



TEST REPORT

Applicant Name : Shenzhen Youmi Intelligent Technology Co., Ltd.
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Report Number : SZNS220313-08566E-RF-00C
FCC ID: 2ATZ4-A13PF

Test Standard (s)

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

Sample Description

Product Type: Smart phone
Model No.: A13 Pro
Multiple Model(s) No.: F3S(Please refer to DOS for Model difference)
Trade Mark: UMIDIGI
Date Received: 2022/03/13
Report Date: 2022/05/18

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

Prepared and Checked By:

Ting Lü
EMC Engineer

Approved By:

Robert 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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FCC -2G,3G,4G

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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 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 13: 777-787MHz(TX); 746-756MHz(RX) LTE Band 41: 2535-2655MHz(TX/RX)
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA 850/LTE B5 : -2.28dBi WCDMA 1900/PCS1900/LTE B2 : 0.83dBi LTE B12/B13 : -1.01dBi LTE B41 : -1.33dBi (provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5V from adapter
Sample serial number	SZNS220313-08566E-RF-S1 for Radiated Emissions SZNS220313-08566E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: HJ-0502000W2-US Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2.0A
Normal/Extreme Condition	L.V.: Low Voltage 3.45V _{DC} N.V.: Normal Voltage 3.85V _{DC} H.V.: High Voltage 4.4V _{DC}

Note: The series model F3S is electrical identical to the model A13 pro, the difference between them is back cover shape, the material is same, so the difference will not affect the test result, only the model A13 pro was tested.

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-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
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz -26.5GHz	5.06dB
	26.5GHz -40GHz	4.72dB
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 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. 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 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

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 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 B13	5	779.5	782.0	784.5
	10	/	782.0	/
LTE B41	5	2537.5	2595	2652.5
	10	2540	2595	2650
	15	2542.5	2595	2647.5
	20	2545	2595	2645

Equipment Modifications

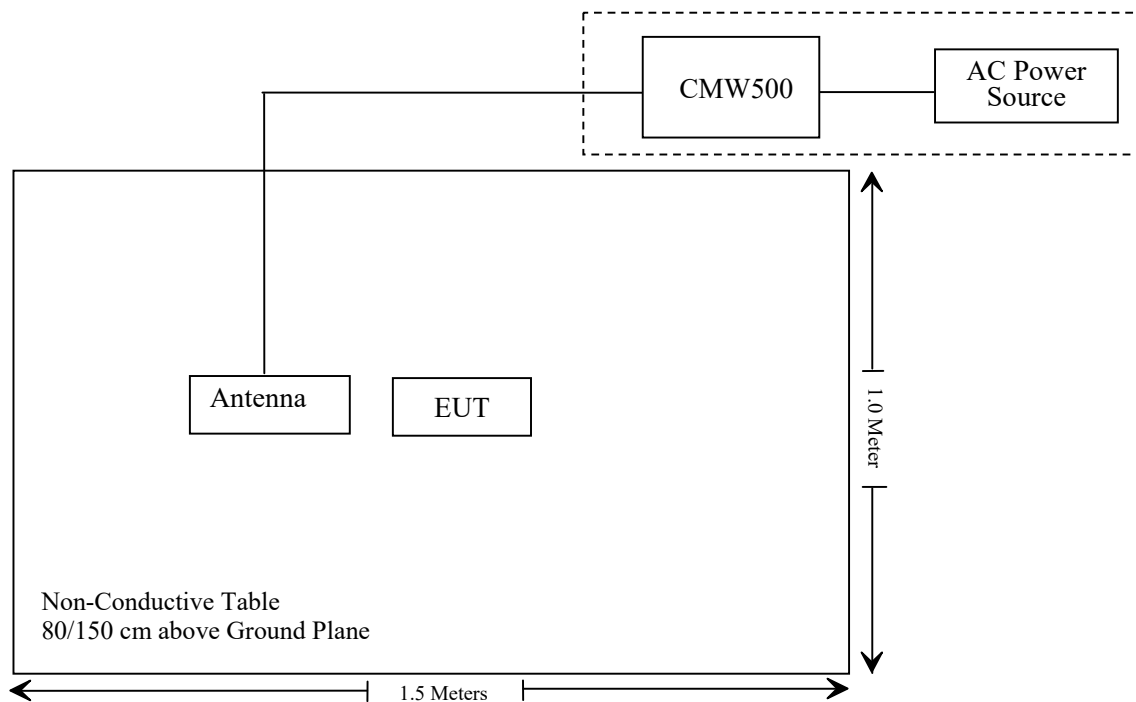
No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-11621 8-UY

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	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	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
PASTERNAK	Horn Antenn	PE9852/2F-20	1120	2020/01/05	2023/01/04
PASTERNAK	Horn Antenn	PE9852/2F-20	1120	2020/01/05	2023/01/04
Agilent	Signal Generator	N5183A	MY51040755	2021/12/13	2022/12/12
Wainwright	High Pass Filter	WHKX3.6/18G-10S S	5	2021/12/14	2022/12/13
CD	High Pass Filter	HPM-1.2/18G-60	110	2021/12/14	2022/12/13
RF Conducted Test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2021/07/06	2022/07/05
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2021/12/13	2022/12/12
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2021/12/13	2022/12/12
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2021/12/14	2022/12/13
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2021/10/14	2022/10/13
Fluke	Multi Meter	45	7664009	2021/12/14	2022/12/13
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Unknown	RF Cable	Unknown	Unknown	Each time	/
HP	6dB Attenuator	8493B	06151	2021/12/14	2022/12/13

* 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: CR22030066-20A.

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(b)(c)(h)- RF OUTPUT POWER

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.

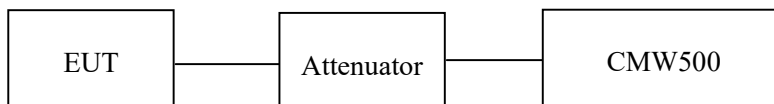
According to §27.50(b), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei from 2022-03-24 to 2022-05-17.

Conducted Power**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	31.60	26.67	38.45
	190	836.6	31.50	26.57	38.45
	251	848.8	31.50	26.57	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	31.57	29.49	27.52	25.85	26.64	24.56	22.59	20.92	38.45
	190	836.6	31.54	29.35	27.42	25.86	26.61	24.42	22.49	20.93	38.45
	251	848.8	31.55	29.16	27.19	25.66	26.62	24.23	22.26	20.73	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA	RMC12.2k		21.83	21.85	21.83	16.90	16.92	16.90
	HSDPA	1	21.82	21.79	21.74	16.89	16.86	16.81
		2	21.83	21.52	21.58	16.90	16.59	16.65
		3	21.77	21.33	21.44	16.84	16.40	16.51
		4	21.59	21.45	21.53	16.66	16.52	16.60
	HSUPA	1	21.86	21.74	21.72	16.93	16.81	16.79
		2	21.73	21.42	21.55	16.80	16.49	16.62
		3	21.55	21.56	21.46	16.62	16.63	16.53
		4	21.46	21.43	21.72	16.53	16.50	16.79
		5	21.59	21.46	21.55	16.66	16.53	16.62
	HSPA+	1	21.47	21.8	21.46	16.54	16.87	16.53

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)
 For GSM850/WCDMA Band5: Antenna Gain = -2.28dBi = -4.43dBd (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	29.50	29.53	33
	661	1880.0	29.70	29.73	33
	810	1909.8	29.60	29.63	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	29.38	27.08	25.69	23.71	29.41	27.11	25.72	23.74	33
	661	1880.0	29.61	26.95	25.44	23.67	29.64	26.98	25.47	23.70	33
	810	1909.8	29.53	26.63	25.32	23.66	29.56	26.66	25.35	23.69	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.31	22.28	22.30	22.34	22.31	22.33
	HSDPA	1	21.96	22.00	21.77	21.99	22.03	21.80
		2	21.88	21.97	21.58	21.91	22.00	21.61
		3	21.92	21.95	21.66	21.95	21.98	21.69
		4	21.69	21.89	21.84	21.72	21.92	21.87
	HSUPA	1	22.03	22.01	21.76	22.06	22.04	21.79
		2	22.01	21.99	21.88	22.04	22.02	21.91
		3	21.98	21.85	21.93	22.01	21.88	21.96
		4	21.96	21.87	21.46	21.99	21.90	21.49
		5	22.14	21.76	21.58	22.17	21.79	21.61
	HSPA+	1	22.03	21.92	21.55	22.06	21.95	21.58

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

For PCS1900 / WCDMA Band2: Antenna Gain =0.83dBi

Cable Loss=0.8dB*(provided by the applicant)

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	20.09	19.85	18.98	20.12	19.88	19.01
		RB1#3	20.01	19.85	18.99	20.04	19.88	19.02
		RB1#5	19.95	19.84	19.01	19.98	19.87	19.04
		RB3#0	20.03	19.88	19.07	20.06	19.91	19.10
		RB3#3	20.15	19.92	18.93	20.18	19.95	18.96
		RB6#0	18.94	18.86	17.90	18.97	18.89	17.93
	16QAM	RB1#0	19.65	19.38	18.07	19.68	19.41	18.10
		RB1#3	19.69	19.42	18.12	19.72	19.45	18.15
		RB1#5	19.65	19.33	18.15	19.68	19.36	18.18
		RB3#0	19.12	18.89	17.80	19.15	18.92	17.83
		RB3#3	19.13	18.78	17.75	19.16	18.81	17.78
		RB6#0	18.22	18.03	17.00	18.25	18.06	17.03
3.0	QPSK	RB1#0	19.57	18.95	18.69	19.60	18.98	18.72
		RB1#8	19.47	18.94	18.70	19.50	18.97	18.73
		RB1#14	19.51	18.91	18.63	19.54	18.94	18.66
		RB6#0	18.54	18.02	17.67	18.57	18.05	17.70
		RB6#9	18.56	17.89	17.56	18.59	17.92	17.59
		RB15#0	18.62	17.95	17.65	18.65	17.98	17.68
	16QAM	RB1#0	19.01	18.24	17.12	19.04	18.27	17.15
		RB1#8	18.94	18.11	17.06	18.97	18.14	17.09
		RB1#14	18.91	18.07	17.06	18.94	18.10	17.09
		RB6#0	17.54	17.10	16.68	17.57	17.13	16.71
		RB6#9	17.52	17.10	16.67	17.55	17.13	16.70
		RB15#0	17.60	17.08	16.74	17.63	17.11	16.77

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	19.57	19.59	18.92	19.60	19.62	18.95
		RB1#13	19.52	19.57	18.84	19.55	19.60	18.87
		RB1#24	19.45	19.60	18.87	19.48	19.63	18.90
		RB15#0	18.65	18.52	18.12	18.68	18.55	18.15
		RB15#10	18.58	18.52	18.04	18.61	18.55	18.07
		RB25#0	18.58	18.54	18.05	18.61	18.57	18.08
	16QAM	RB1#0	17.66	18.53	18.10	17.69	18.56	18.13
		RB1#13	17.69	18.49	18.01	17.72	18.52	18.04
		RB1#24	17.66	18.48	18.05	17.69	18.51	18.08
		RB15#0	17.63	17.43	17.01	17.66	17.46	17.04
		RB15#10	17.61	17.38	17.06	17.64	17.41	17.09
		RB25#0	17.71	17.56	17.18	17.74	17.59	17.21
10.0	QPSK	RB1#0	19.45	19.10	19.41	19.48	19.13	19.44
		RB1#25	19.39	19.03	19.40	19.42	19.06	19.43
		RB1#49	19.35	19.08	19.31	19.38	19.11	19.34
		RB25#0	18.39	18.04	18.57	18.42	18.07	18.60
		RB25#25	18.44	17.96	18.43	18.47	17.99	18.46
		RB50#0	18.41	18.05	18.52	18.44	18.08	18.55
	16QAM	RB1#0	18.89	18.88	18.26	18.92	18.91	18.29
		RB1#25	18.76	18.79	18.20	18.79	18.82	18.23
		RB1#49	18.80	18.76	18.15	18.83	18.79	18.18
		RB25#0	17.54	17.23	17.72	17.57	17.26	17.75
		RB25#25	17.50	17.16	17.68	17.53	17.19	17.71
		RB50#0	17.44	17.17	17.52	17.47	17.20	17.55

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	19.78	19.39	18.58	19.81	19.42	18.61
		RB1#38	19.79	19.30	18.47	19.82	19.33	18.50
		RB1#74	19.68	19.28	18.38	19.71	19.31	18.41
		RB36#0	18.83	18.45	17.83	18.86	18.48	17.86
		RB36#39	18.82	18.40	17.61	18.85	18.43	17.64
		RB75#0	18.82	18.25	17.65	18.85	18.28	17.68
	16QAM	RB1#0	19.07	19.21	17.95	19.10	19.24	17.98
		RB1#38	19.07	19.07	17.84	19.10	19.10	17.87
		RB1#74	18.95	18.97	17.70	18.98	19.00	17.73
		RB36#0	17.98	17.48	16.85	18.01	17.51	16.88
		RB36#39	18.39	17.48	16.72	18.42	17.51	16.75
		RB75#0	18.04	17.39	16.75	18.07	17.42	16.78
20.0	QPSK	RB1#0	19.46	19.86	19.21	19.49	19.89	19.24
		RB1#50	19.41	19.69	19.10	19.44	19.72	19.13
		RB1#99	19.22	19.76	18.94	19.25	19.79	18.97
		RB50#0	18.24	18.63	18.15	18.27	18.66	18.18
		RB50#50	18.26	18.57	18.00	18.29	18.60	18.03
		RB100#0	18.38	18.59	18.00	18.41	18.62	18.03
	16QAM	RB1#0	18.33	18.63	18.99	18.36	18.66	19.02
		RB1#50	18.28	18.41	18.81	18.31	18.44	18.84
		RB1#99	18.18	18.47	18.63	18.21	18.50	18.66
		RB50#0	17.38	17.69	17.27	17.41	17.72	17.30
		RB50#50	17.36	17.56	17.00	17.39	17.59	17.03
		RB100#0	17.34	17.66	17.15	17.37	17.69	17.18

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

For Band2: Antenna Gain = 0.83dBi

Cable Loss=0.8dB*(provided by the applicant)

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	22.27	22.16	22.20	17.34	17.23	17.27
		RB1#3	22.33	22.26	22.21	17.40	17.33	17.28
		RB1#5	22.30	22.31	22.20	17.37	17.38	17.27
		RB3#0	22.38	22.35	22.16	17.45	17.42	17.23
		RB3#3	22.38	22.21	22.19	17.45	17.28	17.26
		RB6#0	21.36	21.25	21.00	16.43	16.32	16.07
	16QAM	RB1#0	21.92	20.86	21.36	16.99	15.93	16.43
		RB1#3	21.91	20.59	21.46	16.98	15.66	16.53
		RB1#5	21.93	20.68	21.41	17.00	15.75	16.48
		RB3#0	21.30	20.99	20.93	16.37	16.06	16.00
		RB3#3	21.30	21.00	20.97	16.37	16.07	16.04
		RB6#0	20.47	20.21	20.16	15.54	15.28	15.23
3.0	QPSK	RB1#0	22.28	22.25	22.29	17.35	17.32	17.36
		RB1#8	22.32	22.28	22.25	17.39	17.35	17.32
		RB1#14	22.30	22.25	22.28	17.37	17.32	17.35
		RB6#0	21.33	21.34	21.18	16.40	16.41	16.25
		RB6#9	21.41	21.12	21.02	16.48	16.19	16.09
		RB15#0	21.27	21.22	21.11	16.34	16.29	16.18
	16QAM	RB1#0	21.69	21.45	20.71	16.76	16.52	15.78
		RB1#8	21.58	21.22	20.62	16.65	16.29	15.69
		RB1#14	21.59	21.29	20.75	16.66	16.36	15.82
		RB6#0	20.39	20.97	20.22	15.46	16.04	15.29
		RB6#9	20.35	20.45	20.20	15.42	15.52	15.27
		RB15#0	20.49	20.27	20.04	15.56	15.34	15.11

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	22.34	22.32	22.05	17.41	17.39	17.12
		RB1#13	22.35	22.34	22.08	17.42	17.41	17.15
		RB1#24	22.27	22.26	22.03	17.34	17.33	17.10
		RB15#0	21.36	21.32	21.23	16.43	16.39	16.30
		RB15#10	21.47	21.10	21.05	16.54	16.17	16.12
		RB25#0	21.38	21.11	21.12	16.45	16.18	16.19
	16QAM	RB1#0	20.46	21.29	21.14	15.53	16.36	16.21
		RB1#13	20.41	21.17	21.10	15.48	16.24	16.17
		RB1#24	20.47	21.08	21.18	15.54	16.15	16.25
		RB15#0	20.49	20.74	20.04	15.56	15.81	15.11
		RB15#10	20.49	20.16	20.00	15.56	15.23	15.07
		RB25#0	20.54	20.18	20.09	15.61	15.25	15.16
10.0	QPSK	RB1#0	22.37	22.35	22.16	17.44	17.42	17.23
		RB1#25	22.37	22.28	22.04	17.44	17.35	17.11
		RB1#49	22.32	22.30	22.04	17.39	17.37	17.11
		RB25#0	21.35	21.31	21.32	16.42	16.38	16.39
		RB25#25	21.38	21.19	21.20	16.45	16.26	16.27
		RB50#0	21.32	21.29	21.20	16.39	16.36	16.27
	16QAM	RB1#0	21.75	22.01	20.96	16.82	17.08	16.03
		RB1#25	21.78	21.89	20.92	16.85	16.96	15.99
		RB1#49	21.71	21.95	20.91	16.78	17.02	15.98
		RB25#0	20.48	20.91	20.40	15.55	15.98	15.47
		RB25#25	20.36	20.32	20.28	15.43	15.39	15.35
		RB50#0	20.42	20.21	20.18	15.49	15.28	15.25

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

For Band5: Antenna Gain = -2.28dBi = -4.43dBd (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	22.40	22.32	22.47	18.74	18.66	18.81
		RB1#3	22.55	22.43	21.33	18.89	18.77	17.67
		RB1#5	22.52	22.39	20.56	18.86	18.73	16.90
		RB3#0	22.62	22.39	21.89	18.96	18.73	18.23
		RB3#3	22.64	22.41	20.84	18.98	18.75	17.18
		RB6#0	21.44	21.42	21.29	17.78	17.76	17.63
	16QAM	RB1#0	21.76	20.99	21.70	18.10	17.33	18.04
		RB1#3	22.22	21.25	21.58	18.56	17.59	17.92
		RB1#5	22.21	21.23	20.70	18.55	17.57	17.04
		RB3#0	21.78	21.38	21.52	18.12	17.72	17.86
		RB3#3	21.76	21.37	20.92	18.10	17.71	17.26
		RB6#0	20.94	20.36	20.84	17.28	16.70	17.18
3.0	QPSK	RB1#0	22.76	22.75	22.86	19.10	19.09	19.20
		RB1#8	22.77	22.70	22.75	19.11	19.04	19.09
		RB1#14	22.88	22.66	20.80	19.22	19.00	17.14
		RB6#0	21.77	21.66	21.76	18.11	18.00	18.10
		RB6#9	21.81	21.83	21.67	18.15	18.17	18.01
		RB15#0	21.77	21.85	21.78	18.11	18.19	18.12
	16QAM	RB1#0	22.08	21.82	21.27	18.42	18.16	17.61
		RB1#8	22.07	21.95	21.20	18.41	18.29	17.54
		RB1#14	22.05	21.98	20.88	18.39	18.32	17.22
		RB6#0	21.00	21.37	20.82	17.34	17.71	17.16
		RB6#9	21.01	20.95	20.81	17.35	17.29	17.15
		RB15#0	20.90	20.75	20.66	17.24	17.09	17.00

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	22.65	21.85	21.81	18.99	18.19	18.15
		RB1#13	23.07	21.86	21.77	19.41	18.20	18.11
		RB1#24	22.92	22.31	22.31	19.26	18.65	18.65
		RB15#0	21.78	21.73	21.82	18.12	18.07	18.16
		RB15#10	21.92	21.96	21.73	18.26	18.30	18.07
		RB25#0	21.86	21.88	21.79	18.20	18.22	18.13
	16QAM	RB1#0	21.94	20.98	21.82	18.28	17.32	18.16
		RB1#13	21.96	21.22	21.58	18.30	17.56	17.92
		RB1#24	21.91	21.48	21.36	18.25	17.82	17.70
		RB15#0	20.85	21.21	20.71	17.19	17.55	17.05
		RB15#10	20.84	20.89	20.57	17.18	17.23	16.91
		RB25#0	20.95	20.90	20.75	17.29	17.24	17.09
10.0	QPSK	RB1#0	21.88	22.62	22.93	18.22	18.96	19.27
		RB1#25	22.01	22.30	22.53	18.35	18.64	18.87
		RB1#49	21.79	22.30	22.17	18.13	18.64	18.51
		RB25#0	21.09	21.46	21.72	17.43	17.80	18.06
		RB25#25	20.94	21.63	21.31	17.28	17.97	17.65
		RB50#0	21.09	21.51	21.78	17.43	17.85	18.12
	16QAM	RB1#0	21.04	22.08	21.33	17.38	18.42	17.67
		RB1#25	20.94	21.73	21.90	17.28	18.07	18.24
		RB1#49	20.96	21.79	21.34	17.30	18.13	17.68
		RB25#0	20.05	20.98	20.15	16.39	17.32	16.49
		RB25#25	20.32	20.67	20.39	16.66	17.01	16.73
		RB50#0	20.37	20.54	20.57	16.71	16.88	16.91

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

For Band12: Antenna Gain = -1.01dBi = -3.16dBd (0dBd=2.15dBi)

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

Limit: ERP≤34.77dBm

LTE Band 13

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	21.96	21.69	21.13	18.30	18.03	17.47
		RB1#13	21.72	21.68	21.15	18.06	18.02	17.49
		RB1#24	21.67	21.78	21.12	18.01	18.12	17.46
		RB15#0	20.89	20.54	20.39	17.23	16.88	16.73
		RB15#10	20.77	20.54	20.23	17.11	16.88	16.57
		RB25#0	20.79	20.65	20.35	17.13	16.99	16.69
	16QAM	RB1#0	20.00	20.56	20.21	16.34	16.90	16.55
		RB1#13	19.70	20.61	20.23	16.04	16.95	16.57
		RB1#24	19.78	20.55	20.32	16.12	16.89	16.66
		RB15#0	20.03	19.52	19.28	16.37	15.86	15.62
		RB15#10	19.89	19.46	19.25	16.23	15.80	15.59
		RB25#0	19.88	19.58	19.38	16.22	15.92	15.72
10.0	QPSK	RB1#0	/	22.05	/	/	18.39	/
		RB1#25	/	21.84	/	/	18.18	/
		RB1#49	/	21.81	/	/	18.15	/
		RB25#0	/	20.96	/	/	17.30	/
		RB25#25	/	20.79	/	/	17.13	/
		RB50#0	/	20.92	/	/	17.26	/
	16QAM	RB1#0	/	21.47	/	/	17.81	/
		RB1#25	/	21.20	/	/	17.54	/
		RB1#49	/	21.22	/	/	17.56	/
		RB25#0	/	19.97	/	/	16.31	/
		RB25#25	/	19.98	/	/	16.32	/
		RB50#0	/	19.83	/	/	16.17	/

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

For Band13: Antenna Gain = -1.01dBi = -3.16dBd (0dBd=2.15dBi)

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

Limit: ERP≤34.77dBm

LTE Band 41:

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	20.01	20.03	19.97	17.88	17.90	17.84
		RB1#13	20.02	20.11	19.80	17.89	17.98	17.67
		RB1#24	19.95	20.02	19.84	17.82	17.89	17.71
		RB15#0	19.11	19.01	18.98	16.98	16.88	16.85
		RB15#10	19.15	19.08	18.74	17.02	16.95	16.61
		RB25#0	19.13	18.99	18.72	17.00	16.86	16.59
	16QAM	RB1#0	19.05	18.72	19.47	16.92	16.59	17.34
		RB1#13	19.01	18.73	19.38	16.88	16.60	17.25
		RB1#24	18.76	18.69	19.34	16.63	16.56	17.21
		RB15#0	18.46	17.78	18.12	16.33	15.65	15.99
		RB15#10	18.40	17.90	18.07	16.27	15.77	15.94
		RB25#0	17.92	18.11	17.84	15.79	15.98	15.71
10.0	QPSK	RB1#0	19.98	20.04	19.87	17.85	17.91	17.74
		RB1#25	19.99	20.04	19.92	17.86	17.91	17.79
		RB1#49	19.97	20.07	19.95	17.84	17.94	17.82
		RB25#0	18.94	19.11	18.90	16.81	16.98	16.77
		RB25#25	19.09	18.96	18.90	16.96	16.83	16.77
		RB50#0	19.13	19.12	18.73	17.00	16.99	16.60
	16QAM	RB1#0	19.05	18.70	19.44	16.92	16.57	17.31
		RB1#25	18.87	18.64	19.45	16.74	16.51	17.32
		RB1#49	18.79	18.69	19.33	16.66	16.56	17.20
		RB25#0	18.31	17.91	18.06	16.18	15.78	15.93
		RB25#25	18.24	17.95	18.03	16.11	15.82	15.90
		RB50#0	17.97	18.26	17.87	15.84	16.13	15.74

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	20.00	20.10	20.05	17.87	17.97	17.92
		RB1#38	19.94	20.28	19.97	17.81	18.15	17.84
		RB1#74	20.04	20.38	20.02	17.91	18.25	17.89
		RB36#0	19.10	19.18	18.94	16.97	17.05	16.81
		RB36#39	19.03	19.04	18.75	16.90	16.91	16.62
		RB75#0	18.53	18.71	18.51	16.40	16.58	16.38
	16QAM	RB1#0	18.73	19.53	18.38	16.60	17.40	16.25
		RB1#38	18.88	19.37	18.20	16.75	17.24	16.07
		RB1#74	18.90	19.29	17.91	16.77	17.16	15.78
		RB36#0	17.97	17.97	18.26	15.84	15.84	16.13
		RB36#39	18.07	18.02	18.14	15.94	15.89	16.01
		RB75#0	17.79	17.85	17.81	15.66	15.72	15.68
20.0	QPSK	RB1#0	20.27	20.20	20.03	18.14	18.07	17.90
		RB1#50	20.20	20.14	20.09	18.07	18.01	17.96
		RB1#99	20.24	20.01	20.10	18.11	17.88	17.97
		RB50#0	19.07	19.07	18.94	16.94	16.94	16.81
		RB50#50	19.22	19.23	18.75	17.09	17.10	16.62
		RB100#0	18.78	18.74	18.46	16.65	16.61	16.33
	16QAM	RB1#0	19.35	18.90	19.85	17.22	16.77	17.72
		RB1#50	19.27	18.87	19.76	17.14	16.74	17.63
		RB1#99	19.33	18.76	19.91	17.20	16.63	17.78
		RB50#0	18.26	18.22	18.16	16.13	16.09	16.03
		RB50#50	18.35	18.07	17.95	16.22	15.94	15.82
		RB100#0	17.91	17.82	17.68	15.78	15.69	15.55

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

For Band 41: Antenna Gain = -1.33dBi

Cable Loss=0.8dB* (provided by the applicant)

Limit: EIRP ≤ 33dBm

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.22	13
	Middle	3.35	13
	High	3.42	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.17	13
	Middle	3.32	13
	High	3.25	13
HSDPA (16QAM)	Low	4.22	13
	Middle	3.52	13
	High	3.71	13
HSUPA (QPSK)	Low	3.45	13
	Middle	3.67	13
	High	3.63	13
HSPA+	Low	3.35	13
	Middle	3.24	13
	High	3.52	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.37	13
	Middle	3.25	13
	High	3.72	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.25	13
	Middle	3.24	13
	High	3.52	13
HSDPA (16QAM)	Low	4.67	13
	Middle	4.22	13
	High	4.49	13
HSUPA (QPSK)	Low	3.65	13
	Middle	3.72	13
	High	3.87	13
HSPA+	Low	3.33	13
	Middle	3.25	13
	High	3.64	13

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.42	5.35	5.42	13	Pass
QPSK (100RB Size)	5.42	5.74	5.61	13	Pass
16QAM (1RB Size)	5.54	6.22	6.92	13	Pass
16QAM (100RB Size)	6.28	6.54	6.41	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.00	5.54	5.10	13	Pass
QPSK (50RB Size)	5.64	5.67	5.61	13	Pass
16QAM (1RB Size)	6.35	6.25	6.09	13	Pass
16QAM (50RB Size)	6.51	6.57	6.57	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.33	9.35	5.35	13	Pass
QPSK (50RB Size)	4.71	8.74	5.73	13	Pass
16QAM (1RB Size)	4.17	7.22	6.22	13	Pass
16QAM (50RB Size)	5.32	6.54	6.54	13	Pass

LTE Band 13 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	/	3.33	/	13	Pass
QPSK (50RB Size)	/	4.71	/	13	Pass
16QAM (1RB Size)	/	4.17	/	13	Pass
16QAM (50RB Size)	/	5.32	/	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	7.72	7.24	7.66	13	Pass
QPSK (100RB Size)	10.43	7.82	7.24	13	Pass
16QAM (1RB Size)	8.94	7.24	8.43	13	Pass
16QAM (100RB Size)	10.61	8.01	11.96	13	Pass

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

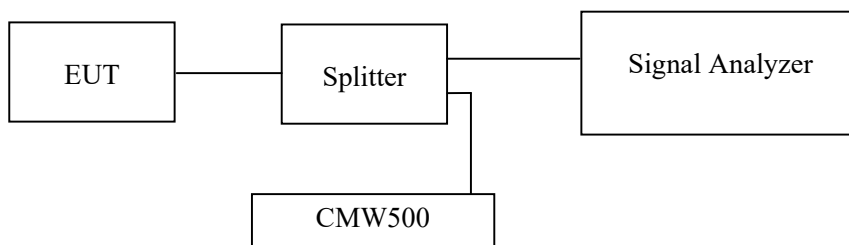
Applicable Standard

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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei from 2022-03-24 to 2022-05-17.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

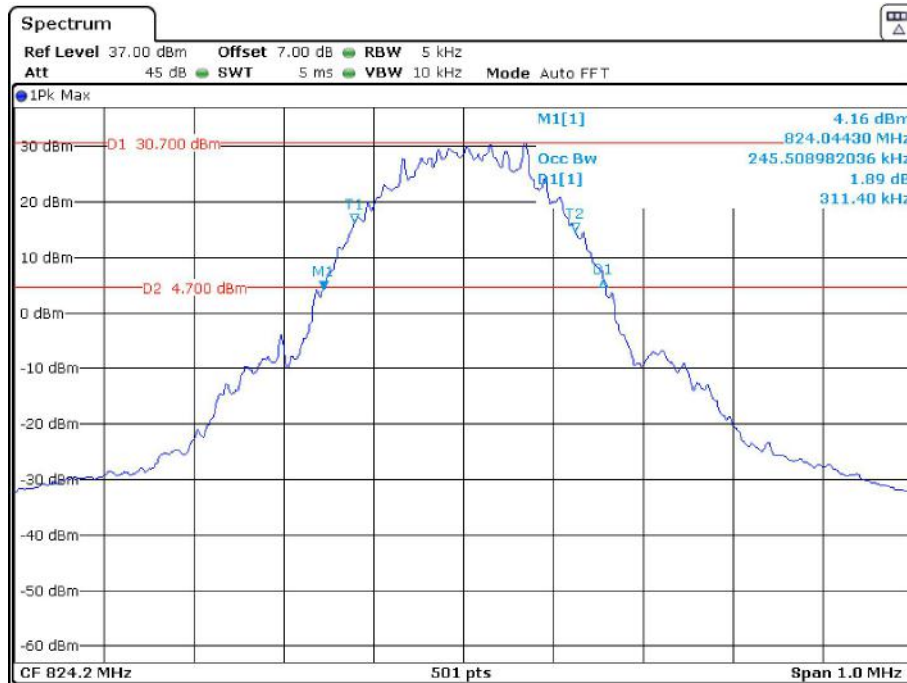
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	128	824.2	245.51	311.40
	190	836.6	243.51	309.40
	251	848.8	243.51	311.40

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.15	4.67
	836.6	4.15	4.67
	846.6	4.15	4.67
HSDPA	826.4	4.15	4.69
	836.6	4.15	4.67
	846.6	4.15	4.69
HSUPA	826.4	4.15	4.68
	836.6	4.15	4.69
	846.6	4.15	4.69

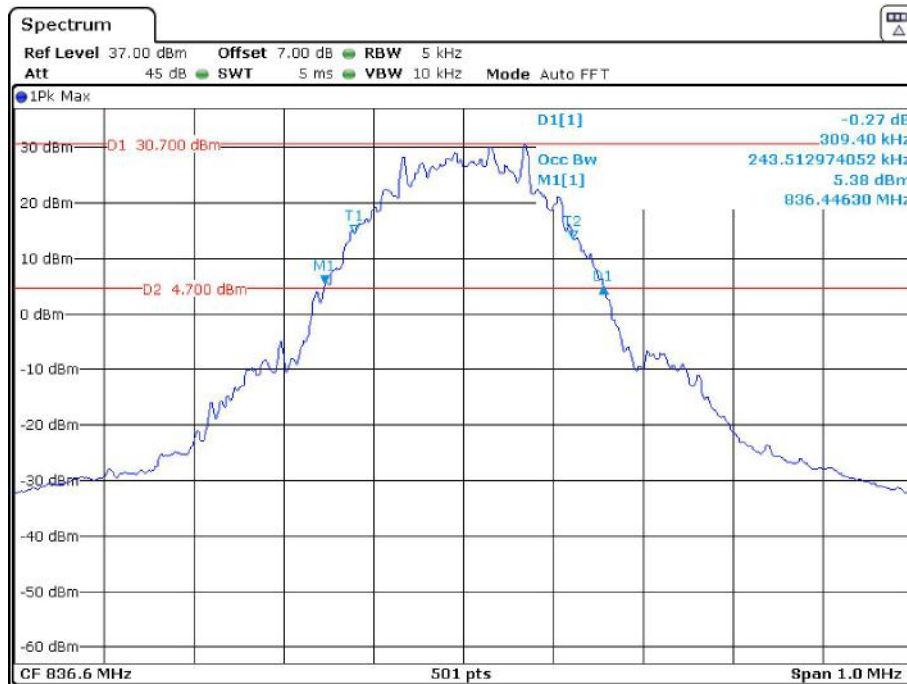
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	245.51	317.40
	661	1880.0	245.51	309.40
	810	1909.8	243.51	309.40

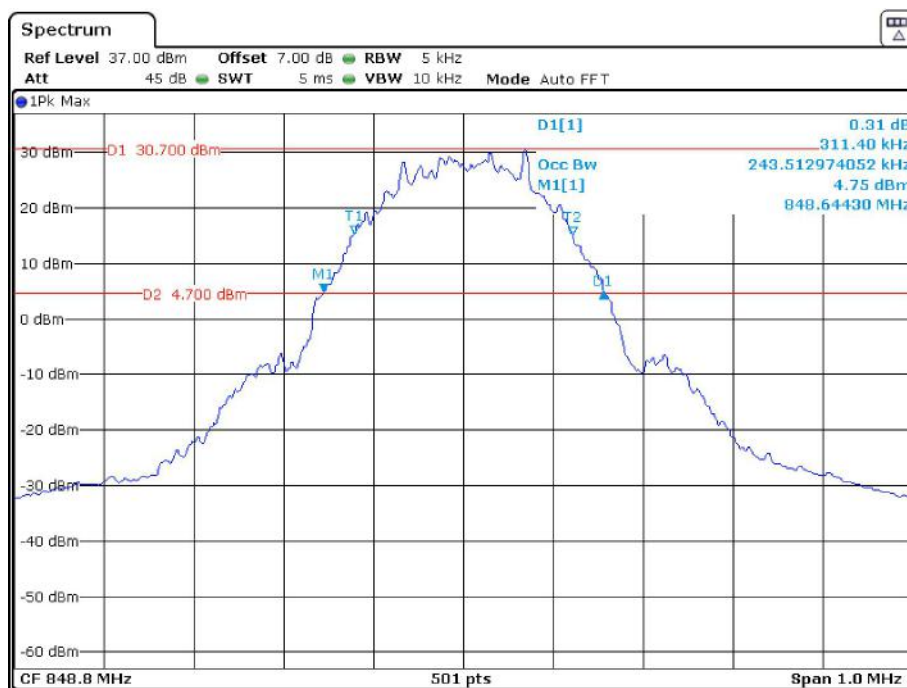
	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.15	4.67
	1880.0	4.15	4.67
	1907.6	4.15	4.67
HSDPA	1852.4	4.15	4.67
	1880.0	4.15	4.69
	1907.6	4.15	4.67
HSUPA	1852.4	4.15	4.67
	1880.0	4.15	4.69
	1907.6	4.15	4.69

Cellular Band**26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel**

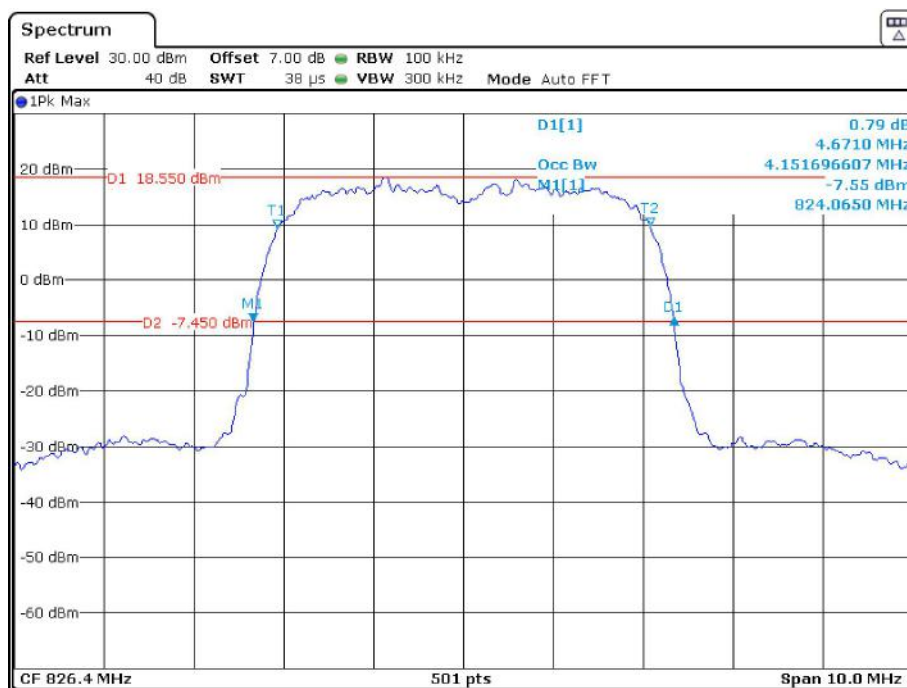
Date: 31.MAR.2022 15:45:37

26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel

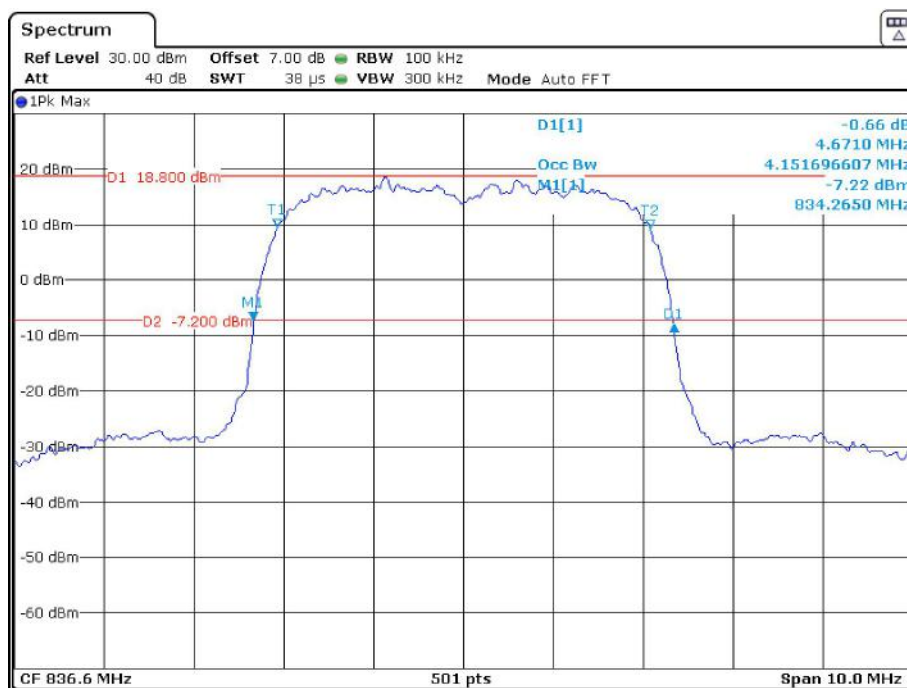
Date: 31.MAR.2022 15:46:00

26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, High channel

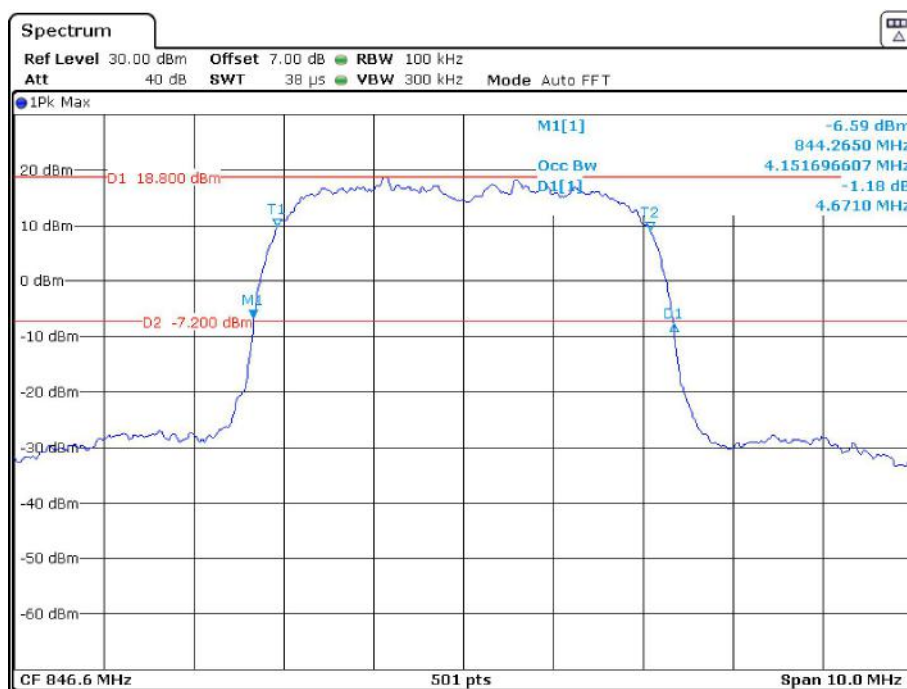
Date: 31.MAR.2022 15:46:37

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel

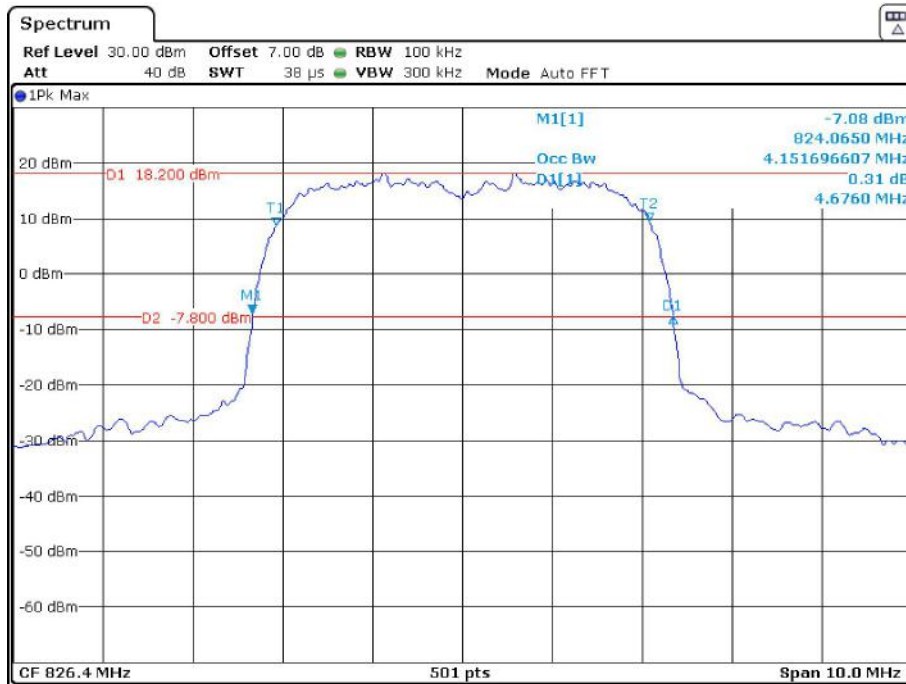
Date: 31.MAR.2022 17:01:46

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

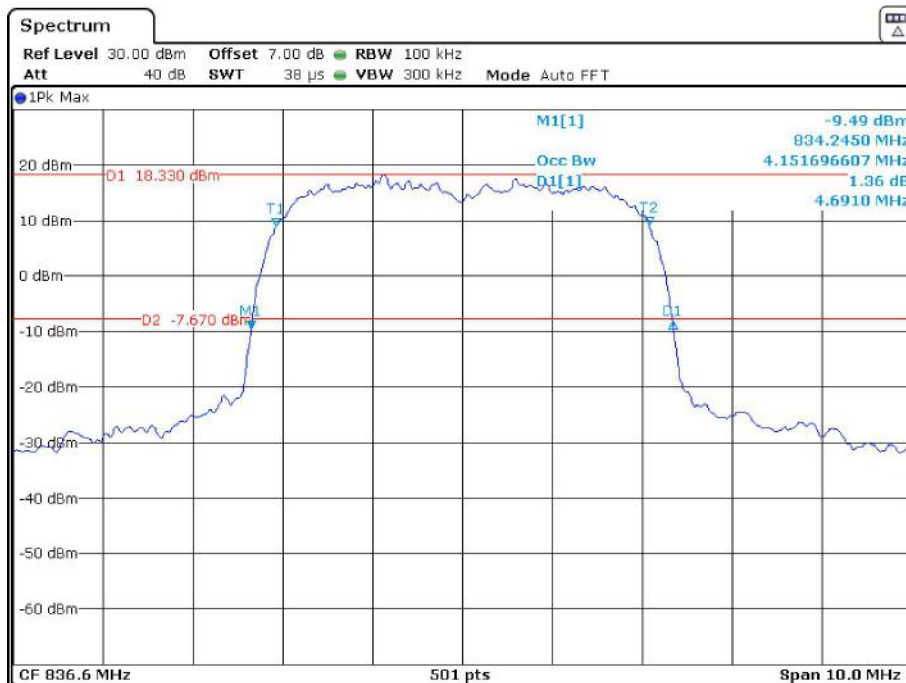
Date: 31.MAR.2022 17:04:49

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel

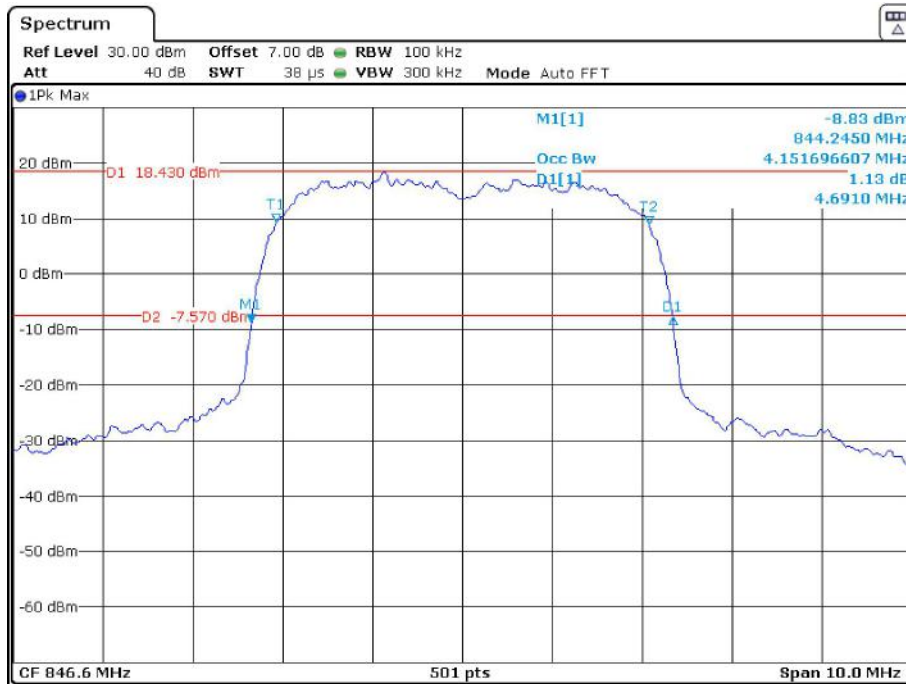
Date: 31.MAR.2022 17:03:58

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

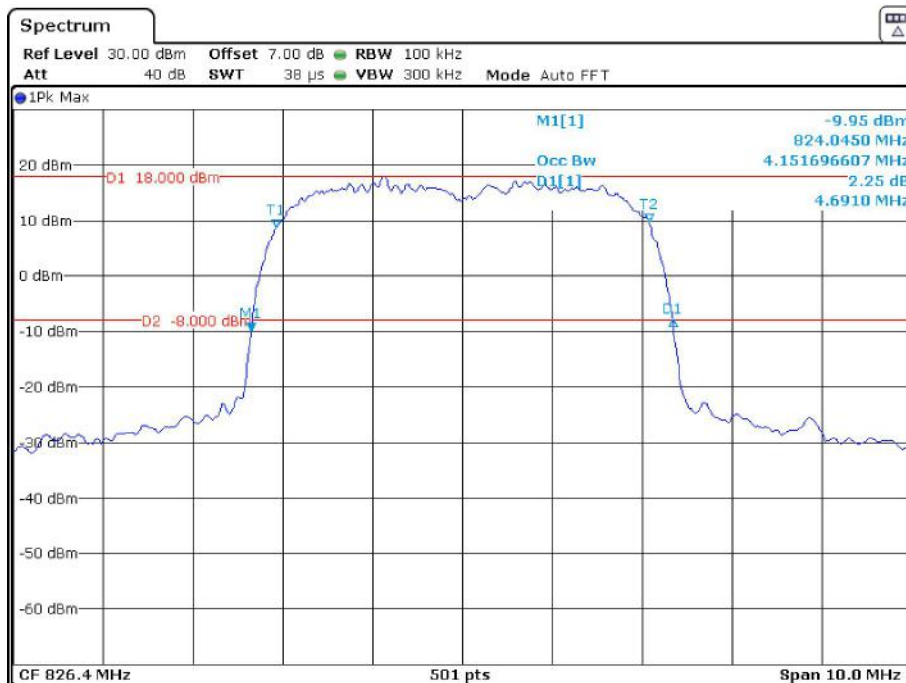
Date: 31.MAR.2022 17:15:16

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

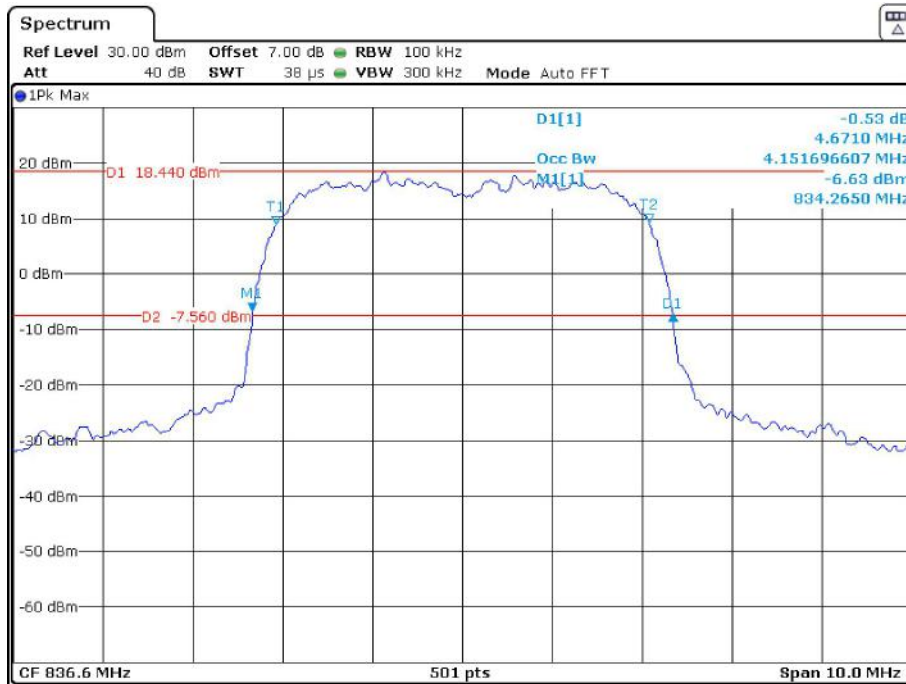
Date: 31.MAR.2022 17:16:33

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

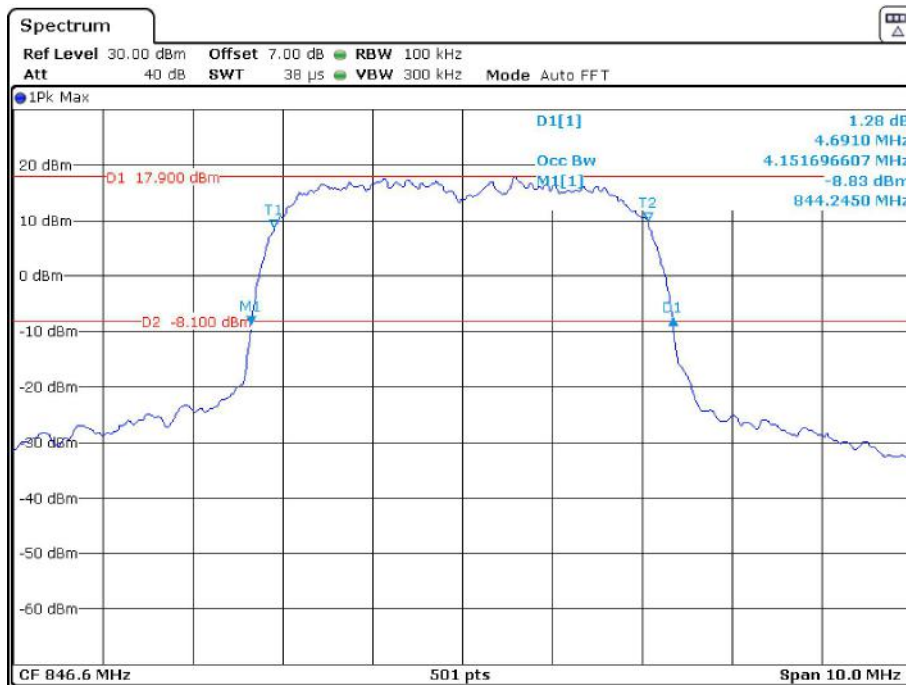
Date: 31.MAR.2022 17:17:48

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

Date: 31.MAR.2022 17:08:57

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

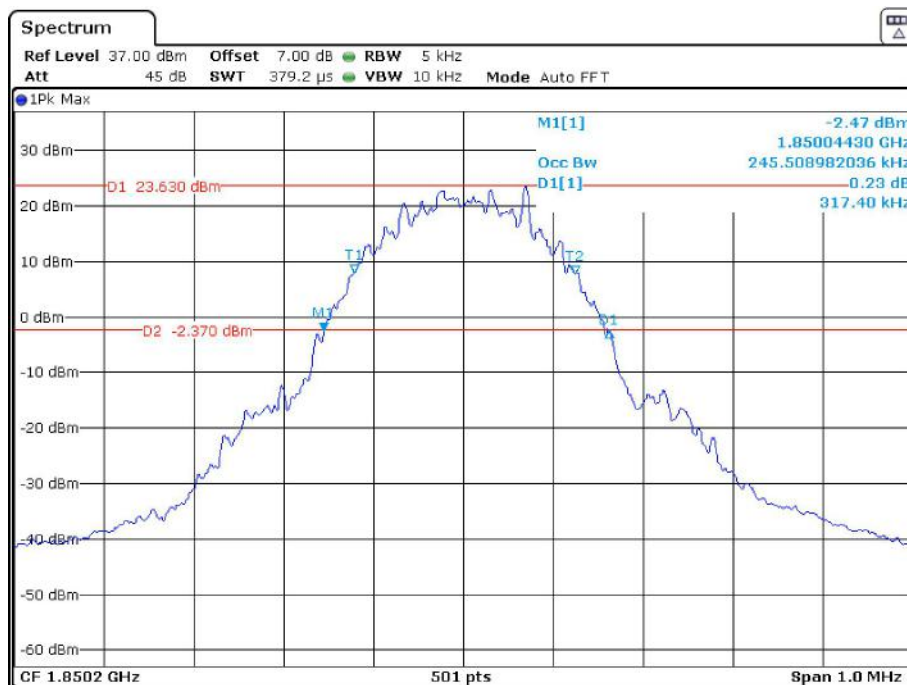
Date: 31.MAR.2022 17:10:09

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel

Date: 31.MAR.2022 17:12:46

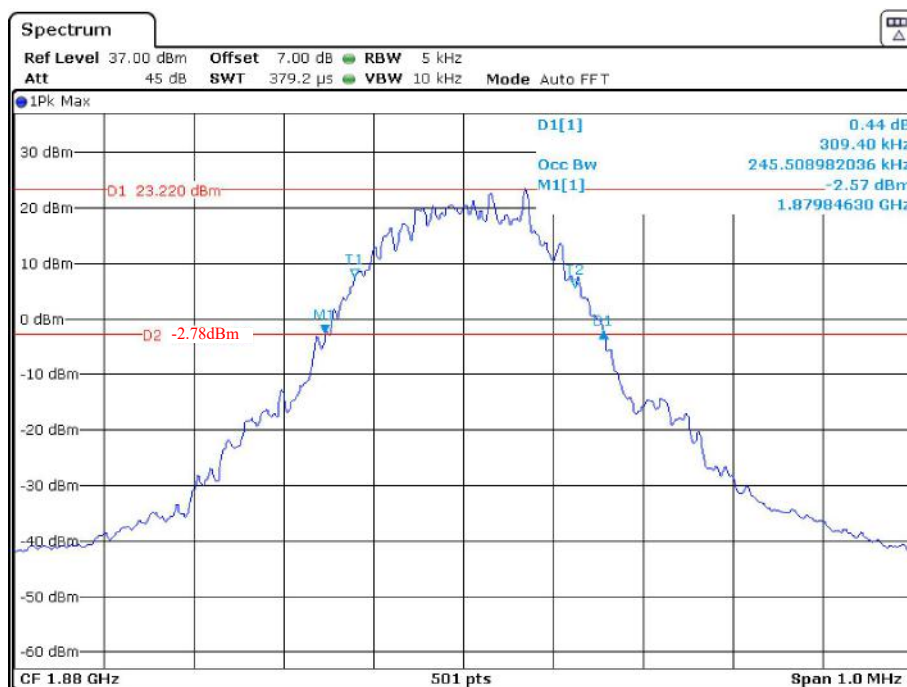
PCS Band

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel

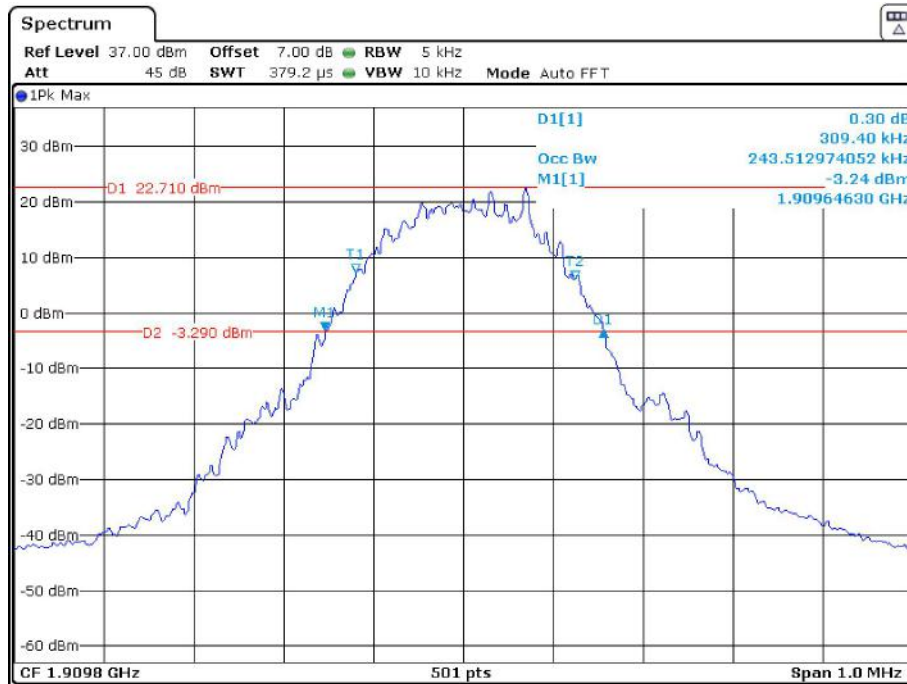


Date: 31.MAR.2022 16:02:43

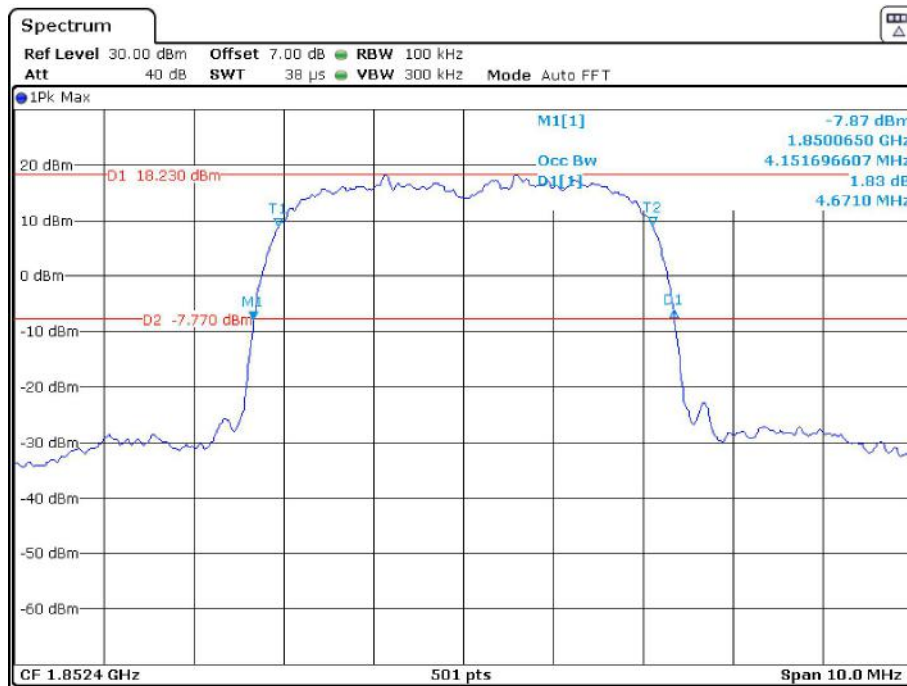
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel



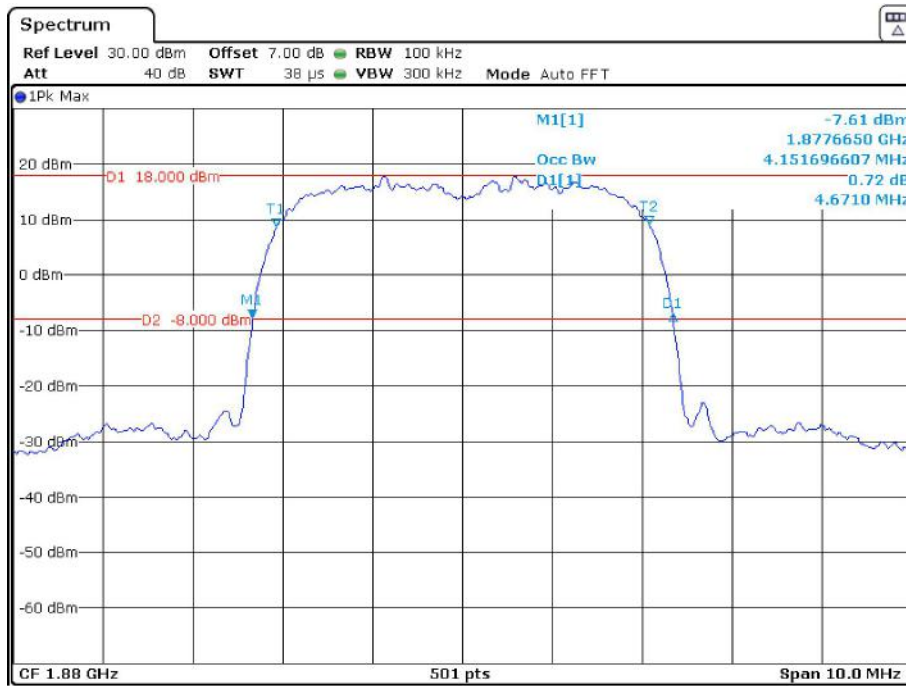
Date: 31.MAR.2022 16:01:40

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, High channel

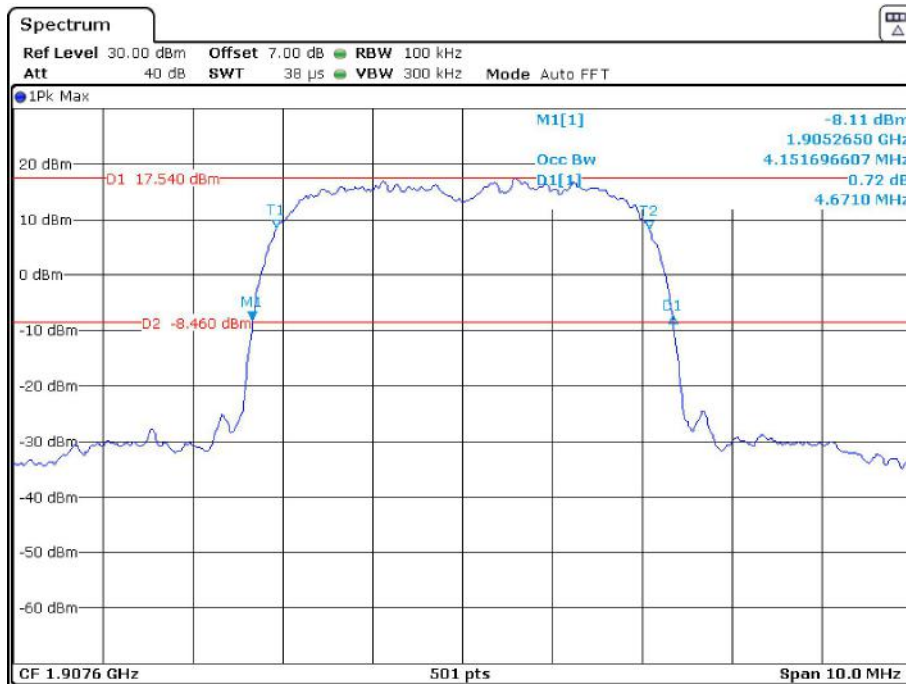
Date: 31.MAR.2022 16:03:23

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel

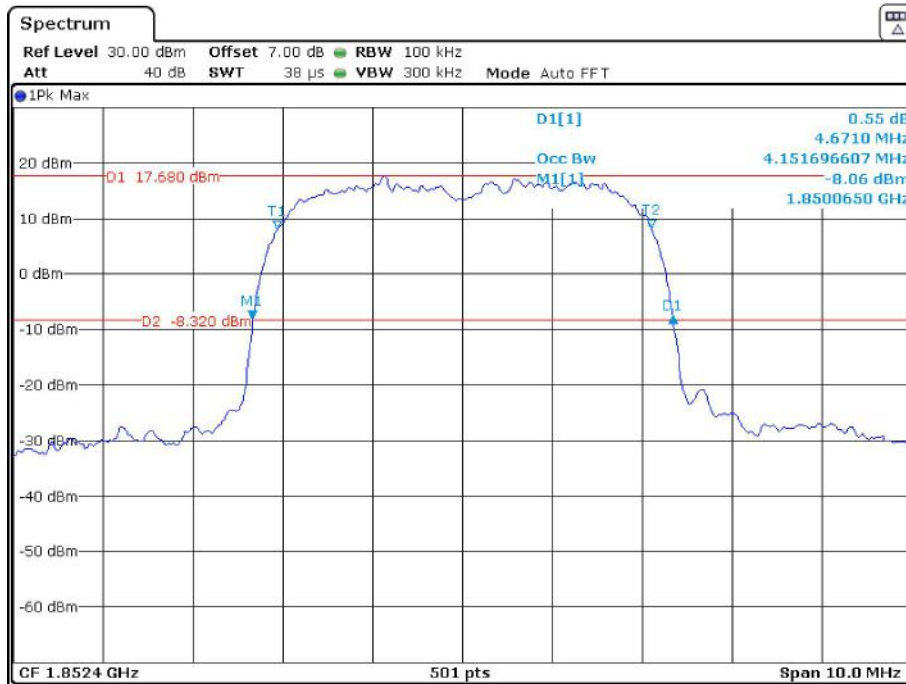
Date: 31.MAR.2022 16:37:56

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel

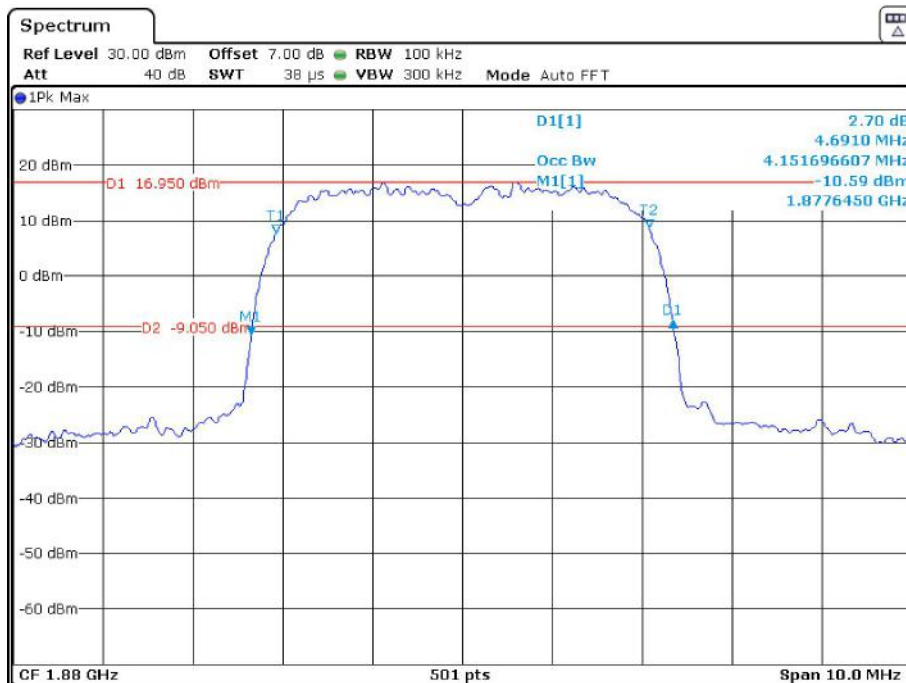
Date: 31.MAR.2022 16:39:29

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel

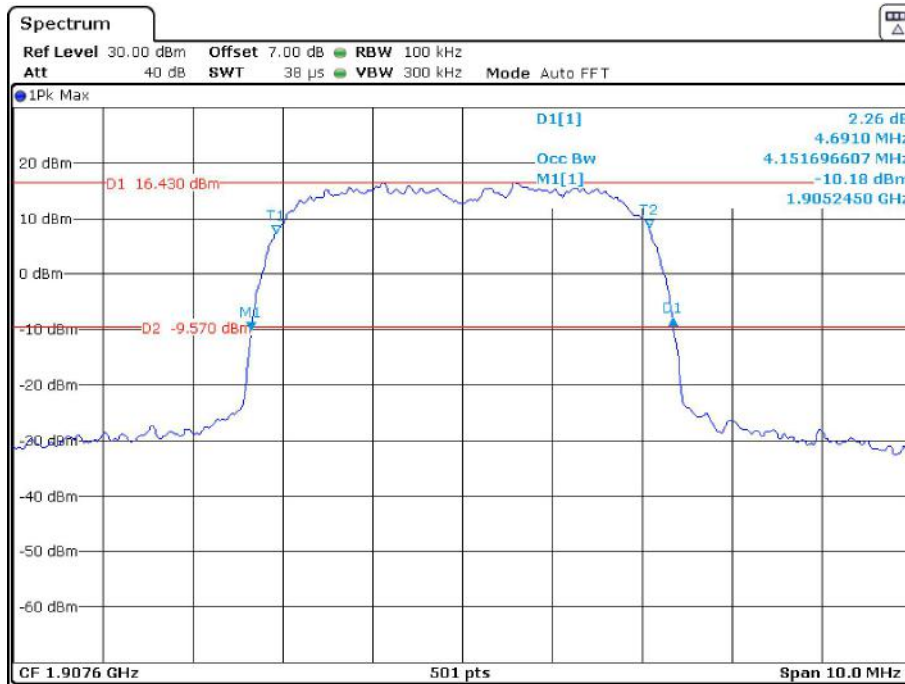
Date: 31.MAR.2022 16:40:23

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel

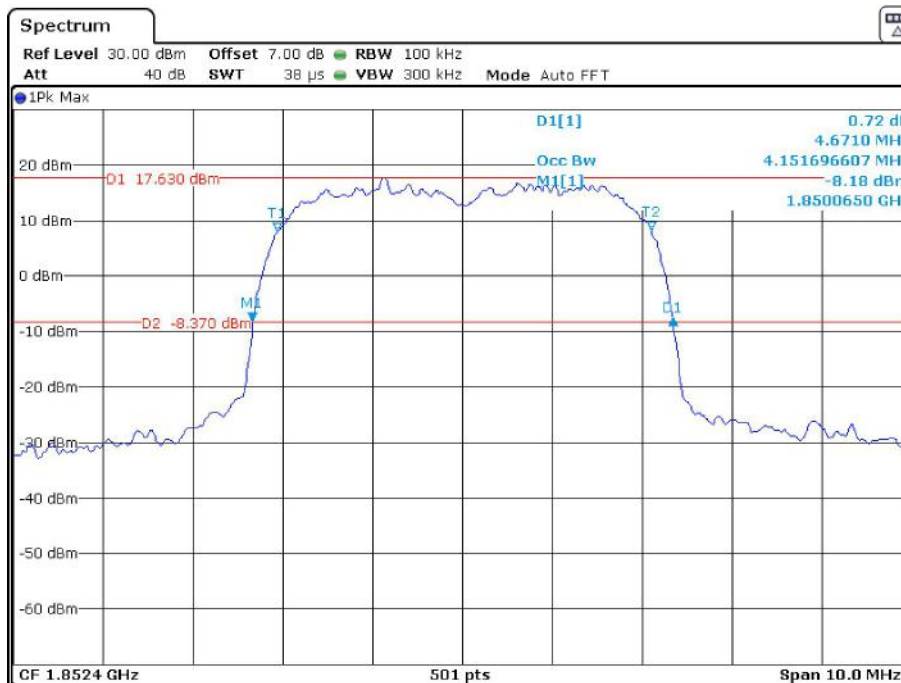
Date: 31.MAR.2022 16:49:05

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel

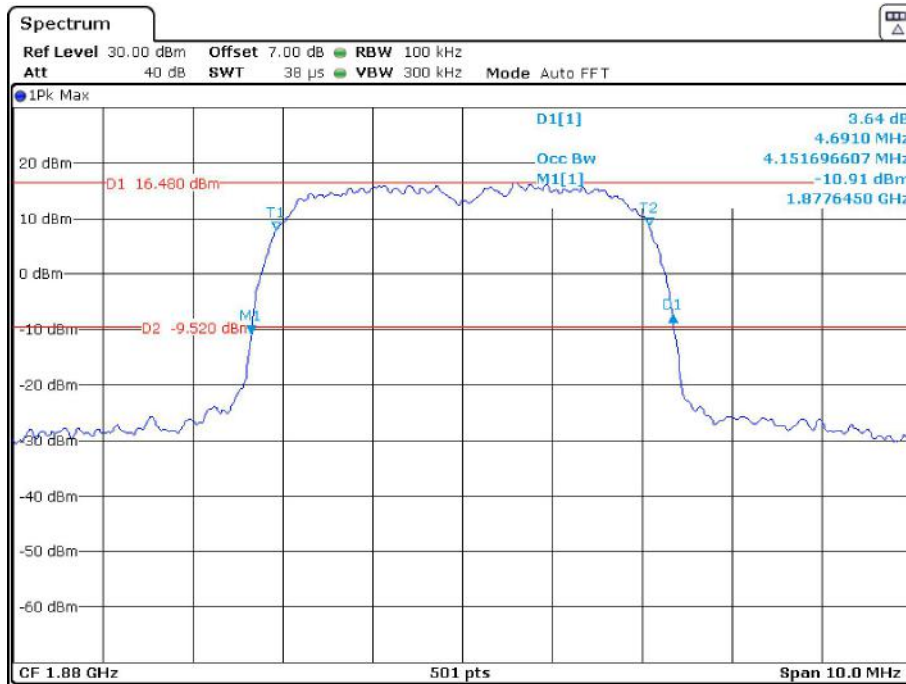
Date: 31.MAR.2022 16:50:17

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel

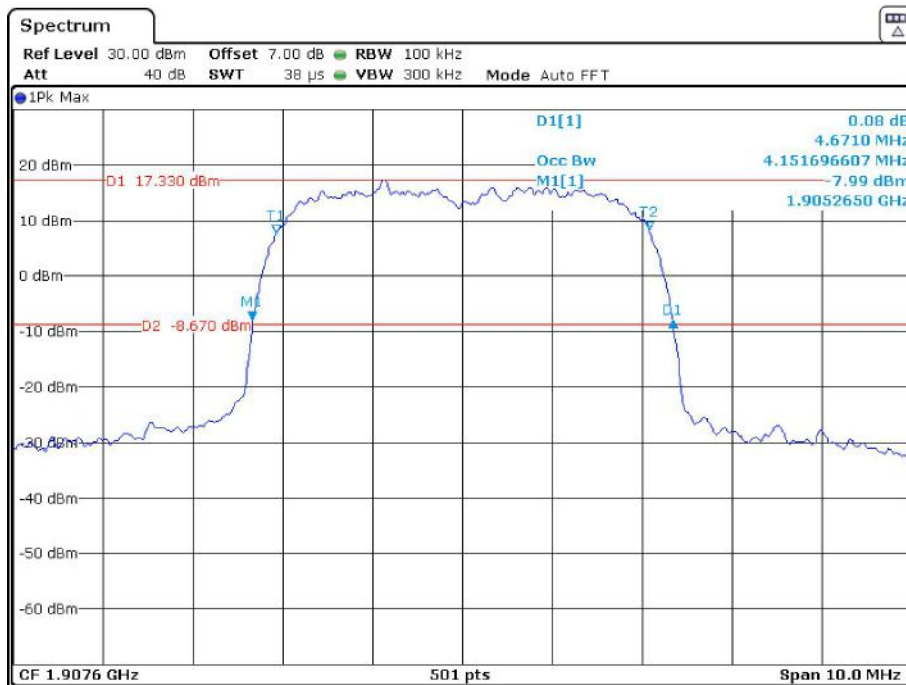
Date: 31.MAR.2022 16:51:37

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel

Date: 31.MAR.2022 16:58:21

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel

Date: 31.MAR.2022 16:57:23

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel

Date: 31.MAR.2022 16:56:30

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	1.110	1.266	1.104	1.248	1.104	1.254
	16QAM	1.104	1.260	1.104	1.260	1.098	1.254
3 MHz	QPSK	2.700	3.000	2.700	3.012	2.700	3.024
	16QAM	2.700	3.024	2.688	3.000	2.700	3.012
5 MHz	QPSK	4.540	4.980	4.520	5.000	4.520	4.960
	16QAM	4.500	5.000	4.540	5.020	4.520	5.000
10 MHz	QPSK	8.960	9.720	9.000	9.720	8.960	9.720
	16QAM	8.960	9.680	9.000	9.760	8.960	9.720
15 MHz	QPSK	13.560	15.000	13.500	15.000	13.560	15.120
	16QAM	13.560	15.000	13.560	15.000	13.500	14.880
20 MHz	QPSK	18.000	19.600	18.080	19.520	18.000	19.760
	16QAM	18.000	19.600	18.000	19.680	18.000	19.600

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	1.104	1.260	1.098	1.254	1.104	1.260
	16QAM	1.104	1.254	1.104	1.260	1.098	1.248
3 MHz	QPSK	2.712	2.976	2.700	3.012	2.700	3.024
	16QAM	2.700	2.988	2.688	3.000	2.700	3.024
5 MHz	QPSK	4.540	4.960	4.520	4.960	4.500	4.960
	16QAM	4.520	4.960	4.520	4.980	4.520	4.960
10 MHz	QPSK	9.000	9.760	8.960	9.680	8.960	9.720
	16QAM	8.960	9.680	8.960	9.760	8.960	9.720

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	1.134	1.968	1.116	1.296	1.116	1.920
	16QAM	1.128	1.794	1.110	1.260	1.116	1.266
3 MHz	QPSK	2.700	3.024	2.712	3.204	2.700	3.036
	16QAM	2.700	3.036	2.688	3.024	2.700	3.000
5 MHz	QPSK	4.520	4.980	4.540	6.180	4.500	5.000
	16QAM	4.500	5.000	4.560	5.000	4.520	5.000
10 MHz	QPSK	8.960	9.800	9.000	11.600	8.960	9.760
	16QAM	8.960	9.720	9.000	10.640	8.960	9.760

LTE Band 13:

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	4.520	5.000	4.520	5.020	4.500	4.960
	16QAM	4.520	5.000	4.540	5.000	4.540	5.000
10 MHz	QPSK	/	/	9.000	9.760	/	/
	16QAM	/	/	9.000	9.720	/	/

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	4.540	5.360	4.520	5.520	4.520	5.060
	16QAM	4.520	5.080	4.500	5.000	4.520	5.100
10 MHz	QPSK	8.960	9.880	8.960	9.720	8.960	9.680
	16QAM	8.960	9.520	8.960	9.560	8.960	9.640
15 MHz	QPSK	13.560	14.760	13.500	15.360	13.500	15.000
	16QAM	13.500	15.060	13.560	14.820	13.500	15.360
20 MHz	QPSK	18.000	19.360	18.000	19.680	18.000	19.520
	16QAM	18.000	19.360	18.000	19.840	17.920	19.440

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

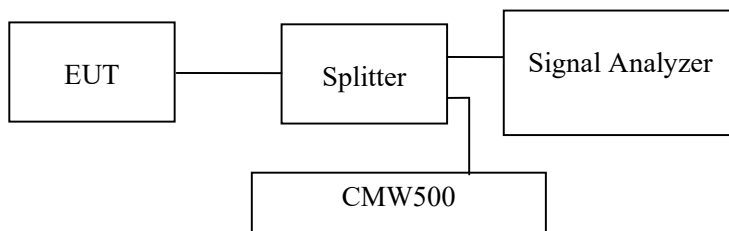
Applicable Standard

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.



Test Data

Environmental Conditions

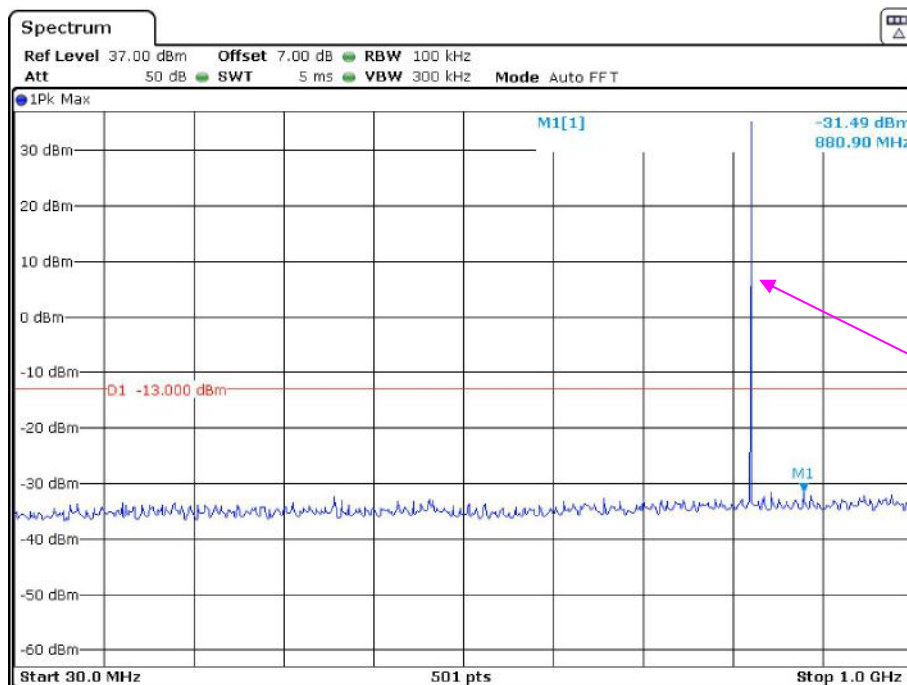
Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei from 2022-2022-03-24 to 2022-05-18

EUT operation mode: Transmitting

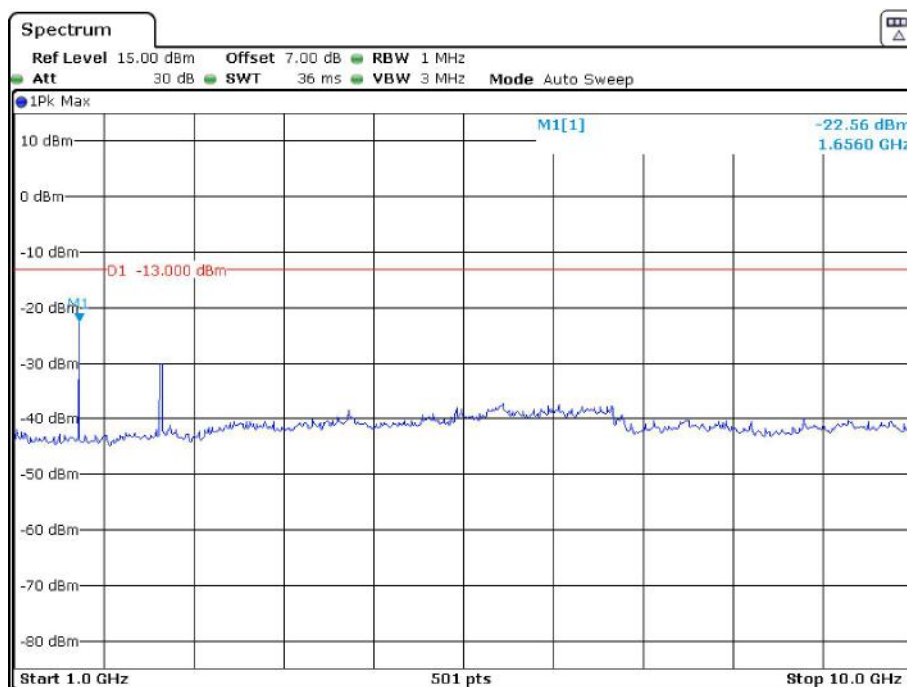
Test result: Pass

Please refer to the following plots.

**Cellular Band
Low Channel:****30 MHz – 1 GHz (GSM Mode)**

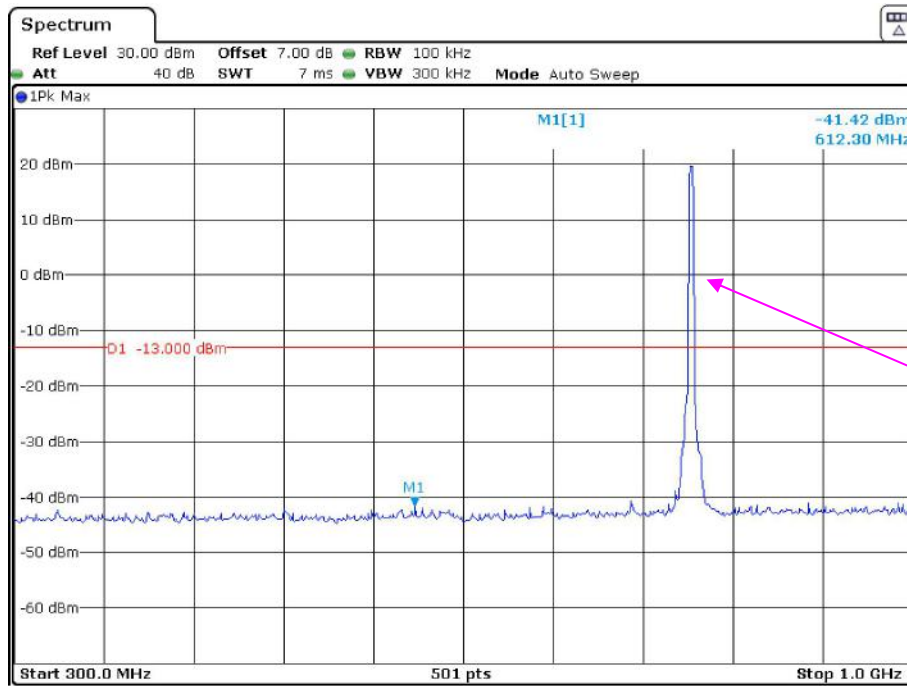
Date: 31.MAR.2022 15:48:44

Fundamental test

1 GHz – 10 GHz (GSM Mode)

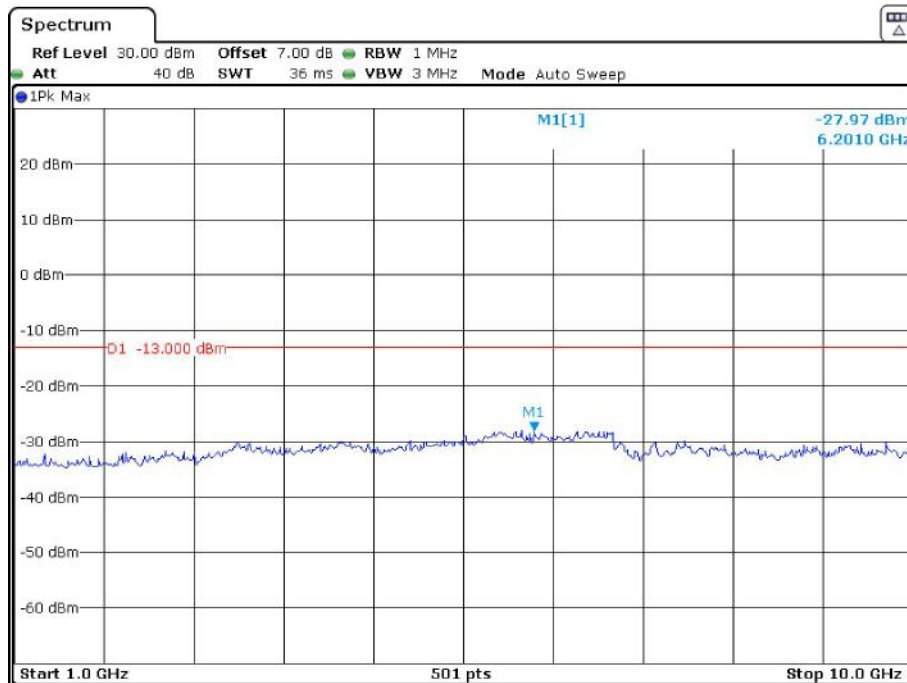
Date: 31.MAR.2022 15:49:35

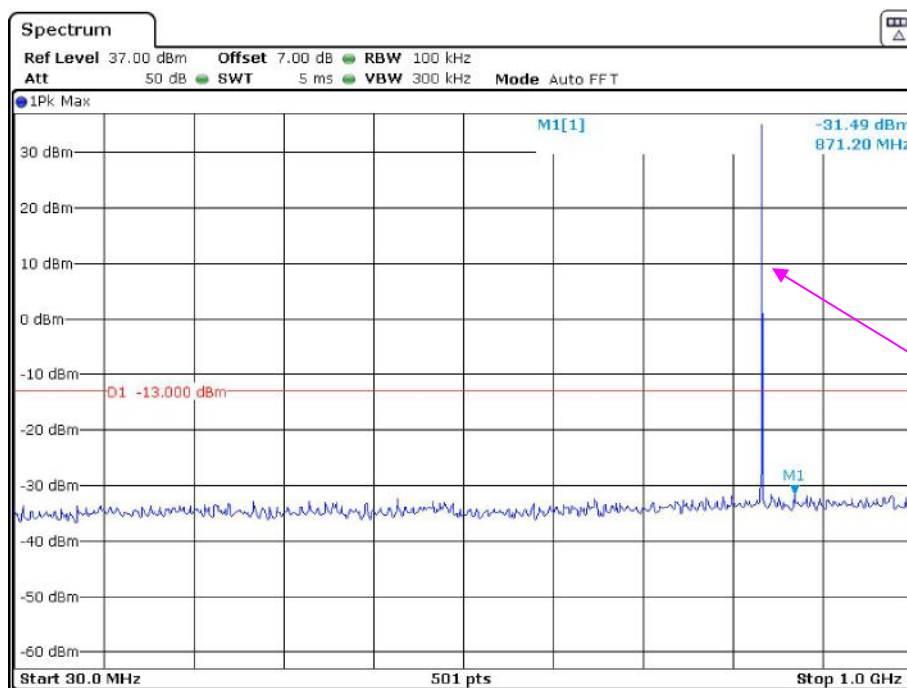
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

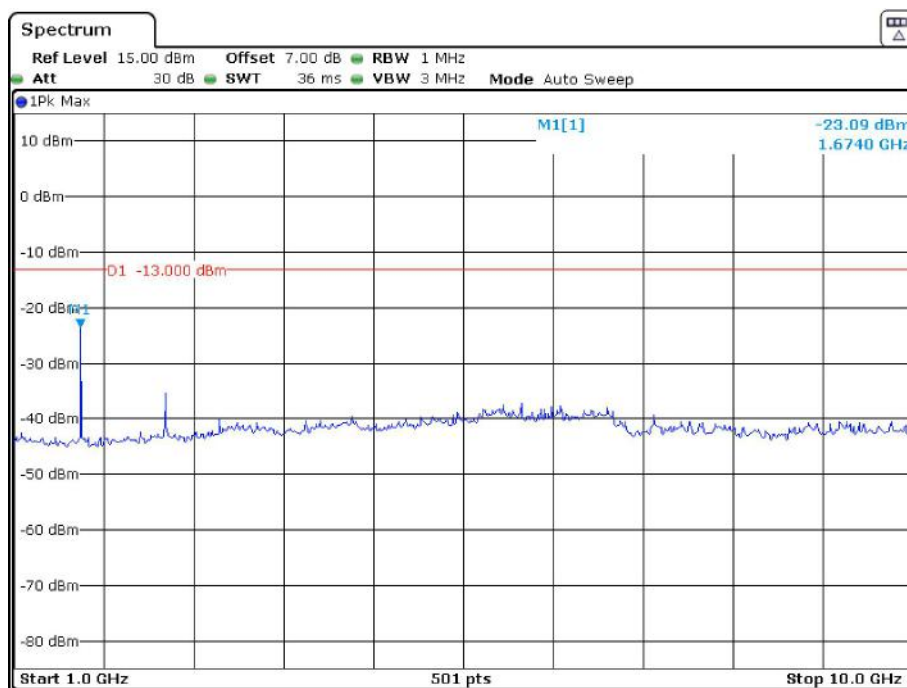
1 GHz – 10 GHz (WCDMA Mode)



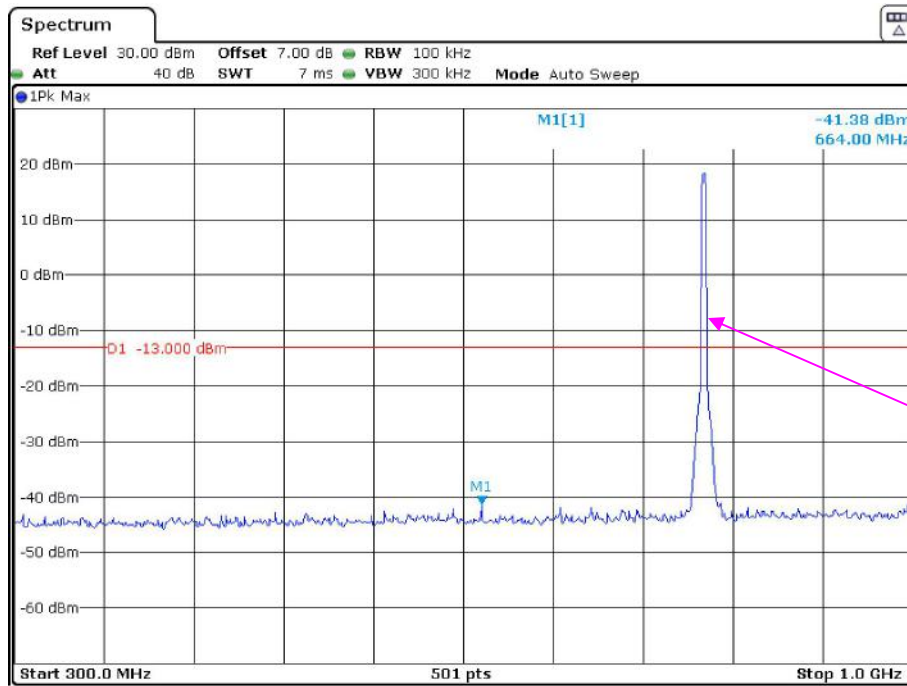
Middle Channel:**30 MHz – 1 GHz (GSM Mode)**

Date: 31.MAR.2022 15:48:21

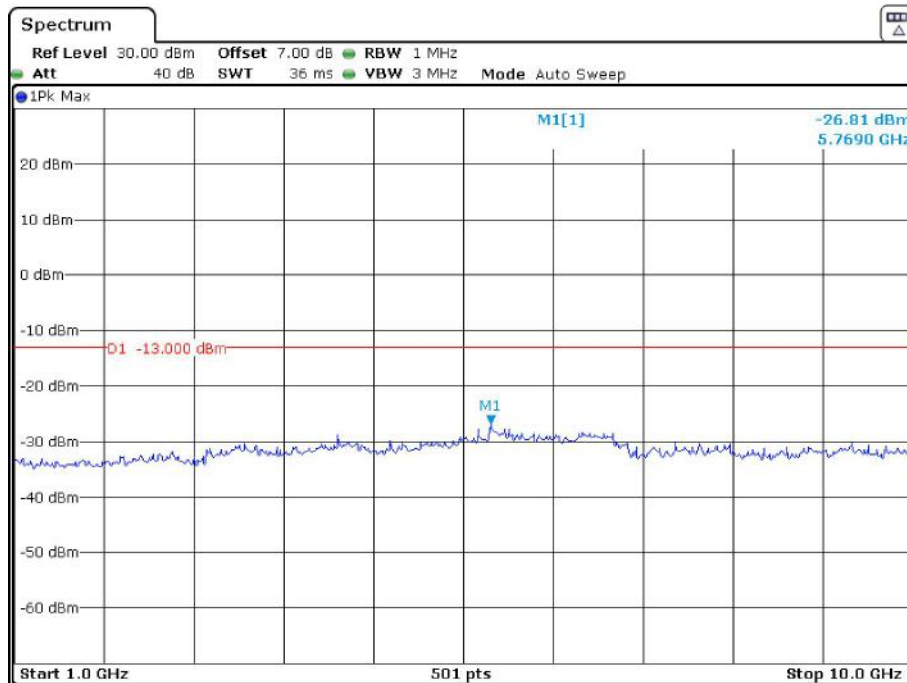
Fundamental test

1 GHz – 10 GHz (GSM Mode)

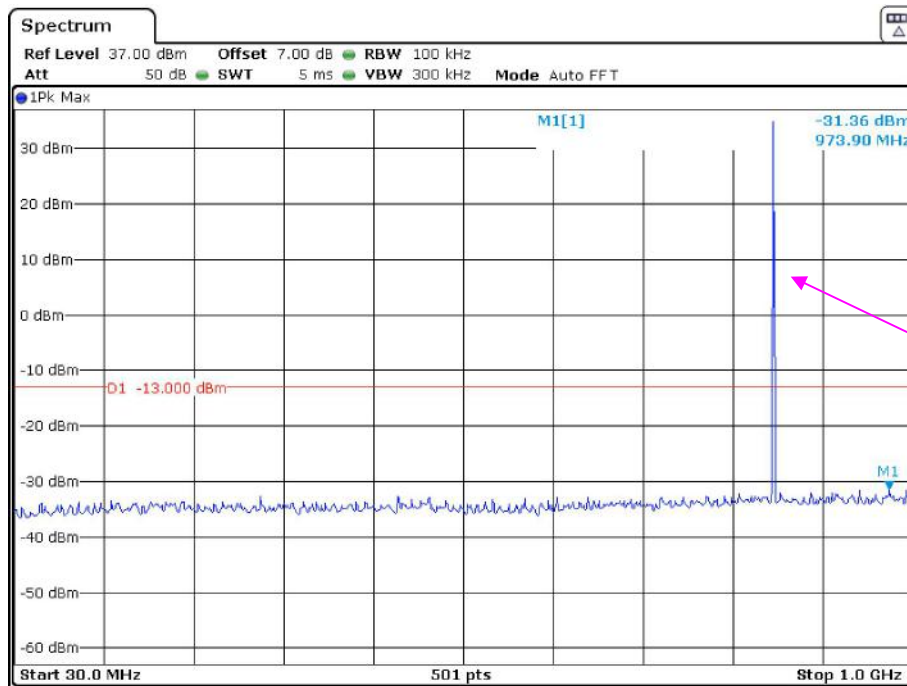
Date: 31.MAR.2022 15:49:47

30 MHz – 1 GHz (WCDMA Mode)

Date: 31.MAR.2022 22:07:58

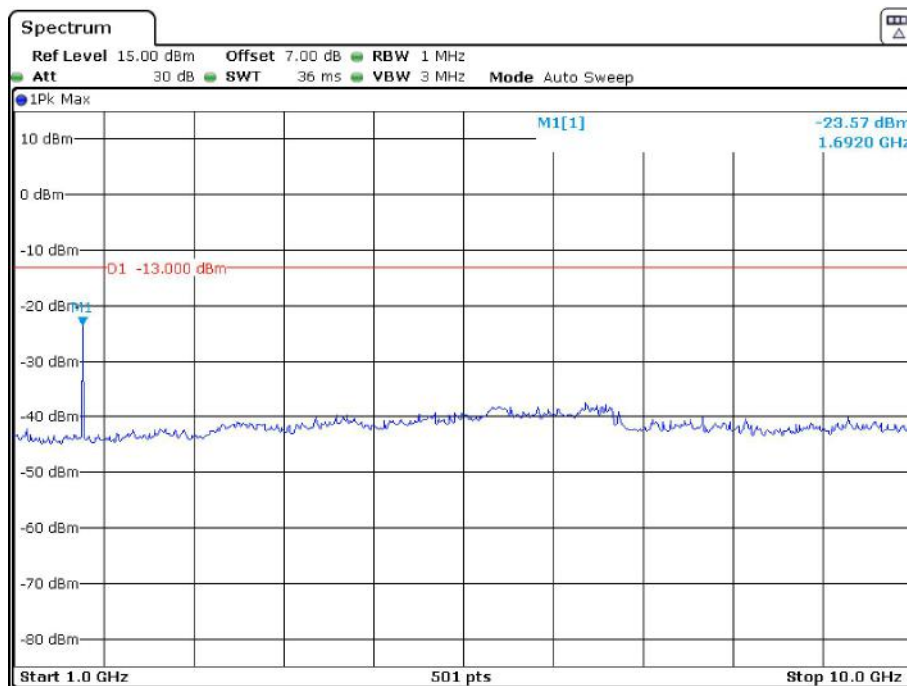
1 GHz – 10 GHz (WCDMA Mode)

Date: 31.MAR.2022 22:09:16

High Channel:**30 MHz – 1 GHz (GSM Mode)**

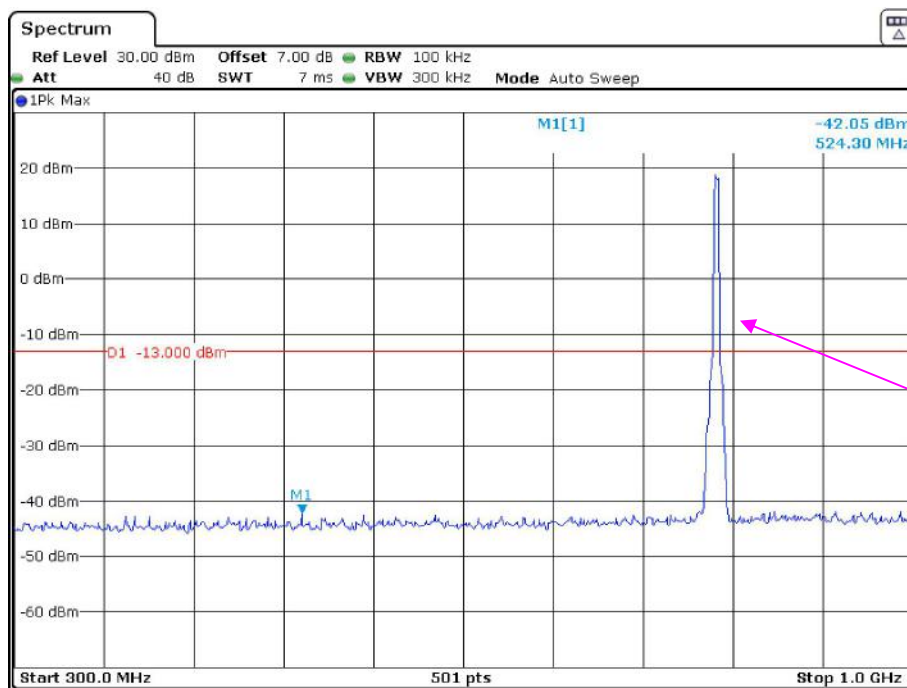
Date: 31.MAR.2022 15:47:32

Fundamental test

1 GHz – 10 GHz (GSM Mode)

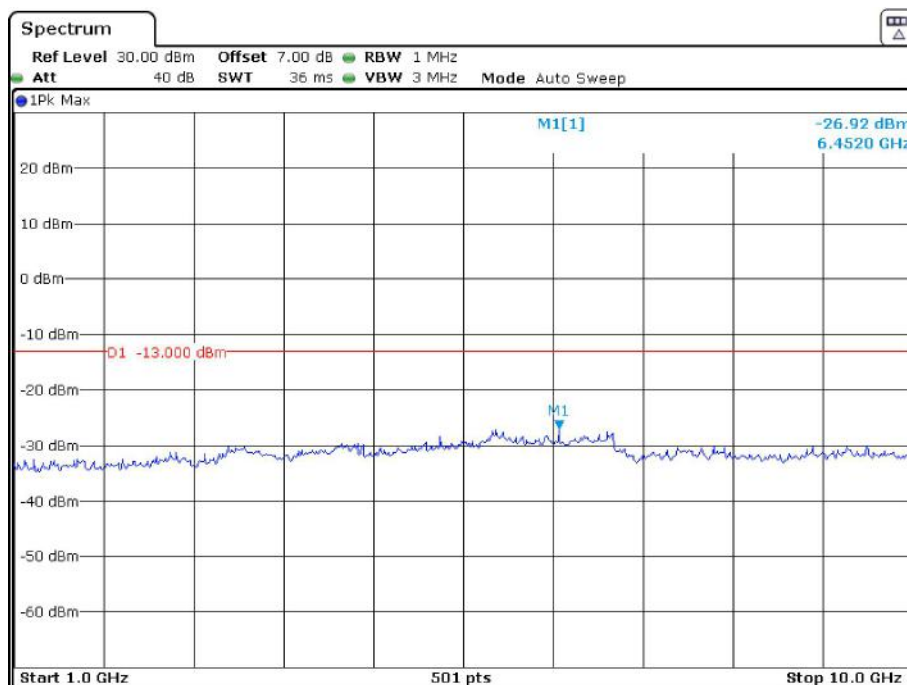
Date: 31.MAR.2022 15:50:07

30 MHz – 1 GHz (WCDMA Mode)

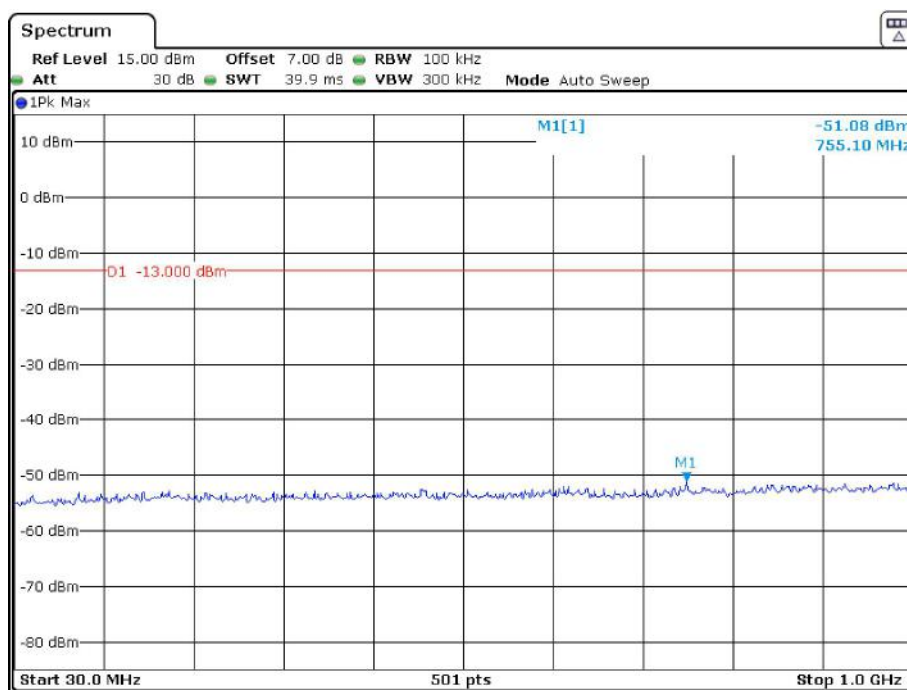


Date: 31.MAR.2022 22:08:21

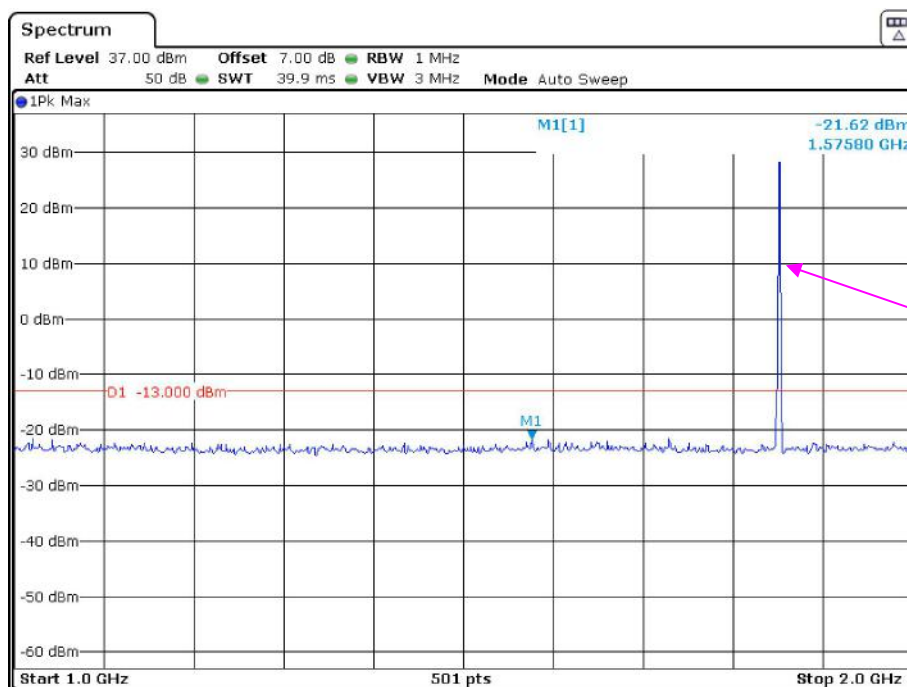
1 GHz – 10 GHz (WCDMA Mode)



Date: 31.MAR.2022 22:08:58

**PCS Band
Low Channel:****30 MHz – 1 GHz (GSM Mode)**

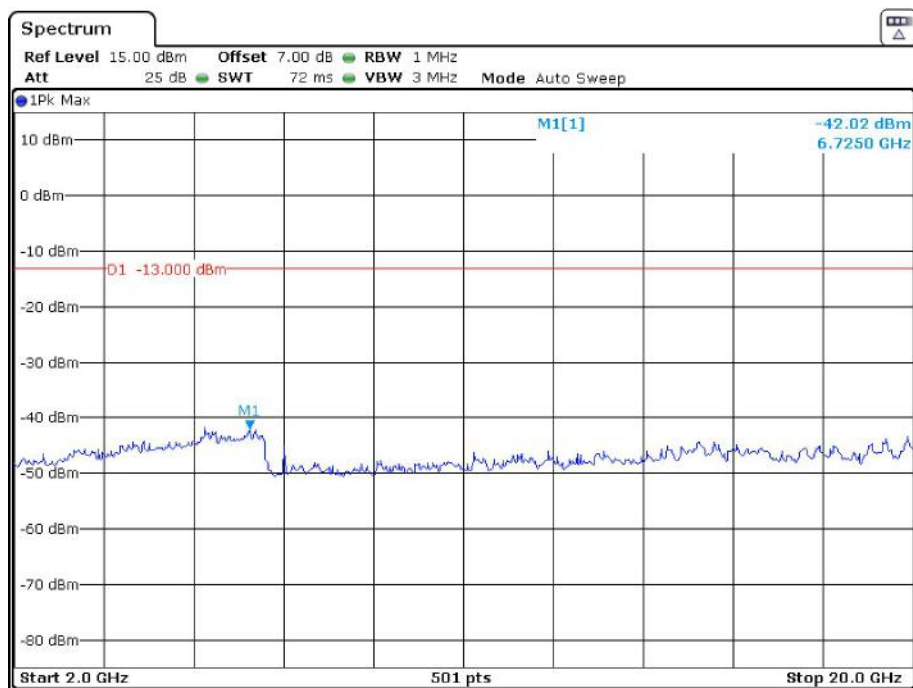
Date: 31.MAR.2022 15:54:32

1 GHz – 2 GHz (GSM Mode)

Date: 31.MAR.2022 15:57:05

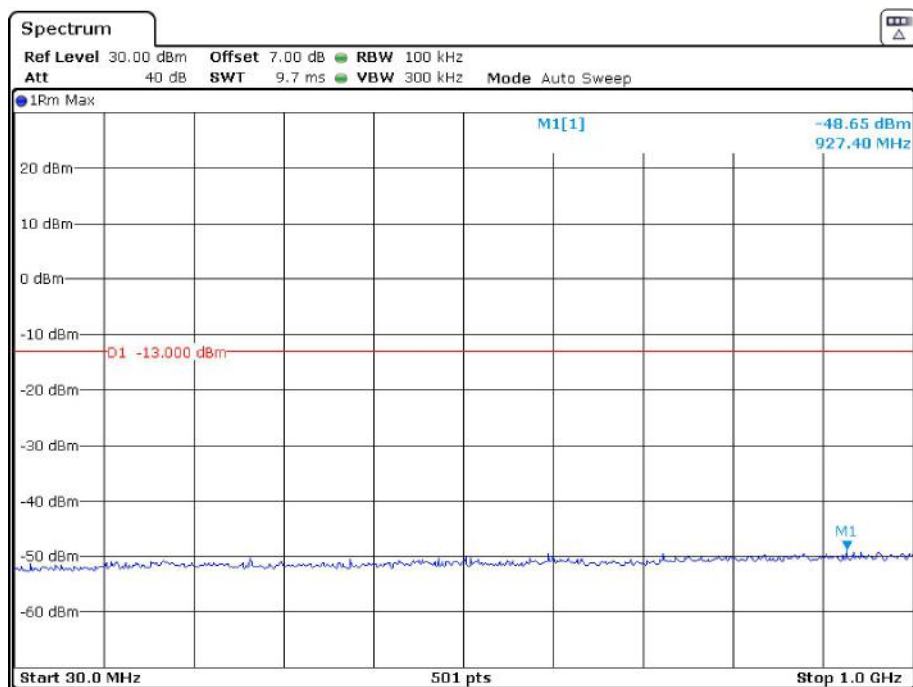
Fundamental test

2 GHz – 20 GHz (GSM Mode)



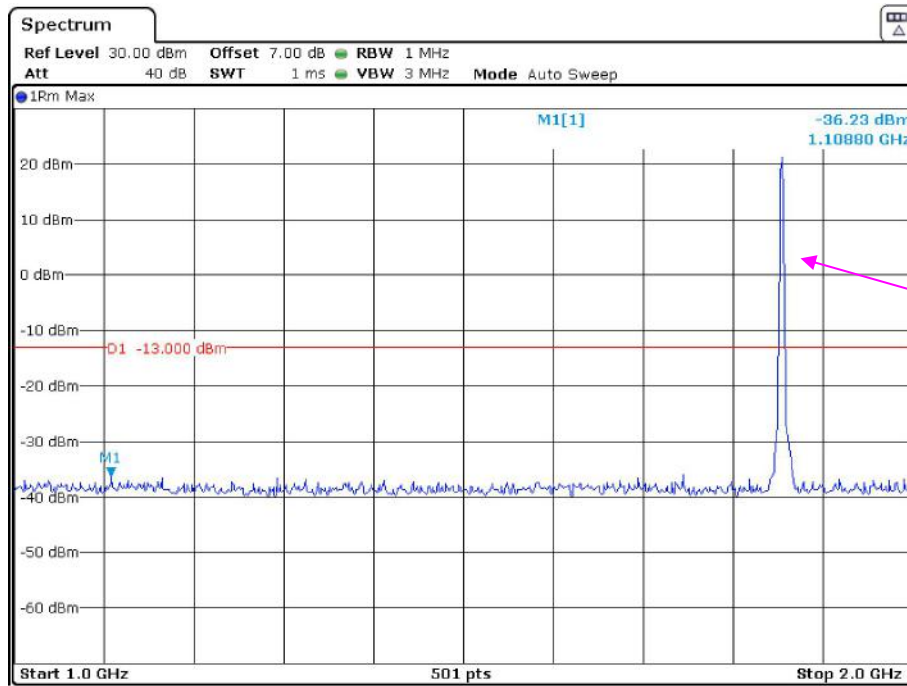
Date: 31.MAR.2022 15:57:40

30 MHz – 1 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:42:32

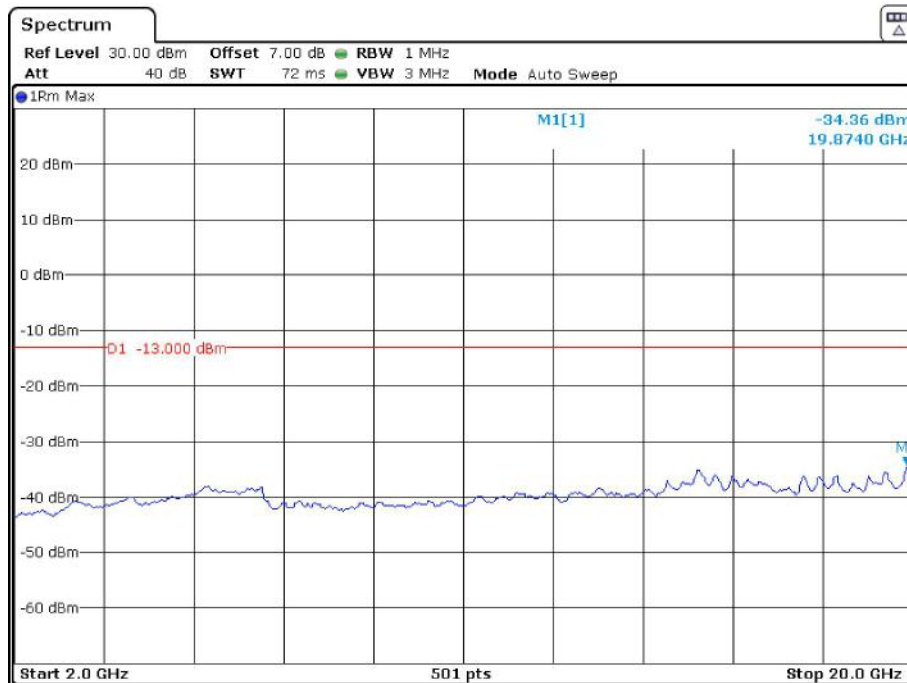
1 GHz – 2 GHz (WCDMA Mode)



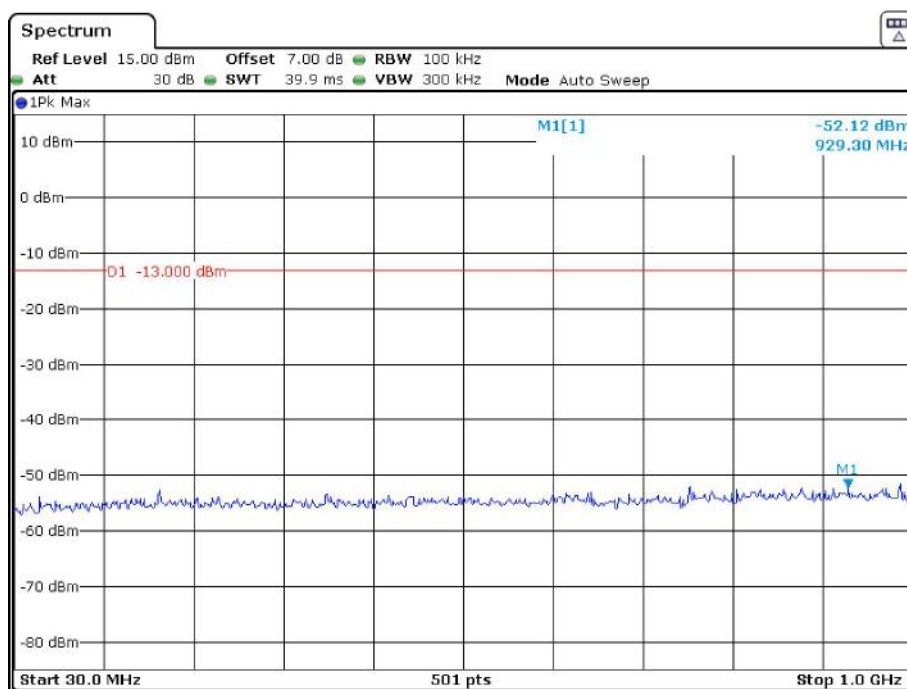
Date: 31.MAR.2022 16:45:06

Fundamental test

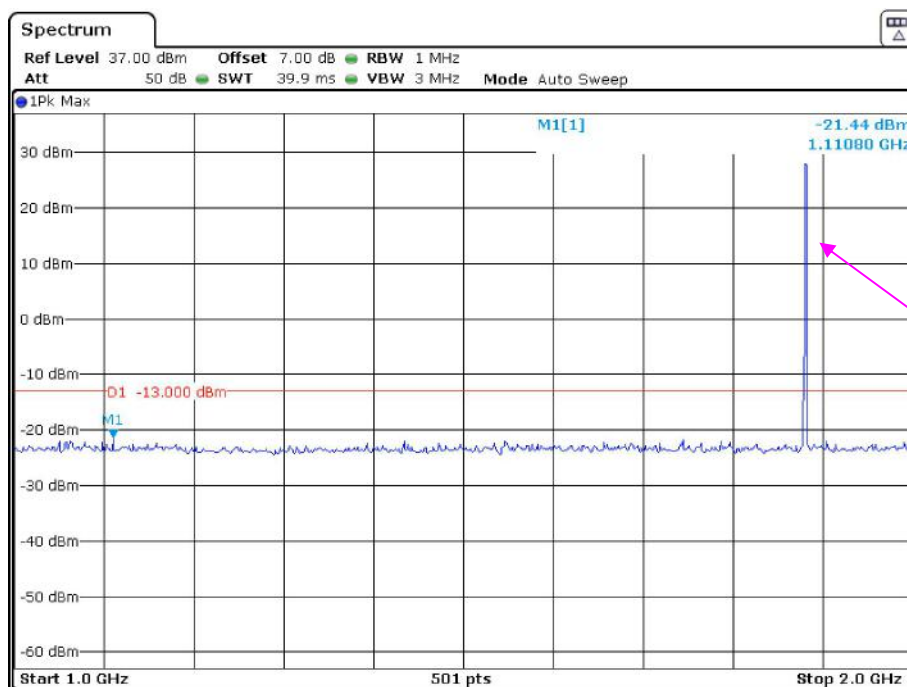
2 GHz – 20 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:45:43

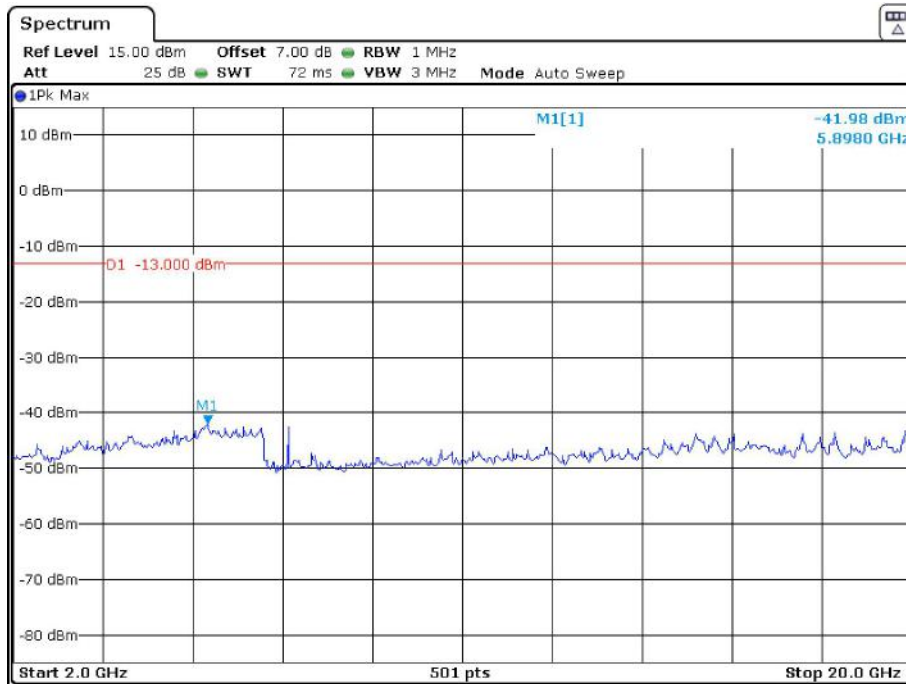
Middle Channel:**30 MHz – 1 GHz (GSM Mode)**

Date: 31.MAR.2022 15:54:47

1 GHz – 2 GHz (GSM Mode)

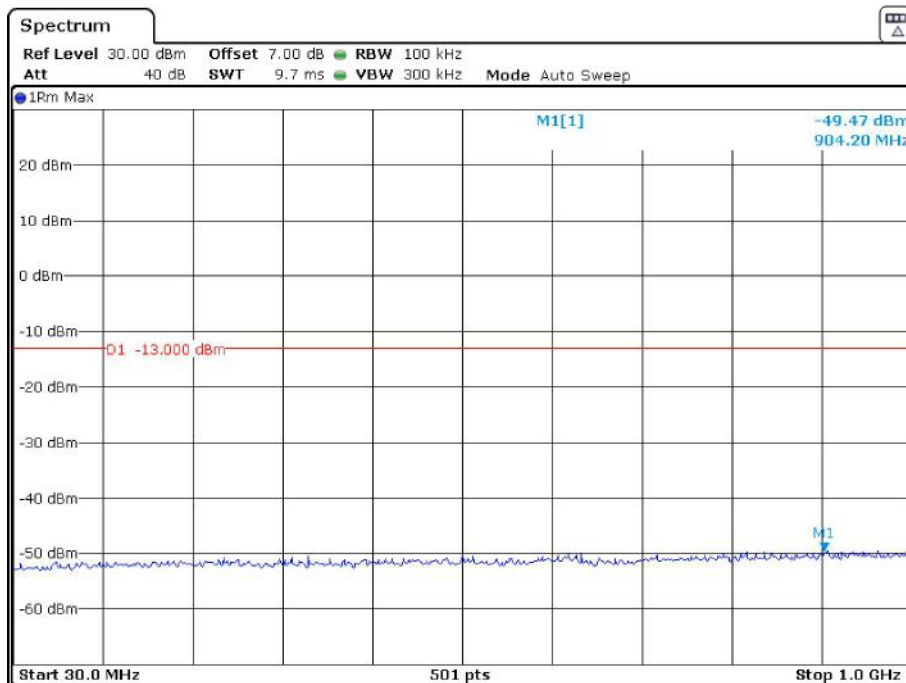
Date: 31.MAR.2022 15:56:42

2 GHz– 20 GHz (GSMMode)



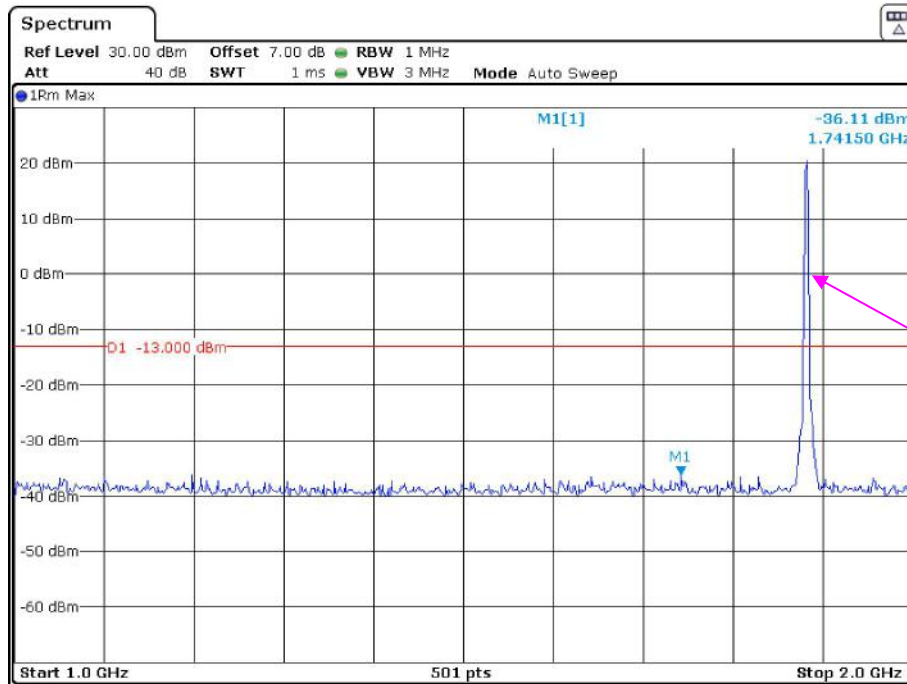
Date: 31.MAR.2022 15:57:58

30 MHz – 1 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:42:50

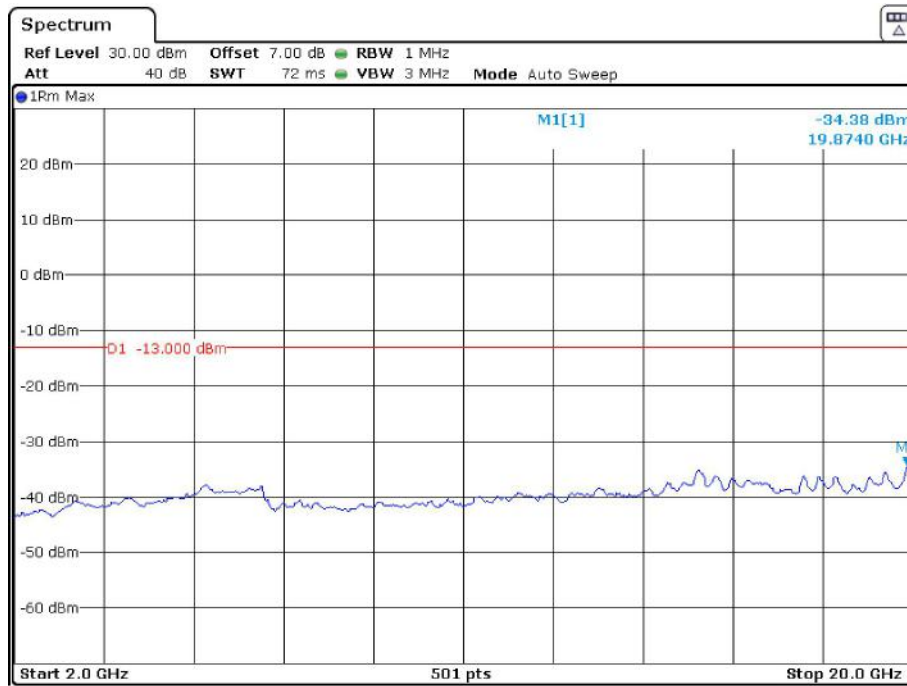
1 GHz – 2 GHz (WCDMA Mode)



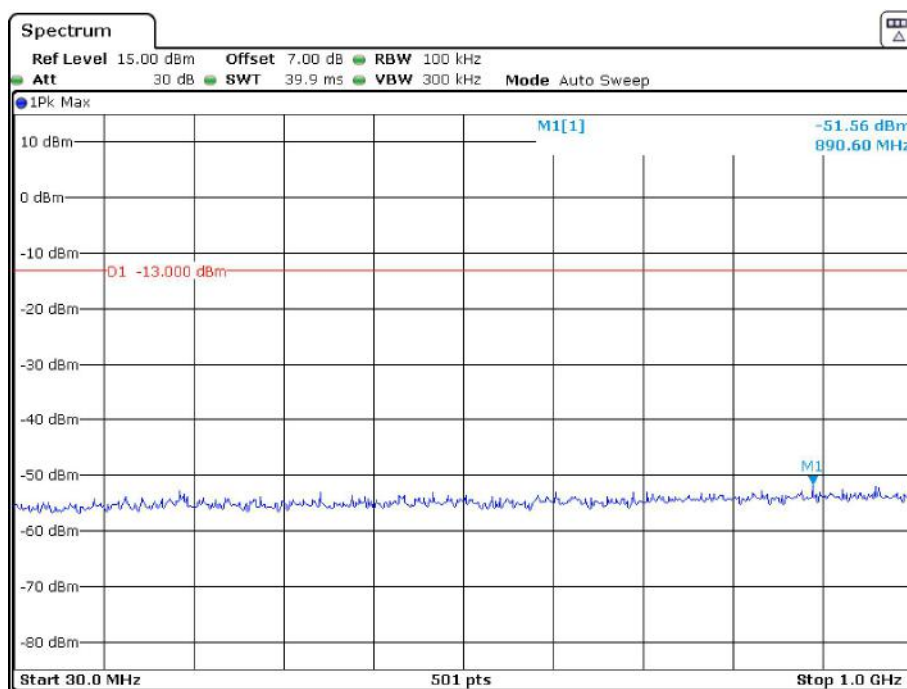
Date: 31.MAR.2022 16:44:09

Fundamental test

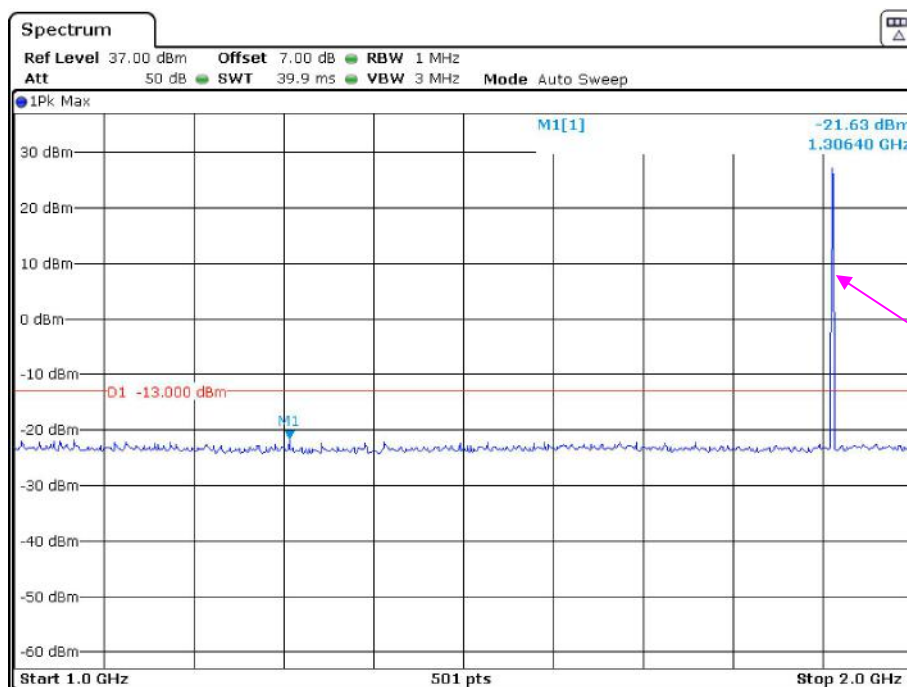
2 GHz – 20 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:46:02

High Channel:**30 MHz – 1 GHz (GSM Mode)**

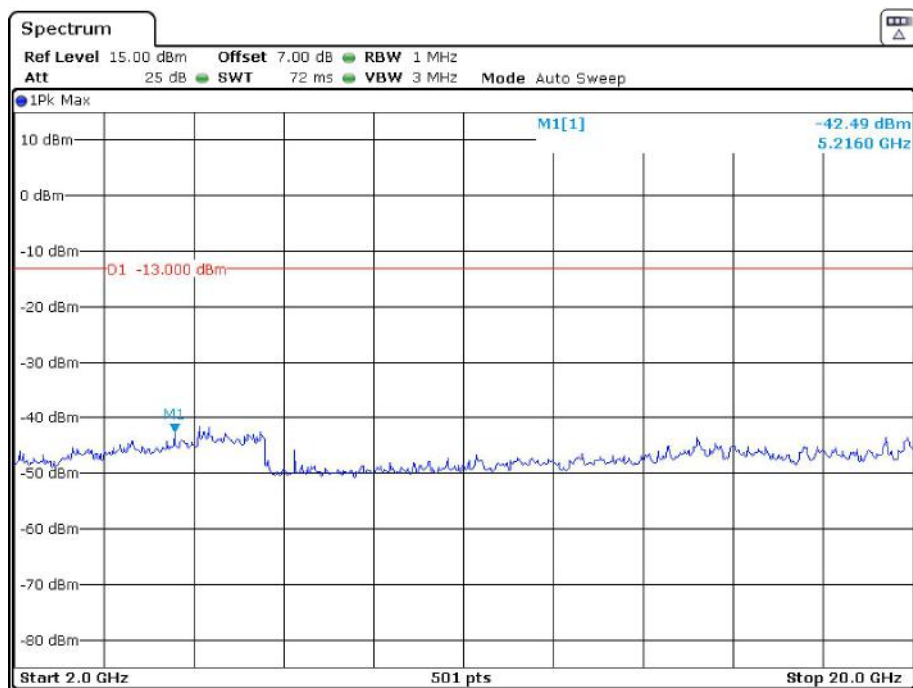
Date: 31.MAR.2022 15:55:00

1 GHz– 2 GHz (GSM Mode)

Date: 31.MAR.2022 15:56:20

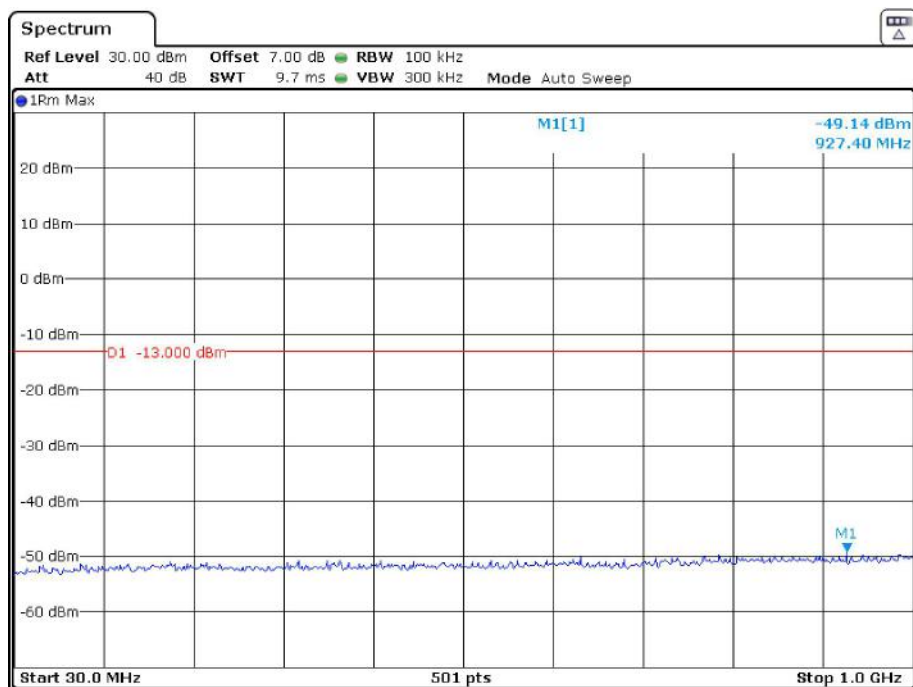
Fundamental test

2 GHz– 20 GHz (GSM Mode)

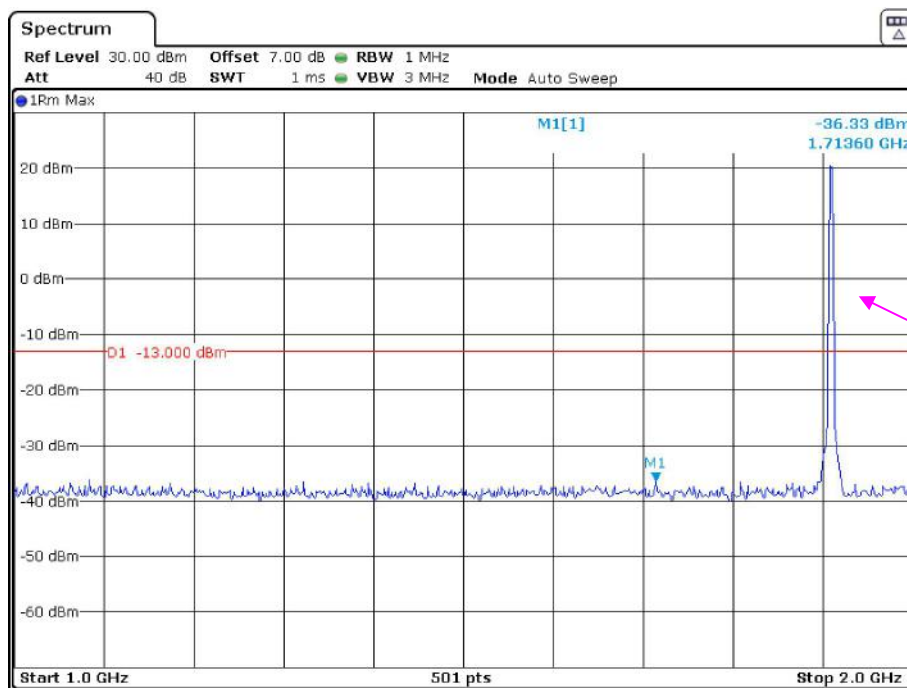


Date: 31.MAR.2022 15:58:11

30 MHz – 1 GHz (WCDMA Mode)

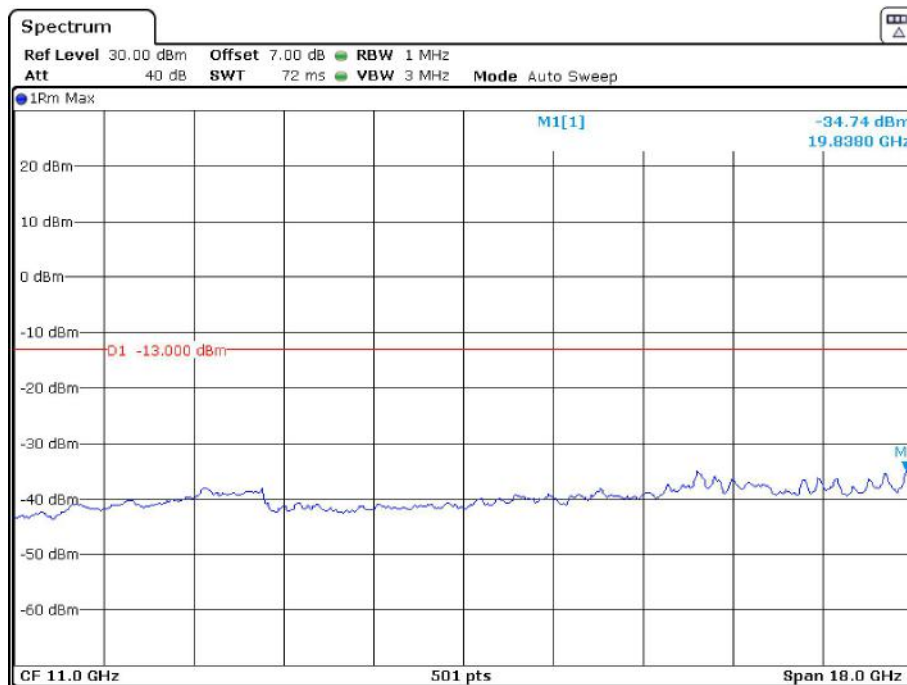


Date: 31.MAR.2022 16:43:03

1 GHz – 2 GHz (WCDMA Mode)

Date: 31.MAR.2022 16:43:51

Fundamental test

2GHz – 20 GHz (WCDMA Mode)

Date: 31.MAR.2022 16:46:17

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:	25.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by I Icey Huang from 2022-04-10 to 2022-04-13

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

The worst case is 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)				
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
45.05	-73.31	30	1.9	H	6.6	-66.7	-13	-53.7
199.98	-62.61	177	2.1	V	-2.0	-64.6	-13	-51.6
1648.4	-60.2	274	1.9	H	3.5	-56.70	-13	-43.70
1648.4	-59.9	65	1.8	V	3.1	-56.80	-13	-43.80
2472.6	-47.2	18	1.6	H	6.6	-40.60	-13	-27.60
2472.6	-44.2	60	1.7	V	5.8	-38.40	-13	-25.40
3296.8	-53.1	237	1.6	H	6.4	-46.70	-13	-33.70
3296.8	-52.2	232	2.1	V	5.7	-46.50	-13	-33.50
Middle channel								
45.05	-74.49	171	2.0	H	6.6	-67.9	-13	-54.9
199.98	-62.83	166	1.6	V	-2.0	-64.8	-13	-51.8
1673.2	-55.9	138	1.9	H	3.8	-52.10	-13	-39.10
1673.2	-55.4	34	1.6	V	3.1	-52.30	-13	-39.30
2509.8	-48.3	163	1.8	H	6.2	-42.10	-13	-29.10
2509.8	-44.3	93	2.0	V	5.6	-38.70	-13	-25.70
3346.4	-51.7	240	1.6	H	6.6	-45.10	-13	-32.10
3346.4	-50.3	131	1.6	V	5.4	-44.90	-13	-31.90
High channel								
45.05	-74.36	50	2.0	H	6.6	-67.8	-13	-54.8
199.98	-61.81	196	1.8	V	-2.0	-63.8	-13	-50.8
1697.6	-56.7	97	1.9	H	4.1	-52.60	-13	-39.60
1697.6	-56.2	59	1.7	V	3.1	-53.10	-13	-40.10
2546.4	-47.6	301	1.9	H	6.1	-41.50	-13	-28.50
2546.4	-45.0	320	1.9	V	5.8	-39.20	-13	-26.20
3395.2	-51.3	163	1.6	H	6.2	-45.10	-13	-32.10
3395.2	-50.0	36	1.9	V	5.4	-44.60	-13	-31.60

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								
45.05	-73.36	230	1.8	H	6.6	-66.8	-13	-53.8
199.98	-61.08	29	2.0	V	-2.0	-63.1	-13	-50.1
3700.4	-54.7	34	1.7	H	8.1	-46.60	-13	-33.60
3700.4	-54.2	338	1.8	V	7.6	-46.60	-13	-33.60
5550.6	-52.3	7	1.8	H	9.6	-42.70	-13	-29.70
5550.6	-48.8	336	2.0	V	9.1	-39.70	-13	-26.70
Middle channel								
45.05	-73.43	86	1.6	H	6.6	-66.8	-13	-53.8
199.98	-62.00	209	2.0	V	-2.0	-64.0	-13	-51.0
3760	-55.3	278	1.9	H	8.8	-46.50	-13	-33.50
3760	-54.4	131	1.8	V	8	-46.40	-13	-33.40
5640	-54.1	138	2.0	H	10.2	-43.90	-13	-30.90
5640	-49.1	275	1.9	V	9.4	-39.70	-13	-26.70
High channel								
45.05	-74.19	7	1.9	H	6.6	-67.6	-13	-54.6
199.98	-63.00	294	1.5	V	-2.0	-65.0	-13	-52.0
3819.6	-55.6	238	2.0	H	8.7	-46.90	-13	-33.90
3819.6	-54.8	260	1.8	V	8	-46.80	-13	-33.80
5729.4	-52.4	233	1.5	H	10.6	-41.80	-13	-28.80
5729.4	-49.3	165	2.0	V	10.2	-39.10	-13	-26.10

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								
45.05	-73.64	324	1.8	H	6.6	-67.0	-13	-54.0
199.98	-62.20	60	1.6	V	-2.0	-64.2	-13	-51.2
3704.8	-55	245	1.7	H	8.2	-46.8	-13	-33.8
3704.8	-54.3	0	1.6	V	7.6	-46.7	-13	-33.7
5557.2	-53.9	14	2.0	H	9.7	-44.2	-13	-31.2
5557.2	-52.7	262	1.7	V	9.1	-43.6	-13	-30.6
Middle channel								
45.05	-74.44	24	1.8	H	6.6	-67.8	-13	-54.8
199.98	-62.58	58	1.8	V	-2.0	-64.6	-13	-51.6
3760	-56.6	349	1.9	H	8.8	-47.8	-13	-34.8
3760	-55.6	266	1.8	V	8	-47.6	-13	-34.6
5640	-55.5	10	1.8	H	10.2	-45.3	-13	-32.3
5640	-54.2	316	1.6	V	9.4	-44.8	-13	-31.8
High channel								
45.05	-73.04	199	1.9	H	6.6	-66.4	-13	-53.4
199.98	-61.66	270	1.7	V	-2.0	-63.7	-13	-50.7
3815.2	-56.2	197	1.8	H	8.7	-47.5	-13	-34.5
3815.2	-55.2	30	2.0	V	7.9	-47.3	-13	-34.3
5722.8	-55.3	351	1.6	H	10.6	-44.7	-13	-31.7
5722.8	-54	25	1.7	V	10.1	-43.9	-13	-30.9

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								
45.05	-73.63	43	1.5	H	6.6	-67.0	-13	-54.0
199.98	-62.47	54	1.8	V	-2.0	-64.5	-13	-51.5
1652.8	-54.5	251	1.6	H	3.5	-51	-13	-38
1652.8	-54.8	228	1.7	V	3.1	-51.7	-13	-38.7
2479.2	-50.7	136	1.9	H	6.5	-44.2	-13	-31.2
2479.2	-50.1	350	1.9	V	5.7	-44.4	-13	-31.4
3305.6	-51.6	211	1.8	H	6.4	-45.2	-13	-32.2
3305.6	-51.5	263	2.1	V	5.7	-45.8	-13	-32.8
Middle channel								
45.05	-74.12	24	1.8	H	6.6	-67.5	-13	-54.5
199.98	-62.76	284	2.0	V	-2.0	-64.8	-13	-51.8
1673.2	-50.6	149	2.1	H	3.8	-46.8	-13	-33.8
1673.2	-50.6	144	2.1	V	3.1	-47.5	-13	-34.5
2509.8	-51.1	178	2.0	H	6.2	-44.9	-13	-31.9
2509.8	-50.9	343	2.0	V	5.7	-45.2	-13	-32.2
3346.4	-52.1	42	1.7	H	6.6	-45.5	-13	-32.5
3346.4	-51.3	116	2.0	V	5.4	-45.9	-13	-32.9
High channel								
45.05	-73.69	39	1.7	H	6.6	-67.1	-13	-54.1
199.98	-62.82	178	1.5	V	-2.0	-64.8	-13	-51.8
1693.2	-55.7	99	1.6	H	4	-51.7	-13	-38.7
1693.2	-55.6	82	2.0	V	3.1	-52.5	-13	-39.5
2509.8	-56.3	114	1.8	H	6.1	-50.2	-13	-37.2
2509.8	-55.7	202	1.7	V	5.7	-50	-13	-37
3386.4	-51.9	237	2.0	H	6.3	-45.6	-13	-32.6
3386.4	-51.2	328	1.5	V	5.4	-45.8	-13	-32.8

LTE Bands: (pre-scan 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								
1.4MHz, Low channel								
45.05	-73.40	155	2.1	H	6.6	-66.8	-13	-53.8
199.98	-62.43	231	2.0	V	-2.0	-64.4	-13	-51.4
3701.4	-55.2	350	2.0	H	8.1	-47.1	-13	-34.1
3701.4	-53.5	288	1.7	V	7.6	-45.9	-13	-32.9
5552.1	-52	1	1.6	H	9.6	-42.4	-13	-29.4
5552.1	-48.5	16	1.5	V	9.1	-39.4	-13	-26.4
1.4MHz, Middle channel								
45.05	-72.80	54	1.6	H	6.6	-66.2	-13	-53.2
199.98	-61.81	158	1.9	V	-2.0	-63.8	-13	-50.8
3760	-56.2	111	1.8	H	8.8	-47.4	-13	-34.4
3760	-54.3	75	1.7	V	8	-46.3	-13	-33.3
5640	-53.8	148	1.8	H	10.2	-43.6	-13	-30.6
5640	-49.1	220	1.8	V	9.4	-39.7	-13	-26.7
1.4MHz, High channel								
45.05	-73.98	58	1.6	H	6.6	-67.4	-13	-54.4
199.98	-61.06	149	1.6	V	-2.0	-63.1	-13	-50.1
3818.6	-55.6	211	1.5	H	8.7	-46.9	-13	-33.9
3818.6	-53.7	287	1.8	V	8	-45.7	-13	-32.7
5727.9	-53.7	283	2.0	H	10.6	-43.1	-13	-30.1
5727.9	-49.8	181	1.6	V	10.2	-39.6	-13	-26.6

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-10GHz								
1.4MHz, Low channel								
45.05	-74.10	270	1.7	H	6.6	-67.5	-13	-54.5
199.98	-62.21	46	2.1	V	-2.0	-64.2	-13	-51.2
1649.4	-54.7	307	2.0	H	3.2	-51.5	-13	-38.5
1649.4	-56.2	52	1.7	V	3.1	-53.1	-13	-40.1
2474.1	-44.9	135	1.6	H	6.6	-38.3	-13	-25.3
2474.1	-42.4	168	1.8	V	5.8	-36.6	-13	-23.6
3298.8	-51.7	262	1.7	H	6.4	-45.3	-13	-32.3
3298.8	-50.9	276	1.6	V	5.7	-45.2	-13	-32.2
1.4MHz, Middle channel								
45.05	-72.68	315	1.8	H	6.6	-66.1	-13	-53.1
199.98	-61.03	90	2.1	V	-2.0	-63.0	-13	-50.0
1673.0	-50.1	37	1.7	H	3.8	-46.3	-13	-33.3
1673.0	-50.3	149	1.7	V	3.1	-47.2	-13	-34.2
2509.5	-43	47	2.0	H	6.2	-36.8	-13	-23.8
2509.5	-41	199	1.9	V	5.6	-35.4	-13	-22.4
3346.0	-51.4	153	1.5	H	6.6	-44.8	-13	-31.8
3346.0	-50	202	1.7	V	5.4	-44.6	-13	-31.6
1.4MHz, High channel								
45.05	-72.80	349	1.5	H	6.6	-66.2	-13	-53.2
199.98	-62.29	28	1.8	V	-2.0	-64.3	-13	-51.3
1696.6	-53.3	204	1.7	H	4.1	-49.2	-13	-36.2
1696.6	-52.4	132	2.0	V	3.1	-49.3	-13	-36.3
2544.9	-42.2	322	2.1	H	6.1	-36.1	-13	-23.1
2544.9	-29.1	102	1.8	V	5.8	-23.3	-13	-10.3
3393.2	-51.6	177	2.1	H	6.3	-45.3	-13	-32.3
3393.2	-50.1	298	1.6	V	5.4	-44.7	-13	-31.7

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								
1.4MHz, Low channel								
45.05	-74.34	5	1.7	H	6.6	-67.7	-13	-54.7
199.98	-61.96	262	1.9	V	-2.0	-64.0	-13	-51.0
1399.4	-54.5	77	1.5	H	5.9	-48.6	-13	-35.6
1399.4	-57.2	105	1.7	V	5.9	-51.3	-13	-38.3
2099.1	-38.5	0	2.1	H	6.3	-32.2	-13	-19.2
2099.1	-40.5	29	1.7	V	5.1	-35.4	-13	-22.4
1.4MHz, Middle channel								
45.05	-74.28	69	1.8	H	6.6	-67.7	-13	-54.7
199.98	-61.43	228	1.8	V	-2.0	-63.4	-13	-50.4
1415	-59.7	227	2.1	H	5.7	-54.0	-13	-41.0
1415	-57.3	201	2.0	V	5.4	-51.9	-13	-38.9
2122.5	-42.9	42	1.7	H	6.7	-36.2	-13	-23.2
2122.5	-38.7	314	1.7	V	5.8	-32.9	-13	-19.9
1.4MHz, High channel								
45.05	-74.42	89	1.8	H	6.6	-67.8	-13	-54.8
199.98	-62.97	25	1.5	V	-2.0	-65.0	-13	-52.0
1430.6	-56.3	263	1.7	H	5.4	-50.9	-13	-37.9
1430.6	-54.5	182	1.6	V	4.8	-49.7	-13	-36.7
2145.9	-39.3	285	1.6	H	7	-32.3	-13	-19.3
2145.9	-43.1	152	1.6	V	6.6	-36.5	-13	-23.5

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 Band13								
Test frequency range: 30MHz-10GHz								
1.4MHz, Low channel								
45.05	-73.60	351	1.9	H	6.6	-67.0	-13	-54.0
199.98	-61.07	8	2.0	V	-2.0	-63.1	-13	-50.1
1559	-53.9	174	2.0	H	4.2	-49.7	-40	-9.7
1559	-54.4	98	1.7	V	3.3	-51.1	-40	-11.1
2338.5	-40	160	1.9	H	7.3	-32.7	-13	-19.7
2338.5	-38.8	309	2.0	V	6.5	-32.3	-13	-19.3
3118	-53.3	81	1.6	H	7.3	-46.0	-13	-33.0
3118	-51.7	311	1.8	V	6.5	-45.2	-13	-32.2
1.4MHz, Middle channel								
45.05	-74.10	116	2.0	H	6.6	-67.5	-13	-54.5
199.98	-61.11	326	1.8	V	-2.0	-63.1	-13	-50.1
1564	-56	130	1.7	H	4.2	-51.8	-40	-11.8
1564	-55.5	161	2.0	V	3.3	-52.2	-40	-12.2
2346	-43.8	289	1.9	H	7.3	-36.5	-13	-23.5
2346	-40.8	37	1.7	V	6.4	-34.4	-13	-21.4
3128	-53.9	31	1.8	H	7.3	-46.6	-13	-33.6
3128	-52.2	290	1.9	V	6.6	-45.6	-13	-32.6
1.4MHz, High channel								
45.05	-74.45	140	1.8	H	6.6	-67.9	-13	-54.9
199.98	-61.63	93	1.8	V	-2.0	-63.6	-13	-50.6
1569	-58.2	131	1.5	H	4.2	-54.0	-40	-14.0
1569	-54.7	203	1.9	V	3.3	-51.4	-40	-11.4
2353.5	-51.6	338	1.7	H	7.3	-44.3	-13	-31.3
2353.5	-43.7	252	1.8	V	6.4	-37.3	-13	-24.3
3138	-52.9	169	2.1	H	7.4	-45.5	-13	-32.5
3138	-51.7	325	1.9	V	6.6	-45.1	-13	-32.1

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-26.5GHz								
5MHz, Low channel								
45.05	-72.69	319	2.1	H	6.6	-66.1	-25	-41.1
199.98	-61.62	68	1.9	V	-2.0	-63.6	-25	-38.6
5075	-52.5	12	1.6	H	11.2	-41.3	-25	-16.3
5075	-53.3	78	1.6	V	10.8	-42.5	-25	-17.5
7612.5	-64.6	320	1.9	H	21.2	-43.4	-25	-18.4
7612.5	-64.9	125	1.9	V	20.2	-44.7	-25	-19.7
5MHz, Middle channel								
45.05	-74.33	15	2.0	H	6.6	-67.7	-25	-42.7
199.98	-61.36	249	1.6	V	-2.0	-63.4	-25	-38.4
5190	-54.92	306	2.0	H	10.52	-44.4	-25	-19.4
5190	-54.7	5	2.0	V	10	-44.7	-25	-19.7
7785	-61.5	234	2.0	H	18.3	-43.2	-25	-18.2
7785	-59.7	345	1.6	V	18	-41.7	-25	-16.7
5MHz, High channel								
45.05	-73.99	236	2.1	H	6.6	-67.4	-25	-42.4
199.98	-61.98	8	1.5	V	-2.0	-64.0	-25	-39.0
5305	-52.1	137	2.1	H	9.6	-42.5	-25	-17.5
5305	-50	344	1.8	V	8.8	-41.2	-25	-16.2
7957.5	-64.1	84	1.8	H	18.9	-45.2	-25	-20.2
7957.5	-63.1	225	1.7	V	18.5	-44.6	-25	-19.6

Note:

Absolute Level = Reading Level + Substituted Factor

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

Margin = Absolute Level - Limit

FCC§ 22.917 (a);§ 24.238 (a); §27.53 (c)(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 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

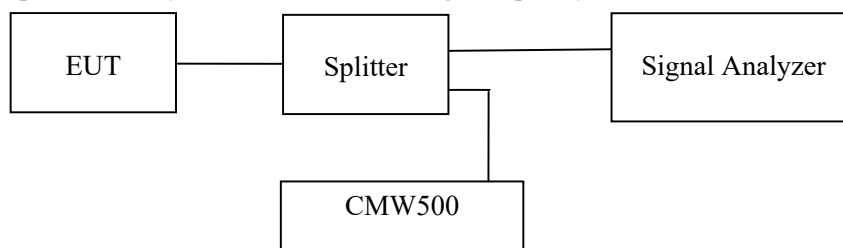
- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

According to FCC §27.53 (h)(m), 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.

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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

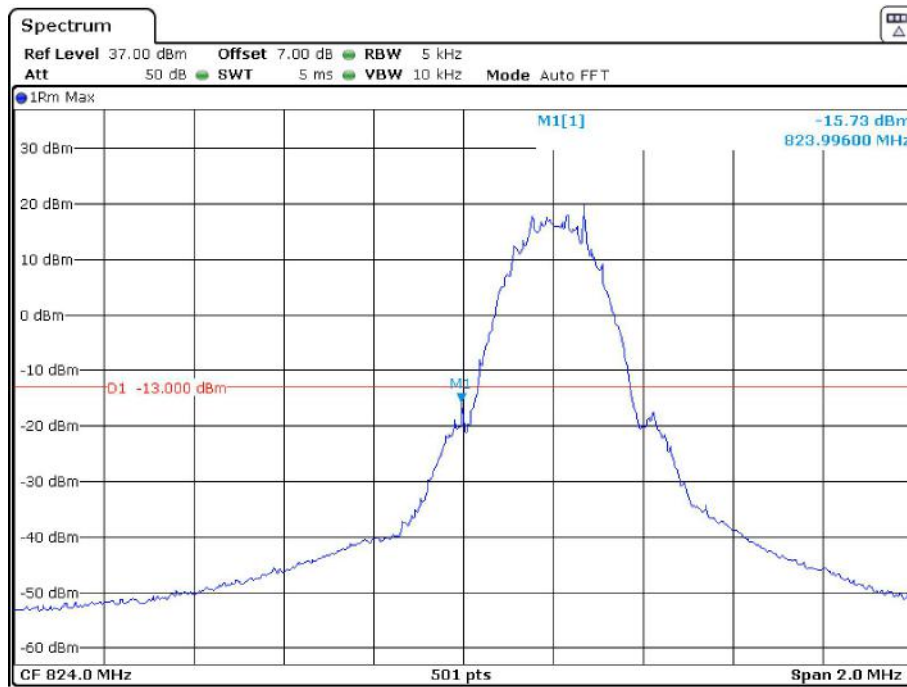
The testing was performed by Key Pei from 2022-2022-03-24 to 2022-05-17

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

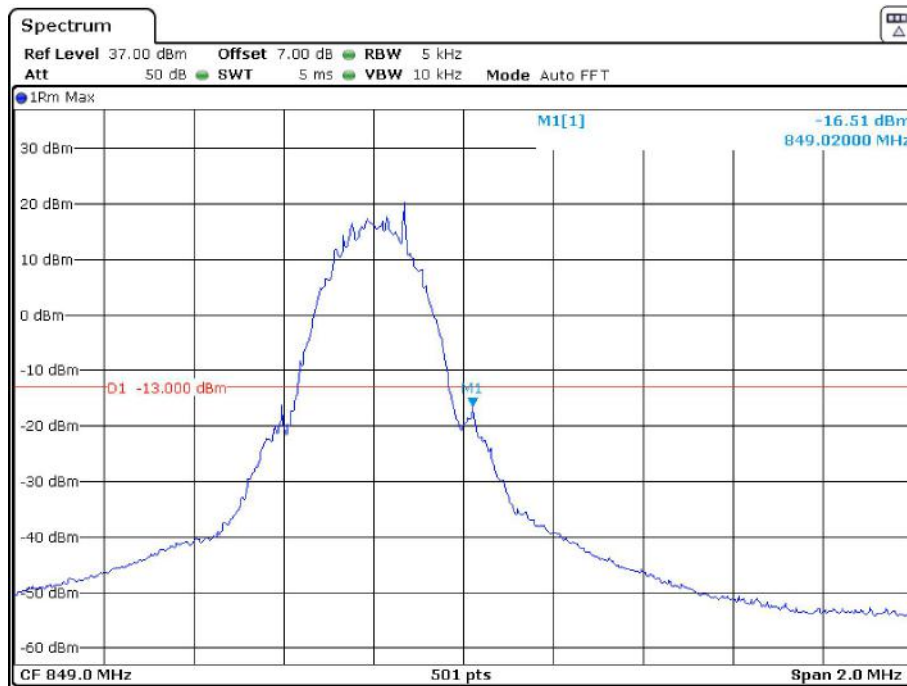
Please refer to the following plots.

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



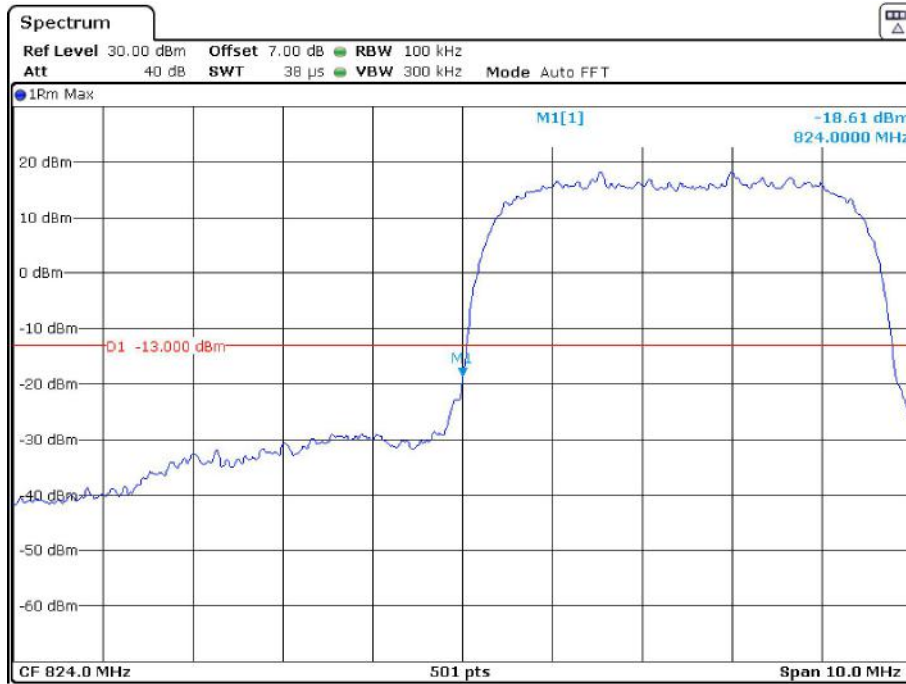
Date: 31.MAR.2022 15:43:16

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



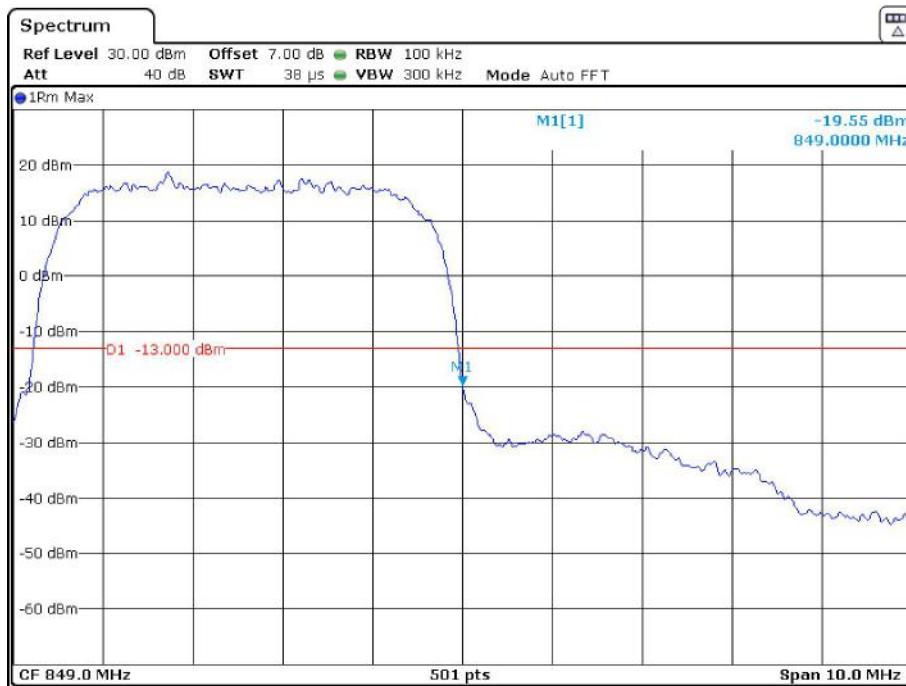
Date: 31.MAR.2022 15:43:49

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



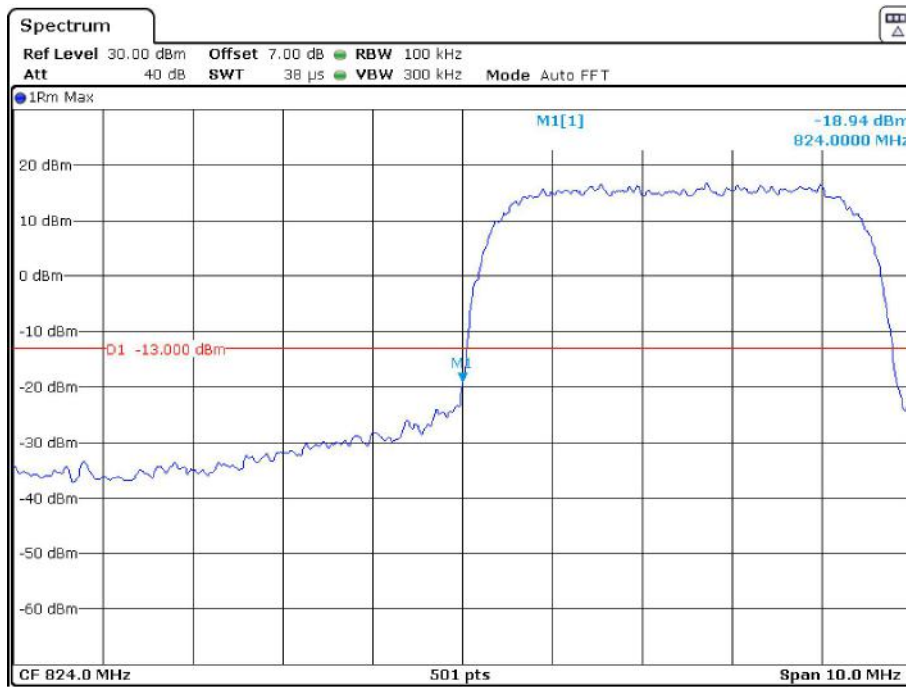
Date: 31.MAR.2022 17:05:39

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



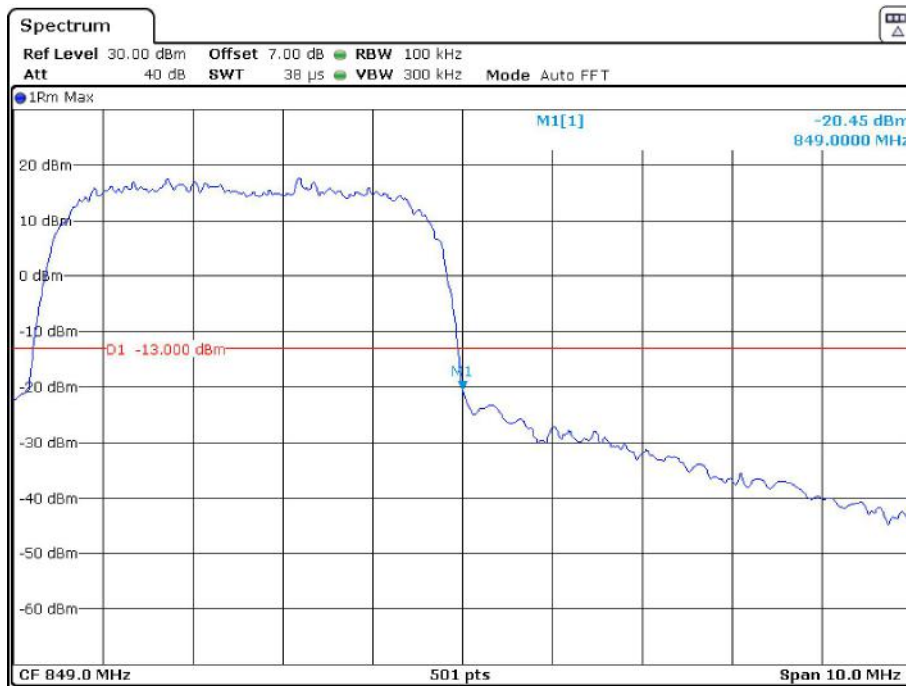
Date: 31.MAR.2022 17:06:09

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



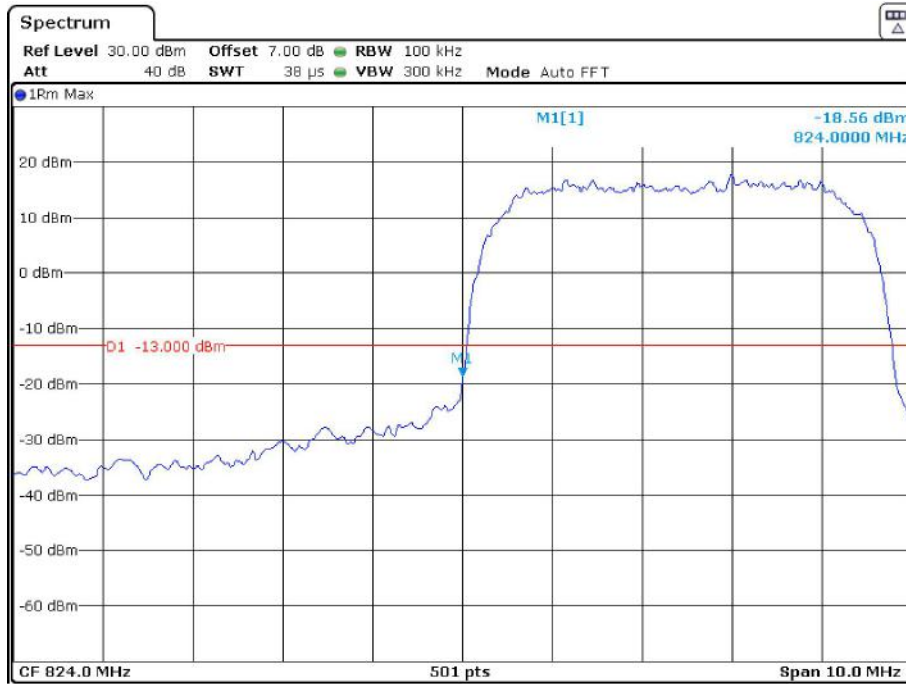
Date: 31.MAR.2022 17:07:48

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



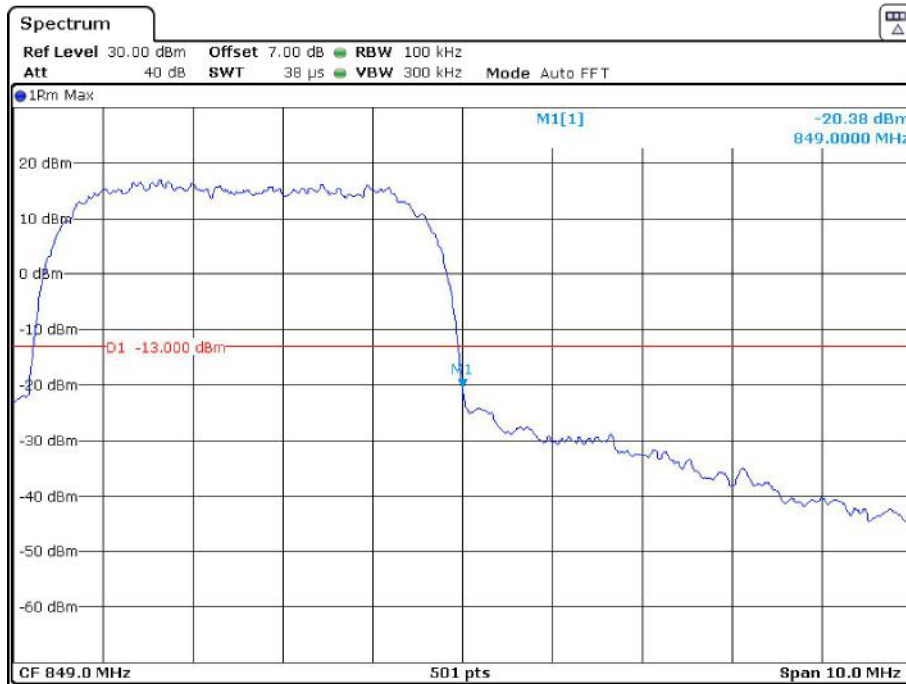
Date: 31.MAR.2022 17:07:29

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



Date: 31.MAR.2022 17:18:47

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



Date: 31.MAR.2022 17:19:08

Spectrum

Ref Level 37.00 dBm Offset 7.00 dB RBW 5 kHz
Att 50 dB SWT 5 ms VBW 10 kHz Mode Auto FFT

1Rm Max

M1[1] -24.49 dBm
1.85000000 GHz

D1 -13.000 dBm

CF 1.85 GHz 501 pts Span 2.0 MHz

The image shows a spectrum analyzer display. The title is 'Spectrum'. Below the title, there are several settings: 'Ref Level 37.00 dBm', 'Offset 7.00 dB', 'RBW 5 kHz', 'Att 50 dB', 'SWT 5 ms', 'VBW 10 kHz', and 'Mode Auto FFT'. The main plot area shows a blue line representing the spectrum. The y-axis is labeled from -60 dBm to 30 dBm in increments of 10 dBm. The x-axis is labeled from 1.84 GHz to 1.86 GHz in increments of 0.01 GHz. A red horizontal line is drawn at -13.000 dBm, labeled 'D1 -13.000 dBm'. A blue peak is visible at 1.85 GHz, labeled 'M1[1] -24.49 dBm' and '1.85000000 GHz'. The plot is titled '1Rm Max'. At the bottom, it says 'CF 1.85 GHz', '501 pts', and 'Span 2.0 MHz'.

Spectrum
 Ref Level 37.00 dBm Offset 7.00 dB RBW 5 kHz
 Att 50 dB SWT 5 ms VBW 10 kHz Mode Auto FFT

1Rm Max

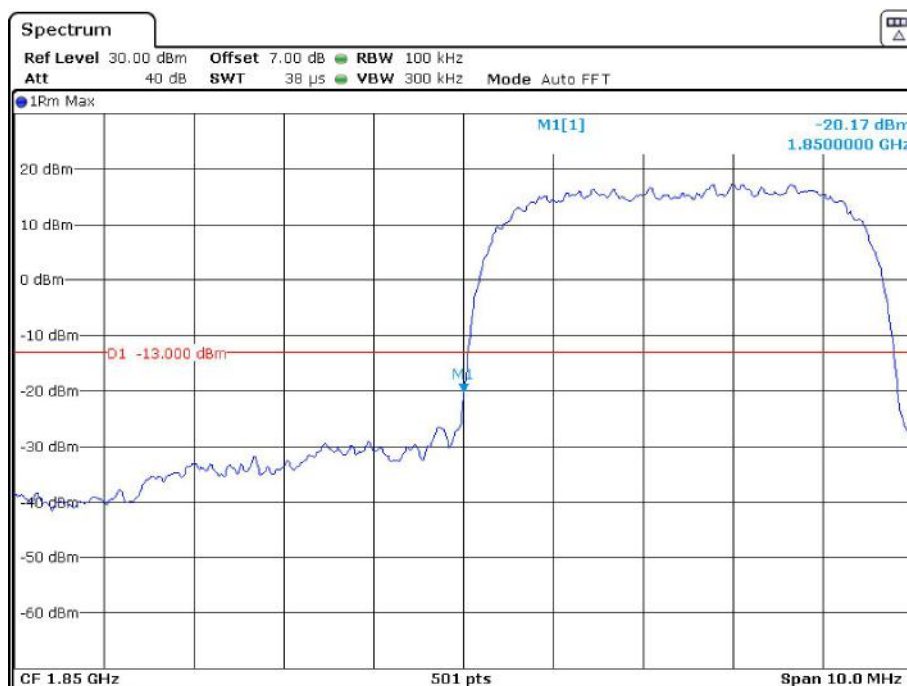
M1[1] -25.74 dBm
 1.91002400 GHz

D1 -13.000 dBm

CF 1.91 GHz 501 pts Span 2.0 MHz

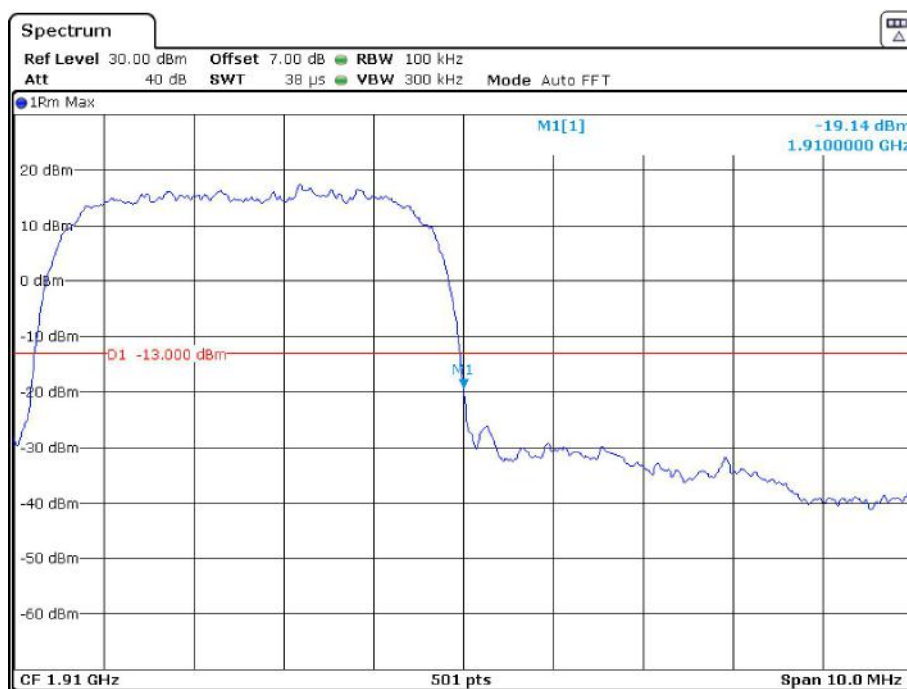
FCC -2G,3G,4G

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



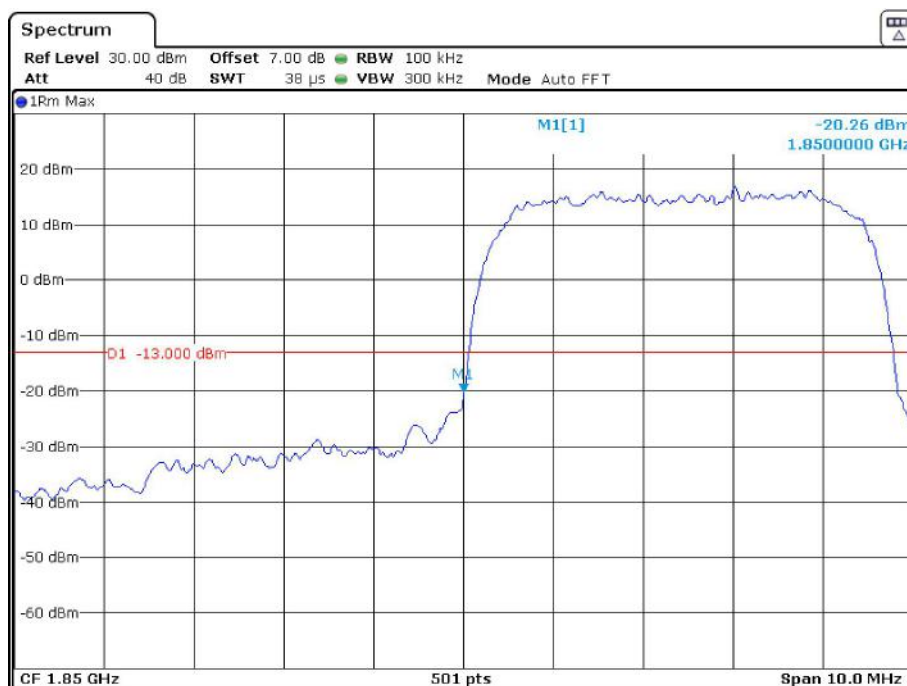
Date: 31.MAR.2022 16:41:30

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



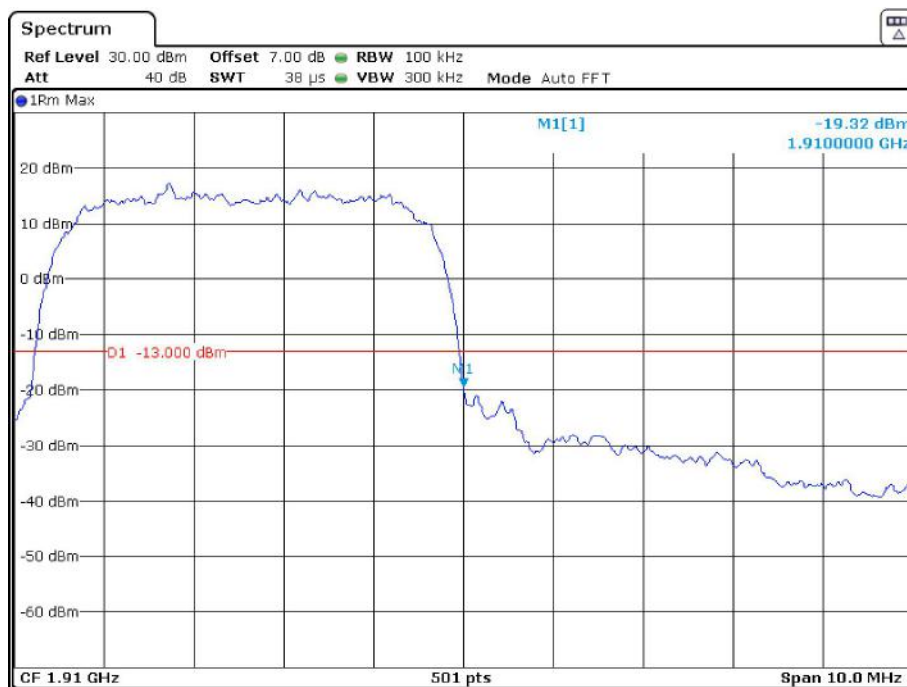
Date: 31.MAR.2022 16:41:13

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

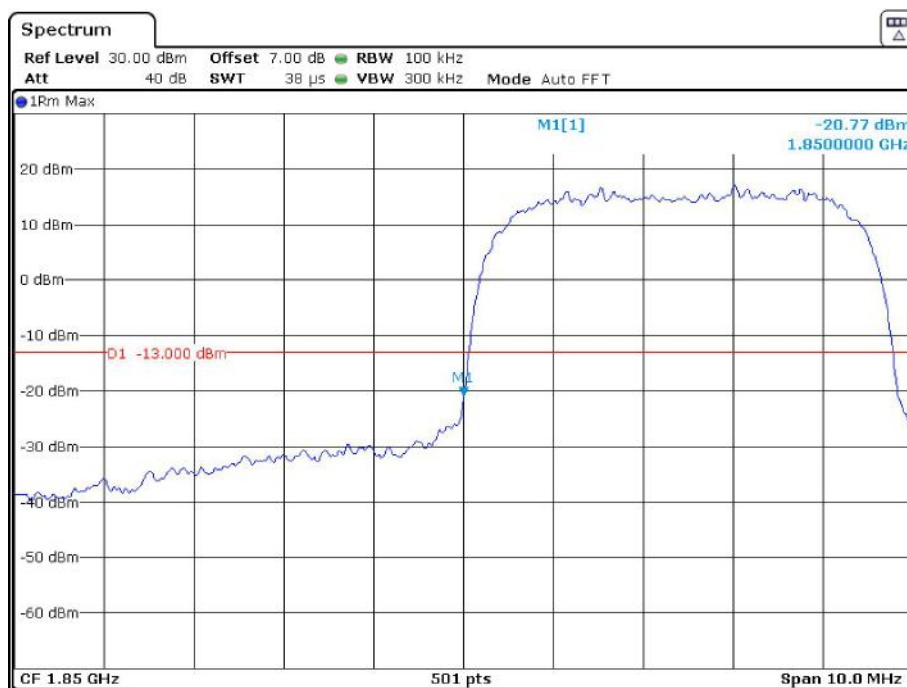


Date: 31.MAR.2022 16:54:18

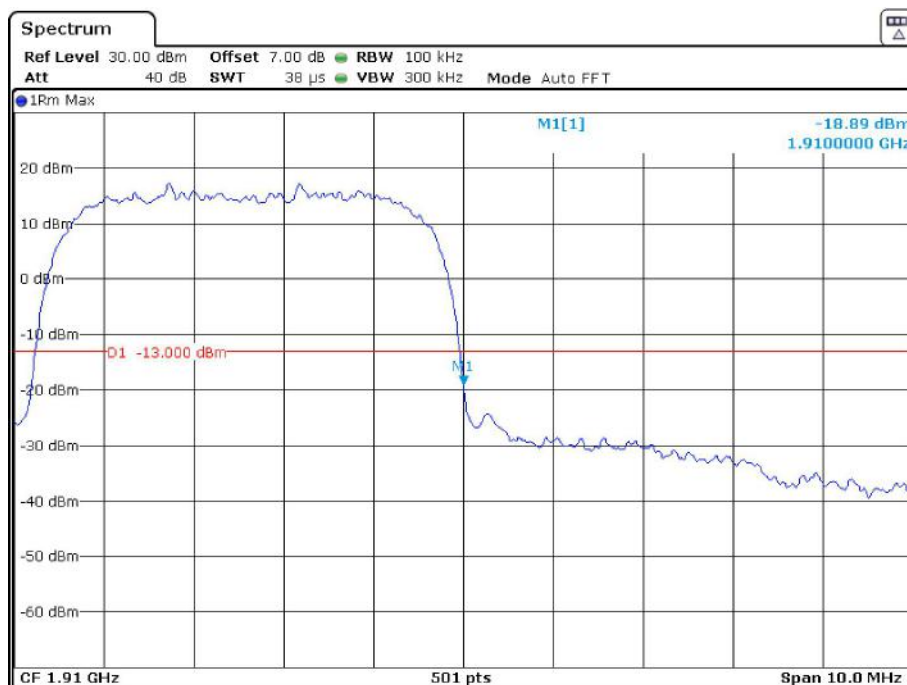
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



Date: 31.MAR.2022 16:54:44

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

Date: 31.MAR.2022 16:52:54

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

Date: 31.MAR.2022 16:52:34

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

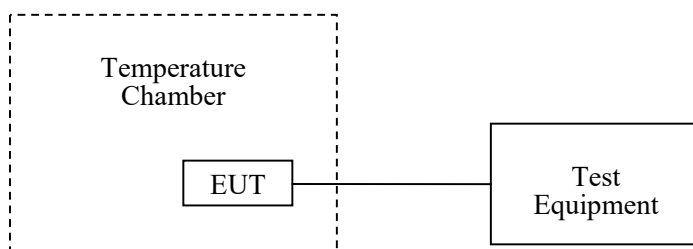
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei from 2022-03-24 to 2022-05-09.

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		4	0.0048	2.5
-10		6	0.0072	2.5
0		7	0.0084	2.5
10		8	0.0096	2.5
20		10	0.0120	2.5
30		9	0.0108	2.5
40		6	0.0072	2.5
50		8	0.0096	2.5
20	L.V.	6	0.0072	2.5
	H.V.	4	0.0048	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.	1.23	0.0015	2.5
-20		2.37	0.0028	2.5
-10		3.21	0.0038	2.5
0		1.52	0.0018	2.5
10		-1.33	-0.0016	2.5
20		0.83	0.0010	2.5
30		1.96	0.0023	2.5
40		1.47	0.0018	2.5
50		1.62	0.0019	2.5
20	L.V.	1.88	0.0022	2.5
	H.V.	1.73	0.0021	2.5

PCS Band (Part 24E)
GSM Mode

Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	8	0.0043	pass
-20		-6	-0.0032	pass
-10		15	0.0080	pass
0		11	0.0059	pass
10		-12	-0.0064	pass
20		-7	-0.0037	pass
30		-9	-0.0048	pass
40		-14	-0.0074	pass
50		6	0.0032	pass
20	L.V.	8	0.0043	pass
	H.V.	-10	-0.0053	pass

WCDMA Mode

Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	1.45	0.0008	pass
-20		1.33	0.0007	pass
-10		1.26	0.0007	pass
0		1.29	0.0007	pass
10		2.17	0.0012	pass
20		1.07	0.0006	pass
30		2.31	0.0012	pass
40		1.22	0.0006	pass
50		1.42	0.0008	pass
20	L.V.	1.32	0.0007	pass
	H.V.	1.46	0.0008	pass

LTE:
QPSK:
Band 2:

10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.6	21.84	0.0116	pass
-20		-9.97	-0.0053	pass
-10		-6.13	-0.0033	pass
0		6.17	0.0033	pass
10		7.92	0.0042	pass
20		6.46	0.0034	pass
30		-6.52	-0.0035	pass
40		7.18	0.0038	pass
50		-9.69	-0.0052	pass
20	L.V.	-8.17	-0.0043	pass
	H.V.	-7.05	-0.0038	pass

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.	19.74	0.0236	2.5
-20		-9.97	-0.0119	2.5
-10		-6.13	-0.0073	2.5
0		6.17	0.0074	2.5
10		7.92	0.0095	2.5
20		6.46	0.0077	2.5
30		-6.52	-0.0078	2.5
40		7.18	0.0086	2.5
50		-9.69	-0.0116	2.5
20	L.V.	-8.17	-0.0098	2.5
	H.V.	-7.05	-0.0084	2.5

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.	699.0374	715.9632	699	716
-20		699.0362	715.9627	699	716
-10		699.0362	715.9671	699	716
0		699.0318	715.9665	699	716
10		699.0345	715.9647	699	716
20		699.0384	715.9672	699	716
30		699.0378	715.9665	699	716
40		699.0377	715.9691	699	716
50		699.0362	715.9654	699	716
20	L.V.	699.0338	715.9672	699	716
	H.V.	699.0375	715.9647	699	716

Band 13:

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.	777.1295	786.8467	777	787
-20		777.1237	786.8437	777	787
-10		777.1276	786.8445	777	787
0		777.1216	786.8465	777	787
10		777.1248	786.8456	777	787
20		777.1297	786.8482	777	787
30		777.1256	786.8487	777	787
40		777.1295	786.8495	777	787
50		777.1264	786.8452	777	787
20	L.V.	777.1212	786.8461	777	787
	H.V.	777.1267	786.8445	777	787

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.	2535.0567	2654.9455	2535	2655
-20		2535.0558	2654.9468	2535	2655
-10		2535.0525	2654.9406	2535	2655
0		2535.0539	2654.9427	2535	2655
10		2535.0528	2654.9425	2535	2655
20		2535.0526	2654.9472	2535	2655
30		2535.0512	2654.9467	2535	2655
40		2535.0565	2654.9452	2535	2655
50		2535.0574	2654.9395	2535	2655
20	L.V.	2535.0497	2654.9414	2535	2655
	H.V.	2535.0512	2654.9422	2535	2655

Note: the frequency range of LTE B41 is 2535-2655MHz which was declared by applicant.

16QAM:**Band 2:**

10.0 MHz Middle Channel, f ₀ =1880MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	35.69	0.0190	pass
-20		-6.68	-0.0036	pass
-10		9.77	0.0052	pass
0		-7.62	-0.0041	pass
10		-9.91	-0.0053	pass
20		-9.82	-0.0052	pass
30		-6.68	-0.0036	pass
40		-8.85	-0.0047	pass
50		5.67	0.0030	pass
20	L.V.	6.05	0.0032	pass
	H.V.	7.52	0.0040	pass

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.	-18.50	-0.0221	2.5
-20		-6.68	-0.0080	2.5
-10		9.77	0.0117	2.5
0		-7.62	-0.0091	2.5
10		-9.91	-0.0118	2.5
20		-9.82	-0.0117	2.5
30		-6.68	-0.0080	2.5
40		-8.85	-0.0106	2.5
50		5.67	0.0068	2.5
20	L.V.	6.05	0.0072	2.5
	H.V.	7.52	0.0090	2.5

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.	699.0387	715.9688	699	716
-20		699.0355	715.9627	699	716
-10		699.0398	715.9674	699	716
0		699.0345	715.9676	699	716
10		699.0355	715.9657	699	716
20		699.0407	715.9628	699	716
30		699.0355	715.9626	699	716
40		699.0342	715.9644	699	716
50		699.0385	715.9636	699	716
20	L.V.	699.0367	715.9665	699	716
	H.V.	699.0345	715.9676	699	716

Band 13:

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.	777.0316	786.9217	777	787
-20		777.0362	786.9243	777	787
-10		777.0357	786.9245	777	787
0		777.0365	786.9276	777	787
10		777.0317	786.9237	777	787
20		777.0328	786.9248	777	787
30		777.0332	786.9217	777	787
40		777.0315	786.9249	777	787
50		777.0297	786.9247	777	787
20	L.V.	777.0342	786.9253	777	787
	H.V.	777.0346	786.9214	777	787

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.	2535.0512	2654.8539	2535	2655
-20		2535.0495	2654.8532	2535	2655
-10		2535.0432	2654.8556	2535	2655
0		2535.0458	2654.8582	2535	2655
10		2535.0457	2654.8548	2535	2655
20		2535.0433	2654.8555	2535	2655
30		2535.0472	2654.8562	2535	2655
40		2535.0445	2654.8536	2535	2655
50		2535.0462	2654.8595	2535	2655
20	L.V.	2535.0487	2654.8547	2535	2655
	H.V.	2535.0428	2654.8553	2535	2655

Note: the frequency range of LTE B41 is 2535-2655MHz which was declared by applicant.

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