.62	21.61	16.96	17.12	17.11
		RB3#3	21.43	21.54	21.80	16.93	17.04	17.30
		RB6#0	21.16	21.21	20.80	16.66	16.71	16.30
3.0	QPSK	RB1#0	22.66	22.66	22.52	18.16	18.16	18.02
		RB1#8	22.68	22.59	22.50	18.18	18.09	18.00
		RB1#14	22.71	22.50	22.58	18.21	18.00	18.08
		RB6#0	21.43	21.57	21.54	16.93	17.07	17.04
		RB6#9	21.95	21.51	21.56	17.45	17.01	17.06
		RB15#0	21.49	21.49	21.49	16.99	16.99	16.99
	16QAM	RB1#0	21.72	21.10	21.72	17.22	16.60	17.22
		RB1#8	21.60	20.97	21.65	17.10	16.47	17.15
		RB1#14	22.17	21.05	21.78	17.67	16.55	17.28
		RB6#0	21.18	20.47	20.47	16.68	15.97	15.97
		RB6#9	21.19	21.06	20.62	16.69	16.56	16.12
		RB15#0	21.00	21.07	20.58	16.50	16.57	16.08

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.64	22.51	22.47	18.14	18.01	17.97
		RB1#13	22.59	22.38	22.42	18.09	17.88	17.92
		RB1#24	22.69	22.47	22.43	18.19	17.97	17.93
		RB15#0	21.37	21.51	21.60	16.87	17.01	17.10
		RB15#10	21.96	21.49	21.49	17.46	16.99	16.99
		RB25#0	21.98	21.55	21.55	17.48	17.05	17.05
	16QAM	RB1#0	21.44	21.48	20.71	16.94	16.98	16.21
		RB1#13	21.90	21.43	20.69	17.40	16.93	16.19
		RB1#24	21.56	21.60	20.80	17.06	17.10	16.30
		RB15#0	20.92	20.39	20.62	16.42	15.89	16.12
		RB15#10	20.88	20.89	20.52	16.38	16.39	16.02
		RB25#0	20.93	21.10	20.51	16.43	16.60	16.01
10.0	QPSK	RB1#0	22.56	22.49	22.57	18.06	17.99	18.07
		RB1#25	22.59	22.36	22.47	18.09	17.86	17.97
		RB1#49	22.51	22.49	22.53	18.01	17.99	18.03
		RB25#0	22.07	21.53	21.53	17.57	17.03	17.03
		RB25#25	21.59	21.53	21.56	17.09	17.03	17.06
		RB50#0	21.54	21.50	21.62	17.04	17.00	17.12
	16QAM	RB1#0	22.06	21.64	21.85	17.56	17.14	17.35
		RB1#25	22.16	21.18	21.96	17.66	16.68	17.46
		RB1#49	22.15	21.25	21.91	17.65	16.75	17.41
		RB25#0	21.13	20.62	21.07	16.63	16.12	16.57
		RB25#25	20.57	20.86	20.60	16.07	16.36	16.10
		RB50#0	20.52	21.11	20.63	16.02	16.61	16.13

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)

For Band12: Antenna Gain = -1.85dBi = -4.00dBd (0dBd=2.15dBi)

Cable Loss=0.5dB* (provided by the applicant)

Limit: ERP≤34.77dBm

LTE Band 7

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QPSK	RB1#0	22.98	22.73	22.57	24.26	24.01	23.85
		RB1#13	22.96	22.67	22.55	24.24	23.95	23.83
		RB1#24	22.98	22.78	22.56	24.26	24.06	23.84
		RB15#0	21.95	21.75	21.59	23.23	23.03	22.87
		RB15#10	22.04	21.74	21.47	23.32	23.02	22.75
		RB25#0	22.00	21.73	21.52	23.28	23.01	22.80
	16QAM	RB1#0	21.49	20.93	21.54	22.77	22.21	22.82
		RB1#13	21.58	20.92	21.53	22.86	22.20	22.81
		RB1#24	21.57	20.89	21.50	22.85	22.17	22.78
		RB15#0	20.99	20.88	20.54	22.27	22.16	21.82
		RB15#10	21.07	20.81	20.46	22.35	22.09	21.74
		RB25#0	20.94	20.85	20.59	22.22	22.13	21.87
10	QPSK	RB1#0	22.82	22.71	22.51	24.10	23.99	23.79
		RB1#25	22.91	22.71	22.39	24.19	23.99	23.67
		RB1#49	22.96	22.67	22.50	24.24	23.95	23.78
		RB25#0	21.97	21.76	21.61	23.25	23.04	22.89
		RB25#25	21.83	21.79	21.48	23.11	23.07	22.76
		RB50#0	22.02	21.72	21.49	23.30	23.00	22.77
	16QAM	RB1#0	22.60	21.23	21.73	23.88	22.51	23.01
		RB1#25	22.76	21.18	21.69	24.04	22.46	22.97
		RB1#49	22.65	21.16	21.65	23.93	22.44	22.93
		RB25#0	21.12	20.93	20.64	22.40	22.21	21.92
		RB25#25	21.10	20.92	20.57	22.38	22.20	21.85
		RB50#0	21.08	20.75	20.73	22.36	22.03	22.01

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15	QPSK	RB1#0	22.84	22.77	22.45	24.12	24.05	23.73
		RB1#38	22.91	22.68	22.52	24.19	23.96	23.80
		RB1#74	22.84	22.68	22.39	24.12	23.96	23.67
		RB36#0	22.02	21.8	21.58	23.30	23.08	22.86
		RB36#39	21.88	21.58	21.56	23.16	22.86	22.84
		RB75#0	21.98	21.64	21.64	23.26	22.92	22.92
	16QAM	RB1#0	22.68	22.14	21.80	23.96	23.42	23.08
		RB1#38	22.76	22.02	21.78	24.04	23.30	23.06
		RB1#74	22.79	22.10	21.74	24.07	23.38	23.02
		RB36#0	21.05	20.79	20.73	22.33	22.07	22.01
		RB36#39	21.00	20.73	20.67	22.28	22.01	21.95
		RB75#0	21.03	20.79	20.74	22.31	22.07	22.02
20	QPSK	RB1#0	22.89	22.77	22.64	24.17	24.05	23.92
		RB1#50	22.87	22.67	22.58	24.15	23.95	23.86
		RB1#99	22.88	22.70	22.60	24.16	23.98	23.88
		RB50#0	22.01	21.78	21.59	23.29	23.06	22.87
		RB50#50	21.93	21.76	21.58	23.21	23.04	22.86
		RB100#0	22.02	21.82	21.57	23.30	23.10	22.85
	16QAM	RB1#0	22.39	22.68	21.51	23.67	23.96	22.79
		RB1#50	22.37	22.55	21.53	23.65	23.83	22.81
		RB1#99	22.41	22.50	21.43	23.69	23.78	22.71
		RB50#0	21.22	20.87	20.76	22.50	22.15	22.04
		RB50#50	21.06	20.76	20.68	22.34	22.04	21.96
		RB100#0	21.09	20.88	20.57	22.37	22.16	21.85

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)

For Band7: Antenna Gain = 1.78dBi

Cable Loss=0.5dB* (provided by the applicant)

Limit: EIRP≤33dBm

LTE Band 41:

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QPSK	RB1#0	23.10	23.05	22.76	24.39	24.34	24.05
		RB1#13	23.01	23.03	22.69	24.30	24.32	23.98
		RB1#24	23.09	23.08	22.79	24.38	24.37	24.08
		RB15#0	22.2	22.02	21.66	23.49	23.31	22.95
		RB15#10	22.13	21.93	21.59	23.42	23.22	22.88
		RB25#0	22.24	21.90	21.62	23.53	23.19	22.91
	16QAM	RB1#0	22.18	22.08	21.98	23.47	23.37	23.27
		RB1#13	21.99	22.11	21.93	23.28	23.40	23.22
		RB1#24	22.03	21.92	21.97	23.32	23.21	23.26
		RB15#0	21.47	21.04	20.83	22.76	22.33	22.12
		RB15#10	21.49	21.04	20.76	22.78	22.33	22.05
		RB25#0	21.18	21.10	20.81	22.47	22.39	22.10
10	QPSK	RB1#0	23.29	23.04	22.70	24.58	24.33	23.99
		RB1#25	23.33	22.98	22.69	24.62	24.27	23.98
		RB1#49	23.33	22.96	22.77	24.62	24.25	24.06
		RB25#0	22.12	22.03	21.62	23.41	23.32	22.91
		RB25#25	22.24	22.03	21.70	23.53	23.32	22.99
		RB50#0	22.24	22.03	21.68	23.53	23.32	22.97
	16QAM	RB1#0	22.35	22.02	21.76	23.64	23.31	23.05
		RB1#25	22.44	21.83	21.78	23.73	23.12	23.07
		RB1#49	22.43	21.85	21.75	23.72	23.14	23.04
		RB25#0	21.49	21.41	20.64	22.78	22.70	21.93
		RB25#25	21.40	21.37	20.58	22.69	22.66	21.87
		RB50#0	21.41	21.01	20.73	22.70	22.30	22.02

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15	QP SK	RB1#0	23.27	23.00	22.73	24.56	24.29	24.02
		RB1#38	23.24	22.98	22.76	24.53	24.27	24.05
		RB1#74	23.25	22.93	22.76	24.54	24.22	24.05
		RB36#0	22.14	22.06	21.72	23.43	23.35	23.01
		RB36#39	22.06	22.00	21.64	23.35	23.29	22.93
		RB75#0	22.03	22.00	21.69	23.32	23.29	22.98
	16QAM	RB1#0	22.38	21.29	21.83	23.67	22.58	23.12
		RB1#38	22.24	21.36	21.84	23.53	22.65	23.13
		RB1#74	22.41	21.19	21.86	23.70	22.48	23.15
		RB36#0	21.09	21.23	20.74	22.38	22.52	22.03
		RB36#39	21.05	21.18	20.67	22.34	22.47	21.96
		RB75#0	21.29	21.16	20.68	22.58	22.45	21.97
20.0	QPSK	RB1#0	23.11	23.29	22.68	24.40	24.58	23.97
		RB1#50	23.08	23.19	22.70	24.37	24.48	23.99
		RB1#99	23.15	23.10	22.71	24.44	24.39	24.00
		RB50#0	22.09	22.03	21.69	23.38	23.32	22.98
		RB50#50	22.15	21.93	21.69	23.44	23.22	22.98
		RB100#0	22.08	21.95	21.70	23.37	23.24	22.99
	16QAM	RB1#0	21.98	22.75	21.97	23.27	24.04	23.26
		RB1#50	22.01	22.62	22.01	23.30	23.91	23.30
		RB1#99	21.90	22.66	22.00	23.19	23.95	23.29
		RB50#0	21.26	21.09	20.88	22.55	22.38	22.17
		RB50#50	21.30	21.01	20.89	22.59	22.30	22.18
		RB100#0	21.17	21.04	20.74	22.46	22.33	22.03

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)

For Band7: Antenna Gain = 1.79dBi

Cable Loss=0.5dB* (provided by the applicant)

Limit: EIRP≤33dBm

Peak-to-average ratio (PAR)**Cellular Band 850**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	9.01	13
	Middle	9.78	13
	High	8.46	13

PCS Band 1900

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	9.87	13
	Middle	9.78	13
	High	9.33	13

WCDMA Band 2

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.14	13
	Middle	3.14	13
	High	3.08	13
HSDPA (16QAM)	Low	3.88	13
	Middle	3.97	13
	High	3.97	13
HSUPA (BPSK)	Low	3.97	13
	Middle	4.01	13
	High	3.88	13
HSPA+	Low	3.24	13
	Middle	3.25	13
	High	3.64	13

WCDMA Band 5

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.95	13
	Middle	3.14	13
	High	2.85	13
HSDPA (16QAM)	Low	3.81	13
	Middle	4.13	13
	High	3.91	13
HSUPA (BPSK)	Low	3.88	13
	Middle	3.97	13
	High	4.13	13
HSPA+	Low	3.56	13
	Middle	3.81	13
	High	3.69	13

LTE mode: (pre-scan all bandwidth, the worst case as below)

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.62	5.59	5.59	13	Pass
QPSK (100RB Size)	5.62	5.59	5.62	13	Pass
16QAM (1RB Size)	5.51	5.59	5.62	13	Pass
16QAM (100RB Size)	5.51	5.59	5.59	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.23	4.01	4.84	13	Pass
QPSK (50RB Size)	5.38	5.45	5.42	13	Pass
16QAM (1RB Size)	5.38	4.42	5.71	13	Pass
16QAM (50RB Size)	6.12	6.22	6.28	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.65	4.65	4.87	13	Pass
QPSK (50RB Size)	5.61	5.71	5.54	13	Pass
16QAM (1RB Size)	5.71	5.77	6.06	13	Pass
16QAM (50RB Size)	6.35	6.57	6.41	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.33	3.30	4.12	13	Pass
QPSK (100RB Size)	4.72	4.64	4.64	13	Pass
16QAM (1RB Size)	4.38	5.48	5.54	13	Pass
16QAM (100RB Size)	5.57	5.62	5.62	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.97	4.49	8.32	13	Pass
QPSK (100RB Size)	5.62	5.22	8.38	13	Pass
16QAM (1RB Size)	5.42	8.78	8.32	13	Pass
16QAM (100RB Size)	6.99	8.75	8.35	13	Pass

FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH

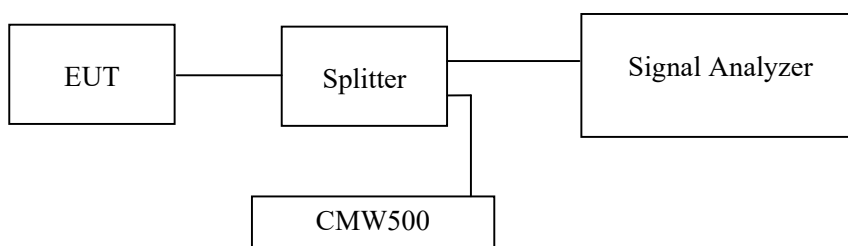
Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	24~27 °C
Relative Humidity:	52~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2023-04-07 to 2023-04-16.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	128	824.2	238.00	305.00
	190	836.6	240.00	305.00
	251	848.8	238.00	306.00

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.16	4.70
	836.6	4.14	4.68
	846.6	4.14	4.71
HSDPA	826.4	4.16	4.71
	836.6	4.14	4.71
	846.6	4.16	4.68
HSUPA	826.4	4.16	4.70
	836.6	4.14	4.71
	846.6	4.14	4.70

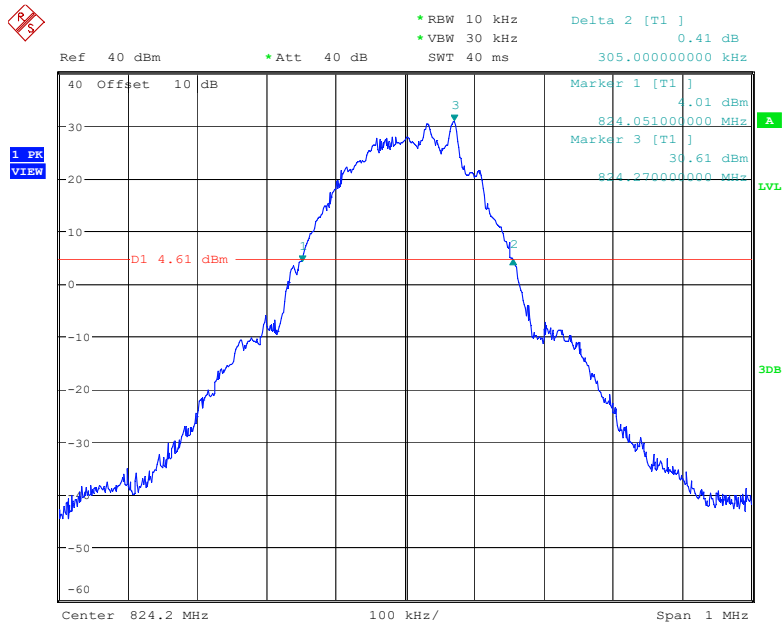
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	240.00	312.00
	661	1880.0	242.00	307.00
	810	1909.8	240.00	306.00

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.16	4.70
	1880.0	4.16	4.68
	1907.6	4.14	4.70
HSDPA	1852.4	4.16	4.71
	1880.0	4.16	4.73
	1907.6	4.14	4.70
HSUPA	1852.4	4.16	4.70
	1880.0	4.16	4.71
	1907.6	4.16	4.68

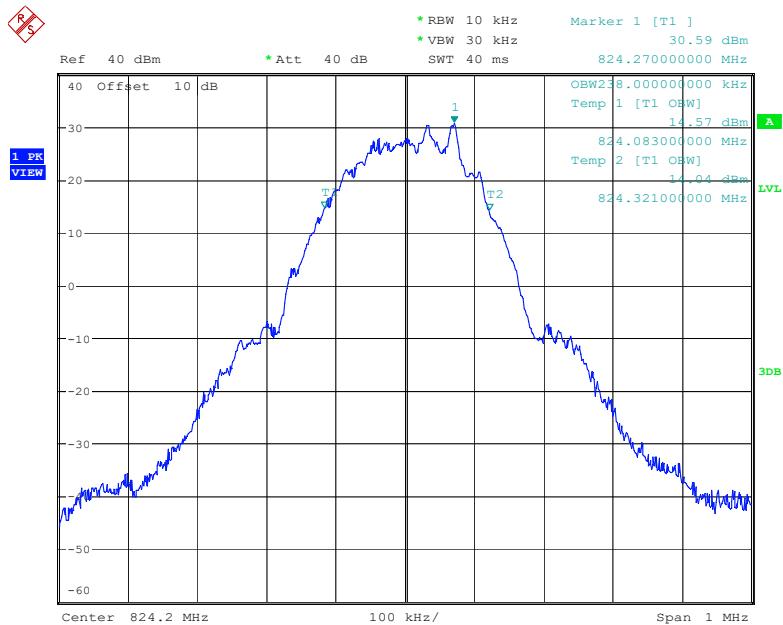
Cellular Band

26 dB Emission Bandwidth for GSM(GMSK) Mode, Low channel



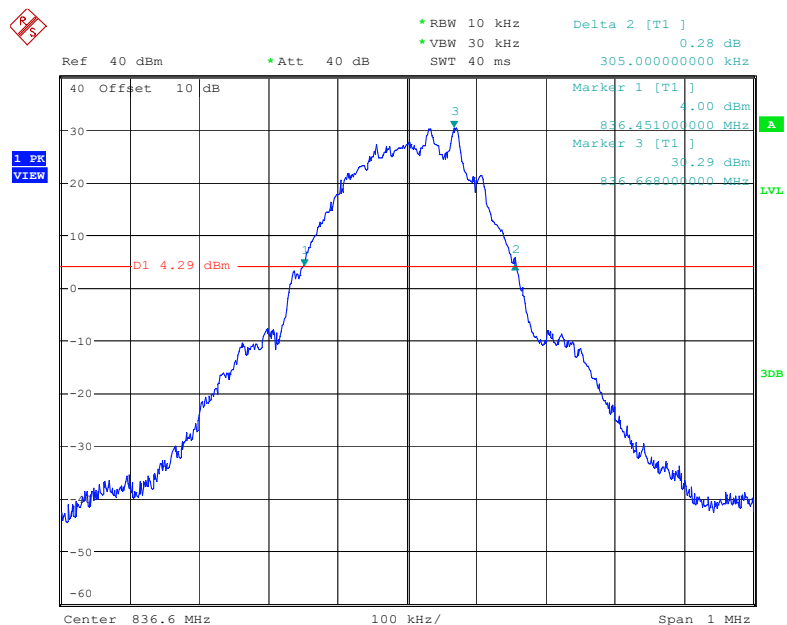
Date: 10.APR.2023 11:43:45

99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



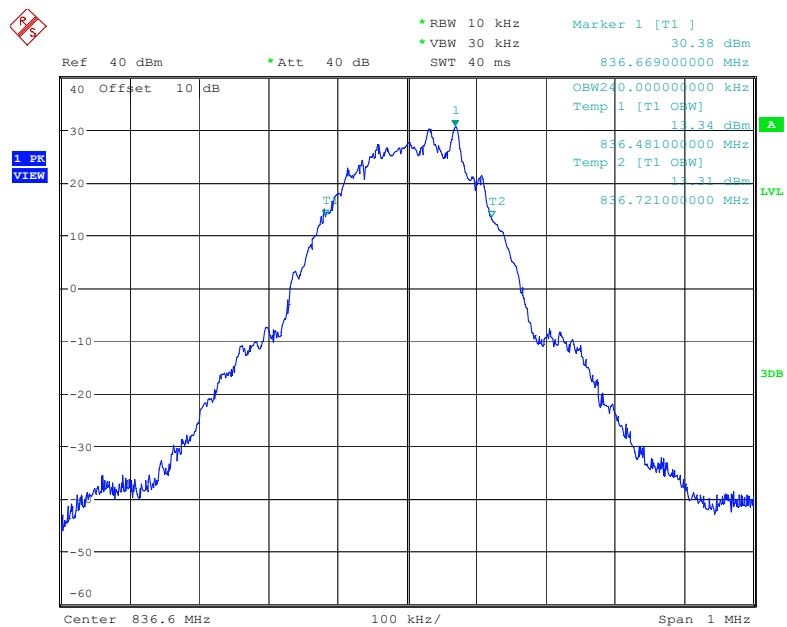
Date: 10.APR.2023 11:43:04

26 dB Emission Bandwidth for GSM(GMSK) Mode, Middle channel

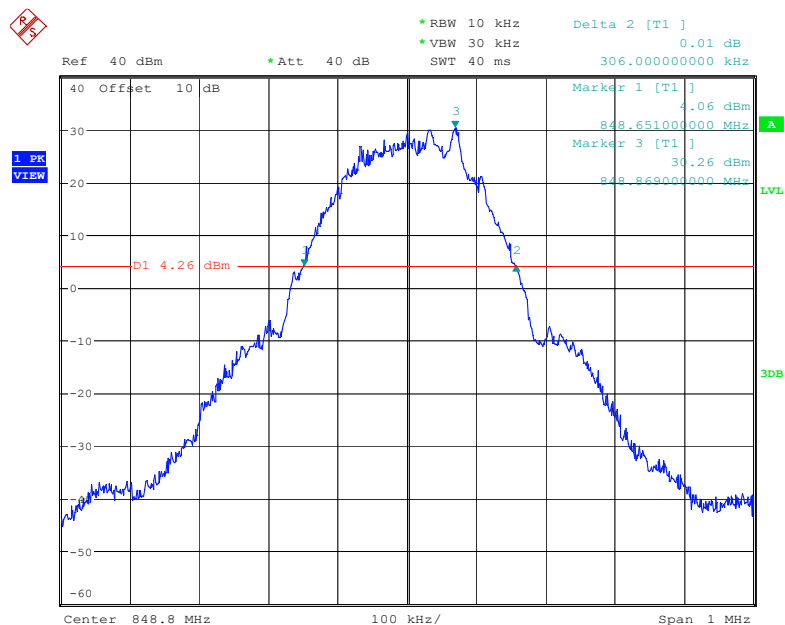


Date: 10.APR.2023 13:16:01

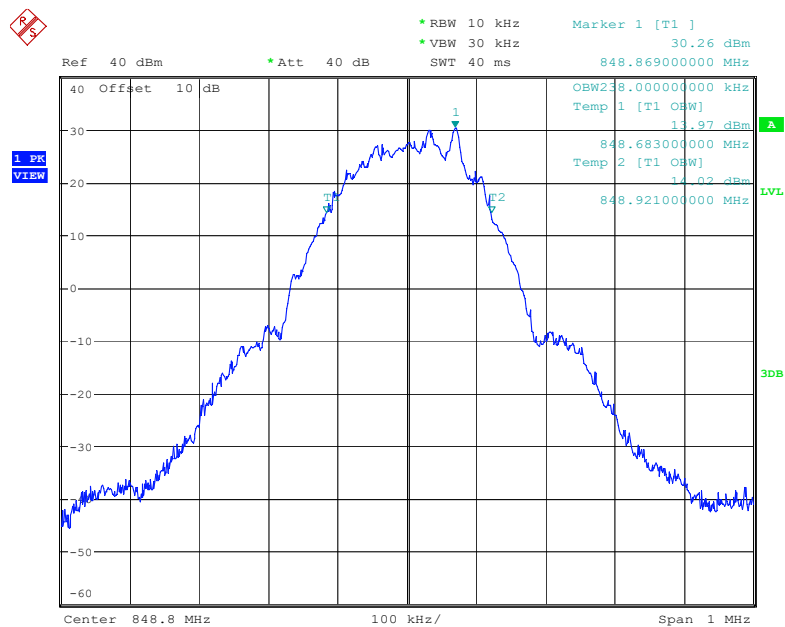
99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



Date: 10.APR.2023 13:15:20

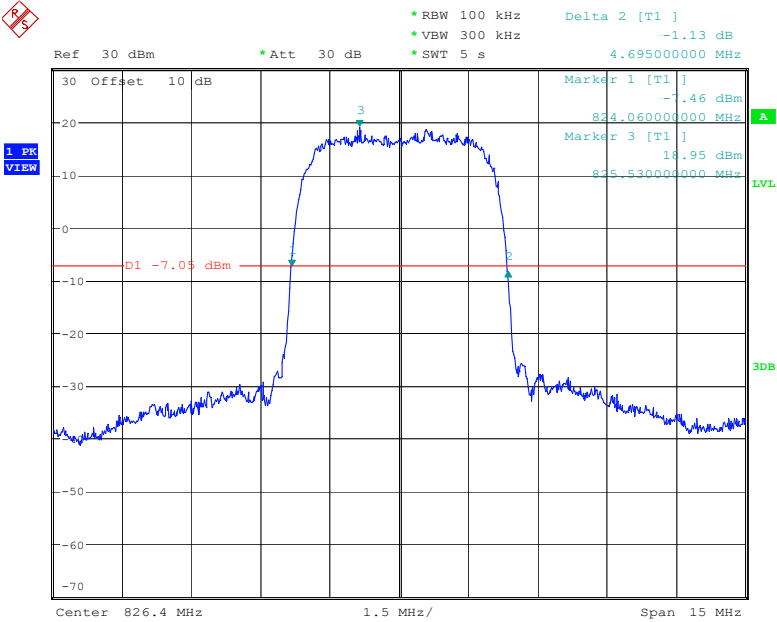
26 dB Emission Bandwidth for GSM(GMSK) Mode, High channel

Date: 10.APR.2023 13:20:28

99% Occupied Bandwidth for GSM(GMSK) Mode, High channel

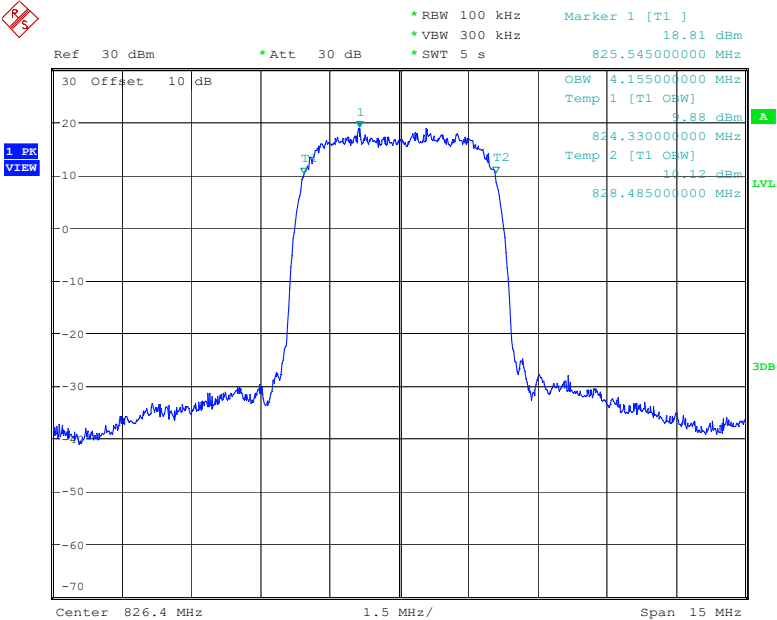
Date: 10.APR.2023 13:19:47

26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel



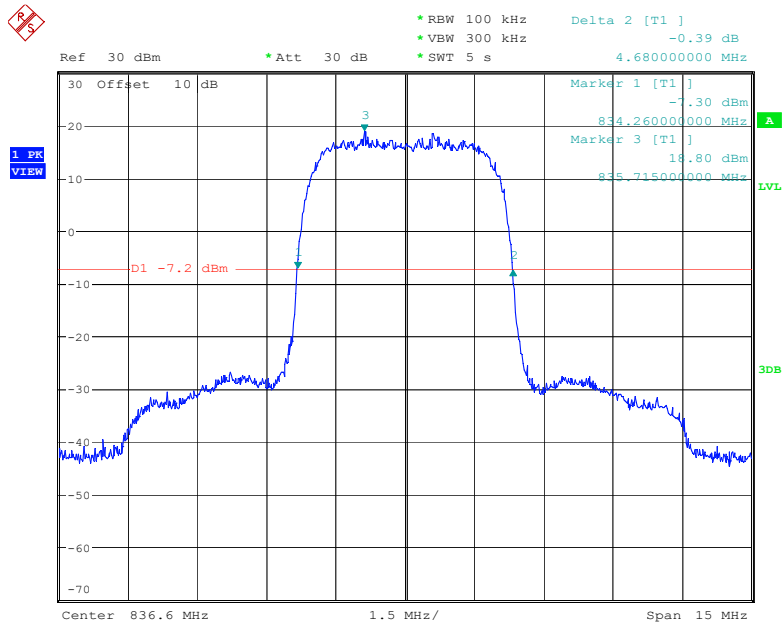
Date: 9.APR.2023 11:19:59

99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



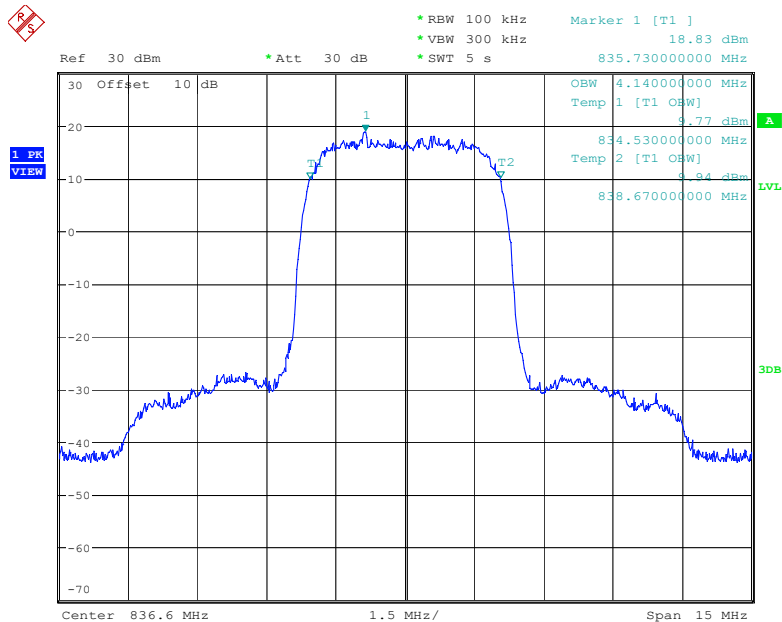
Date: 9.APR.2023 11:19:33

26 dB Emission Bandwidth for RMC (BPSK) Mode, Middle channel



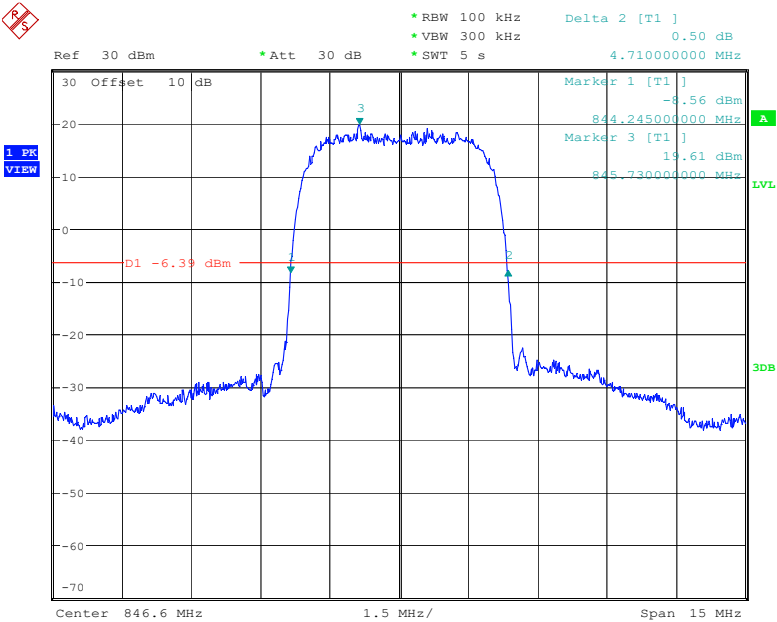
Date: 9.APR.2023 11:24:28

99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



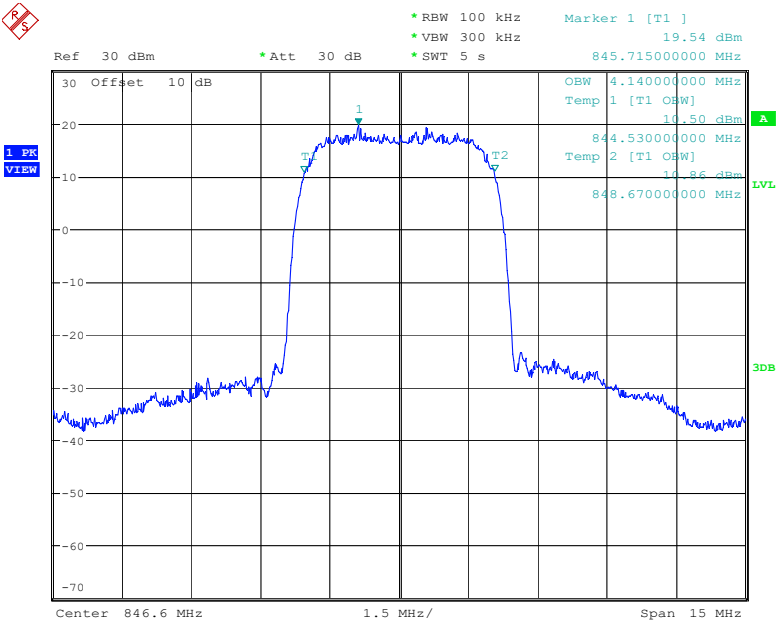
Date: 9.APR.2023 11:24:03

26 dB Emission Bandwidth for RMC (BPSK) Mode, High channel

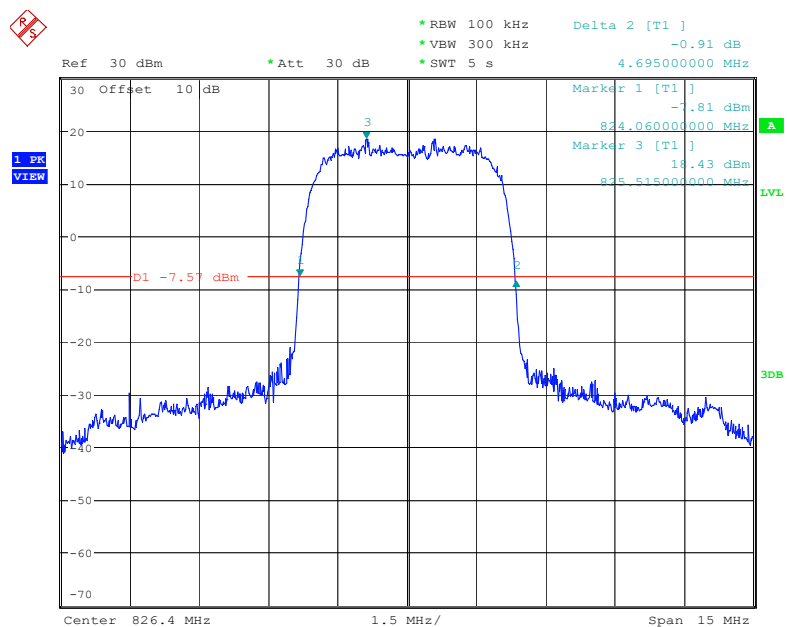


Date: 9.APR.2023 11:28:17

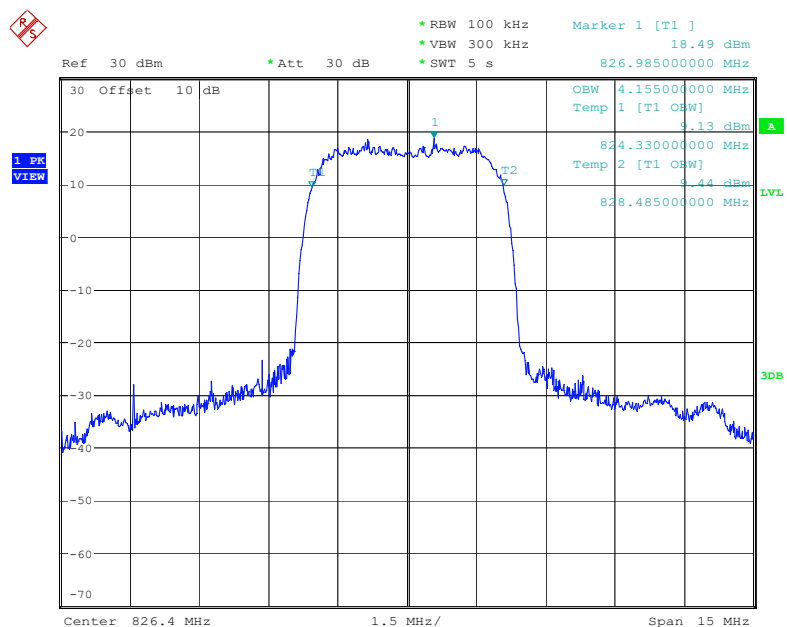
99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



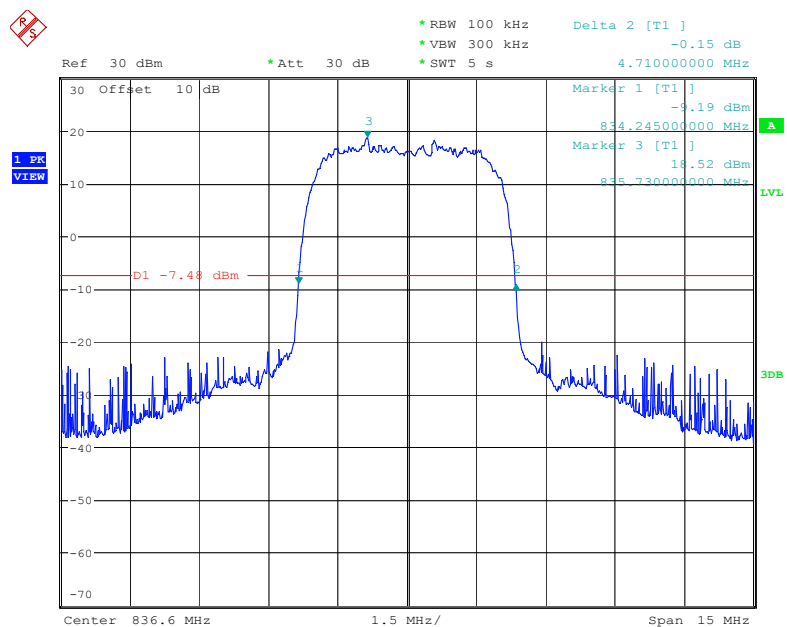
Date: 9.APR.2023 11:27:51

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Low channel

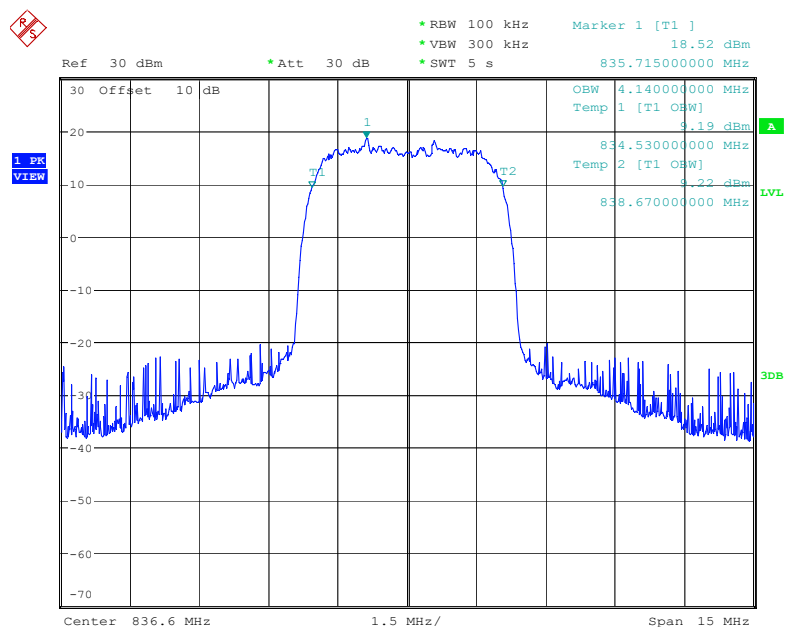
Date: 9.APR.2023 12:37:40

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

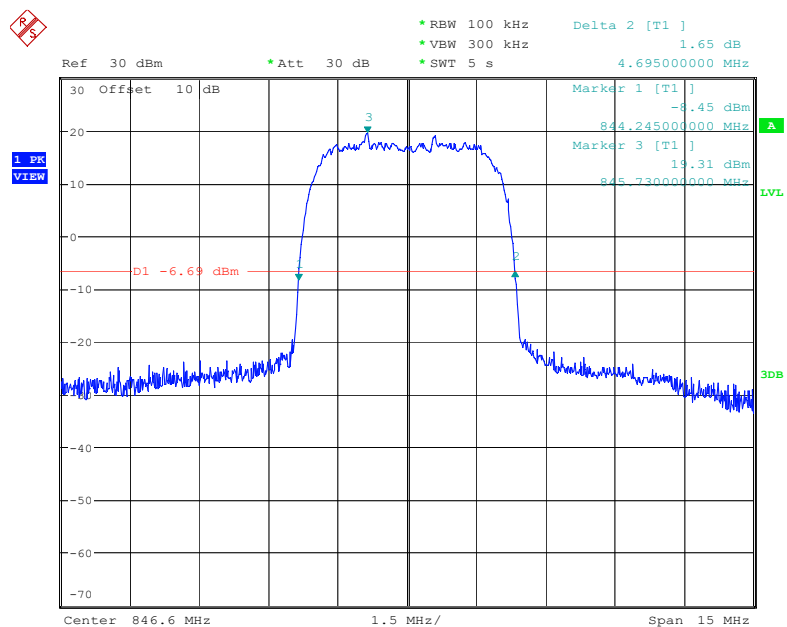
Date: 9.APR.2023 12:36:59

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Middle channel

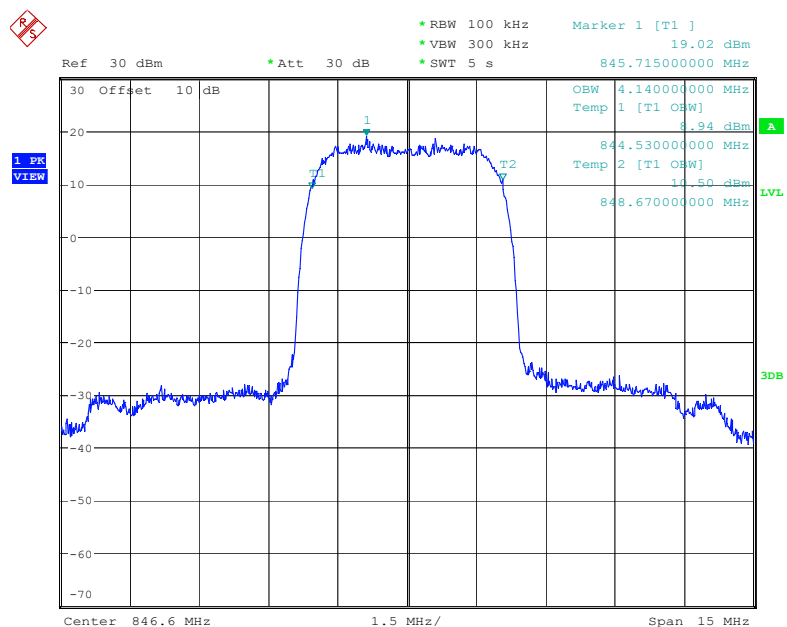
Date: 9.APR.2023 13:08:47

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

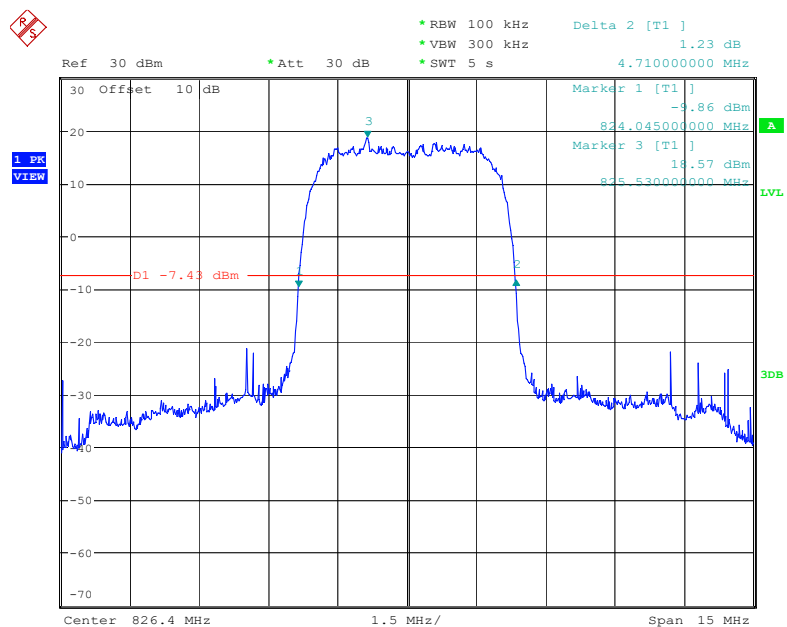
Date: 9.APR.2023 13:05:19

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel

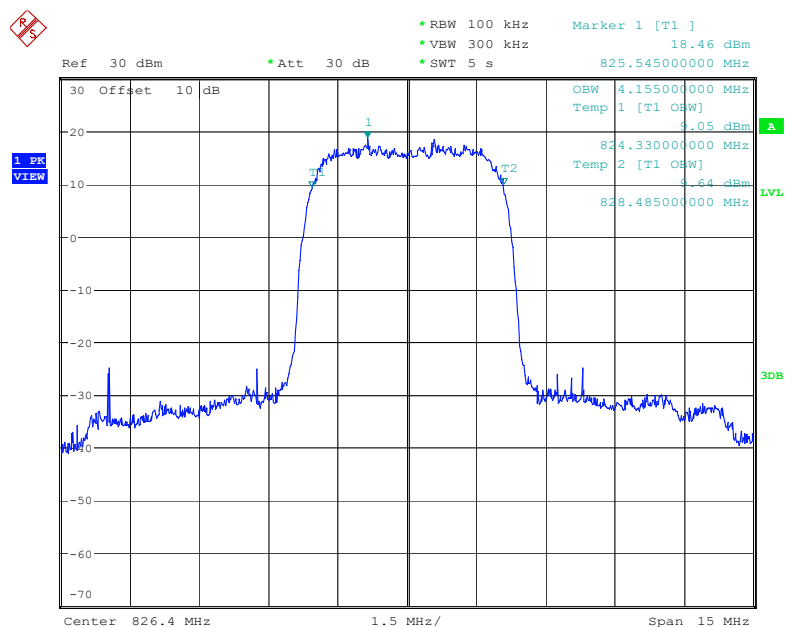
Date: 9.APR.2023 13:17:13

99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

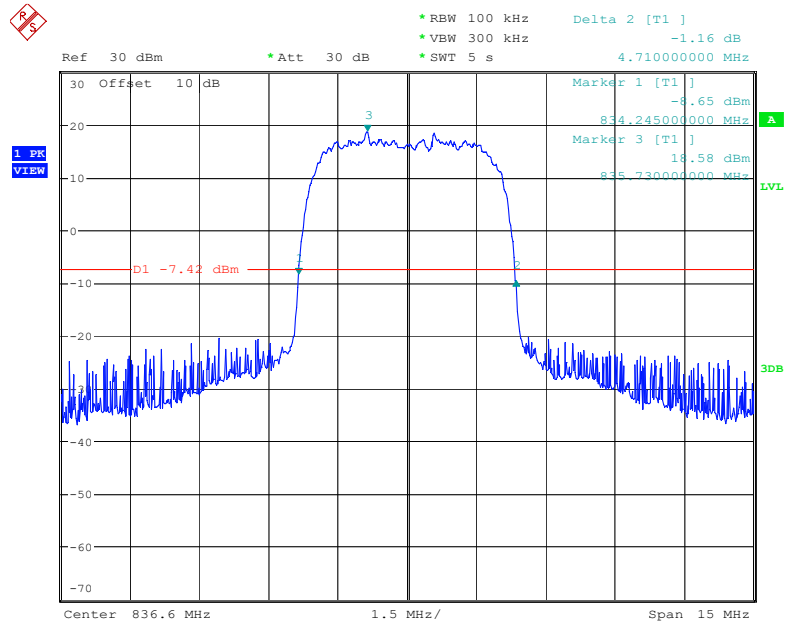
Date: 9.APR.2023 13:15:46

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Low channel

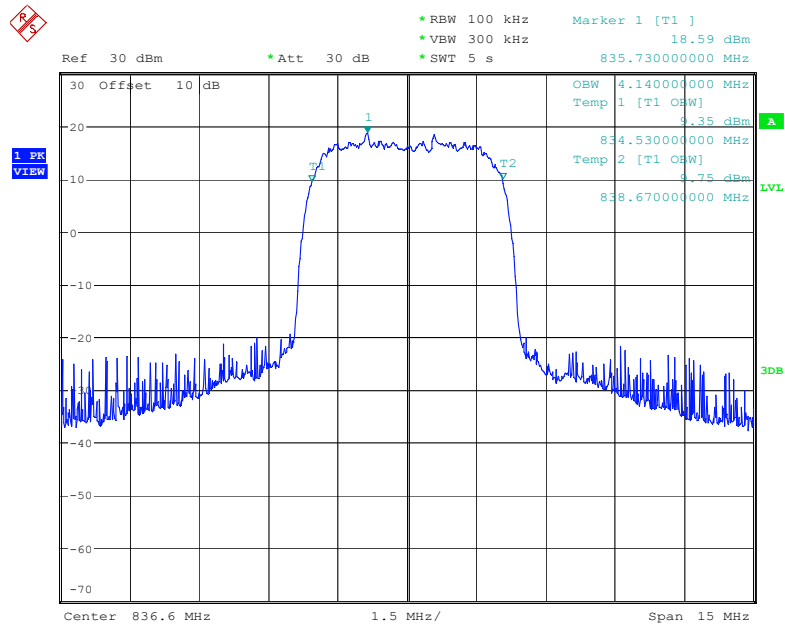
Date: 9.APR.2023 11:57:50

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

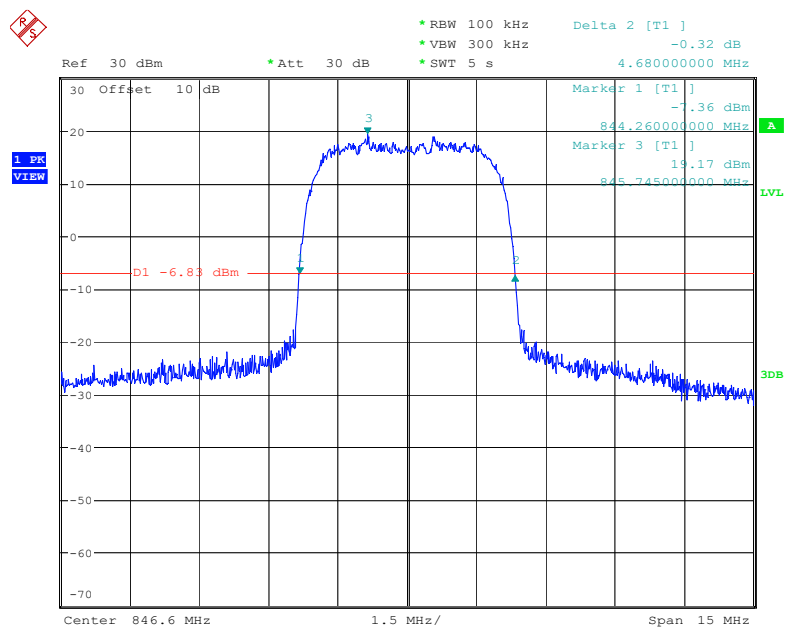
Date: 9.APR.2023 11:56:54

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Middle channel

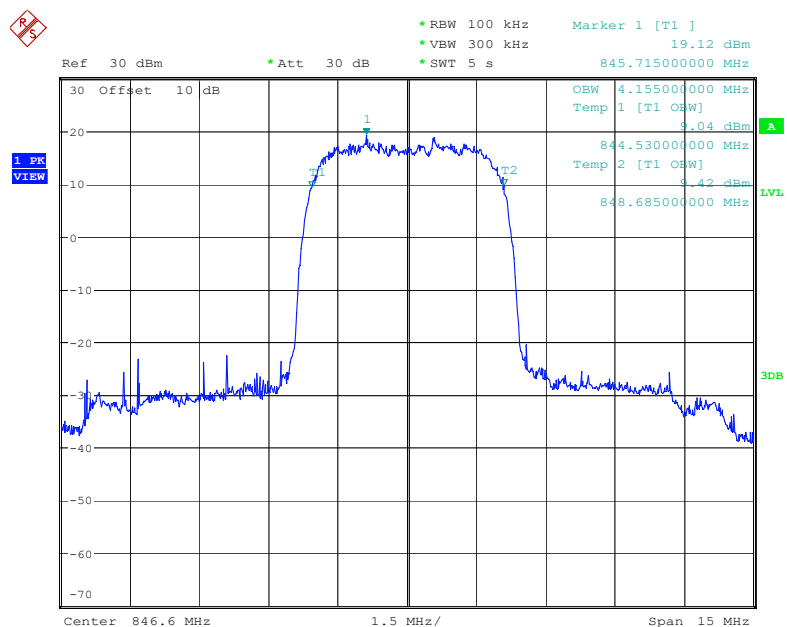
Date: 9.APR.2023 12:08:36

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

Date: 9.APR.2023 12:03:21

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, High channel

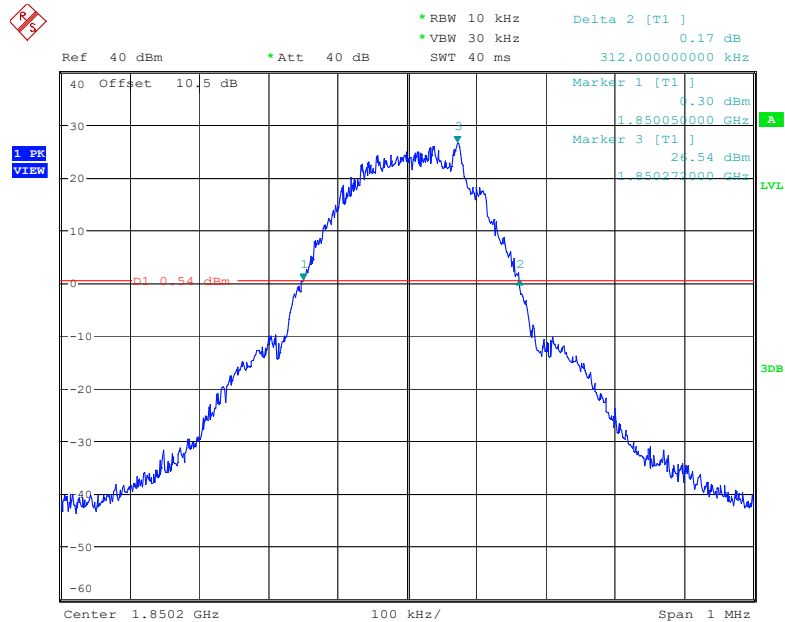
Date: 9.APR.2023 12:17:44

99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel

Date: 9.APR.2023 12:17:04

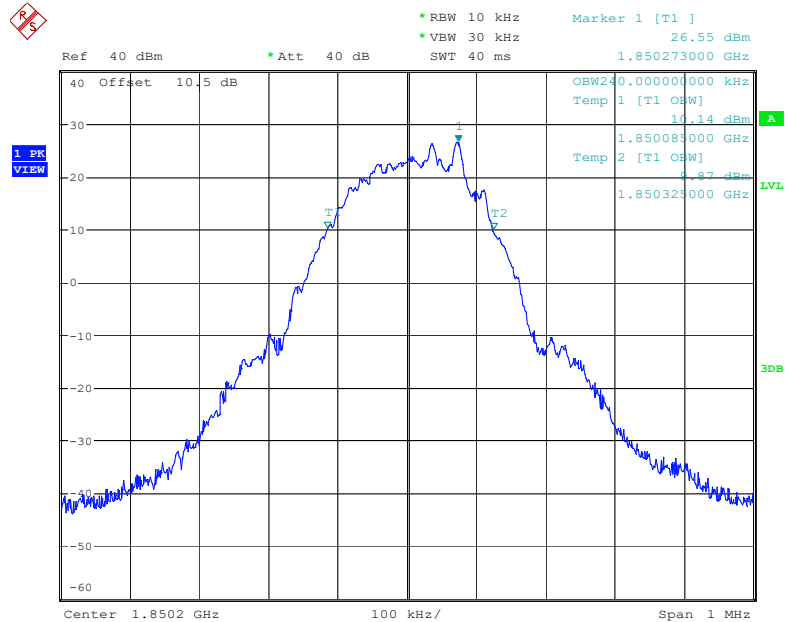
PCS Band

26 dB Emission Bandwidth for GSM(GMSK) Mode, Low channel



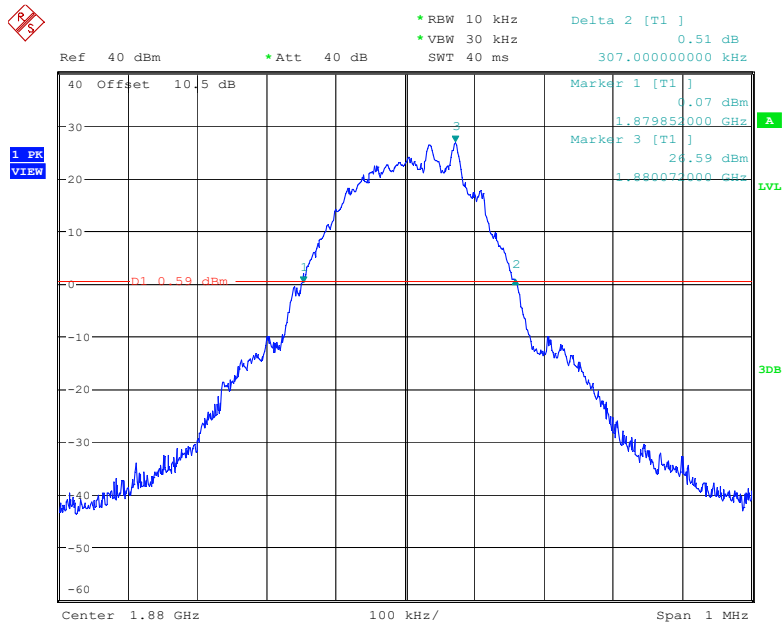
Date: 10.APR.2023 09:09:36

99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



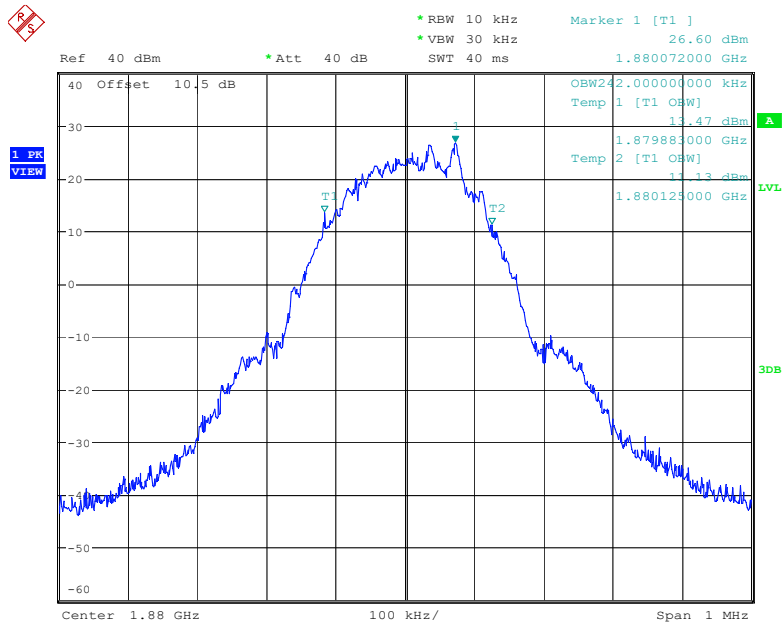
Date: 10.APR.2023 09:08:44

26 dB Emission Bandwidth for GSM(GMSK) Mode, Middle channel



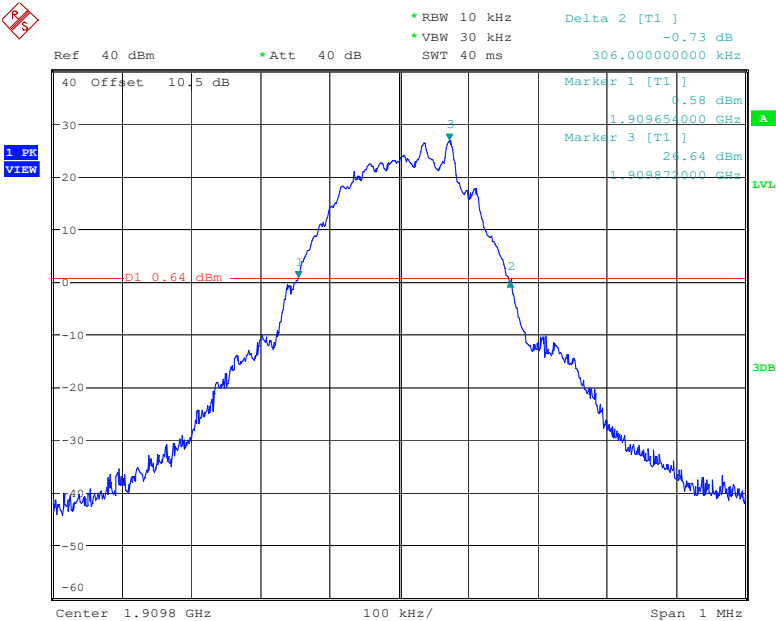
Date: 10.APR.2023 09:17:53

99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



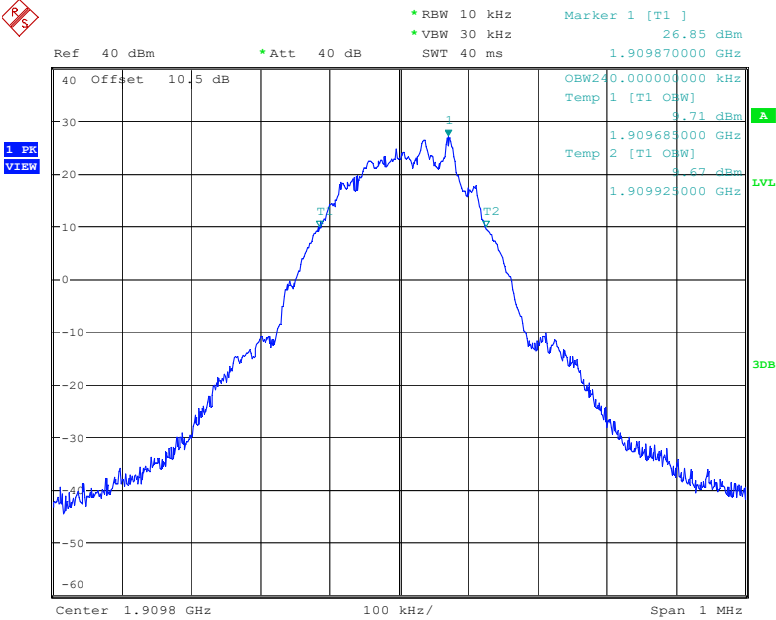
Date: 10.APR.2023 09:17:22

26 dB Emission Bandwidth for GSM(GMSK) Mode, High channel



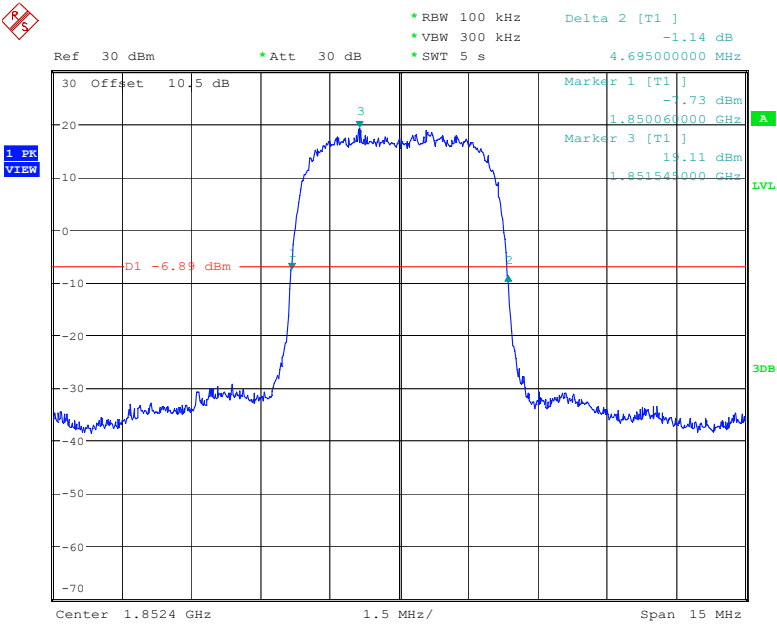
Date: 10.APR.2023 09:23:55

99% Occupied Bandwidth for GSM(GMSK) Mode, High channel



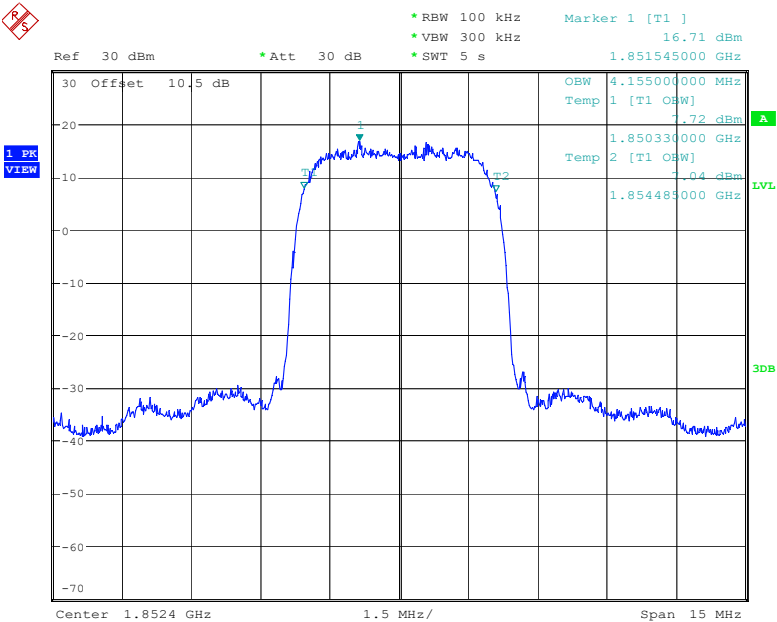
Date: 10.APR.2023 09:23:14

26 dB Emission Bandwidth for RMC (BPSK) Mode, Low channel

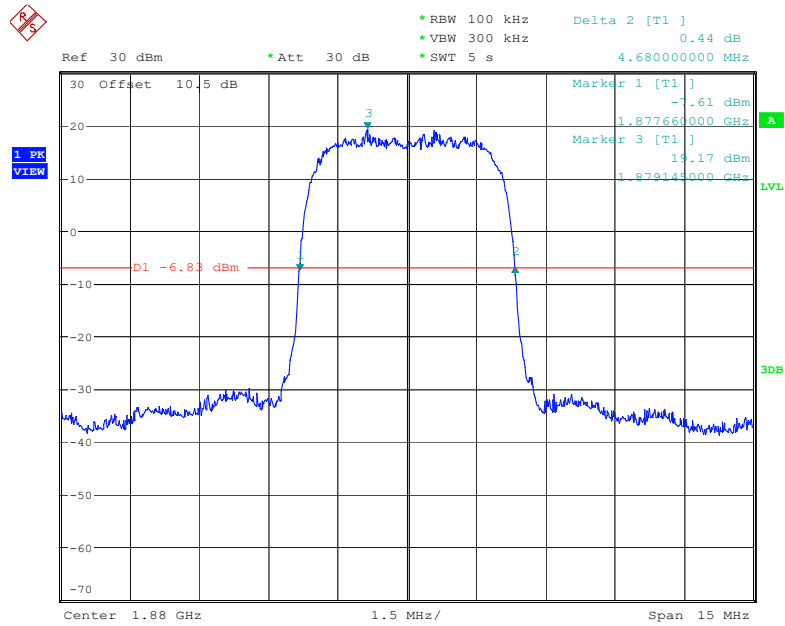


Date: 9.APR.2023 15:43:19

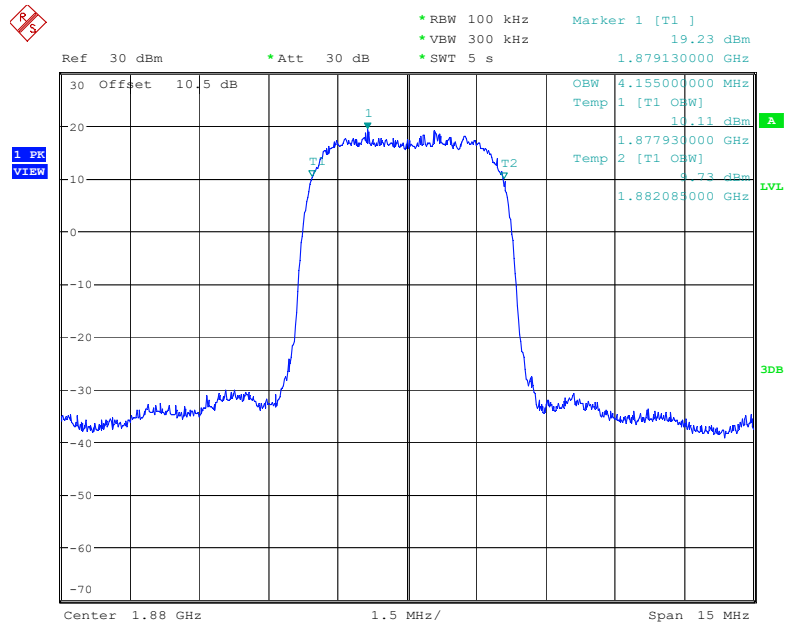
99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



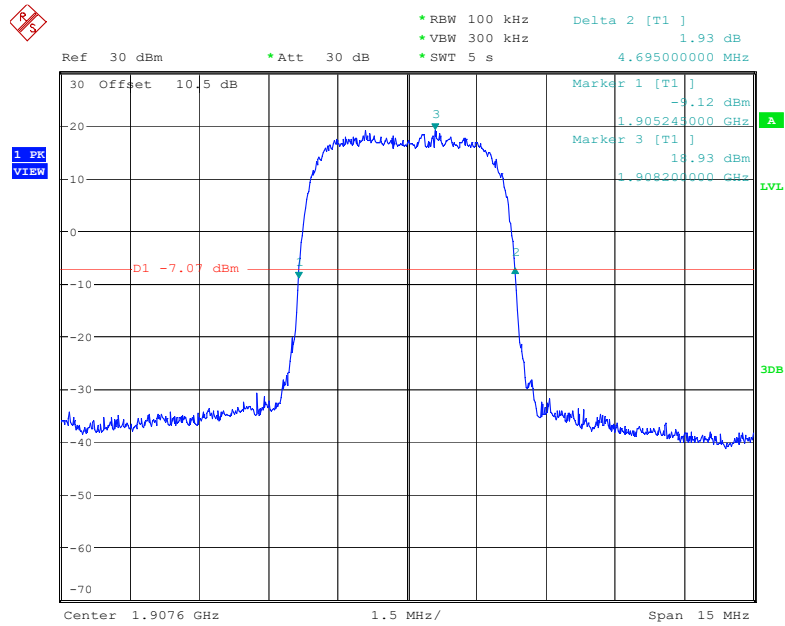
Date: 16.APR.2023 14:39:23

26 dB Emission Bandwidth for RMC (BPSK) Mode, Middle channel

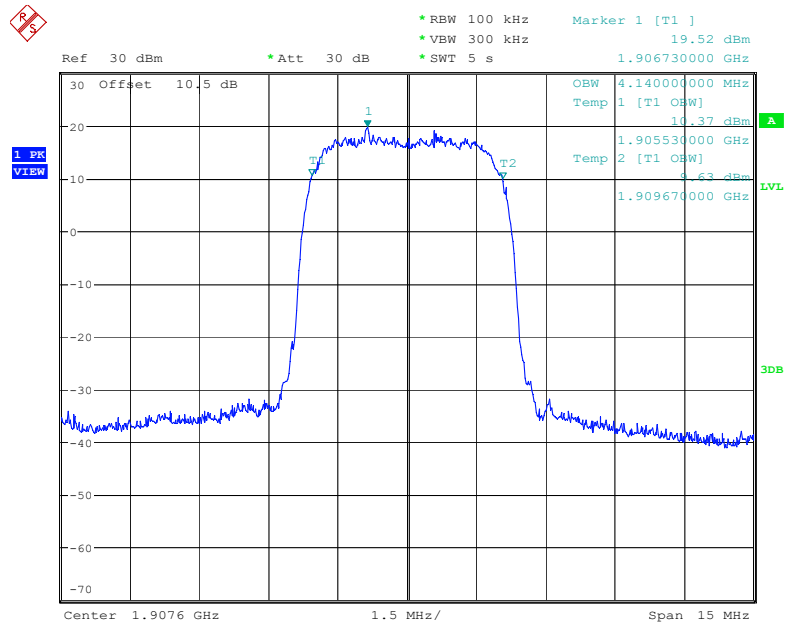
Date: 9.APR.2023 15:48:24

99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

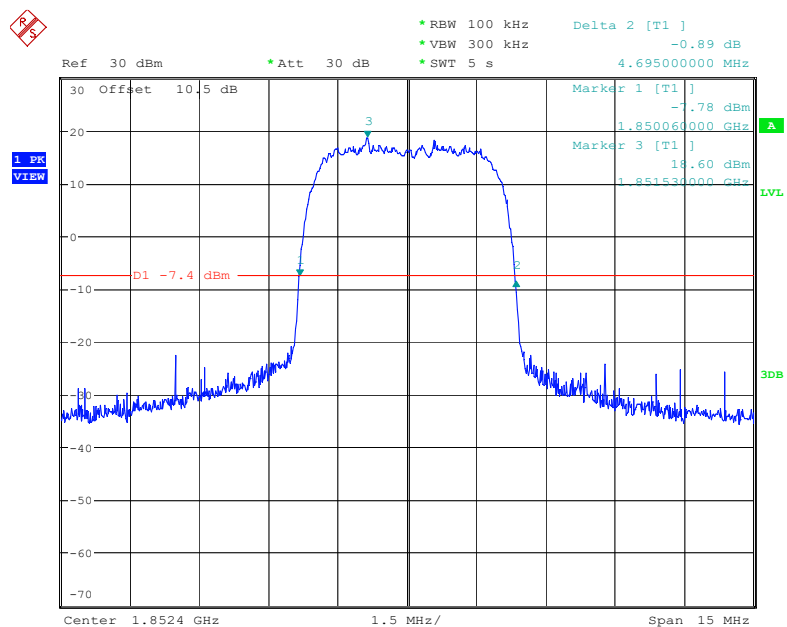
Date: 9.APR.2023 15:47:58

26 dB Emission Bandwidth for RMC (BPSK) Mode, High channel

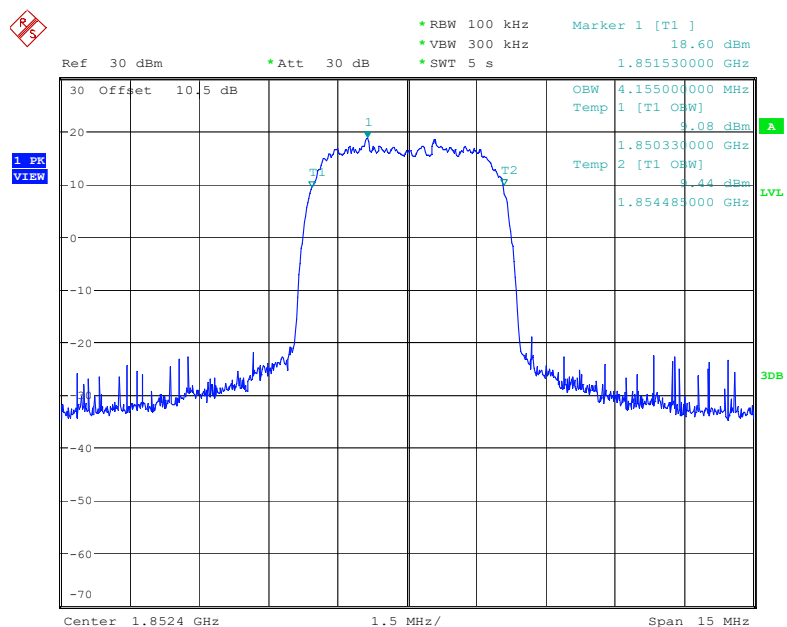
Date: 9.APR.2023 15:53:50

99% Occupied Bandwidth for RMC (BPSK) Mode, High channel

Date: 9.APR.2023 15:53:24

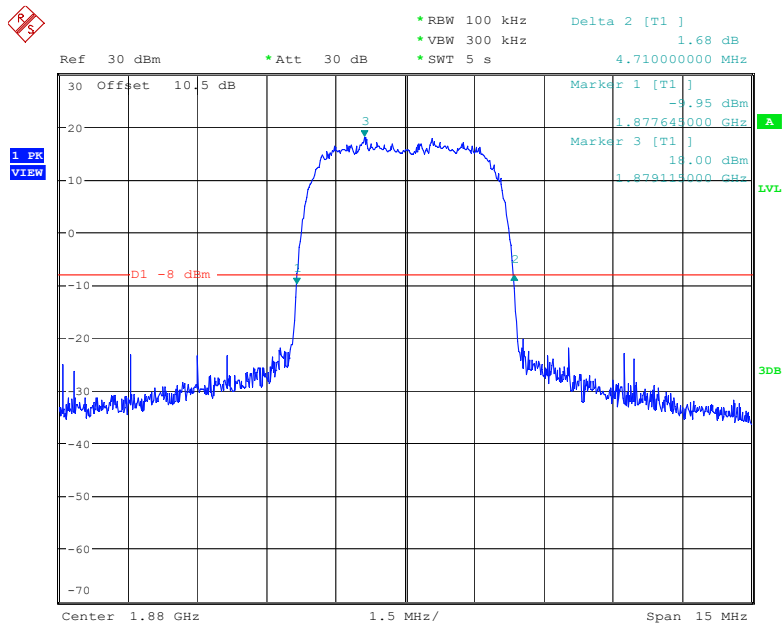
26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Low channel

Date: 9.APR.2023 16:39:15

99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

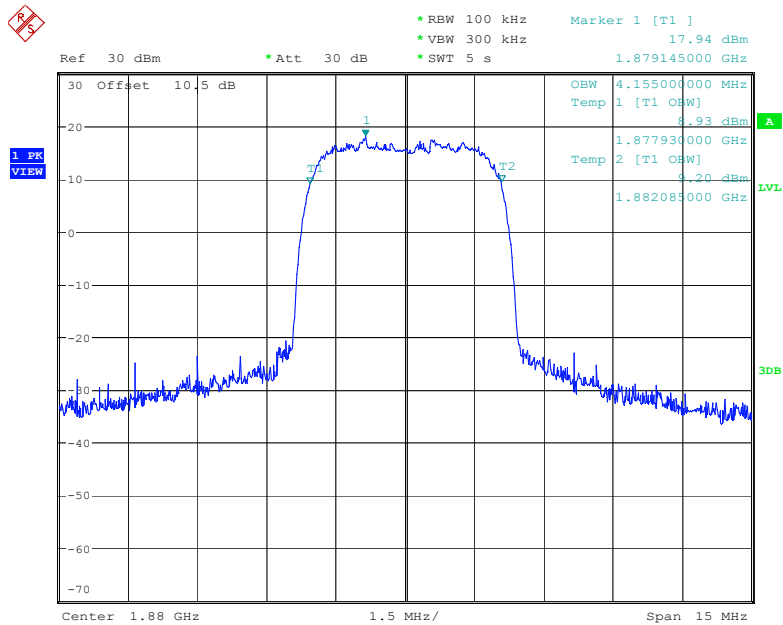
Date: 9.APR.2023 16:38:04

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, Middle channel

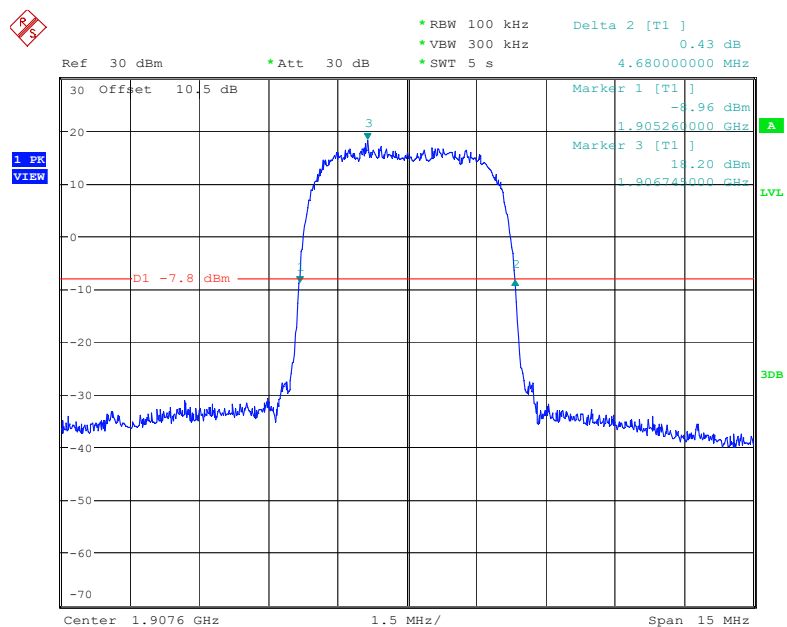


Date: 9.APR.2023 16:52:35

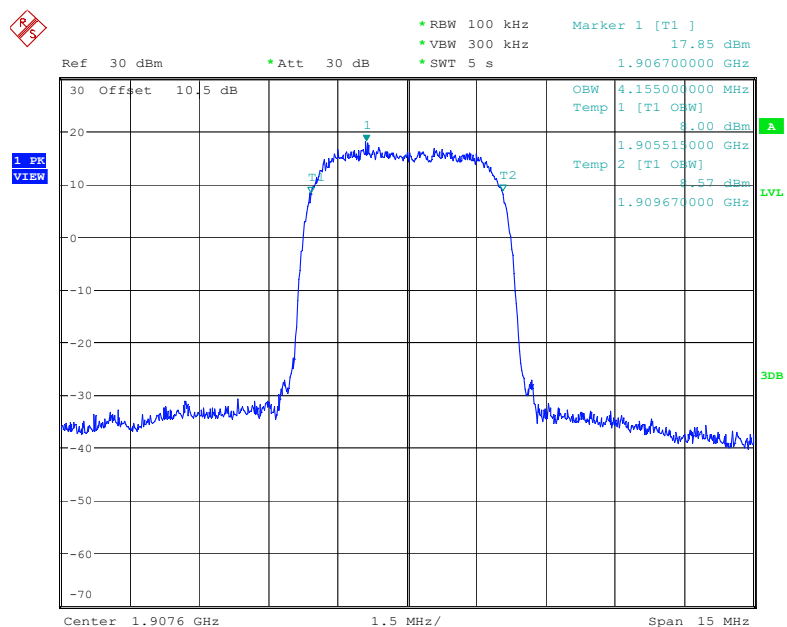
99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel



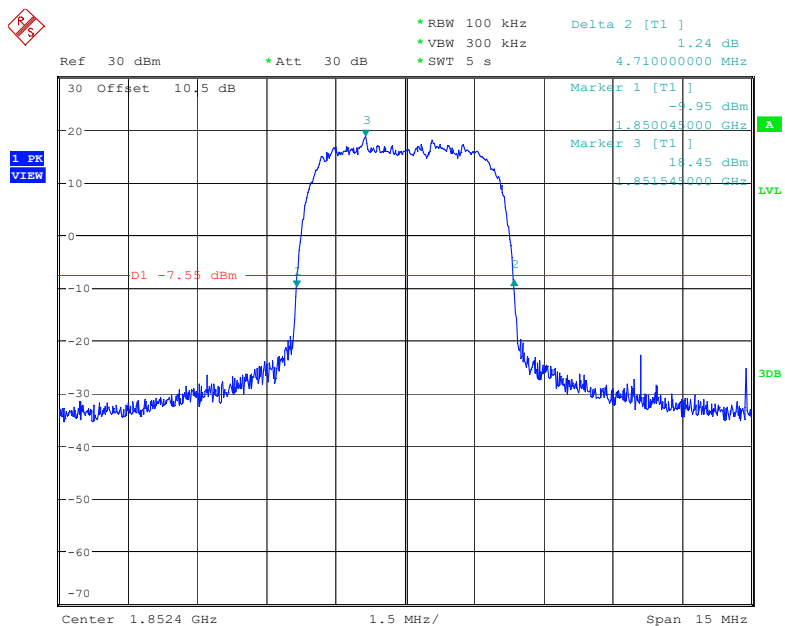
Date: 9.APR.2023 16:51:40

26 dB Emission Bandwidth for HSUPA (QPSK) Mode, High channel

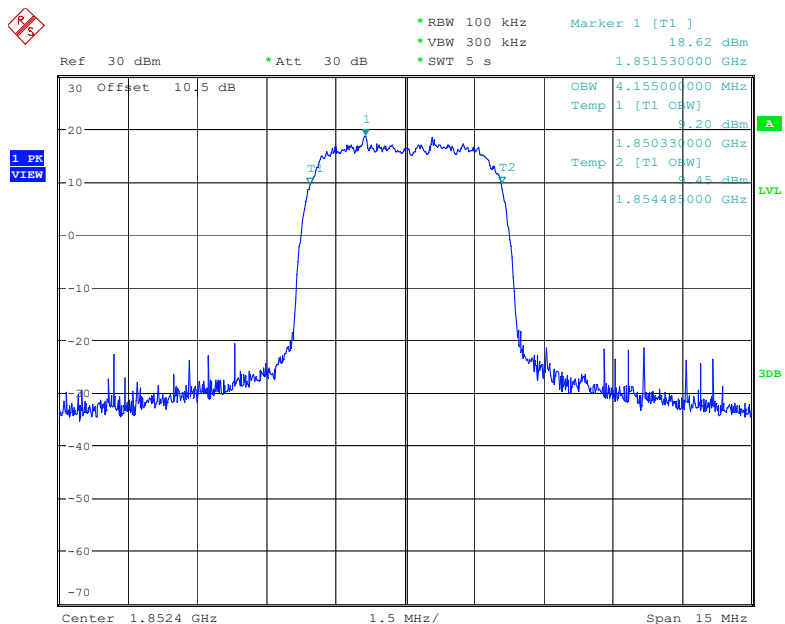
Date: 9.APR.2023 17:05:34

99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

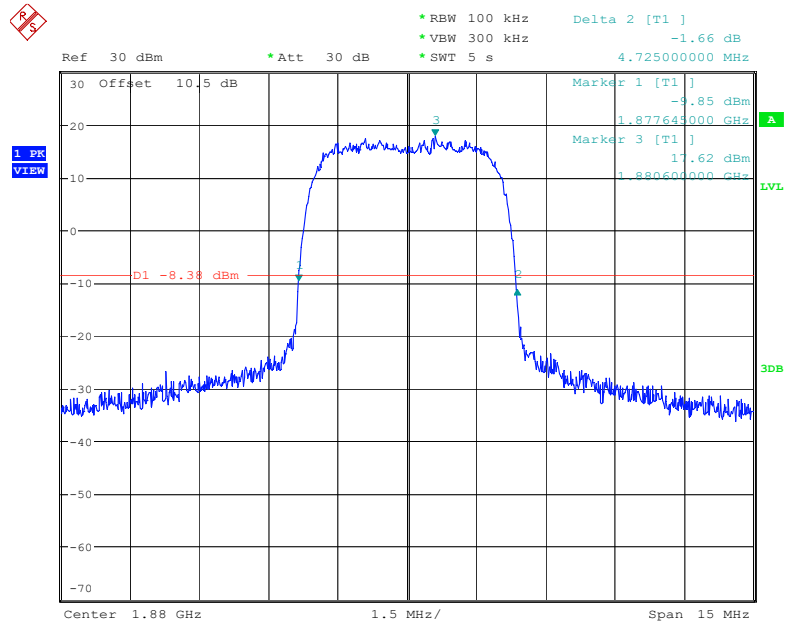
Date: 9.APR.2023 17:05:09

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Low channel

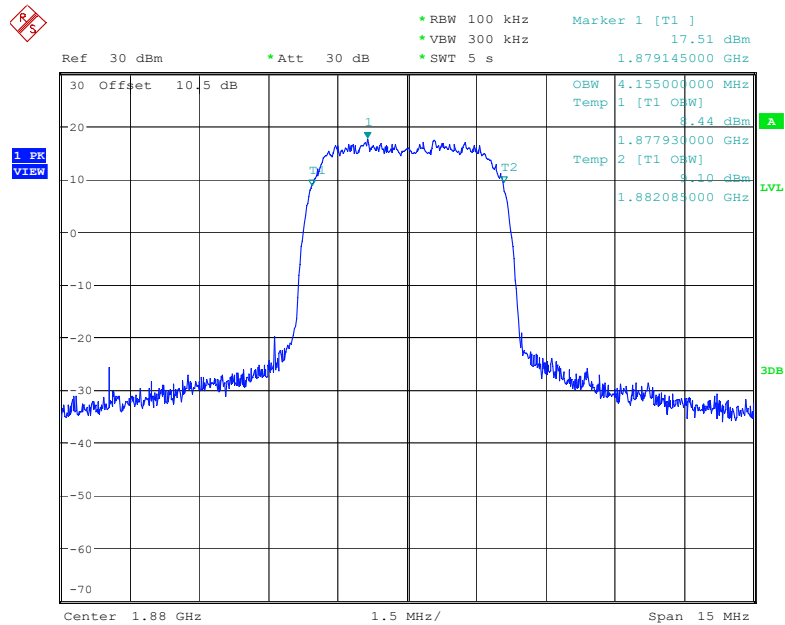
Date: 9.APR.2023 16:02:34

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

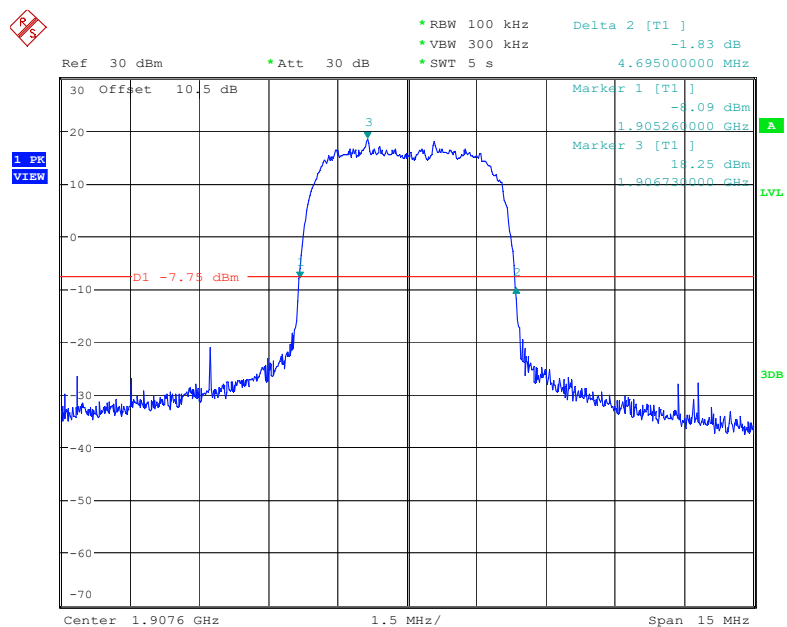
Date: 9.APR.2023 16:01:38

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, Middle channel

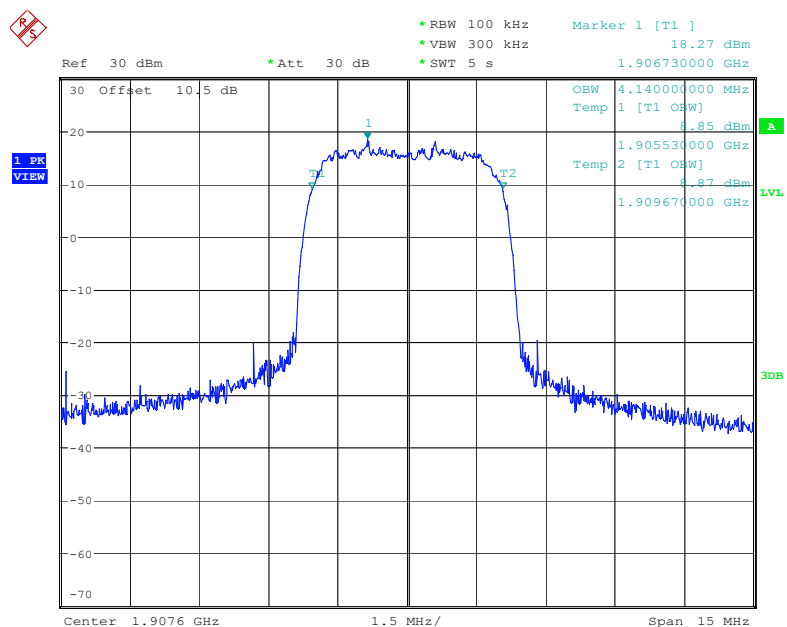
Date: 9.APR.2023 16:17:08

99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

Date: 9.APR.2023 16:16:27

26 dB Emission Bandwidth for HSDPA (16QAM) Mode, High channel

Date: 9.APR.2023 16:21:39

99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel

Date: 9.APR.2023 16:20:28

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.10	1.27	1.11	1.26	1.10	1.34
	16QAM	1.10	1.26	1.10	1.25	1.10	1.26
3 MHz	QPSK	2.70	2.99	2.70	3.01	2.70	2.98
	16QAM	2.70	3.01	2.70	3.01	2.70	3.00
5 MHz	QPSK	4.52	5.00	4.52	5.00	4.52	5.00
	16QAM	4.54	4.98	4.54	5.02	4.52	4.98
10 MHz	QPSK	9.00	9.96	8.96	9.80	8.96	9.76
	16QAM	9.00	9.84	8.96	9.88	8.96	9.80
15 MHz	QPSK	13.56	15.00	13.50	15.06	13.56	15.00
	16QAM	13.56	15.06	13.50	14.94	13.50	15.00
20 MHz	QPSK	18.00	19.60	18.00	19.76	18.00	19.76
	16QAM	18.00	19.60	18.00	19.68	18.00	19.68

LTE Band7:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.52	5.00	4.52	5.00	4.54	4.98
	16QAM	4.54	5.02	4.54	5.04	4.52	5.02
10 MHz	QPSK	9.00	9.76	9.00	9.80	9.00	9.76
	16QAM	9.00	9.80	9.00	9.84	8.96	9.76
15 MHz	QPSK	13.50	15.18	13.56	15.06	13.56	15.06
	16QAM	13.56	15.06	13.56	15.00	13.50	15.00
20 MHz	QPSK	18.00	19.68	18.00	19.84	18.00	19.68
	16QAM	18.00	19.84	18.08	19.84	18.08	19.76

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.10	1.25	1.10	1.25	1.11	1.27
	16QAM	1.11	1.27	1.09	1.25	1.10	1.25
3 MHz	QPSK	2.70	3.00	2.69	3.01	2.70	2.99
	16QAM	2.70	3.00	2.71	3.04	2.70	3.01
5 MHz	QPSK	4.52	5.02	4.50	4.96	4.52	5.00
	16QAM	4.54	5.02	4.52	5.00	4.52	4.96
10 MHz	QPSK	8.96	9.76	8.96	9.76	8.96	9.72
	16QAM	9.00	9.72	8.96	9.76	8.96	9.76

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.10	1.25	1.10	1.25	1.10	1.26
	16QAM	1.10	1.26	1.10	1.26	1.10	1.25
3 MHz	QPSK	2.70	3.00	2.70	3.01	2.71	3.01
	16QAM	2.69	3.01	2.70	3.02	2.70	3.01
5 MHz	QPSK	4.52	4.96	4.52	5.00	4.52	4.98
	16QAM	4.52	4.98	4.54	5.00	4.52	4.98
10 MHz	QPSK	8.96	9.68	9.00	9.84	8.96	9.68
	16QAM	9.00	9.72	9.00	9.84	8.96	9.76

LTE Band 41

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.52	4.94	4.54	5.00	4.50	5.00
	16QAM	4.52	5.04	4.50	5.02	4.52	4.98
10 MHz	QPSK	9.00	9.92	9.00	9.76	9.00	9.80
	16QAM	9.00	9.76	8.96	9.92	8.96	9.68
15 MHz	QPSK	13.56	15.00	13.56	15.48	13.56	15.18
	16QAM	13.62	15.36	13.62	15.06	13.50	15.00
20 MHz	QPSK	18.00	19.52	18.00	19.76	18.00	19.60
	16QAM	18.00	19.68	18.00	19.68	18.00	19.76

The test plots of LTE band please refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a)& §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

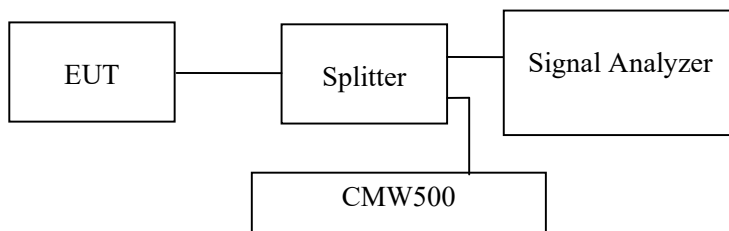
Applicable Standard

FCC §2.1051, §22.917(a) & §24.238(a)&§27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range was added into plots.

Test Data

Environmental Conditions

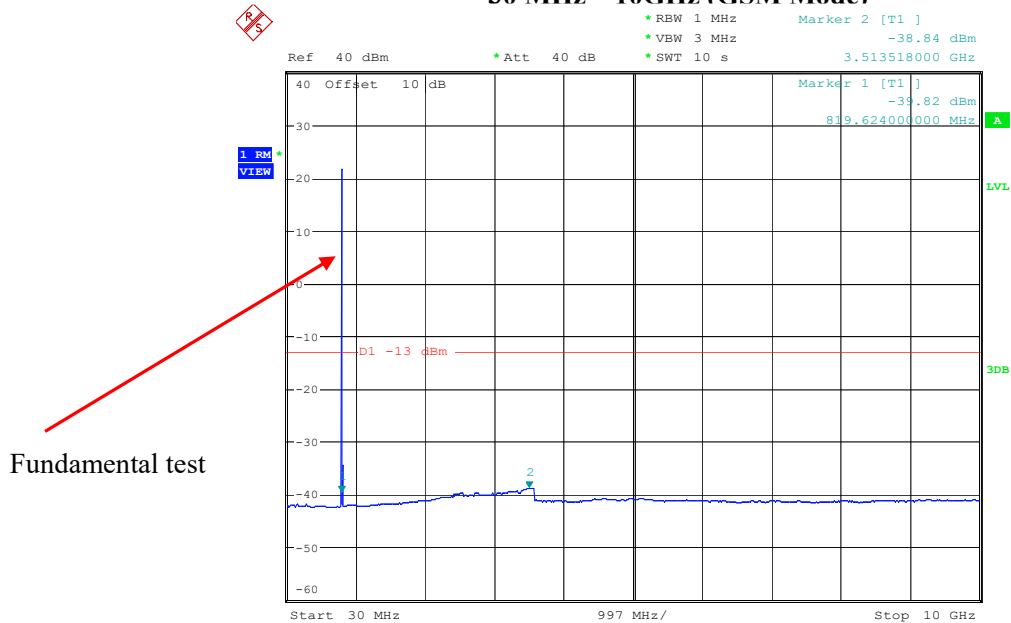
Temperature:	24~27 °C
Relative Humidity:	52~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2023-04-07 to 2023-05-05.

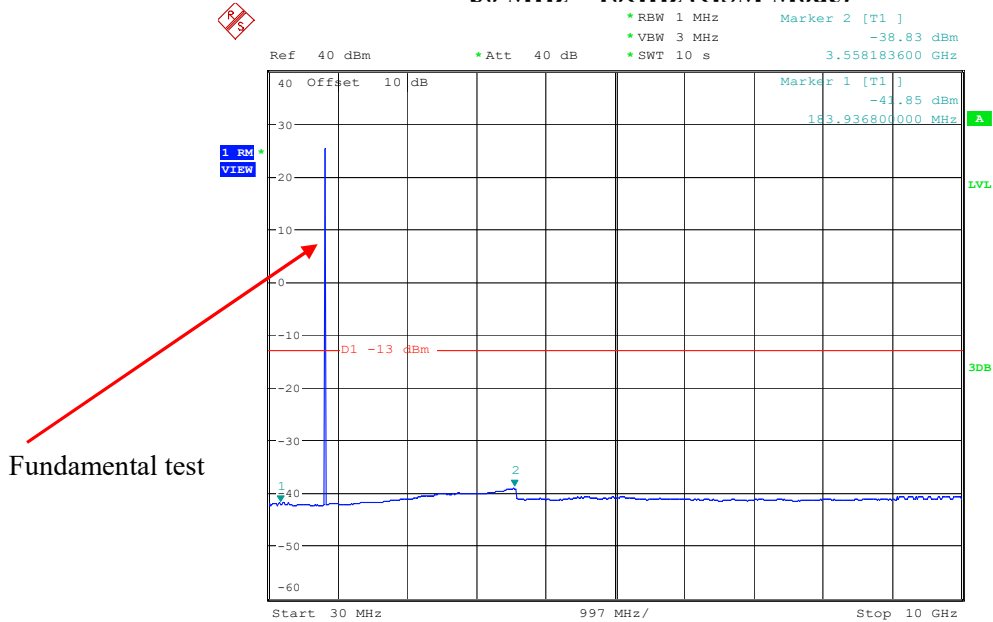
EUT operation mode: Transmitting

Test result: Pass

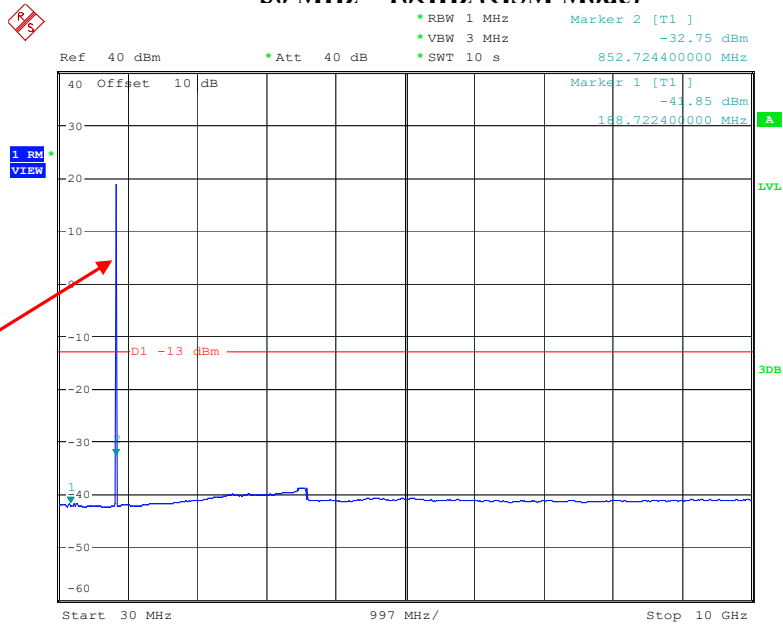
Please refer to the following plots.

Cellular Band**Low Channel:****30 MHz – 10GHz (GSM Mode)**

Date: 10.APR.2023 11:47:11

Middle Channel:**30 MHz – 10GHz (GSM Mode)**

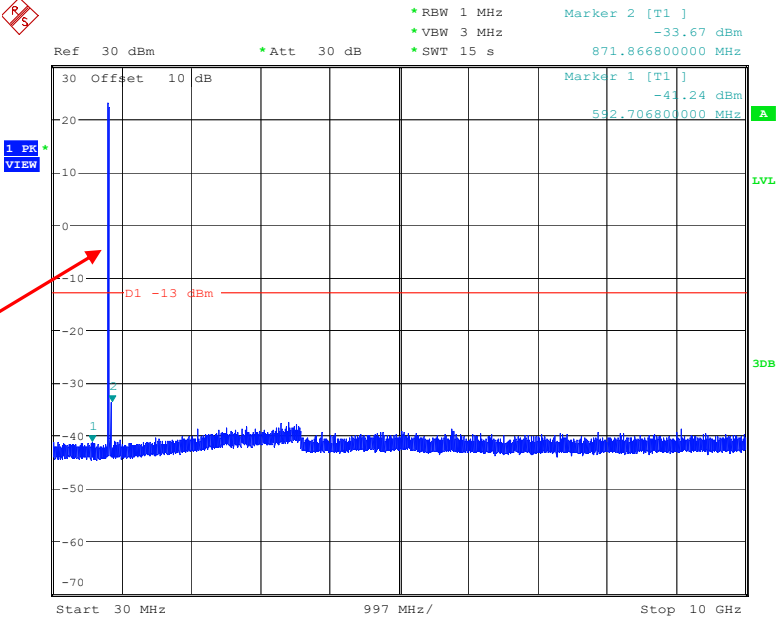
Date: 10.APR.2023 13:17:55

High Channel:**30 MHz – 10GHz (GSM Mode)**

Date: 10.APR.2023 13:23:55

Low Channel:

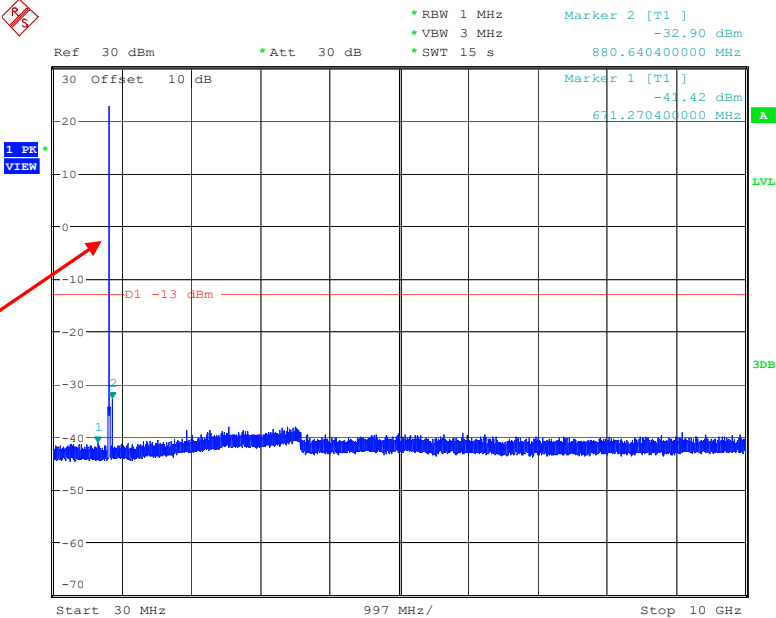
30 MHz – 10GHz (WCDMA Mode)



Date: 9.APR.2023 11:21:11

Middle Channel:

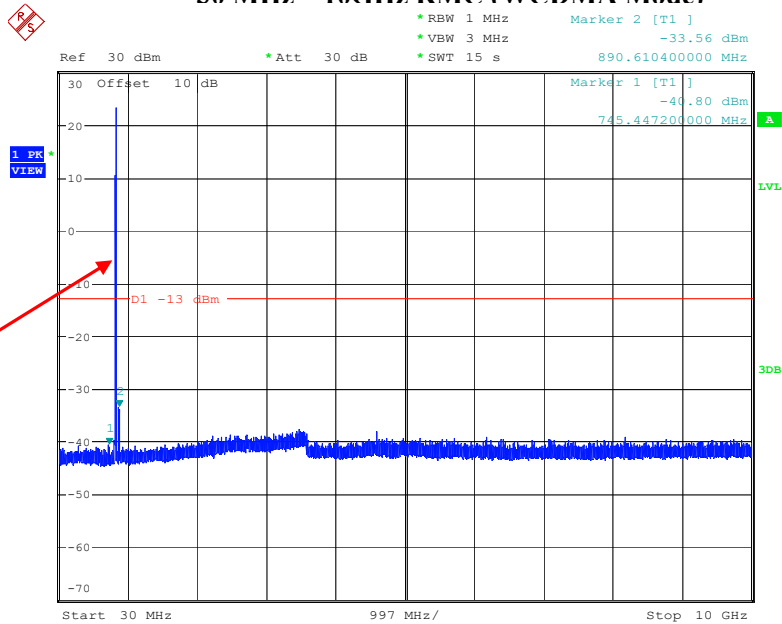
30 MHz – 10GHz (WCDMA Mode)



Date: 9.APR.2023 11:25:15

High Channel:

30 MHz – 10GHz RMC (WCDMA Mode)

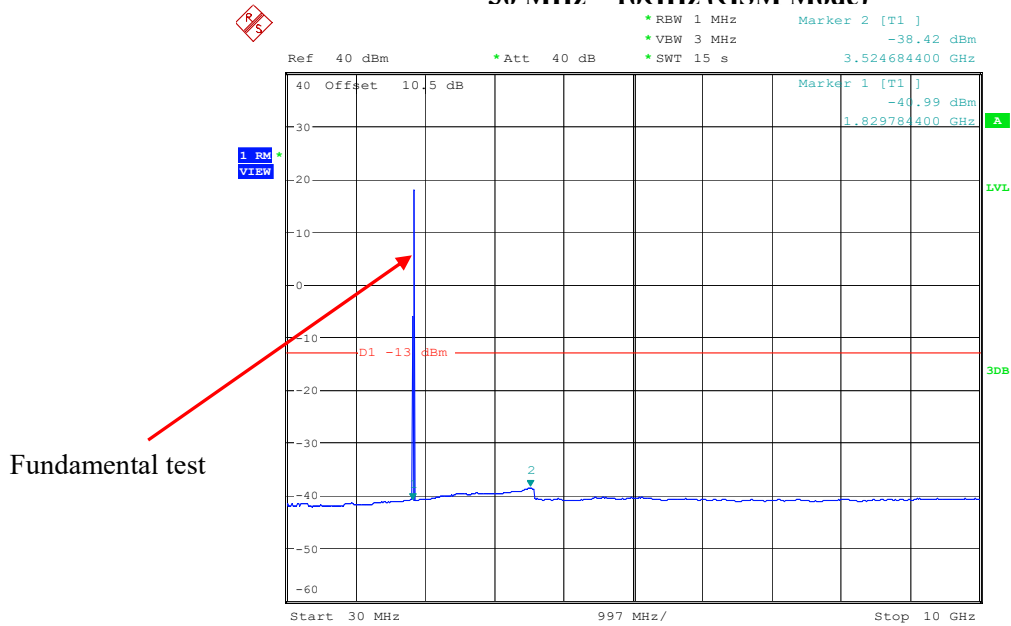


Date: 9.APR.2023 11:29:30

PCS Band

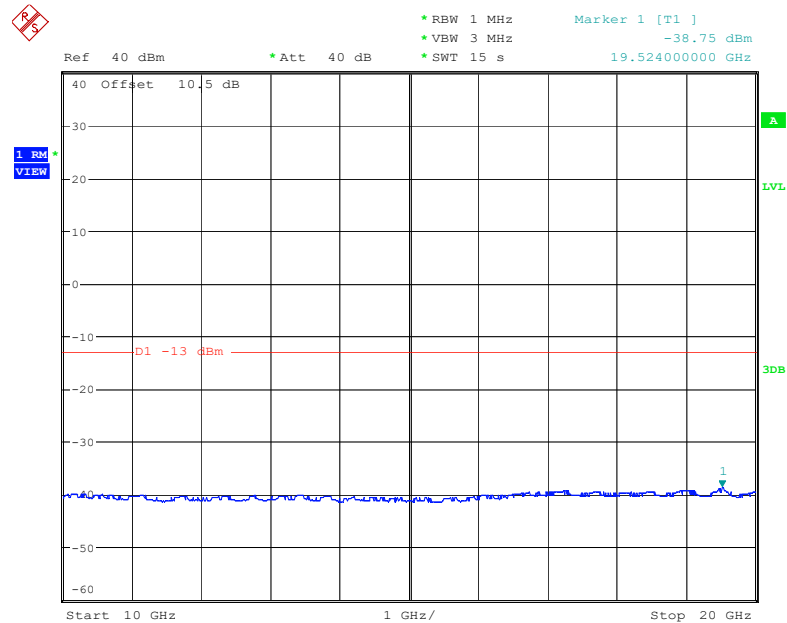
Low Channel:

30 MHz – 10GHz (GSM Mode)

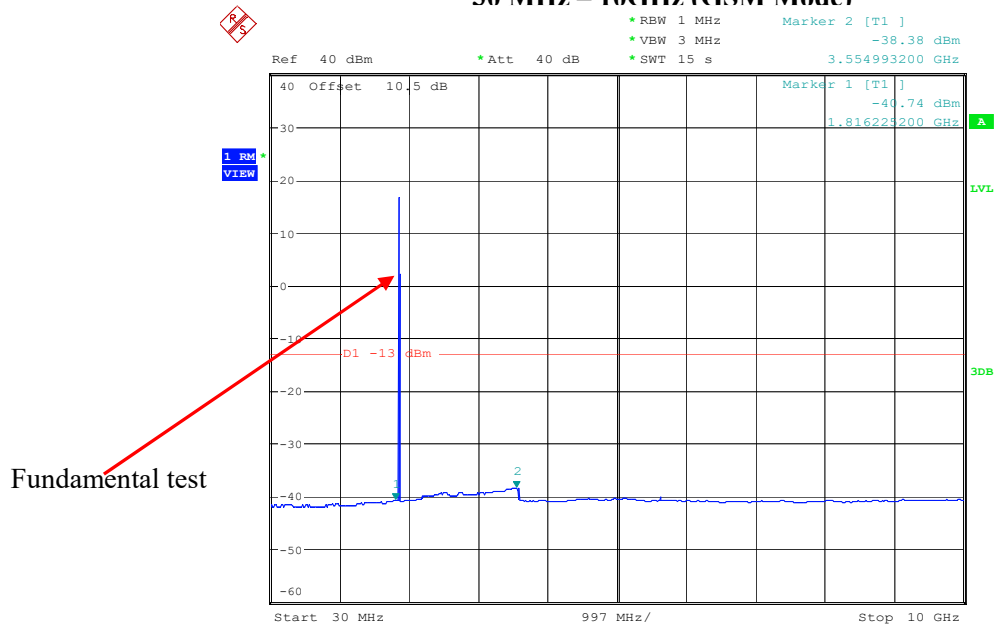


Date: 10.APR.2023 09:13:41

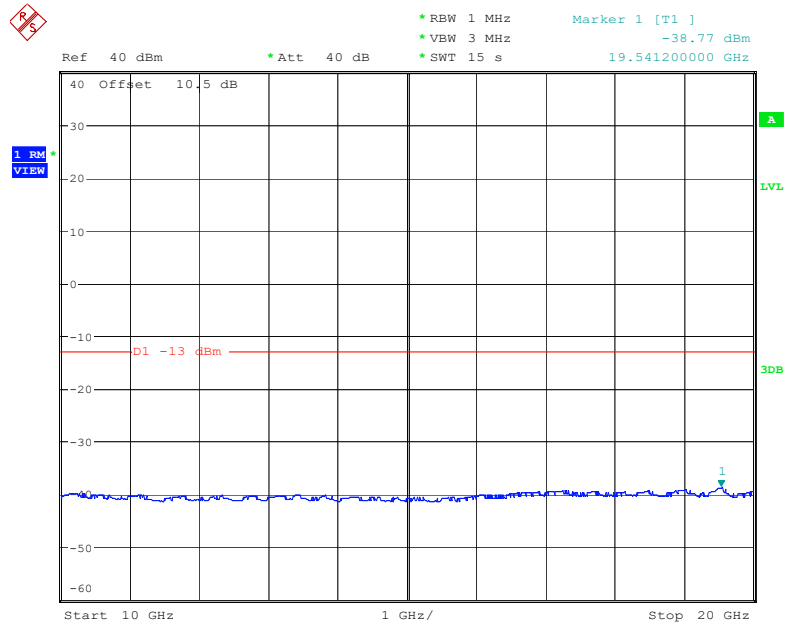
10 GHz – 20GHz (GSM Mode)



Date: 10.APR.2023 09:14:30

Middle Channel:**30 MHz – 10GHz (GSM Mode)**

Date: 10.APR.2023 09:19:51

10 GHz – 20GHz (GSM Mode)

Date: 10.APR.2023 09:20:39

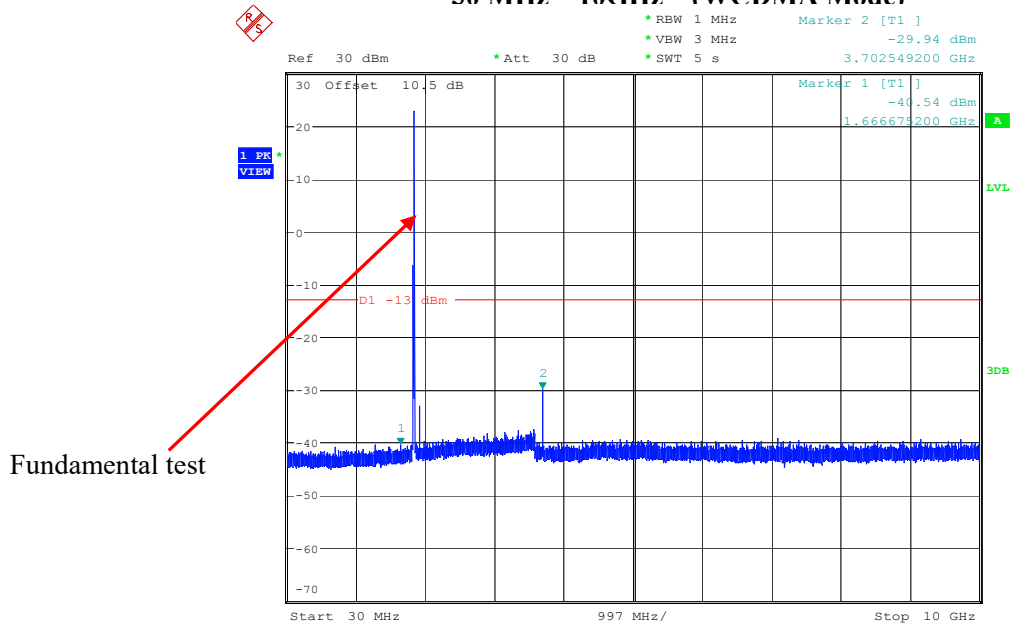
30 MHz – 10GHz (GSM Mode)



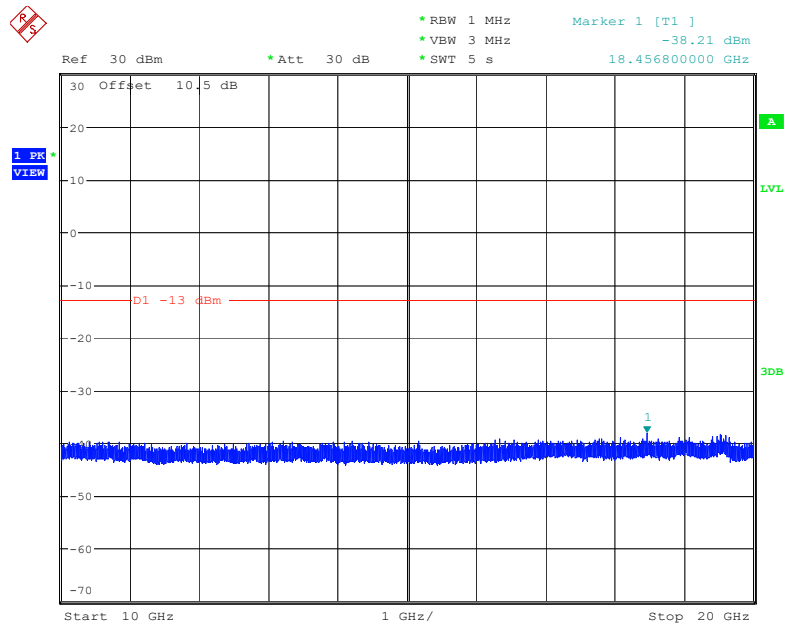
10 GHz – 20GHz (GSM Mode)



FCC -2G,3G,4G

Low Channel:**30 MHz – 10GHz (WCDMA Mode)**

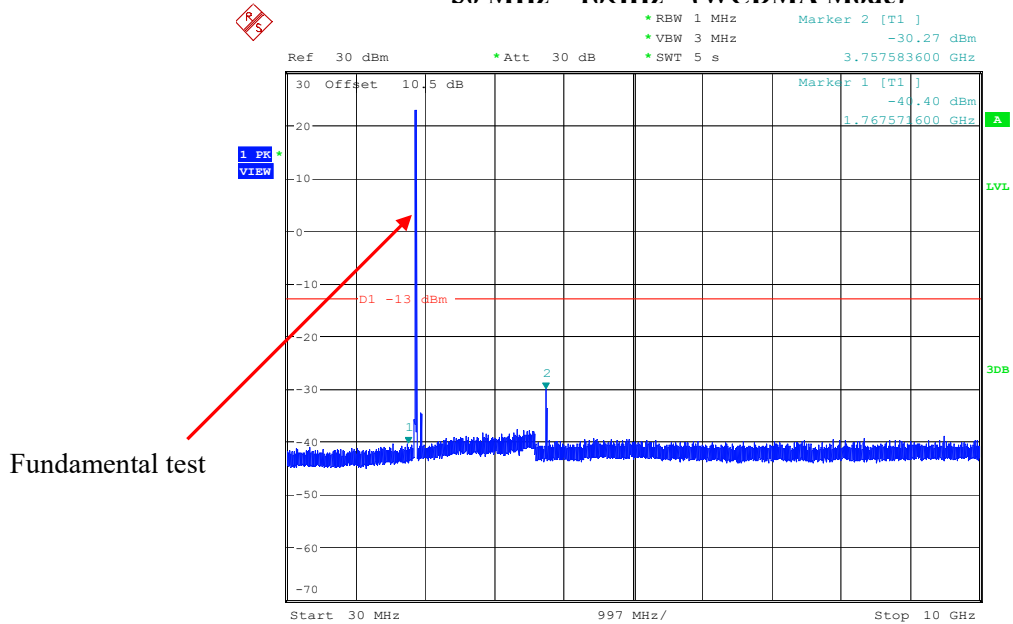
Date: 9.APR.2023 15:44:12

10 GHz – 20GHz (WCDMA Mode)

Date: 9.APR.2023 15:44:39

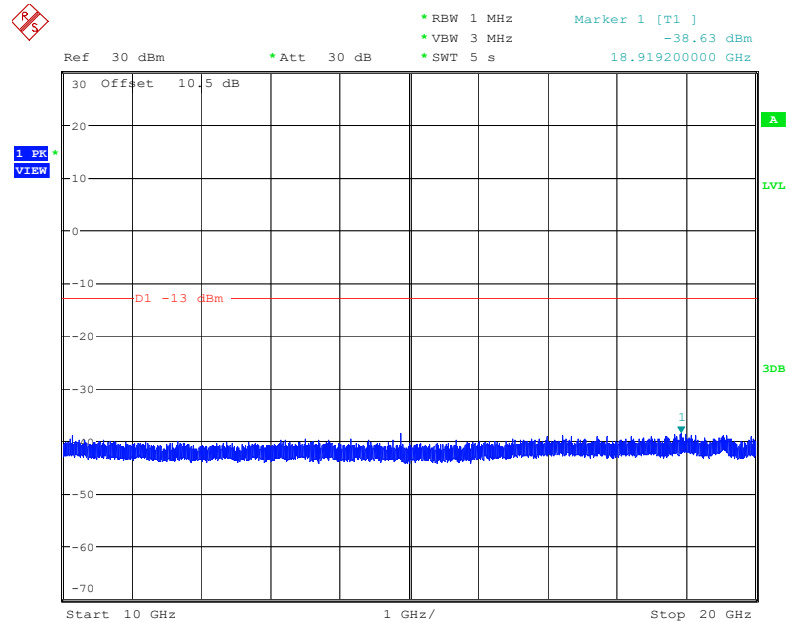
Middle Channel:

30 MHz – 10GHz (WCDMA Mode)

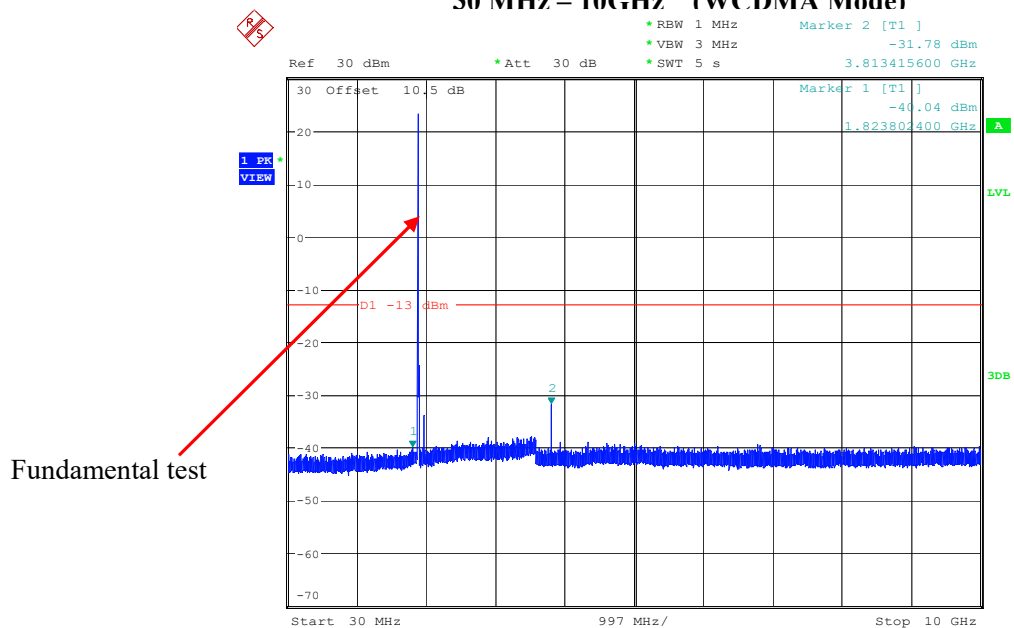


Date: 9.APR.2023 15:48:49

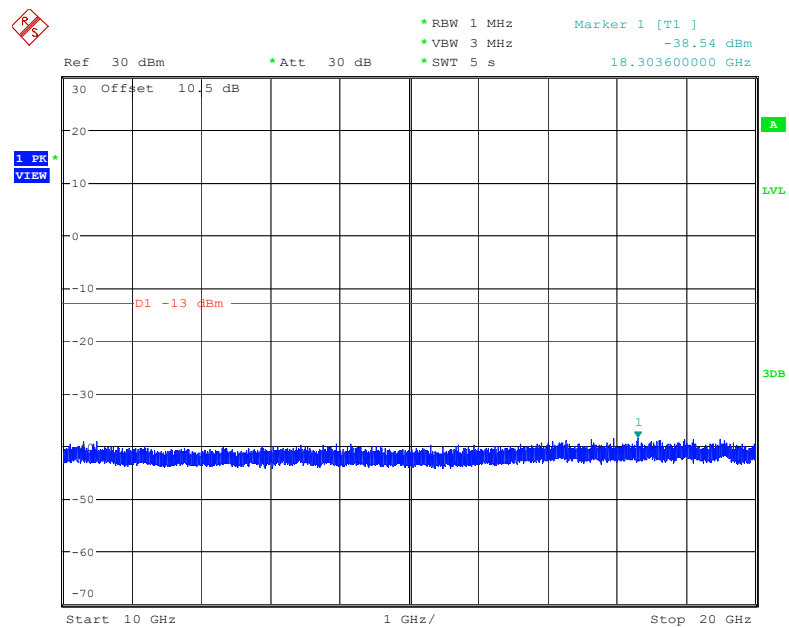
10 GHz – 20GHz (WCDMA Mode)



Date: 9.APR.2023 15:49:17

High Channel:**30 MHz – 10GHz (WCDMA Mode)**

Date: 9.APR.2023 15:54:43

10 GHz – 20GHz (WCDMA Mode)

Date: 9.APR.2023 15:55:10

The test plots of LTE band please refer to the Appendix B.

FCC § 2.1053; § 22.917 (a); § 24.238 (a); § 27.53 - SPURIOUS RADIATED EMISSIONS**Applicable Standard**

FCC § 2.1053, § 22.917(a) & § 24.238(a) & § 27.53.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data**Environmental Conditions**

Temperature:	23~26.5 °C
Relative Humidity:	46~55 %
ATM Pressure:	101.0 kPa

The testing was performed by Jason Liu on 2023-04-08 and 2023-04-11.

EUT operation mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axes of orientation was recorded)

Radiated Emission (Scan with X-AXIS, Y-AXIS, Z-AXIS, the worst case was recorded)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
1648.4	-53.4	258	2.2	H	3	-50.4	-13	37.4
1648.4	-55.1	332	1.4	V	2.6	-52.5	-13	39.5
2472.6	-57.2	154	1.3	H	7.1	-50.1	-13	37.1
2472.6	-55.0	84	1.5	V	5.9	-49.1	-13	36.1
3296.8	-50.1	37	1.4	H	6.7	-43.4	-13	30.4
3296.8	-49.0	153	1.0	V	6.2	-42.8	-13	29.8
Middle channel								
1673.2	-51.6	312	1.4	H	3.1	-48.5	-13	35.5
1673.2	-53.8	274	2.0	V	2.5	-51.3	-13	38.3
2509.8	-57.8	44	2.4	H	7.1	-50.7	-13	37.7
2509.8	-54.2	283	2.5	V	5.4	-48.8	-13	35.8
3346.4	-50.1	114	2.1	H	7.3	-42.8	-13	29.8
3346.4	-48.1	195	1.2	V	5.4	-42.7	-13	29.7
High channel								
1697.6	-51.1	287	1.0	H	3.2	-47.9	-13	34.9
1697.6	-52.6	180	1.3	V	2.4	-50.2	-13	37.2
2546.4	-56.3	243	1.6	H	6.9	-49.4	-13	36.4
2546.4	-55.5	140	1.7	V	6.2	-49.3	-13	36.3
3395.2	-49.3	229	1.0	H	5.9	-43.4	-13	30.4
3395.2	-48.2	270	1.4	V	5.2	-43	-13	30.0

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
3700.4	-45.6	136	1.5	H	8.2	-37.4	-13	24.4
3700.4	-43.9	313	1.9	V	6.8	-37.1	-13	24.1
Middle channel								
3760	-46.4	179	1.9	H	8.2	-38.2	-13	25.2
3760	-45.5	214	2.1	V	7.7	-37.8	-13	24.8
High channel								
3819.6	-46.2	156	1.4	H	8.1	-38.1	-13	25.1
3819.6	-45.0	293	1.6	V	7.6	-37.4	-13	24.4

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band2								
Test frequency range: 30MHz-20GHz								
Low channel								
3704.8	-49.3	172	1.1	H	8.2	-41.1	-13	28.1
3704.8	-44.8	48	2.3	V	6.9	-37.9	-13	24.9
Middle channel								
3760	-49.6	332	2.3	H	8.2	-41.4	-13	28.4
3760	-45.6	171	1.5	V	7.7	-37.9	-13	24.9
High channel								
3815.2	-49.4	250	1.7	H	8.2	-41.2	-13	28.2
3815.2	-45.1	269	2.5	V	7.5	-37.6	-13	24.6

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band5								
Test frequency range: 30MHz-10GHz								
Low channel								
1652.8	-54.9	140	2.2	H	3	-51.9	-13	38.9
1652.8	-54.6	136	2.1	V	2.6	-52	-13	39.0
2479.2	-56.3	45	1.5	H	7.1	-49.2	-13	36.2
2479.2	-54.5	113	2.3	V	5.8	-48.7	-13	35.7
3305.6	-50.0	272	2.0	H	6.7	-43.3	-13	30.3
3305.6	-49.3	150	1.1	V	6.1	-43.2	-13	30.2
Middle channel								
1673.2	-53.7	353	1.5	H	3.1	-50.6	-13	37.6
1673.2	-55.7	79	2.1	V	2.5	-53.2	-13	40.2
2509.8	-56.3	287	2.4	H	7.1	-49.2	-13	36.2
2509.8	-54.7	215	2.4	V	5.4	-49.3	-13	36.3
3346.4	-51.0	108	2.3	H	7.3	-43.7	-13	30.7
3346.4	-48.9	95	2.4	V	5.4	-43.5	-13	30.5
High channel								
1693.2	-55.0	284	1.1	H	3.2	-51.8	-13	38.8
1693.2	-55.3	236	2.3	V	2.4	-52.9	-13	39.9
2539.8	-56.2	231	1.8	H	7	-49.2	-13	36.2
2539.8	-54.8	259	1.0	V	6	-48.8	-13	35.8
3386.4	-50.0	207	1.1	H	6.2	-43.8	-13	30.8
3386.4	-48.5	233	2.2	V	5.2	-43.3	-13	30.3

LTE Bands: (pre-scan QPSK & 16QAM with all bandwidths, the worst case as below)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 2								
Test frequency range: 30MHz-20GHz								
QPSK 1.4MHz Bandwidth, Low channel								
3701.4	-46.6	357	1.4	H	8.2	-38.4	-13	-25.4
3701.4	-40.5	222	1.5	V	6.9	-33.6	-13	-20.6
5552.1	-44.6	214	2.3	H	9	-35.6	-13	-22.6
5552.1	-45.5	159	2.3	V	10	-35.5	-13	-22.5
QPSK 1.4MHz Bandwidth, Middle channel								
3760	-47.2	35	1.9	H	8.2	-39.0	-13	-26.0
3760	-41.9	261	2.4	V	7.7	-34.2	-13	-21.2
5640	-46.5	81	1.4	H	10.7	-35.8	-13	-22.8
5640	-45.1	54	1.5	V	9.8	-35.3	-13	-22.3
QPSK 1.4MHz Bandwidth, High channel								
3818.6	-46.9	31	1.7	H	8.1	-38.8	-13	-25.8
3818.6	-41.7	80	2.0	V	7.6	-34.1	-13	-21.1
5727.9	-47.3	231	2.3	H	11.4	-35.9	-13	-22.9
5727.9	-45.4	326	2.5	V	10	-35.4	-13	-22.4

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1649.4	-53.7	340	1.9	H	3	-50.7	-13	-37.7
1649.4	-54.8	310	1.9	V	2.6	-52.2	-13	-39.2
2474.1	-55.2	302	1.7	H	7.1	-48.1	-13	-35.1
2474.1	-53.8	335	1.1	V	5.9	-47.9	-13	-34.9
3298.8	-44.1	206	1.5	H	6.7	-37.4	-13	-24.4
3298.8	-44.8	323	1.3	V	6.2	-38.6	-13	-25.6
QPSK 1.4MHz Bandwidth, Middle channel								
1673	-49.6	31	1.0	H	3.1	-46.5	-13	-33.5
1673	-53.0	191	2.2	V	2.5	-50.5	-13	-37.5
2509.5	-55.3	215	1.3	H	7.1	-48.2	-13	-35.2
2509.5	-52.4	244	2.2	V	5.4	-47.0	-13	-34.0
3346	-45.5	336	1.7	H	7.3	-38.2	-13	-25.2
3346	-44.7	148	1.6	V	5.4	-39.3	-13	-26.3
QPSK 1.4MHz Bandwidth, High channel								
1696.6	-52.6	20	1.4	H	3.3	-49.3	-13	-36.3
1696.6	-52.3	324	1.0	V	2.4	-49.9	-13	-36.9
2544.9	-55.7	149	2.2	H	6.9	-48.8	-13	-35.8
2544.9	-54.3	35	1.7	V	6.1	-48.2	-13	-35.2
3393.2	-44.8	111	2.4	H	5.9	-38.9	-13	-25.9
3393.2	-45.4	115	1.2	V	5.2	-40.2	-13	-27.2

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band7								
Test frequency range: 30MHz-26GHz								
QPSK 5MHz Bandwidth, Low channel								
5005	-55.2	105	2.1	H	10.8	-44.4	-25	-19.4
5005	-54.5	20	1.7	V	10.2	-44.3	-25	-19.3
QPSK 5MHz Bandwidth, Middle channel								
5070	-55.3	133	1.5	H	11.6	-43.7	-25	-18.7
5070	-54.8	107	1.6	V	11.2	-43.6	-25	-18.6
QPSK 5MHz Bandwidth, High channel								
5135	-54.5	271	1.4	H	11.3	-43.2	-25	-18.2
5135	-54.4	59	1.7	V	10.6	-43.8	-25	-18.8

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band12								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
1399.4	-61.8	172	1.3	H	5.5	-56.3	-13	-43.3
1399.4	-63.3	154	1.6	V	6.3	-57.0	-13	-44.0
2099.1	-49.9	280	2.3	H	5.8	-44.1	-13	-31.1
2099.1	-45.5	49	1.9	V	4.6	-40.9	-13	-27.9
2798.8	-53.4	46	1.4	H	5.8	-47.6	-13	-34.6
2798.8	-53.9	54	1.8	V	6.9	-47.0	-13	-34.0
QPSK 1.4MHz Bandwidth, Middle channel								
1415	-61.7	100	1.5	H	5.1	-56.6	-13	-43.6
1415	-62.4	230	2.1	V	5.6	-56.8	-13	-43.8
2122.5	-51.5	205	2.0	H	6.7	-44.8	-13	-31.8
2122.5	-47.2	347	1.5	V	5.6	-41.6	-13	-28.6
2830	-54.7	20	1.4	H	6.3	-48.4	-13	-35.4
2830	-53.6	71	2.2	V	6.5	-47.1	-13	-34.1
QPSK 1.4MHz Bandwidth, High channel								
1430.6	-60.5	257	1.4	H	4.7	-55.8	-13	-42.8
1430.6	-61.3	285	2.0	V	4.9	-56.4	-13	-43.4
2145.9	-50.8	33	1.7	H	7.6	-43.2	-13	-30.2
2145.9	-47.7	40	2.0	V	6.7	-41.0	-13	-28.0
2861.2	-54.9	287	1.7	H	6.7	-48.2	-13	-35.2
2861.2	-53.7	284	2.5	V	6.2	-47.5	-13	-34.5

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band41								
Test frequency range: 30MHz-27GHz								
QPSK 5MHz Bandwidth, Low channel								
5095	-54.4	242	2.5	H	11.6	-42.8	-25	17.8
5095	-54.2	283	1.1	V	11.2	-43	-25	18.0
7642.5	-65.7	86	1.2	H	21.7	-44	-25	19.0
7642.5	-61.9	149	2.4	V	19.9	-42	-25	17.0
QPSK 5MHz Bandwidth, Middle channel								
5200	-53.7	350	1.6	H	11.1	-42.6	-25	17.6
5200	-52.0	180	2.0	V	9.9	-42.1	-25	17.1
7800	-62.3	184	1.3	H	17.8	-44.5	-25	19.5
7800	-58.7	165	1.9	V	17.1	-41.6	-25	16.6
QPSK 5MHz Bandwidth, High channel								
5305	-52.3	100	1.3	H	9.4	-42.9	-25	17.9
5305	-51.0	63	1.1	V	8.6	-42.4	-25	17.4
7957.5	-63.6	41	1.4	H	19.4	-44.2	-25	19.2
7957.5	-60.5	360	1.7	V	18.1	-42.4	-25	17.4

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Absolute Level - Limit

Other emission which was more than 20dB below the limit was not recorded.

FCC§ 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

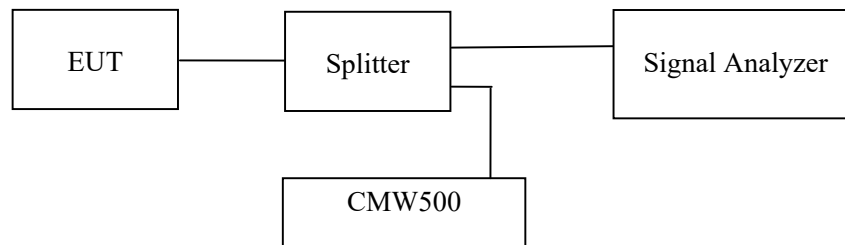
According to FCC §27.53 (h), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC §27.53 (m), For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5MHz.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data**Environmental Conditions**

Temperature:	24~27 °C
Relative Humidity:	52~60 %
ATM Pressure:	101.0 kPa

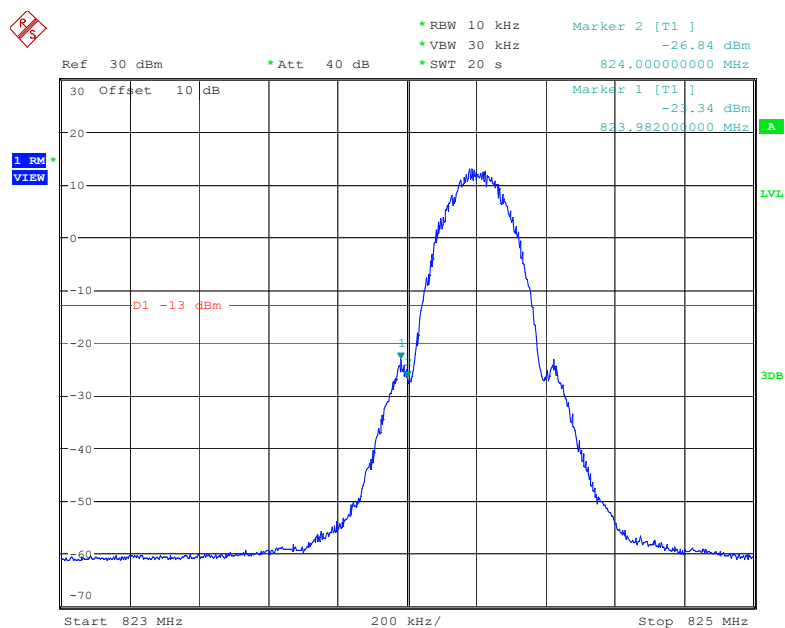
The testing was performed by Roger Ling from 2023-04-07 to 2023-04-14.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

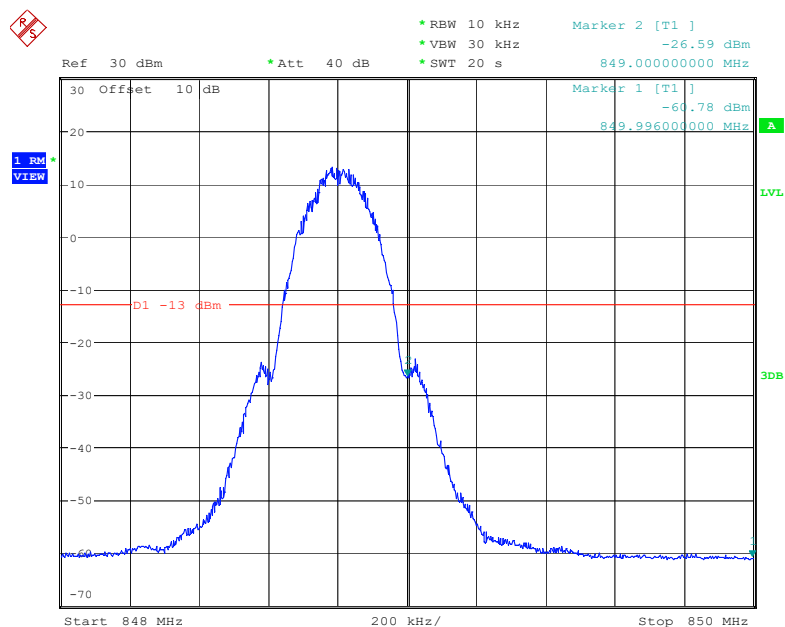
Please refer to the following plots.

Cellular Band, Left Band Edge for GSM (GMSK) Mode



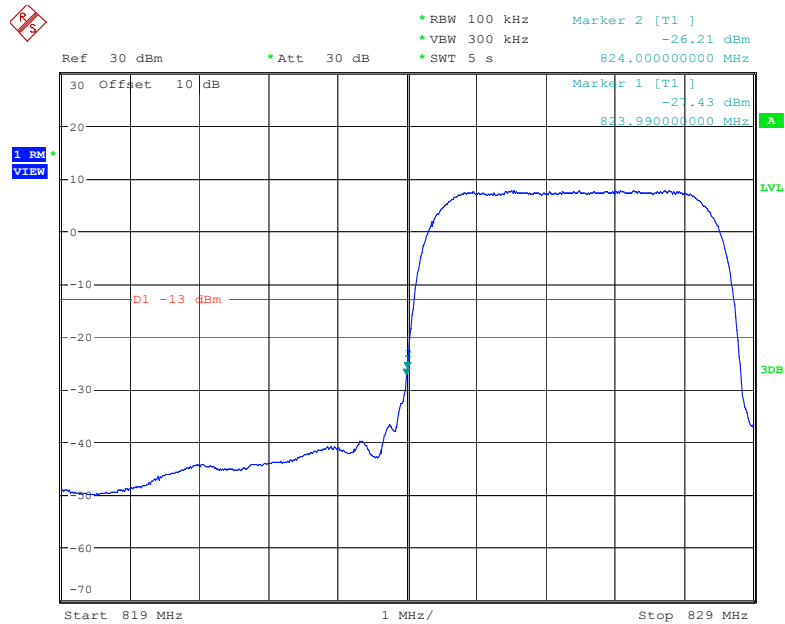
Date: 10.APR.2023 13:51:26

Cellular Band, Right Band Edge for GSM (GMSK) Mode



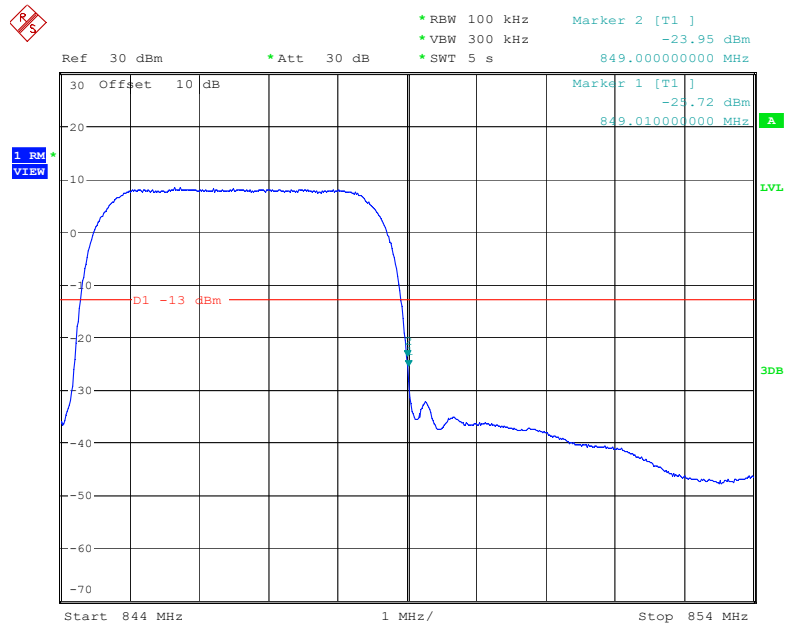
Date: 10.APR.2023 14:18:07

Cellular Band, Left Band Edge for RMC (BPSK) Mode



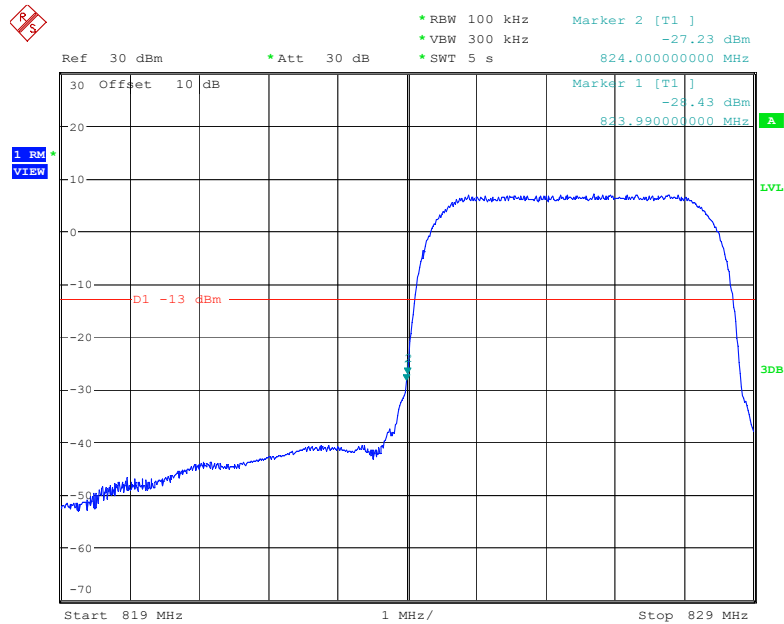
Date: 9.APR.2023 11:20:24

Cellular Band, Right Band Edge for RMC (BPSK) Mode



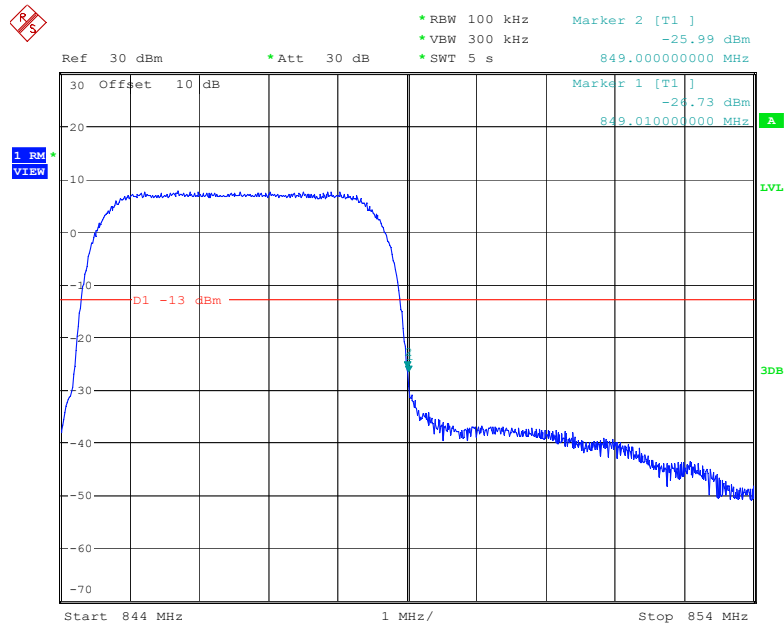
Date: 9.APR.2023 11:28:43

Cellular Band, Left Band Edge for HSDPA(16QAM) Mode



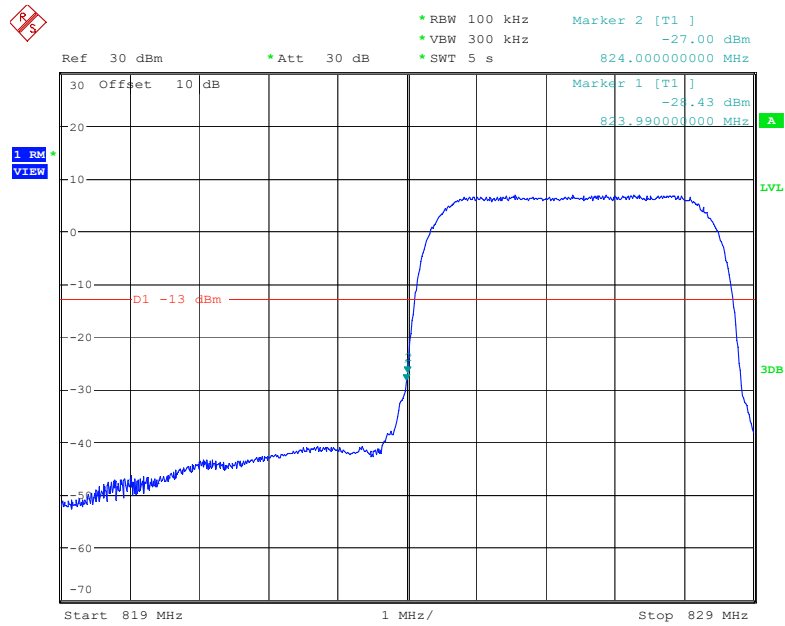
Date: 9.APR.2023 11:58:16

Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



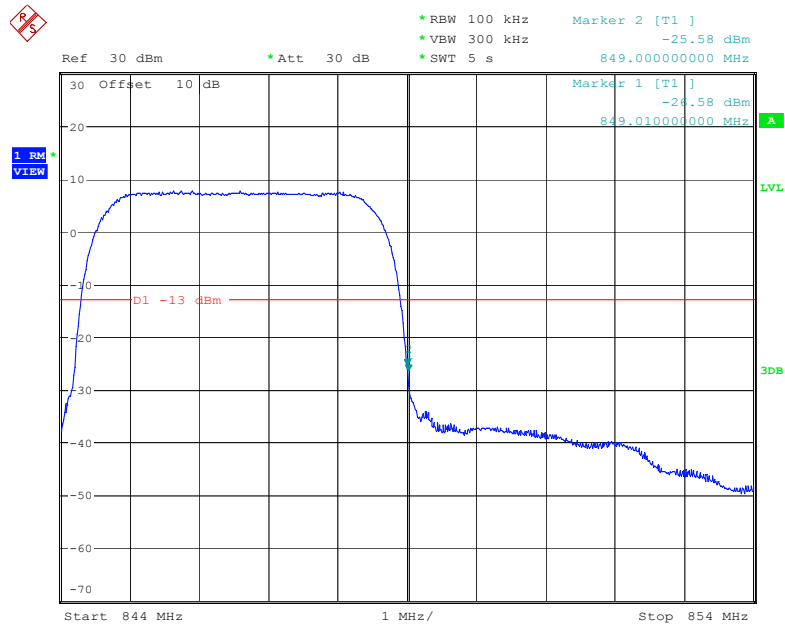
Date: 9.APR.2023 12:18:10

Cellular Band, Left Band Edge for HSUPA (QPSK) Mode



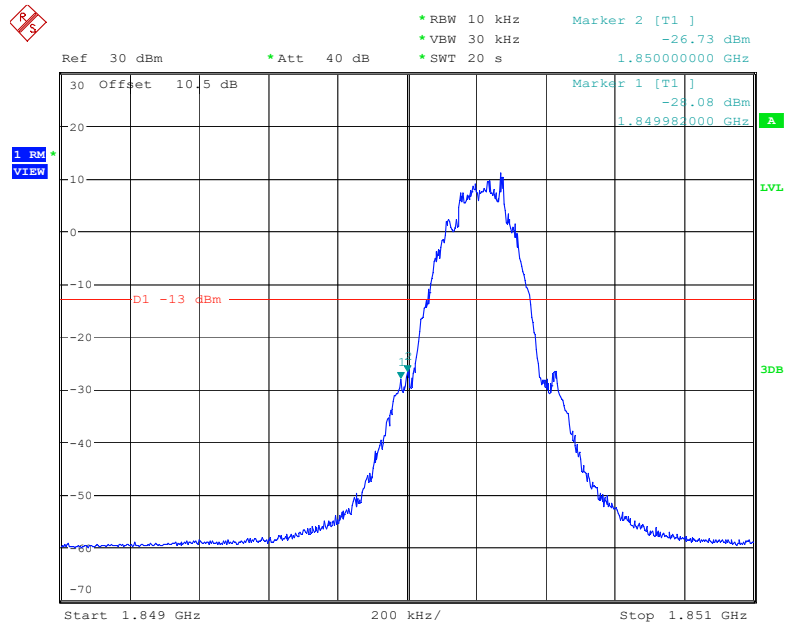
Date: 9.APR.2023 12:38:06

Cellular Band, Right Band Edge for HSUPA (QPSK) Mode



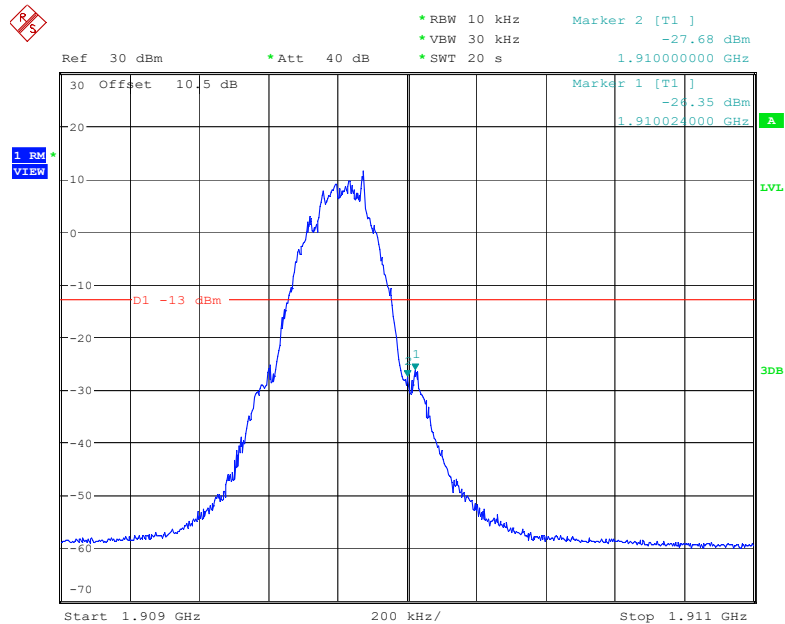
Date: 9.APR.2023 13:17:39

PCS Band, Left Band Edge for GSM (GMSK) Mode



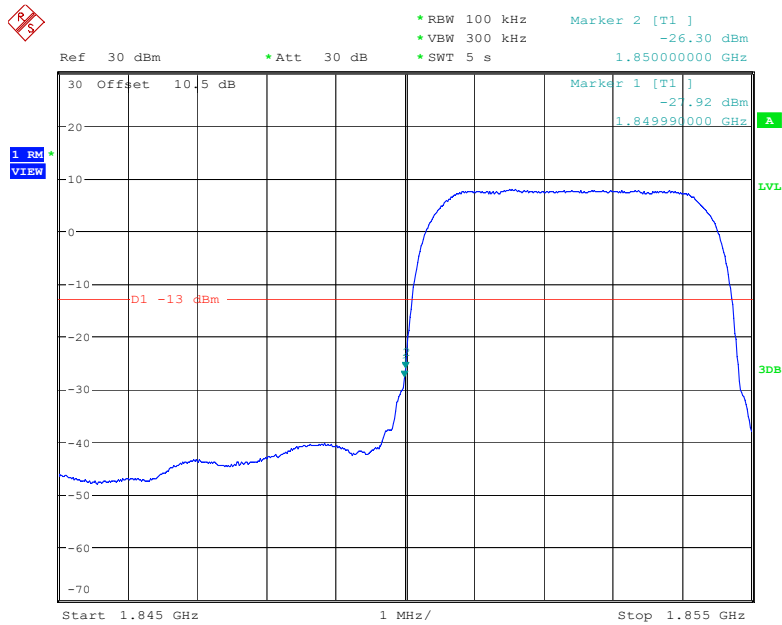
Date: 10.APR.2023 09:11:07

PCS Band, Right Band Edge for GSM (GMSK) Mode



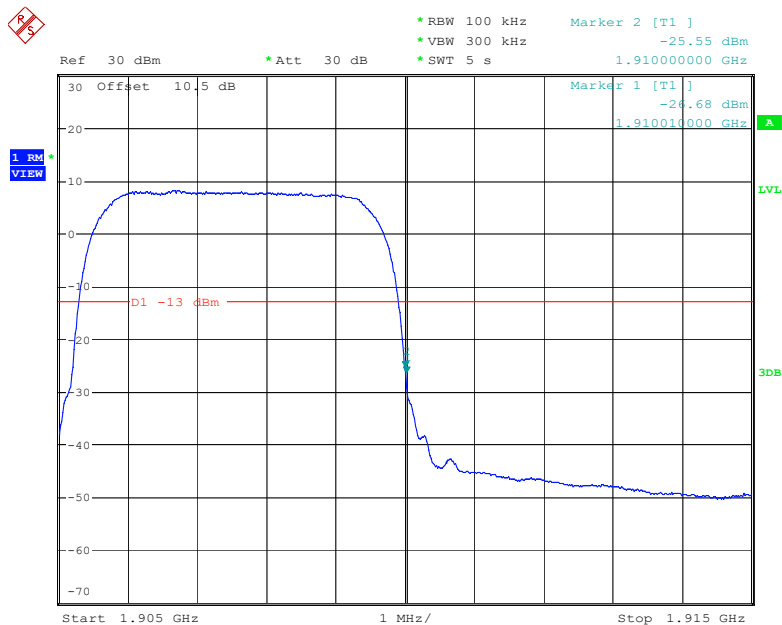
Date: 10.APR.2023 09:25:26

PCS Band, Left Band Edge for RMC (BPSK) Mode



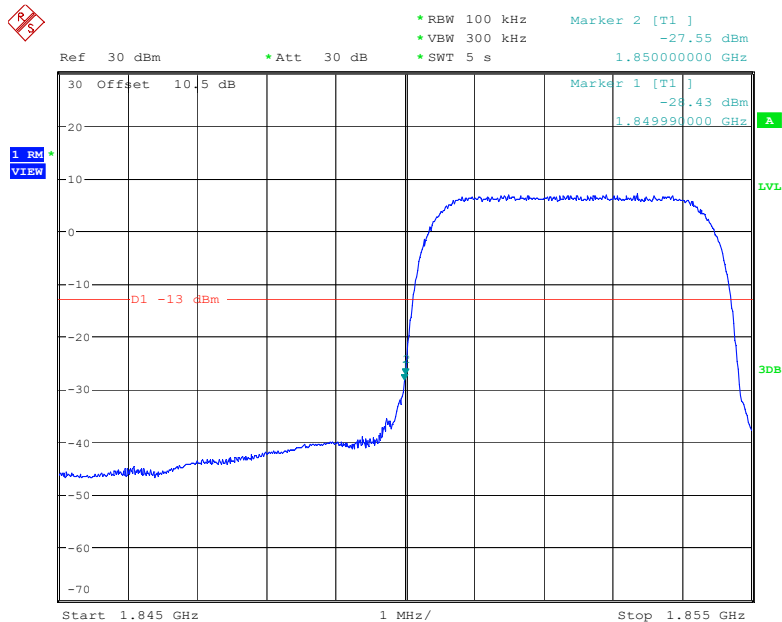
Date: 9.APR.2023 15:43:45

PCS Band, Right Band Edge for RMC (BPSK) Mode



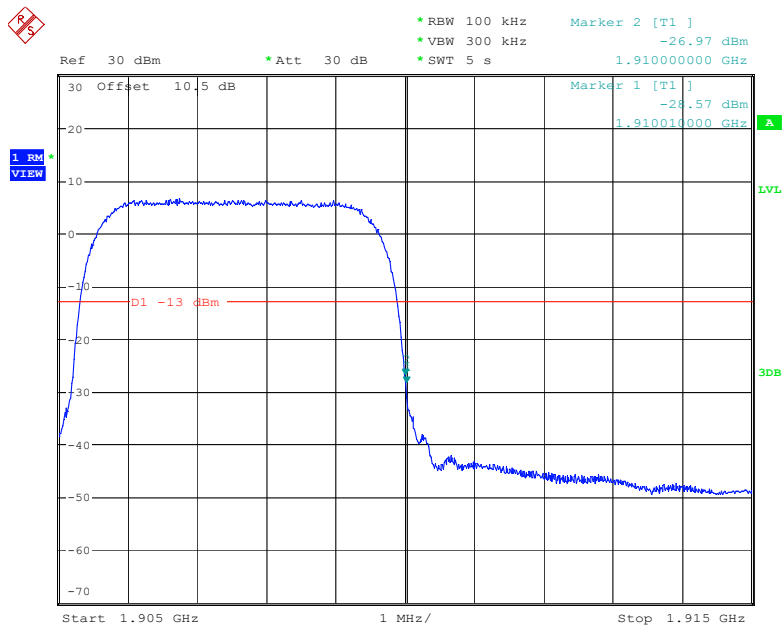
Date: 9.APR.2023 15:54:17

PCS Band, Left Band Edge for HSDPA(16QAM) Mode

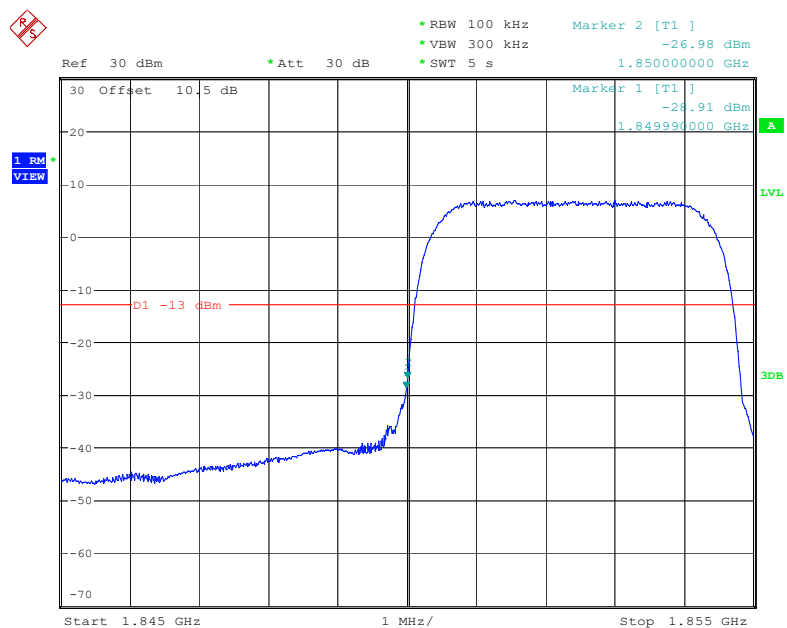


Date: 9.APR.2023 16:03:02

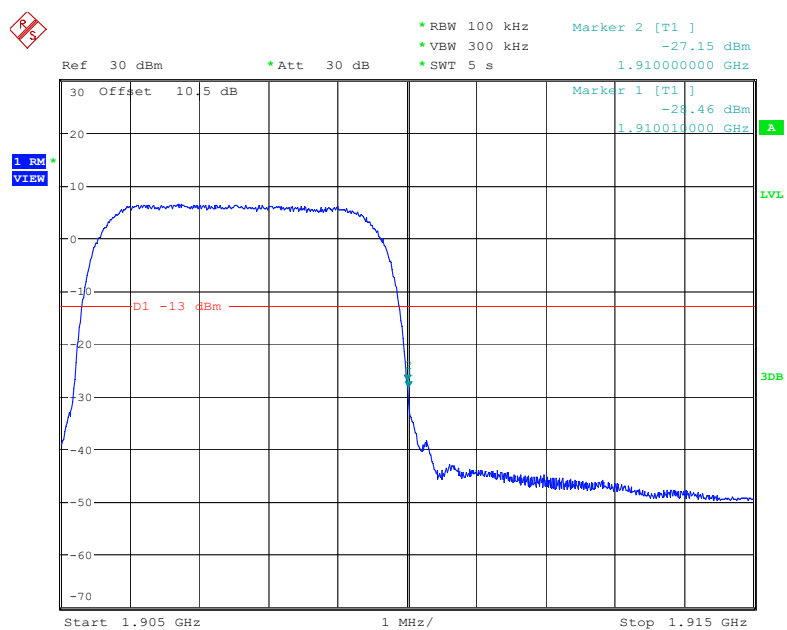
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



Date: 9.APR.2023 16:22:05

PCS Band, Left Band Edge for HSUPA (QPSK) Mode

Date: 9.APR.2023 16:39:40

PCS Band, Right Band Edge for HSUPA (QPSK) Mode

Date: 9.APR.2023 17:06:00

The test plots of LTE bands please refer to the Appendix C.

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY**Applicable Standard**

FCC § 2.1055, §22.355, §24.235&§27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

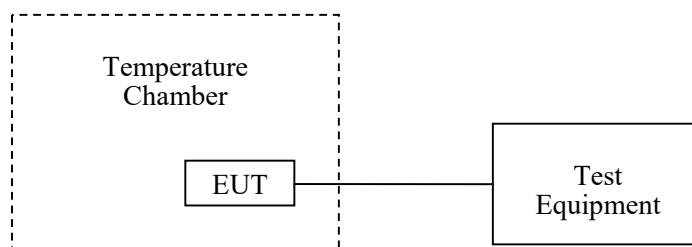
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data**Environmental Conditions**

Temperature:	24~27 °C
Relative Humidity:	52~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling from 2023-04-09 to 2023-04-15.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)**GSM Mode**

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	3	0.0036	2.5
-20		2	0.0024	2.5
-10		0	0.0000	2.5
0		2	0.0024	2.5
10		3	0.0036	2.5
20		3	0.0036	2.5
30		6	0.0072	2.5
40		7	0.0084	2.5
50		3	0.0036	2.5
20	L.V.	2	0.0024	2.5
	H.V.	2	0.0024	2.5

WCDMA Mode

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	2	0.0024	2.5
-20		3	0.0036	2.5
-10		2	0.0024	2.5
0		5	0.0060	2.5
10		3	0.0036	2.5
20		1	0.0012	2.5
30		4	0.0048	2.5
40		6	0.0072	2.5
50		2	0.0024	2.5
20	L.V.	6	0.0072	2.5
	H.V.	7	0.0084	2.5

PCS Band (Part 24E)**GSM Mode**

Middle Channel, $f_0 = 1880\text{MHz}$					
Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	N.V.	1850.0437	1909.9532	1850	1910
-20		1850.0433	1909.9643	1850	1910
-10		1850.0369	1909.9784	1850	1910
0		1850.0669	1909.9575	1850	1910
10		1850.0493	1909.9732	1850	1910
20		1850.0604	1909.9654	1850	1910
30		1850.0556	1909.9655	1850	1910
40		1850.0499	1909.9735	1850	1910
50		1850.0489	1909.9601	1850	1910
20	L.V.	1850.0505	1909.9568	1850	1910
	H.V.	1850.0324	1909.9518	1850	1910

WCDMA Mode

Middle Channel, $f_0=1880\text{MHz}$					
Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	N.V.	1850.0381	1909.9890	1850	1910
-20		1850.0275	1909.9839	1850	1910
-10		1850.0247	1909.9873	1850	1910
0		1850.0423	1909.9984	1850	1910
10		1850.0334	1909.9919	1850	1910
20		1850.0508	1909.9821	1850	1910
30		1850.0312	1909.9966	1850	1910
40		1850.0303	1909.9678	1850	1910
50		1850.0502	1909.9810	1850	1910
20	L.V.	1850.0285	1909.9716	1850	1910
	H.V.	1850.0501	1909.9802	1850	1910

LTE:
QPSK:
Band 2:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	N.V.	1850.1587	1909.7729	1850	1910
-20		1850.1675	1909.7829	1850	1910
-10		1850.1738	1909.7873	1850	1910
0		1850.1532	1909.7651	1850	1910
10		1850.1691	1909.7694	1850	1910
20		1850.1678	1909.7857	1850	1910
30		1850.1636	1909.7656	1850	1910
40		1850.1815	1909.7587	1850	1910
50		1850.1647	1909.7732	1850	1910
20	L.V.	1850.1771	1909.7761	1850	1910
	H.V.	1850.1742	1909.7819	1850	1910

Band 5:

10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	7.94	0.0095	2.5
-20		-7.96	-0.0095	2.5
-10		8.30	0.0099	2.5
0		-6.24	-0.0075	2.5
10		-6.93	-0.0083	2.5
20		-5.21	-0.0062	2.5
30		9.29	0.0111	2.5
40		-7.43	-0.0089	2.5
50		6.09	0.0073	2.5
20	L.V.	6.20	0.0074	2.5
	H.V.	7.96	0.0095	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.1974	2569.8813	2500	2570
-20		2500.1986	2569.9019	2500	2570
-10		2500.1809	2569.8997	2500	2570
0		2500.1706	2569.8742	2500	2570
10		2500.1977	2569.9004	2500	2570
20		2500.2047	2569.8374	2500	2570
30		2500.1676	2569.8448	2500	2570
40		2500.1776	2569.9002	2500	2570
50		2500.1500	2569.9030	2500	2570
20	L.V.	2500.1463	2569.8763	2500	2570
	H.V.	2500.1543	2569.8886	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	699.1715	715.8765	699	716
-20		699.1635	715.8864	699	716
-10		699.1564	715.8408	699	716
0		699.1484	715.8723	699	716
10		699.1306	715.8513	699	716
20		699.1562	715.8674	699	716
30		699.1202	715.8318	699	716
40		699.1288	715.8411	699	716
50		699.1178	715.8594	699	716
20	L.V.	699.1546	715.8818	699	716
	H.V.	699.1504	715.8629	699	716

Band 41:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2545.1852	2654.8927	2545	2655
-20		2545.1832	2654.9014	2545	2655
-10		2545.1636	2654.8671	2545	2655
0		2545.1375	2654.8670	2545	2655
10		2545.1411	2654.8457	2545	2655
20		2545.1426	2654.8616	2545	2655
30		2545.1178	2654.8474	2545	2655
40		2545.1234	2654.8414	2545	2655
50		2545.1878	2654.8215	2545	2655
20	L.V.	2545.1696	2654.8211	2545	2655
	H.V.	2545.1698	2654.8032	2545	2655

16QAM:**Band 2:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1850.1743	1909.7715	1850	1910
-20		1850.1582	1909.7845	1850	1910
-10		1850.1791	1909.7922	1850	1910
0		1850.1644	1909.7724	1850	1910
10		1850.1867	1909.7660	1850	1910
20		1850.1744	1909.8009	1850	1910
30		1850.1765	1909.7730	1850	1910
40		1850.1981	1909.7658	1850	1910
50		1850.1667	1909.7728	1850	1910
20	L.V.	1850.1737	1909.7914	1850	1910
	H.V.	1850.1693	1909.7941	1850	1910

Band 5:

10.0 MHz Middle Channel, f ₀ =836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-14.92	-0.0178	2.5
-20		6.60	0.0079	2.5
-10		8.20	0.0098	2.5
0		7.97	0.0095	2.5
10		-5.46	-0.0065	2.5
20		8.38	0.0100	2.5
30		-6.67	-0.0080	2.5
40		8.44	0.0101	2.5
50		8.89	0.0106	2.5
20	L.V.	8.74	0.0104	2.5
	H.V.	5.51	0.0066	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.1949	2569.8927	2500	2570
-20		2500.2090	2569.8955	2500	2570
-10		2500.1938	2569.9090	2500	2570
0		2500.1829	2569.8891	2500	2570
10		2500.1973	2569.8977	2500	2570
20		2500.2036	2569.8293	2500	2570
30		2500.1756	2569.8498	2500	2570
40		2500.1836	2569.9163	2500	2570
50		2500.1611	2569.9107	2500	2570
20	L.V.	2500.1451	2569.8927	2500	2570
	H.V.	2500.1716	2569.8990	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	699.1698	715.8811	699	716
-20		699.1735	715.8833	699	716
-10		699.1483	715.8564	699	716
0		699.1463	715.8891	699	716
10		699.1298	715.8533	699	716
20		699.1536	715.8784	699	716
30		699.1235	715.8405	699	716
40		699.1258	715.8489	699	716
50		699.1108	715.8649	699	716
20	L.V.	699.1694	715.8952	699	716
	H.V.	699.1624	715.8709	699	716

Band 41:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2545.1754	2654.8988	2545	2655
-20		2545.1731	2654.8931	2545	2655
-10		2545.1687	2654.8679	2545	2655
0		2545.1447	2654.8681	2545	2655
10		2545.1318	2654.8379	2545	2655
20		2545.1343	2654.8538	2545	2655
30		2545.1083	2654.8427	2545	2655
40		2545.1404	2654.8455	2545	2655
50		2545.1613	2654.8403	2545	2655
20	L.V.	2545.1629	2654.8226	2545	2655
	H.V.	2545.1804	2654.8170	2545	2655

***** END OF REPORT *****