



FCC RADIO TEST REPORT

FCC ID : UZ7RM520NGL
Equipment : 5G Sub-6 GHz M.2 Module
Brand Name : ZEBRA
Model Name : RM520N-GL
Applicant : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Manufacturer : Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B),
No. 1016 Tianlin Road, Minhang District, Shanghai,
China 200233
Standard : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)

The product was received on Jan. 09, 2024 and testing was performed from Feb. 08, 2024 to Mar. 11, 2024. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FG3D2501A	01	Initial issue of report	Apr. 17, 2024
FG3D2501A	02	Revise Product Feature This report is an updated version, replacing the report issued on Apr. 17, 2024.	Apr. 22, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Pass	-
	§22.913 (a)(5)	Effective Radiated Power (WCDMA Band V)		
	§24.232 (c)	Equivalent Isotropic Radiated Power (WCDMA Band II)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (WCDMA Band IV)		
-	§24.232 (d)	Peak-to-Average Ratio	-	See Note
-	§2.1049 §22.917 (b) §24.238 (b) §27.53 (g)	Occupied Bandwidth (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Band Edge Measurement (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Conducted Emission (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	-	See Note
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	-	See Note
4.4	§2.1053 §22.917 (a) §24.238 (a) §27.53 (h)	Field Strength of Spurious Radiation (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Pass	41.86 dB under the limit at 7410.00 MHz

Remark:

- For host device, Radiated Spurious Emission, Effective Radiated Power and Equivalent Isotropic Radiated Power are verified and comply with the limit in this test report.
- For host device, the Conducted Output Power is no difference after compared to module (Model: RM520N-GL)

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Wei Chen
Report Producer: Clio Lo



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	5G Sub-6 GHz M.2 Module
Brand Name	ZEBRA
Model Name	RM520N-GL
FCC ID	UZ7RM520NGL
Installed into host	Equipment Name: Industrial Fixed RFID Reader Brand Name: ZEBRA Model Name: FXR9011 FCC ID: UZ7FXR9001
Sample 1	FXR90110-400000-WR 4 port (BT/WiFi/RFID/WWAN/GPS)
Sample 2	FXR90111-400000-WR 4+1 port (BT/WiFi/RFID/WWAN/GPS)
Sample 3	FXR90110-800000-WR 8 port (BT/WiFi/RFID/WWAN/GPS)
EUT supports Radios application	WCDMA/HSPA/LTE/5G NR/RFID/GNSS
HW Version	DV1
SW Version	0.4.18-90
MFD	26DEC23
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

Supported Unit Used in Test Configuration and System				
Cable, 3-way USB Splitter	Brand Name	ZEBRA	Model Name	ADP-USB0010-M12
Cable, USB-C Host, 5ft.	Brand Name	ZEBRA	Model Name	CBL-USBCHST015-M12
Cable, USB-C Host, 15ft.	Brand Name	ZEBRA	Model Name	CBL-USBCHST035-M12
Cable, USB-C Client, 5ft.	Brand Name	ZEBRA	Model Name	CBL-USBCCLT015-M12
Cable, USB-C Client, 15ft.	Brand Name	ZEBRA	Model Name	CBL-USBCCLT035-M12
Cable, USB-A Client, 5ft.	Brand Name	ZEBRA	Model Name	CBL-USBACL015-M12
Cable, USB-A Client, 15ft.	Brand Name	ZEBRA	Model Name	CBL-USBACL035-M12
Cable, GPIO	Brand Name	ZEBRA	Model Name	CBL-GP0050-M12M12A
Cable, 12V (Cigarette Lighter) Power Adapter, 3.5 meter	Brand Name	ZEBRA	Model Name	CBL-PWRD035-M12CL
Cable, DC Power Cord (Flying Leads), 3.5m	Brand Name	ZEBRA	Model Name	CBL-PWRD035-M1200
Cable, DC Power Cord (Flying Leads), 10m	Brand Name	ZEBRA	Model Name	CBL-PWRD100-M1200
Cable, Power Supply Output Adapter, 3.5m	Brand Name	ZEBRA	Model Name	CBL-PWRD035-M12M12
Cable, Power Supply Output Adapter, 10m	Brand Name	ZEBRA	Model Name	CBL-PWRD100-M12M12

Supported Unit Used in Test Configuration and System				
Cable, DC-DC Power Supply Input	Brand Name	ZEBRA	Model Name	CBL-PWRD150-M12M00
Cable, AC-DC Power Supply Input (Flying Leads)	Brand Name	ZEBRA	Model Name	CBL-PWRA150-M1200
Cable, AC-DC Power Supply Input (IEC plug)	Brand Name	ZEBRA	Model Name	CBL-PWRA035-M12IEC
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 68", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-3B4000680R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 180", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-3B4001800R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 240", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-3B4002400R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 360", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-3B4003600R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 68", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-1B4000680R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 180", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-1B4001800R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 240", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-1B4002400R
CBL: RF, N STR PLUG TO RP-TNC STR PLUG ON LMR-240, 360", IP67 Sealed	Brand Name	ZEBRA	Model Name	CBLRD-1B4003600R
CHIMERA ETHERNET CABLE 5M	Brand Name	ZEBRA	Model Name	CBL-ENT00500-M1200
CHIMERA ETHERNET CABLE 15M	Brand Name	ZEBRA	Model Name	CBL-ENT01500-M1200
Outdoor AC-DC PSU	Brand Name	ZEBRA	Model Name	PWR-BGA24V90W0WW (Spec PD-007875-01)
Forklift DC-DC PSU	Brand Name	ZEBRA	Model Name	PWR-BGA24V90W1WW (Spec PD-007876-01)
Indoor AC-DC PSU	Brand Name	ZEBRA	Model Name	PWR-BGA24V78W3WW (Spec PD-007877-01)
PoE adaptor	Brand Name	ZEBRA	Model Name	PD-9001GR/AT/AC



Supported Unit Used in Test Configuration and System				
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN480
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN650
External RFID Antenna	Brand Name	ZEBRA	Model Name	SR5502
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN510
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN520
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN610
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN620
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN720
External RFID Antenna	Brand Name	ZEBRA	Model Name	AN440
External RFID Antenna	Brand Name	ZEBRA	Model Name	SP5504
BT/WLAN_External Antenna	Brand Name	Amphenol	Model Name	ST0228-30-502-A
BT/WLAN_External Antenna	Brand Name	Amphenol	Model Name	ZB511A-02-001-C
AN650 Antenna cable(5ft/1524mm)	Brand Name	ZEBRA	Model Name	CBLRD-1C4000600R
AN650 Antenna cable(20ft/6096mm)	Brand Name	ZEBRA	Model Name	CBLRD-1C4002400R
AN650 Antenna cable(15ft/4572mm)	Brand Name	ZEBRA	Model Name	CBLRD-1C4001800R
AN650 Antenna cable(30ft/9144mm)	Brand Name	ZEBRA	Model Name	CBLRD-1C4003600R
AN650 Antenna cable(10ft/3048mm)	Brand Name	ZEBRA	Model Name	CBLRD-1C4001200R
WWAN_External Antenna	Brand Name	Quectel	Model Name	YB0007BA

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx Frequency	WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4 MHz ~ 1752.6 MHz
Rx Frequency	WCDMA: Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4 MHz ~ 2152.6 MHz
Maximum Output Power to Antenna	WCDMA: Band V: 23.67 dBm Band II: 23.46 dBm Band IV: 23.44 dBm
Antenna Type	Omni-directional Antenna
Antenna Gain	Cellular Band: 0.9 dBi PCS Band: 2.0 dBi AWS Band: 2.0 dBi
Type of Modulation	WCDMA: QPSK (Uplink) HSDPA: 64QAM (Downlink) HSUPA: QPSK (Uplink)

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.3 Modification of EUT

No modifications made to the EUT during the testing.

1.4 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH03-HY
Test Engineer	Eric Wu
Temperature (°C)	21~23
Relative Humidity (%)	47.8~49.8
Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH21-HY (TAF Code: 3786)
Test Engineer	Jack Cheng, Ray Lung and Sky Chang
Temperature (°C)	18~26
Relative Humidity (%)	50~70
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786



1.5 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. The TAF code is not including all the FCC KDB listed without accreditation.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in two config (Ant. Degree 0 and Ant. Degree 90), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and only the worst case emissions were reported in this report.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 9000 MHz for WCDMA Band V
2. 30 MHz to 18000 MHz for WCDMA Band IV
3. 30 MHz to 19100 MHz for WCDMA Band II

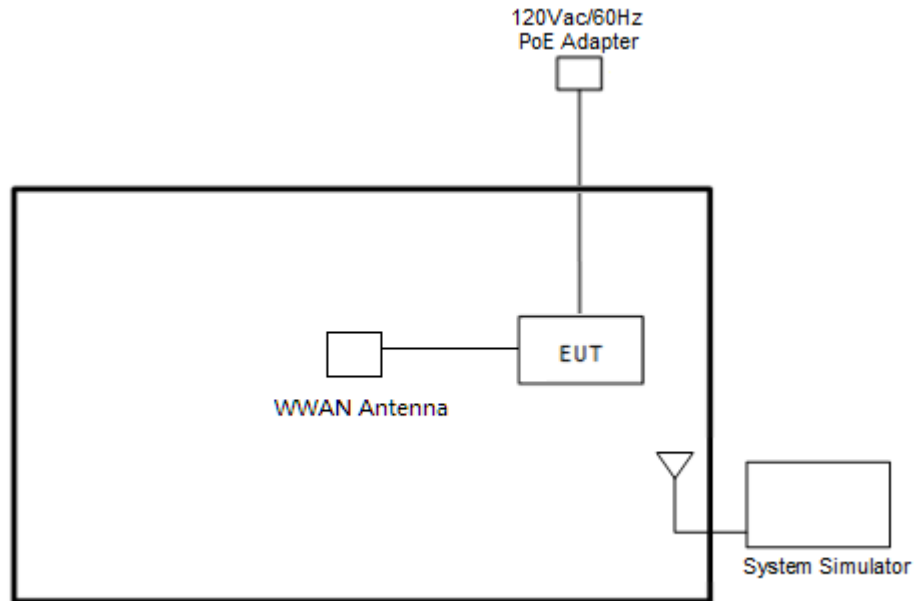
All modes, data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
WCDMA Band V	-	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

Remark: All the radiated test cases were performed with Sample 3.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.2 dB and a 10 dB attenuator.

Example:

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$



2.5 Frequency List of Low/Middle/High Channels

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6
WCDMA Band II	Channel	9262	9400	9538
	Frequency	1852.4	1880.0	1907.6
WCDMA Band IV	Channel	1312	1413	1513
	Frequency	1712.4	1732.6	1752.6

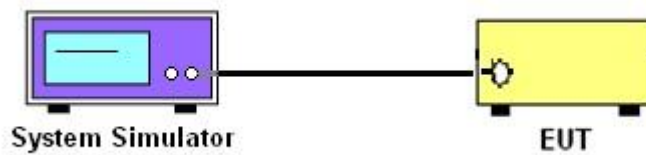
3 Conducted Test Result

3.1 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and ERP/EIRP

3.2.1 Description of the Conducted Output Power and ERP/EIRP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for WCDMA Band V

The EIRP of mobile transmitters must not exceed 2 Watts for WCDMA Band II

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The transmitter output port is connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select the lowest, middle, and the highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

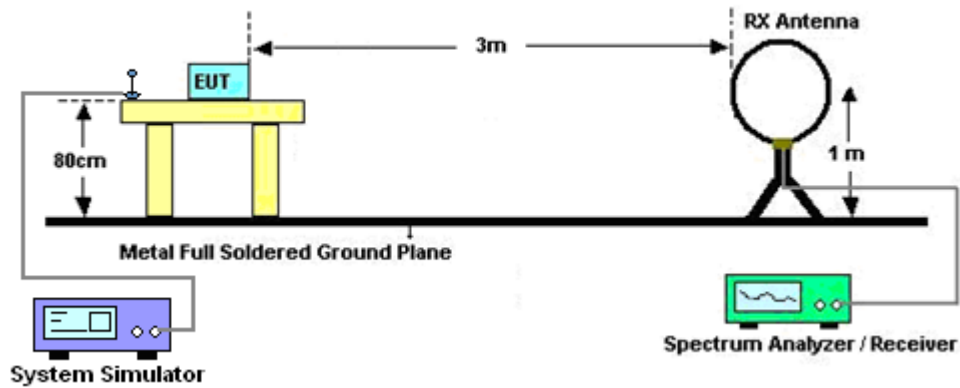
4 Radiated Test Items

4.1 Measuring Instruments

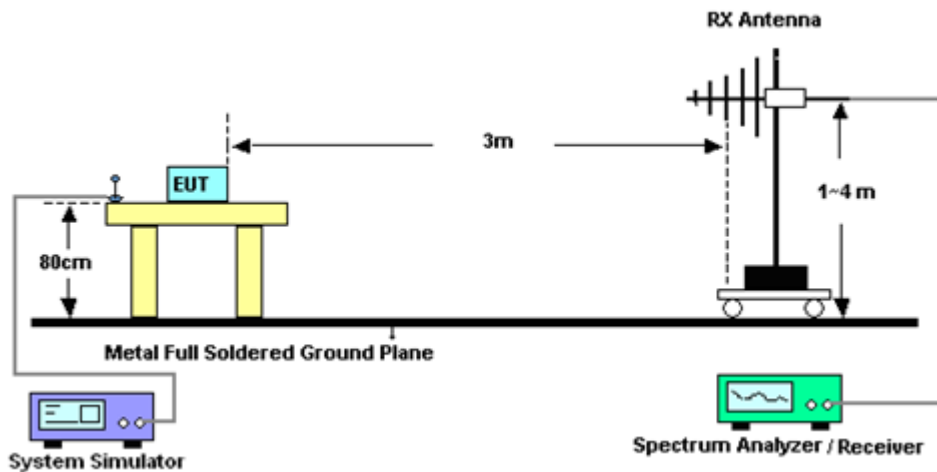
Please refer to the measuring equipment list in this test report.

4.2 Test Setup

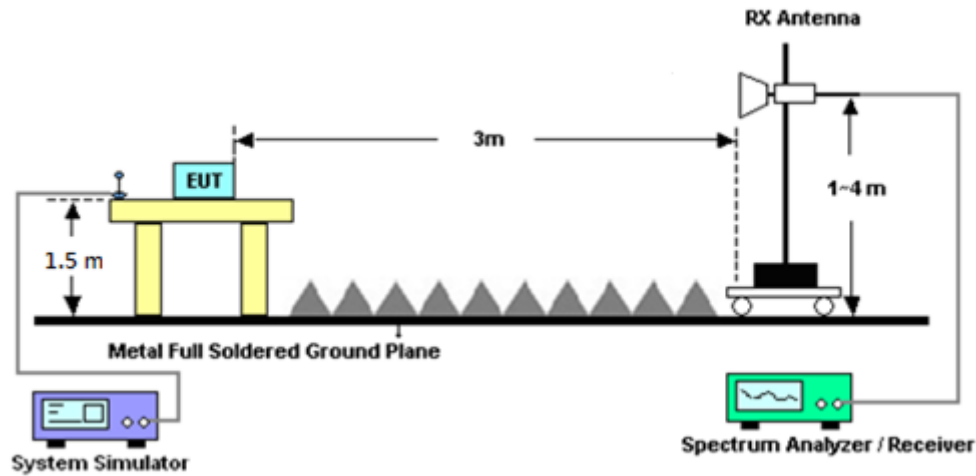
For radiated test below 30MHz



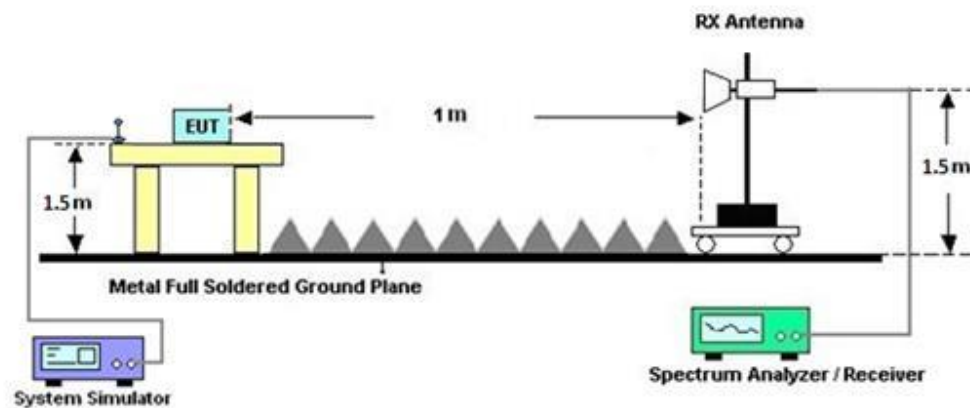
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI C63.26-2015 section 5.5.4 Radiated measurement using the field strength method.

1. The EUT is placed on a rotatable wooden table 0.8 meters for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz above the ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1 MHz, VBW = 3 MHz, taking record of maximum spurious emission.
6. To convert spectrum reading E(dBuV/m) to EIRP(dBm)
$$\text{EIRP(dBm)} = \text{Level (dBuV/m)} + 20\log(d) - 104.77,$$
where d is the distance at which field strength limit is specified in the rules
7. Field Strength Level (dBm) = Spectrum Reading (dBm) + Antenna Factor + Cable Loss + Read Level - Preamp Factor.
8. ERP (dBm) = EIRP (dBm) - 2.15
9. The RF fundamental frequency shall be excluded against the limit line in the operating frequency band.



5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LOOP Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Feb. 08, 2024~ Mar. 06, 2024	Sep. 11, 2024	Radiation (03CH21-HY)
Bilog Antenna	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63303 & 001	30MHz~1GHz	Oct. 15, 2023	Feb. 08, 2024~ Mar. 06, 2024	Oct. 14, 2024	Radiation (03CH21-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C03A18EN	1GHz~18GHz	Jul. 12, 2023	Feb. 08, 2024~ Mar. 06, 2024	Jul. 11, 2024	Radiation (03CH21-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	1223	18GHz~40GHz	Jul. 10, 2023	Feb. 08, 2024~ Mar. 06, 2024	Jul. 09, 2024	Radiation (03CH21-HY)
Amplifier	SONOMA	310N	421580	30MHz~1GHz	Jul. 15, 2023	Feb. 08, 2024~ Mar. 06, 2024	Jul. 14, 2024	Radiation (03CH21-HY)
Amplifier	EMEC	EM01G18GA	060876	1GHz~18GHz	Sep. 28, 2023	Feb. 08, 2024~ Mar. 06, 2024	Sep. 27, 2024	Radiation (03CH21-HY)
Preamplifier	EMEC	EM18G40G	060871	18GHz~40GHz	Aug. 30, 2023	Feb. 08, 2024~ Mar. 06, 2024	Aug. 29, 2024	Radiation (03CH21-HY)
Spectrum Analyzer	Keysight	N9010B	MY62170358	10Hz~44GHz	Aug. 28, 2023	Feb. 08, 2024~ Mar. 06, 2024	Aug. 27, 2024	Radiation (03CH21-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 07, 2023	Feb. 08, 2024~ Mar. 05, 2024	Mar. 06, 2024	Radiation (03CH21-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 06, 2024	Mar. 06, 2024	Mar. 05, 2025	Radiation (03CH21-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804397/2,8046 12/2,804614/2	30MHz~40GHz	Oct. 24, 2023	Feb. 08, 2024~ Mar. 06, 2024	Oct. 23, 2024	Radiation (03CH21-HY)
Hygrometer	TECPEL	DTM-303A	TP211568	N/A	Oct. 30, 2023	Feb. 08, 2024~ Mar. 06, 2024	Oct. 29, 2024	Radiation (03CH21-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 08, 2024~ Mar. 06, 2024	N/A	Radiation (03CH21-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Feb. 08, 2024~ Mar. 06, 2024	N/A	Radiation (03CH21-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Feb. 08, 2024~ Mar. 06, 2024	N/A	Radiation (03CH21-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Feb. 08, 2024~ Mar. 06, 2024	N/A	Radiation (03CH21-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 20, 2023	Mar. 11, 2024	Sep. 19, 2024	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~4A	Sep. 12, 2023	Mar. 11, 2024	Sep. 11, 2024	Conducted (TH03-HY)
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Aug. 06, 2023	Mar. 11, 2024	Aug. 05, 2024	Conducted (TH03-HY)
Thermal Chamber	ESPEC	SU-241	92003713	-30°C ~95°C	May 17, 2023	Mar. 11, 2024	May 16, 2024	Conducted (TH03-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Mar. 11, 2024	Nov. 06, 2024	Conducted (TH03-HY)

6 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.04 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.33 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.68 dB
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**Appendix A. Test Results of Conducted Test****Conducted Output Power(Average power) & ERP / EIRP**

WCDMA Band V Maximum Average Power [dBm] (GT - LC = 0.9 dB)					
Channel	4132	4182	4233	ERP (dBm)	ERP (W)
Frequency	826.4	836.4	846.6		
RMC 12.2K	23.63	23.67	23.55	22.42	0.1746
HSDPA Subtest-1	22.67	22.76	22.73		
HSDPA Subtest-2	22.63	22.71	22.75		
HSDPA Subtest-3	22.16	22.21	22.20		
HSDPA Subtest-4	22.16	22.22	22.23		
HSUPA Subtest-1	22.61	22.72	22.71		
HSUPA Subtest-2	20.60	20.69	20.68		
HSUPA Subtest-3	21.61	21.73	21.71		
HSUPA Subtest-4	20.62	20.69	20.68		
HSUPA Subtest-5	22.60	22.70	22.70		
Limit	ERP < 7W			Result	Pass

WCDMA Band II Maximum Average Power [dBm] (GT - LC = 2 dB)					
Channel	9262	9400	9538	EIRP (dBm)	EIRP (W)
Frequency	1852.4	1880	1907.6		
RMC 12.2K	23.33	23.46	23.30	25.46	0.3516
HSDPA Subtest-1	22.42	22.55	22.40		
HSDPA Subtest-2	22.46	22.55	22.43		
HSDPA Subtest-3	21.96	22.06	21.89		
HSDPA Subtest-4	21.93	22.04	21.88		
HSUPA Subtest-1	22.39	22.51	22.41		
HSUPA Subtest-2	20.40	20.54	20.44		
HSUPA Subtest-3	21.39	21.54	21.44		
HSUPA Subtest-4	20.47	20.54	20.44		
HSUPA Subtest-5	22.40	22.50	22.40		
Limit	EIRP < 2W			Result	Pass

WCDMA Band IV Maximum Average Power [dBm] (GT - LC = 2 dB)					
Channel	1312	1413	1513	EIRP (dBm)	EIRP (W)
Frequency	1712.4	1732.6	1752.6		
RMC 12.2K	23.34	23.44	23.41	25.44	0.3499
HSDPA Subtest-1	22.48	22.57	22.54		
HSDPA Subtest-2	22.45	22.54	22.55		
HSDPA Subtest-3	21.95	22.08	21.99		
HSDPA Subtest-4	21.93	22.07	21.98		
HSUPA Subtest-1	22.40	22.49	22.80		
HSUPA Subtest-2	20.41	20.47	20.84		
HSUPA Subtest-3	21.48	21.52	21.82		
HSUPA Subtest-4	20.39	20.52	20.84		
HSUPA Subtest-5	22.60	22.90	23.00		
Limit	EIRP < 1W			Result	Pass



Appendix B. Test Results of Radiated Test

B1. Summary of each worse mode

Mode	Part	Band	Ch	Freq (MHz)	Level (dBm)	Det	Ant Factor (dB)	Amp\Cbl (dB)	Filter (dB)	EIRPCF (dB)	Reading (dBuV)	Limit (dBm)	Margin (dB)	Pol	Ant
1	Part 24E	WCDMA B2	L	7410	-54.86	RMS	36.90	-20.19	0.42	-95.23	23.24	-13.00	-41.86	H	Tx0
11	Part 27L	WCDMA B4	H	7010	-55.48	RMS	36.50	-20.44	0.46	-95.23	23.23	-13.00	-42.48	H	Tx0

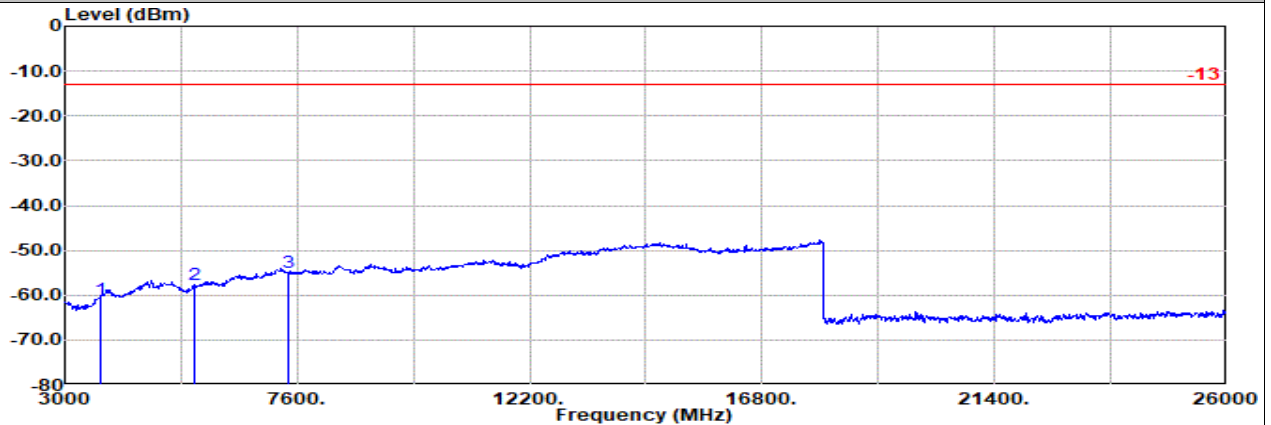


Tx0\RSE

Part 24E Mode 1

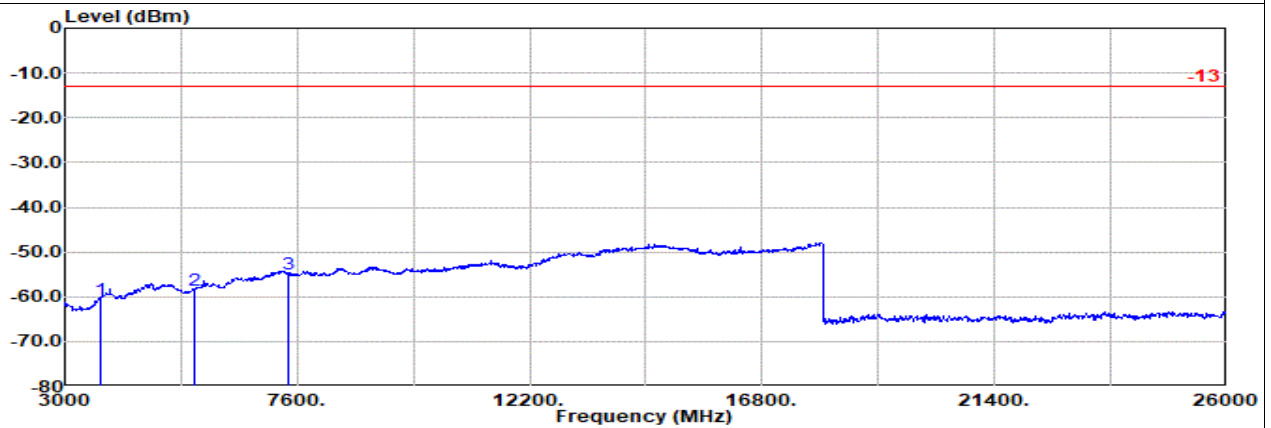
WCDMA B2 Ch9262

L



Site : 03CH21-HY
Condition: -13 1m BBHA9170_1223_230710 Horizontal
: WCDMA 1900 Ch9262

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3705.00	-60.90	RMS	29.84	-21.97	0.85	-95.23	25.61	-13.00	-47.90 Horizontal
2	5557.00	-57.76	RMS	33.00	-20.52	0.73	-95.23	24.26	-13.00	-44.76 Horizontal
3	7410.00	-54.86	RMS	36.90	-20.19	0.42	-95.23	23.24	-13.00	-41.86 Horizontal



Site : 03CH21-HY
Condition: -13 1m BBHA9170_1223_230710 Vertical
: WCDMA 1900 Ch9262

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3705.00	-60.64	RMS	29.84	-21.97	0.85	-95.23	25.87	-13.00	-47.64 Vertical
2	5557.00	-58.48	RMS	33.00	-20.52	0.73	-95.23	23.54	-13.00	-45.48 Vertical
3	7410.00	-54.99	RMS	36.90	-20.19	0.42	-95.23	23.11	-13.00	-41.99 Vertical

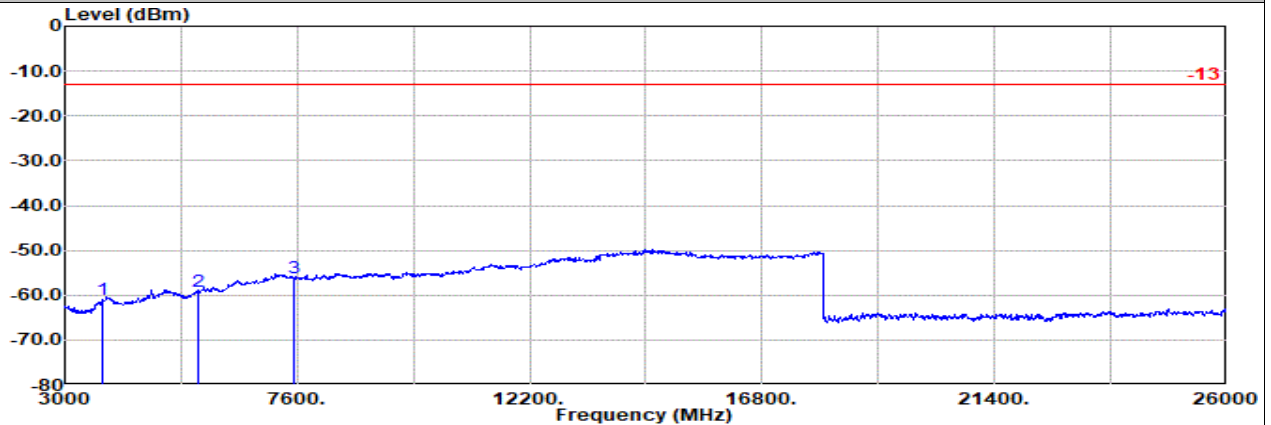


Tx0\|RSE

Part 24E Mode 1

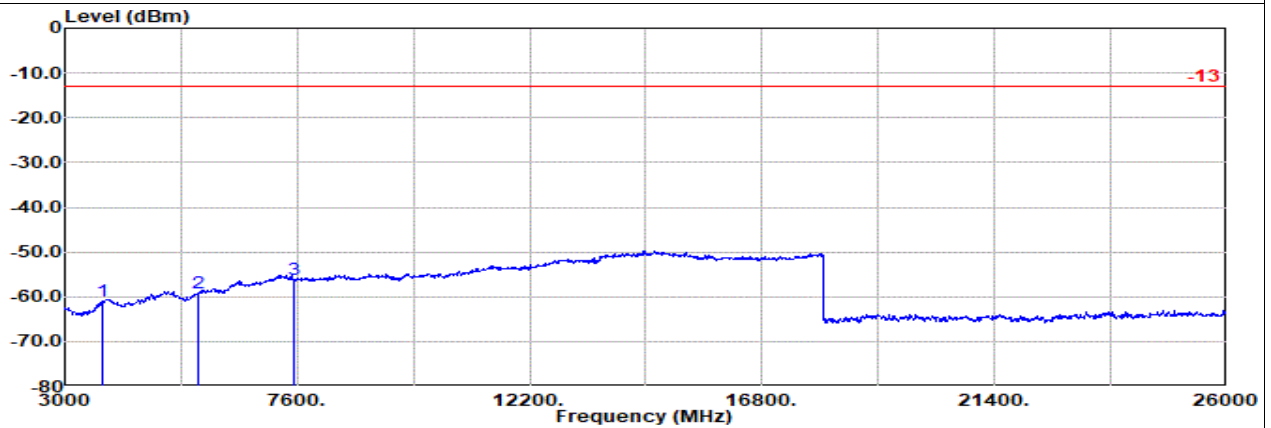
WCDMA B2 Ch9400

M



Site : 03CH21-HY
Condition: -13 1m BBHA9170_1223_230710 Horizontal
: WCDMA 1900 Ch9400

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3760.00	-60.95	RMS	30.24	-23.13	0.84	-95.23	26.33	-13.00	-47.95 Horizontal
2	5640.00	-59.26	RMS	33.24	-21.83	0.73	-95.23	23.83	-13.00	-46.26 Horizontal
3	7520.00	-56.07	RMS	36.76	-21.21	0.38	-95.23	23.23	-13.00	-43.07 Horizontal



Site : 03CH21-HY
Condition: -13 1m BBHA9170_1223_230710 Vertical
: WCDMA 1900 Ch9400

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3760.00	-61.04	RMS	30.24	-23.13	0.84	-95.23	26.24	-13.00	-48.04 Vertical
2	5640.00	-59.16	RMS	33.24	-21.83	0.73	-95.23	23.93	-13.00	-46.16 Vertical
3	7520.00	-56.16	RMS	36.76	-21.21	0.38	-95.23	23.14	-13.00	-43.16 Vertical

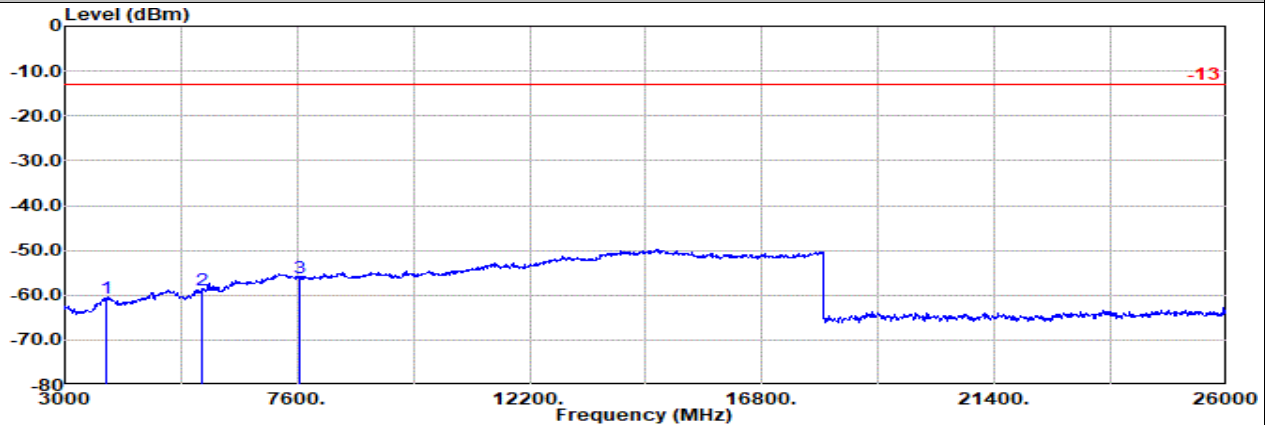


Tx0\|RSE

Part 24E Mode 1

WCDMA B2 Ch9538

H

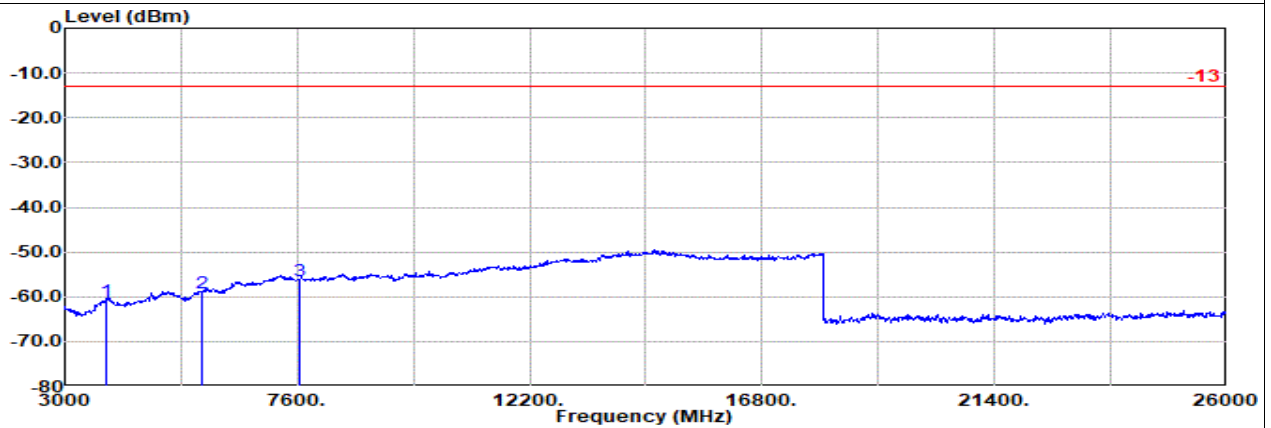


Site : 03CH21-HY

Condition: -13 1m BBHA9170_1223_230710 Horizontal

: WCDMA 1900 Ch9538

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3815.00	-60.74	RMS	30.49	-23.07	0.82	-95.23	26.25	-13.00	-47.74 Horizontal
2	5722.00	-58.91	RMS	33.69	-21.78	0.68	-95.23	23.73	-13.00	-45.91 Horizontal
3	7630.00	-56.03	RMS	36.74	-21.27	0.37	-95.23	23.36	-13.00	-43.03 Horizontal



Site : 03CH21-HY

Condition: -13 1m BBHA9170_1223_230710 Vertical

: WCDMA 1900 Ch9538

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1					
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3815.00	-60.87	RMS	30.49	-23.07	0.82	-95.23	26.12	-13.00	-47.87 Vertical
2	5722.00	-59.17	RMS	33.69	-21.78	0.68	-95.23	23.47	-13.00	-46.17 Vertical
3	7630.00	-56.34	RMS	36.74	-21.27	0.37	-95.23	23.05	-13.00	-43.34 Vertical

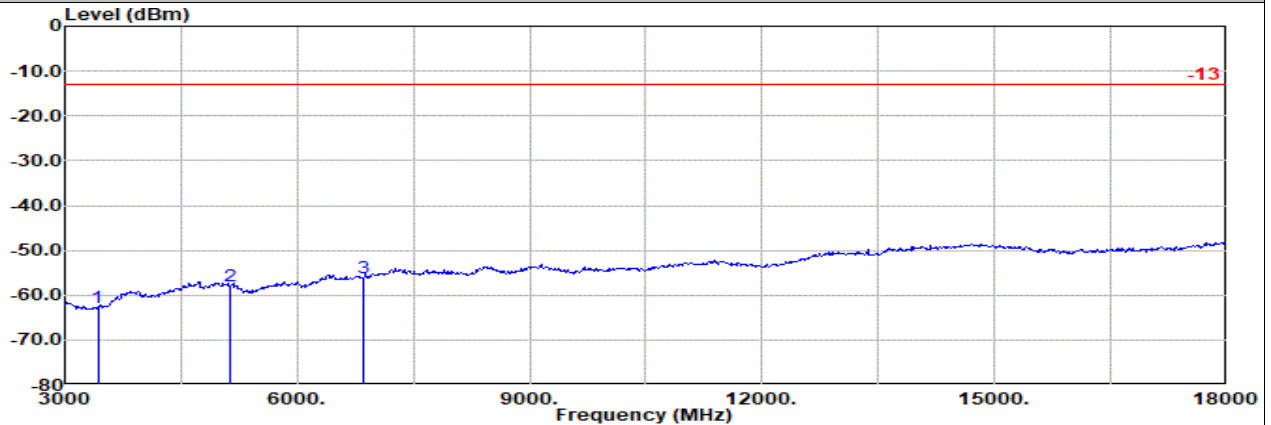


Tx0\|RSE

Part 27L Mode 11

WCDMA B4 Ch1312

L

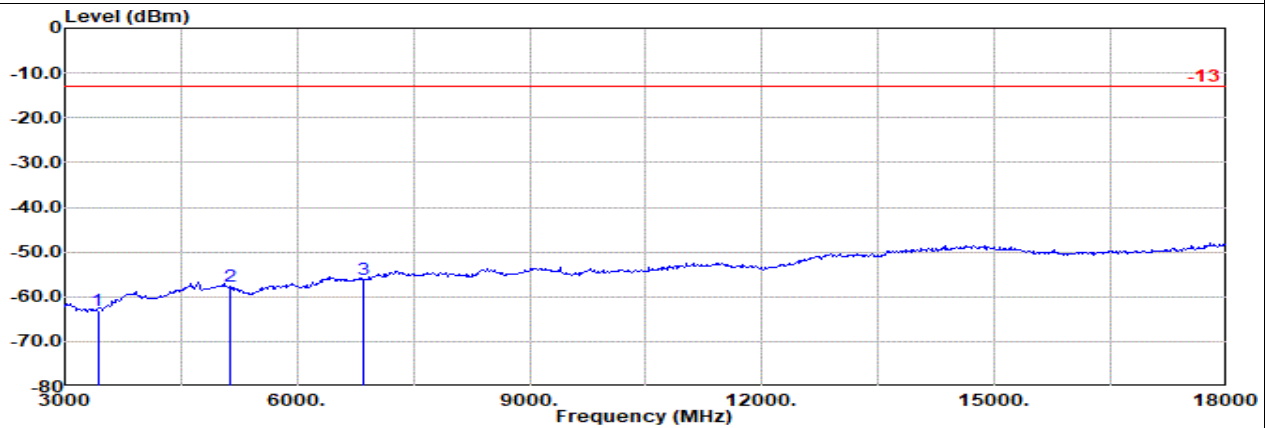


Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Horizontal

: WCDMA 1700 Ch1312

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3425.00	-62.75	RMS	28.60	-22.30	1.08	-95.23	25.10	-13.00	-49.75
2	5137.00	-57.95	RMS	32.60	-20.08	0.40	-95.23	24.36	-13.00	-44.95
3	6850.00	-56.29	RMS	36.20	-20.43	0.44	-95.23	22.73	-13.00	-43.29



Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Vertical

: WCDMA 1700 Ch1312

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3425.00	-62.96	RMS	28.60	-22.30	1.08	-95.23	24.89	-13.00	-49.96
2	5137.00	-57.70	RMS	32.60	-20.08	0.40	-95.23	24.61	-13.00	-44.70
3	6850.00	-56.07	RMS	36.20	-20.43	0.44	-95.23	22.95	-13.00	-43.07

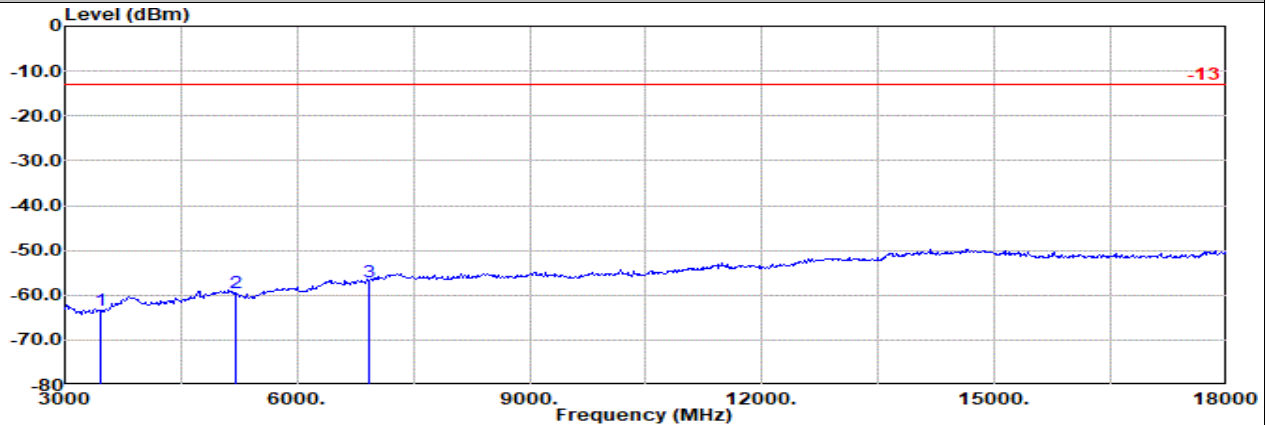


Tx0\|RSE

Part 27L Mode 11

WCDMA B4 Ch1413

M

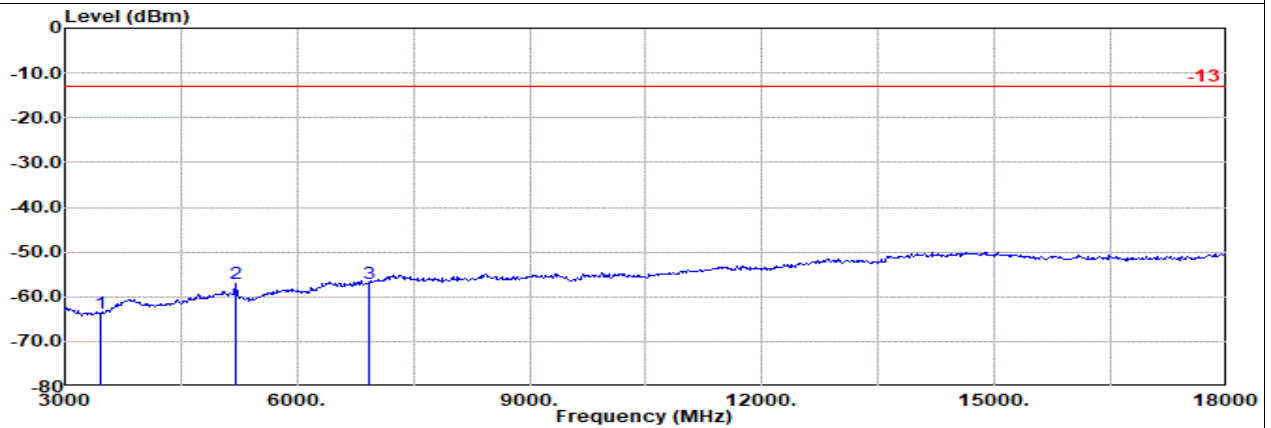


Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Horizontal

: WCDMA 1700 Ch1413

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3465.00	-63.44	RMS	28.76	-23.30	1.03	-95.23	25.30	-13.00	-50.44 Horizontal
2	5198.00	-59.42	RMS	32.60	-21.74	0.39	-95.23	24.56	-13.00	-46.42 Horizontal
3	6930.00	-56.99	RMS	36.36	-21.50	0.45	-95.23	22.93	-13.00	-43.99 Horizontal



Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Vertical

: WCDMA 1700 Ch1413

	Freq	Level	Detector	Ant Amp\Cb Filter		EIRPCF	Readin	Limit	Margin Pol	
				Factor	1		g			
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB
1	3465.00	-63.62	RMS	28.76	-23.30	1.03	-95.23	25.12	-13.00	-50.62 Vertical
2	5198.00	-56.99	RMS	32.60	-21.74	0.39	-95.23	26.99	-13.00	-43.99 Vertical
3	6930.00	-57.01	RMS	36.36	-21.50	0.45	-95.23	22.91	-13.00	-44.01 Vertical

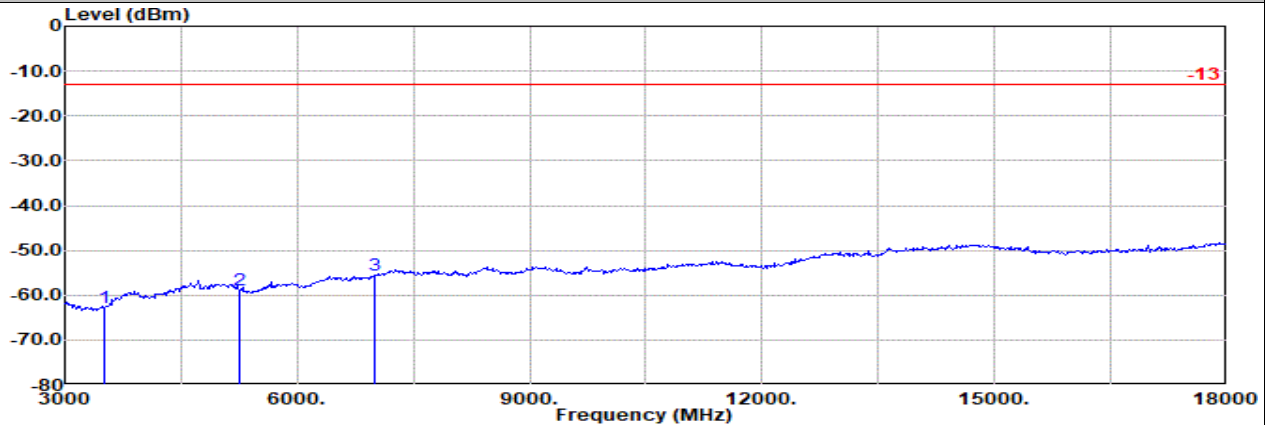


Tx0\|RSE

Part 27L Mode 11

WCDMA B4 Ch1513

H

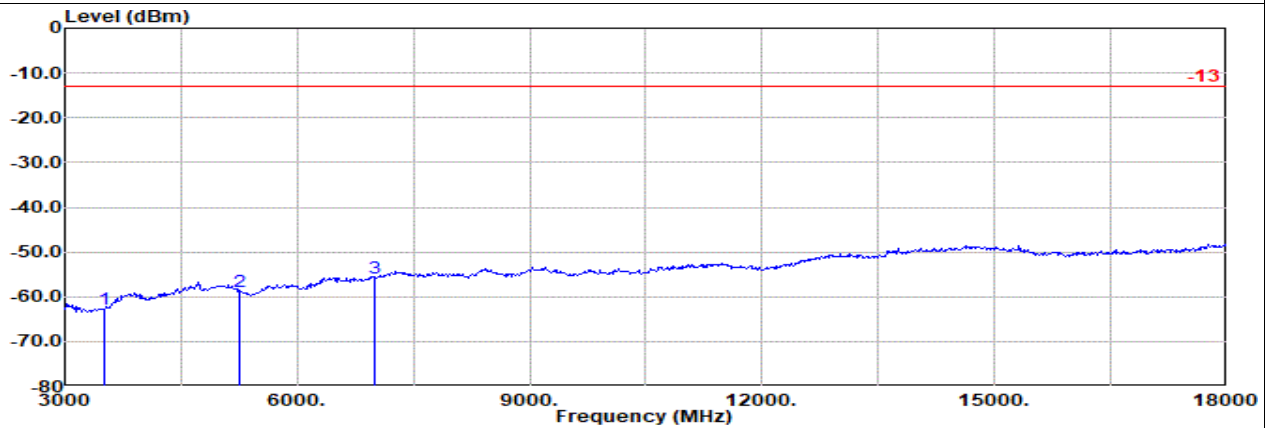


Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Horizontal

: WCDMA 1700 Ch1513

	Freq Level		Detector	Ant Amp\Cb Filter		Factor	Filter		EIRPCF	Readin g	Limit		Margin	Pol
	MHz	dBm		dB/m	dB		dB	dB			dBuV	dBm	dB	
1	3505.00	-62.90	RMS	28.94	-22.26	0.98	-95.23	24.67	-13.00	-49.90	Horizontal			
2	5258.00	-58.88	RMS	32.58	-20.22	0.47	-95.23	23.52	-13.00	-45.88	Horizontal			
3	7010.00	-55.48	RMS	36.50	-20.44	0.46	-95.23	23.23	-13.00	-42.48	Horizontal			



Site : 03CH21-HY

Condition: -13 3m DRH18-E_LE2C03A18EN_230712 Vertical

: WCDMA 1700 Ch1513

	Freq Level		Detector	Ant Amp\Cb Filter		Factor	Filter		EIRPCF	Readin g	Limit		Margin	Pol
	MHz	dBm		dB/m	dB		dB	dB			dBuV	dBm	dB	
1	3505.00	-62.84	RMS	28.94	-22.26	0.98	-95.23	24.73	-13.00	-49.84	Vertical			
2	5258.00	-59.00	RMS	32.58	-20.22	0.47	-95.23	23.40	-13.00	-46.00	Vertical			
3	7010.00	-55.70	RMS	36.50	-20.44	0.46	-95.23	23.01	-13.00	-42.70	Vertical			

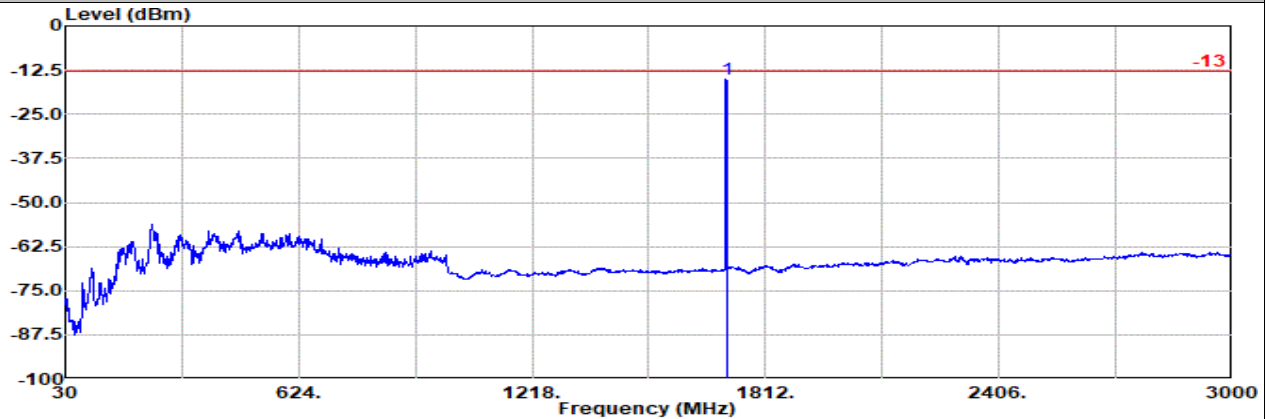


Tx0\Worst\Mode

Part 27L Mode 11

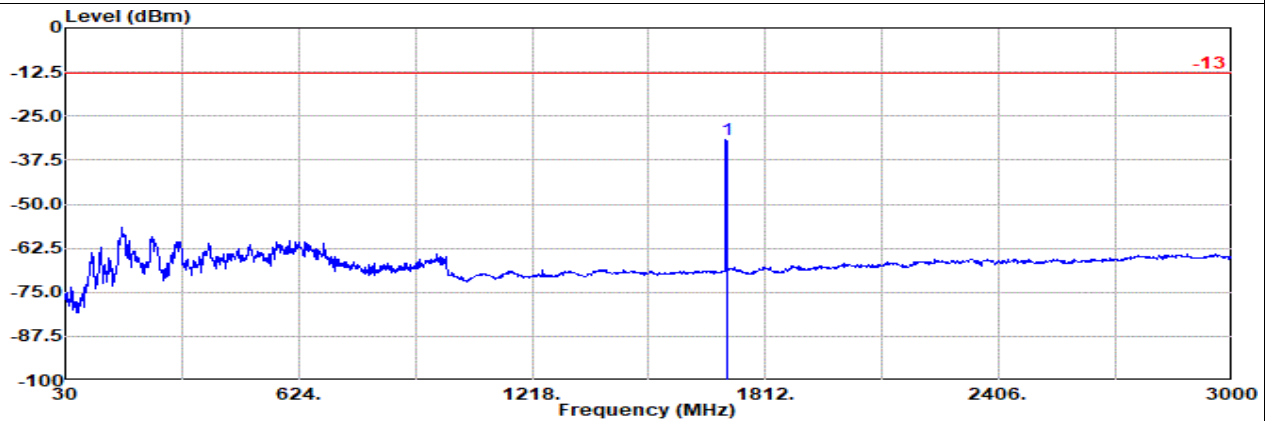
WCDMA B4 Ch1312

L



Site : 03CH21-HY
Condition: -13 3m LF_63303&001_231015 Horizontal
: WCDMA 1700 Ch1312
: #1 is fundamental signal which can be ignored.
: #1 is fundamental signal which can be ignored.

1	Freq	Level	Detector	Ant Factor	Amp\Cb	Filter 1	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm									
1	1712.00	-15.03	RMS	24.88	-25.09	0.35	-95.23	80.06	-13.00	-2.03	Horizontal



Site : 03CH21-HY
Condition: -13 3m LF_63303&001_231015 Vertical
: WCDMA 1700 Ch1312
: #1 is fundamental signal which can be ignored.
: #1 is fundamental signal which can be ignored.

1	Freq	Level	Detector	Ant Factor	Amp\Cb	Filter 1	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm									
1	1712.00	-31.63	RMS	24.88	-25.09	0.35	-95.23	63.46	-13.00	-18.63	Vertical